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Does the Education Level of Refugees Affect Natives' Attitudes?

Abstract

In recent years, Europe has experienced an unprecedented influx of refugees. While natives' attitudes toward refugees are decisive for the political feasibility of asylum policies, little is known about how these attitudes are shaped by refugees' characteristics. We conducted survey experiments with more than 5,000 university students in Germany in which we exogenously shifted participants' beliefs about refugees' education level through information provision. Consistent with economic theory, beliefs about refugees' education significantly affect concerns about labor market competition. These concerns, however, do not translate into general attitudes because economic aspects are rather unimportant for forming attitudes toward refugees.

JEL-Codes: F220, J240, D830, C910.

Keywords: refugees, information provision, education, survey experiment, labor market.

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1. Introduction

In 2014 and 2015, Europe experienced an unprecedented influx of refugees.[1] In 2015 alone, more than 1.5 million individuals applied for asylum in Europe, with Germany registering the highest number of some 440,000 applications (Eurostat 2016).[2] These refugee movements were exceptional not only in terms of magnitude, but also in terms of refugees' origin countries: As Syria, Afghanistan, and Iraq constitute the main source countries, these refugees are perceived as culturally more distinct than those seeking asylum during previous refugee waves, such as refugees from the Balkan countries in the 1990s (see Dustmann et al. 2017). Against this background, European politicians face a challenge when implementing and enforcing asylum policies. On the one hand, these policies have to comply with international commitments, such as the 1951 Geneva Convention for Refugees or the Dublin Convention.[3] On the other hand, it is crucial that refugee policies are supported by domestic voters in order to successfully implement these policies and to preserve solidarity with refugees. The fact that public support for anti-immigration parties increased markedly in several European countries during the refugee crisis suggests that voters' skepticism toward refugees and national asylum policies have not been fully appreciated by policy makers.[4] Despite the importance of public attitudes toward refugees, little is known about the determinants of these attitudes and whether they depend on the characteristics of refugees.

In this paper, we study whether attitudes toward refugees are affected by beliefs about refugees' education level. To do so, we implemented online survey experiments with more than 5,000 students at universities in Germany. To estimate a causal effect of education beliefs on attitudes, we exogenously shifted respondents' beliefs by randomly providing information on refugees' education level. The focus on refugees' education level, one specific characteristic of refugees, allows us to test two economic theories on how immigrants' skill level shapes natives' attitudes toward them (see Hainmueller and Hiscox 2010) in the context of the European refugee crisis: The *labor market competition model* predicts that natives will be most opposed to immigrants whose skills are similar to their own since these immigrants might be competitors on the labor market (see also Haaland and Roth 2017). This model

[1] Throughout the paper, we use the term "refugee" as a collective term for all persons who seek refuge in another country, independent of their legal status. We thereby follow the public discourse in Germany, in which the migration inflow from 2014 onward has generally been referred to as "Flüchtlingskrise" (refugee crisis) by politicians, the media, and the general public.

[2] The Federal Ministry of Internal Affairs registered a total of more than 1.1 million refugees entering Germany in 2015 (Bundesministerium des Inneren 2016).

[3] The *Geneva Convention* broadly defines the rights of refugees and the obligations of hosting countries. The *Dublin Convention*, which came into force in 1997/98, established the principle that the EU member state through which an asylum seeker first enters the EU is responsible for processing the asylum claim (see Dustmann et al. 2017).

[4] Electoral outcomes that have largely been attributed to voters' rising anti-immigration sentiments include the "Brexit" referendum in the United Kingdom (Bansak, Hainmueller, and Hangartner 2016) and the success of the right-wing populist party "Alternative für Deutschland" (AfD) in Germany. The AfD won significant vote shares in several state elections, including the 2016 state election in Mecklenburg-West Pomerania in which it outperformed Chancellor Merkel's "Christlich Demokratische Union" (CDU) in Merkel's home state (21% versus 19%). In the German federal election in September 2017, the AfD received 13% of the votes, which made it the third-largest party in the German Bundestag.

therefore predicts that university students, the participants in our surveys, are more opposed to refugees if they believe refugees to be *well*-educated. The *fiscal burden model*, on the other hand, predicts that natives in general are more opposed to low-skilled immigrants because they impose larger fiscal burdens on the public than high-skilled immigrants. In contrast to the labor market competition model, the fiscal burden model thus predicts that university students are more opposed to refugees if they believe refugees to be *low*-educated.[5] Besides testing these two economic theories, our focus on refugees' education level (instead of other refugee characteristics) has also been shaped by the political debates at the time we conducted our survey, which was after the large refugee influx from 2015 slacked off. At that time, the public debate had started to focus on how to integrate the large number of refugees; obviously, the education level of refugees was central in this debate.

In the context of this study, university students are an interesting and highly relevant focus group for at least two reasons. First, in contrast to low-skilled natives, the two economic theories make *opposing* predictions for the effect of education beliefs on the attitudes of university students, which allows us to test the relevance of these two models. Second, university students constitute an important part of the electorate because their voter turnout is traditionally higher than that of other voter groups (e.g., Schäfer, Vehrkamp, and Gagné 2013). To put our findings into perspective, we provide complementary evidence from the *ifo Education Survey* 2016, an opinion survey representative of the German adult population, on differences in beliefs about refugees' education level between university students and other groups of the population (see Section 5).

For implementing the information treatment, we exploit the fact that, at the time of our survey, the information on refugees' education level[6] discussed in German media seemed to contradict itself. Due to the uncertainty regarding refugees' education level, we were able to provide opposing, equally credible, information on the education level of refugees in Germany. In particular, in our main survey, we randomly assigned survey participants to one of three experimental groups: The control group did not receive any information on the education level of refugees. Respondents in the *High Skilled* treatment were informed about a study that finds that refugees are rather well-educated (UNHCR 2015).[7] In the *Low Skilled* treatment, we induced the opposite beliefs by informing participants about a different

[5] While refugees typically do not migrate for economic reasons, they often stay in the host countries for longer periods, making labor market integration an important challenge. Since labor market integration is considered an important step for the general integration into the host country, refugees in Germany are entitled to work once their asylum has been granted. Since many individuals applied for asylum in Germany, this implies a considerable number of refugees entering the labor market. In June 2017, for example, 10% of all unemployed persons seeking work in Germany were refugees (Degler, Liebig, and Senner 2017).

[6] We use the singular form *education level* to imply the average education level of refugees in Germany. Of course, the education level may vary considerably across individuals.

[7] During 2015, information that refugees are rather well-educated was widespread in German media. For example, newspaper articles discussed the contended high level of education of refugees: https://www.stern.de/politik/deutschland/so-alt-und-gebildet-sind-asylbewerber-in-deutschland-6473632.htmlb [accessed December 1, 2017]; https://www.welt.de/politik/ausland/article149755032/Syrische-Fluechtlinge-ueberdurchschnittlich-gebildet.html [accessed December 1, 2017]. Relatedly, media reports suggested that many refugees were academics, such as doctors or engineers (e.g., https://www.taz.de/!5021964/ [accessed December 1, 2017]). See Section 2 for a detailed discussion on refugees' education level and media reports thereof.

study that finds that refugees are rather low-educated (see Woessmann 2016). To assess the robustness of our main results, we conducted a follow-up survey experiment in 2017, using a new sample of more than 500 university students and a different information treatment, which relied on newly available evidence on the education level of refugees.

We find that the information treatments strongly shift respondents' beliefs about refugees' education level in the expected directions. The follow-up survey, which uses an alternative information treatment, yields very similar effects and shows that the shift in beliefs persists until one week later. Using the exogenous shift in respondents' beliefs about refugees' education as the first stage in an instrumental-variable approach, we find that beliefs about refugees' education level affect natives' concerns about labor market competition. This finding is in line with the predictions of the labor market competition model. In contrast, we find no effects on fiscal burden concerns or other concerns such as increasing crime levels.[8]

Despite a strong correlation between beliefs about refugees' education level and attitudes, we do not find any evidence that education beliefs *affect* attitudes toward refugees in a causal way. These precisely estimated zero effects suggest that economic aspects, such as labor market competition concerns, are rather unimportant for shaping attitudes toward refugees in our sample. To empirically explore the (missing) link between labor market competition concerns and attitudes, we investigate the importance respondents attribute to various aspects when forming their attitudes toward refugees. Two clear patterns emerge: First, providing information about refugees' education level only increases the importance of economic aspects, but not the importance of other aspects, such as humanitarian aspects. Second, when respondents form their attitudes toward refugees, economic aspects are relatively unimportant. This result is consistent with the existing literature on attitude formation toward immigrants, which suggests that non-economic aspects are more important than economic aspects (e.g., Card, Dustmann, and Preston 2012; Dustmann and Preston 2007; Hainmueller and Hiscox 2010).

Several robustness checks indicate that our results are not driven by different types of biases in respondents' answering behavior. In particular, in the follow-up survey, we used the item count technique (ICT) to assess whether survey answers are biased by respondents' desire to provide socially desirable answers (see e.g., Coffman, Coffman, and Ericson 2017). We find little evidence of social desirability bias. Furthermore, the persistence of treatment effects on beliefs about refugees' education level, as well as the pattern of heterogeneous treatment effects by respondents' *baseline* beliefs, suggest that our information treatment effects are not driven by experimenter demand effects or priming effects.

Our paper contributes to several strands of economic research. It is related to the literature on attitudes toward immigration (e.g., Card, Dustmann, and Preston 2012; Dustmann and Preston 2007; Facchini and Mayda 2008; O'Rourke and Sinnott 2006), in particular to those studies that use survey experiments. For example, Grigorieff, Roth and Ubfal (2016) show that randomly provided information about immigration, such as the share of immigrants in the population and immigrants' unemployment

[8] We also present reduced-form estimates, which corroborate our instrumental-variable results.

or incarceration rates, yields more favorable attitudes toward immigrants, but does not affect policy preferences. Similarly, Alesina, Stantcheva, and Teso (2018) study how information about the true share, the origin, and the work ethic of immigrants affects natives' preferences for redistribution. They find a negative effect of priming people to think about immigrants on demand for redistribution, which dominates the effects of their information treatments. Hainmueller and Hiscox (2010) study experimentally how concerns about labor market competition and about the fiscal burden on public services shape attitudes toward high- and low-skilled migration. They find no support for the labor market competition model or the fiscal burden model in their data. Haaland and Roth (2017) investigate whether beliefs about labor market impacts of immigration affect the support for immigration. They find that respondents report more support for immigration when being provided (research-based) evidence that immigration has no adverse effects on natives' wages. To our knowledge, ours is the first paper that studies the relevance of the labor market competition model and the fiscal burden model in the context of the European refugee crisis.

While the literature on natives' attitudes towards immigration is well developed, evidence on what determines attitudes toward refugees is scarce.[9] The study most closely related to ours is the survey experiment by Bansak, Hainmueller, and Hangartner (2016). The authors asked 18,000 eligible voters in 15 European countries to evaluate different profiles of refugees that varied experimentally across nine broad domains. They find that refugees are more likely to be accepted if they worked in higher-skilled occupations in their home country, have more consistent asylum testimonies and higher vulnerability, and are Christians (rather than Muslims). In a related survey experiment, Bansak, Hainmueller, and Hangartner (2017) show that European citizens support a proportional allocation of asylum seekers across countries.[10] To our knowledge, we are the first to provide an in-depth analysis of the causal effect of refugees' education level on natives' attitudes. More generally, our paper contributes to the growing literature that studies the causal effects of information provision on survey respondents' attitudes and preferences in various domains.[11]

The rest of the paper is structured as follows. In Section 2, we describe the labor market competition model and the fiscal burden model. We discuss the challenges of measuring refugees' education level and present the studies that we used for our information treatments. In Section 3, we describe our opinion surveys and the experimental design. In Section 4, we present the results, including evidence that respondents' answers are not driven by different types of biases such as social desirability bias. Section 5 discusses our findings and concludes.

[9] Also note that most surveys cited above were conducted before the massive refugee influx in 2014/2015.

[10] Further recent studies on natives' attitudes in the context of the European refugee crisis include Steinmayr (2016), who investigates how the exposure to refugees affects voting behavior in Austria, and Jeworrek, Leisen and Mertins (2017), who study whether telling survey respondents about the possibility that refugees support the local population with volunteering activities affects natives' support for integrating refugees.

[11] See, for instance, Alesina, Stantcheva, and Teso 2018, Bursztyn 2016, Cruces, Perez-Truglia, and Tetaz 2013, Karadja, Mollerstrom, and Seim 2017, Kuziemko et al. 2015, Lergetporer et al. 2018, Michalopoulos and Papaioannou 2013, Wiswall and Zafar 2015.

2. Theoretical framework and evidence on refugees' education level

While refugees typically do not intend to stay permanently, their integration in the host country is nevertheless an important issue since many refugees have only few prospects of returning to their country in the near future (Woessmann 2016). The success of refugees' integration critically depends on their successful integration into the labor market (Degler, Liebig, and Senner 2017), which is also economically desirable since working refugees typically do not depend on government aid. For these reasons, refugees in Germany are allowed to work once asylum has been granted.[12] In general, policy makers may be more likely to implement successful integration policies when they possess accurate information on the skill level of refugees and when natives have positive attitudes toward refugees.

Economic theories on natives' attitudes toward immigrants

The increasing success of anti-immigration parties in Europe, including the AfD in Germany, during recent years suggests widespread hostile attitudes toward immigration and/or refugees. Thus, natives' attitudes toward immigration might be a key obstacle to the implementation of integration policies as well as for accepting new immigrants and refugees. Economic models on attitudes toward immigration emphasize the importance of migrants' education level and natives' beliefs thereof. Hainmueller and Hiscox (2010) discuss two competing theories on how the skill level of immigrants affects natives' attitudes toward them. According to the *labor market competition model*, natives are most opposed to immigrants with a skill level similar to their own because they expect these immigrants to compete for the same types of jobs (e.g., Mayda 2006; Scheve and Slaughter 2001). Since our sample of university students will fall in the upper tail of the skill distribution of workers,[13] the labor market competition model predicts that our survey participants have more negative attitudes toward refugees when they believe that refugees are highly educated (and thus potential competitors on the labor market). In contrast, the *fiscal burden model* predicts that respondents are more opposed to low-skilled immigration because low-skilled immigrants (by assumption) impose net burdens on public finance whereas high-skilled immigrants are net contributors.[14]

This study tests these two competing theories in the context of the European refugee crisis. In

[12] Furthermore, it has been argued that refugees would alleviate the shortage of skilled workers. For example, in September 2015, Dieter Zetsche (Chairman of Daimler), comparing refugees to guest workers who came to Germany in the 1950s and 1960s, claimed that refugees could help to create a new "German economic miracle" (Die Zeit, August 18, 2016, http://www.zeit.de/2016/35/fluechtling-arbeitsmarkt-buerokratie-unternehmen-versprechen [accessed December 1, 2017]).

[13] Only 21% of the German population holds a university degree (Brücker, Rother, and Schupp 2016). Note that the share of university-educated adults is lower in Germany compared to other OECD countries because of the extensive dual vocational education system in Germany.

[14] In particular, the model predicts that richer (poorer) natives are more opposed to low-skilled immigration if the government balances its budget by changing tax rates (by changing per capita transfers) in response to increased spending on immigrants. Therefore, we measured respondents' concerns about (i) the need for tax increases and about (ii) lower levels of government benefits because of government spending on refugees (see Section 3.1). While we refrain from making assumptions about how the German government might finance spending increases on refugees, note that university graduates in Germany will on average have relatively high future earnings (OECD 2016). This implies that they should be more concerned about tax increases than about cuts in government transfers if they believe that refugees' education level is low.

particular, we test whether shifting respondents' beliefs about refugees' education level upward (i.e., toward a higher education level) (i) increases concerns about competition on the labor market (*hypothesis 1*); (ii) decreases concerns that refugees impose fiscal burdens on public services (*hypothesis 2*); and (iii) affects general attitudes toward refugees (*hypothesis 3*). Of course, beliefs about refugees' education may affect general attitudes not only because of labor market competition concerns and fiscal concerns (e.g., Bauer, Lofstrom, and Zimmermann 2000; Dustmann and Preston 2007). Therefore, we also assess the relevance of alternative concerns such as increasing crime levels.

The education level of refugees in Germany

The successful integration of refugees into the labor market of the host country may substantially depend on their skills.[15] A major challenge in this context is the large degree of uncertainty regarding refugees' formal education, which provides information on their professional skills. The large inflow of refugees during the years 2014 and 2015 posed an enormous administrative challenge to register arriving refugees and an even larger challenge to document their educational degrees. Particular problems arise due to missing verifiable credentials, such as graduation certificates, and because educational degrees from the refugees' home countries are often hardly comparable with German educational degrees (see Brücker, Rother, and Schupp 2016, Woessmann 2016).

As a consequence of these difficulties, studies that aim at quantifying the education or skill level of refugees have produced seemingly contradictory findings. One of the first assessments of refugees' education level is the UNHCR study on Syrian refugees (UNHCR 2015). The study draws a positive picture of refugees' education level since it finds that 43% of adult Syrian refugees report to have some university education and an additional 43% report to have completed secondary education (UNHCR 2015).[16] These data were collected by UNHCR border protection teams who conducted interviews among a non-random sample of Syrian asylum seekers in various locations in Greece.[17] Since the majority of interviewees (50%) intended to request asylum in Germany, the findings of this study have been interpreted as a proxy for the education level of asylum seekers in Germany (von Redetzky and Stoewe 2016).[18]

In contrast to the UNHCR study, Woessmann (2016) draws a more negative picture of refugees' education level. Comparing multiple data sources (e.g., the German Microcensus and the IAB-SOEP Migration Sample), the author finds that only about 10% of asylum seekers in Germany have a university

[15] Note that, from a legal perspective, granting prosecuted individuals temporary refugee status is a humanitarian act that is independent of economic considerations and independent of the asylum seeker's education level (Dustmann et al. 2017).

[16] The UNHCR interprets its findings on the education level of Syrian refugees as follows: "Overall, the profile is of a highly-skilled population on the move." (UNHCR, 8 December 2015, http://www.unhcr.org/news/latest/2015/12/5666ddda6/unhcr-says-syrians-arriving-greece-students.html [accessed 1 December, 2017]).

[17] These Syrian asylum seekers arrived in Greece between April and September 2015. The authors of the study note that the interviews were voluntary and interviewees were not required to verify their statements with credentials.

[18] See Buber-Ennser et al. (2016) for a similar interview study with asylum seekers in Austria.

degree and two-thirds do not have any type of professional qualification. Moreover, using data from the Trends in International Mathematics and Science Study (TIMSS) in 2011 (before the Syrian civil war started), Woessmann (2016) finds that 65% of Syrian 8th-grade students fail to achieve the most basic proficiency level in mathematics and in science. Compared to German 8th-grade students, the achievement gap amounts to 4-5 years of schooling.[19]

We used these two studies for the two information treatments in our main survey to exogenously shift respondents' beliefs about refugees' education level. The fact that the two studies reach contradicting conclusions allows us to implement symmetric information treatments: One treatment tends to shift beliefs about refugees' education level upward, whereas the other treatment tends to shift beliefs downward.

These two studies, UNHCR (2015) and Woessmann (2016), received considerable media attention and were, to our knowledge, the most convincing academic assessments of refugees' education level at the time of our main survey. More recent evidence on refugees' education level from the *IAB-BAMF-SOEP Survey of Refugees in Germany* was released only in late 2016, after our main survey had been conducted. This study finds that 32% of asylum seekers in Germany aged 18 years and older have a high school degree and 13% hold a university degree (see Brücker, Rother, and Schupp 2016). We used this alternative, more recent, finding on refugees' education level in the follow-up survey (conducted in June/July 2017) to assess the robustness of our main findings.

3. Survey design, information treatment, and empirical model

3.1 Main survey experiment

General framework

To implement the main survey experiment, we ran an online survey with 4,901 students from four large German universities (Technical University of Dresden, University of Munich, University of Konstanz, and Technical University of Chemnitz). We obtained access to the universities' mailing lists and invited students to participate in a "short opinion survey on refugees" via email. The email informed students that the survey would take about 5 minutes, participants would have the chance to win Amazon gift vouchers after survey completion, and that the survey would be anonymous.[20] The survey was conducted using the software Qualtrics (Qualtrics, Provo, UT), and the field time was from June to August 2016.

[19] The TIMSS results should be viewed as an *approximation* of the skill level of refugees in Germany. First, while Syria is the most relevant source country of refugees in Germany, refugees also come from other countries. Second, regarding the skill level, it is unclear to what extent Syrian refugees in Germany are a selected group of Syrians.

[20] We were able to guarantee anonymity and simultaneously offer the chance to win Amazon gift vouchers (which were delivered via email) because survey answers were saved in a different file than email addresses. This was known to all respondents before the start of the survey. Furthermore, the survey software prevented respondents from participating in the survey with the same computer more than once.

As is typical for experiments in economics, our study relies on a self-selected sample of university students. Appendix Table A1 compares basic characteristics of students in our sample (share of females, share of non-Germans, and faculty) with official administrative student statistics from the two larger universities. While we do not claim to have a sample that is representative of students in Germany, Appendix Table A1 shows that our sample closely resembles the student populations at the respective university in terms of gender and faculty composition. Non-German students are underrepresented in our sample because the survey was conducted in German.

Survey questions

We designed the survey questions to measure respondents' (i) beliefs about refugees' education level, (ii) labor market competition concerns, (iii) fiscal burden concerns, (iv) other concerns related to refugees (such as increasing crime), (v) general attitudes toward refugees, and (vi) aspects that shape respondents' attitude toward refugees, such as economic considerations. Appendix Table A18 contains the wording and answer categories of all questions in the main survey (translated into English).[21]

Beliefs about refugees' education level. To assess whether the information treatments (described below) indeed shift beliefs about refugees' education level in the intended directions, we asked respondents to indicate their belief about refugees' education level *after* randomly providing the information on refugees' education level. The effects of the information treatments on the education beliefs constitute the first stage of our instrumental-variables (IV) estimation strategy (see Section 3.3).

Labor market competition, fiscal burden, and other concerns. To assess the relevance of the labor market competition model, we elicited concerns that refugees increase labor market competition for both the respondent personally and in general. To assess the relevance of the fiscal burden model, we measured concerns about (i) fiscal revenues and costs, (ii) lower levels of government benefits due to spending on refugees, and (iii) the need for tax increases. To capture other potential channels through which natives' beliefs about refugees' education level might affect attitudes, we elicited additional economic and non-economic concerns (e.g., increased crime) and statements about refugees.

General attitudes toward refugees. Ultimately, we are interested in how natives' beliefs about the education level of refugees translate into general attitudes toward them. To measure general attitudes, we asked respondents whether (i) Germany should admit more or less refugees in the future; whether (ii) the number of refugees that Germany admitted last year was too high or too low; and whether (iii) refugees should be allowed to stay in Germany permanently.

Aspects shaping respondents' attitudes. Finally, we asked respondents about the importance of six different aspects for forming their attitudes toward refugees: humanitarian aspects, economic aspects, refugees' willingness to integrate, religion/culture of refugees, refugees' criminal behavior, and personal

[21] Like many other recent economics papers using survey experiments, our outcomes of interest are self-reported attitudes and policy preferences (e.g., Alesina, Stantcheva, and Teso 2018, Karadja, Mollerstrom, and Seim 2017, Kuziemko et al. 2015). Importantly, recent survey experiments corroborate the relevance of self-reported attitudes toward migration by showing that they correspond closely to actual political behavior, such as the probability of signing an online petition or donating to charity (e.g., Grigorieff, Roth and Ubfal 2016, Haaland and Roth 2017, Alesina, Miano, and Stantcheva 2018).

experience with refugees. We included this question for two purposes: First, it allows us to investigate which aspects of attitude formation become more, or less, important when respondents' beliefs about refugees' education level are changed. Second, comparing the relative importance of the various aspects helps understanding the channels through which education beliefs affect general attitudes.

At the end of the survey, we elicited a set of demographic characteristics, including respondents' migration and family background, as well as refugee-related information, such as personal experience with refugees, and labor-market-related information, such as expected future earnings.

To avoid the risk that general attitudes toward refugees are contaminated by priming respondents beforehand with refugee-related statements, we first elicited respondents' general attitudes, then their beliefs about refugees' education level, followed by specific concerns (labor market competition, fiscal burden, and others) and aspects shaping respondents' attitudes. Note that respondents were not able to return to earlier questions to revise earlier answers. On each screen, except for the final questions on demographic characteristics, we randomized the order of questions to avoid question order effects.

Summary indices. We combine answers to individual questions to create four summary indices: a summary index for general attitudes, for labor market competition, for fiscal burden, and for other concerns/statements, respectively. Each of these four indices is created in three steps: First, we demean the outcomes of all individual questions (concerns are coded from 1="completely disagree" to 5="completely agree"; general attitudes are coded from 1=very negative attitude to 5=very positive attitude). Second, we standardize the demeaned outcomes of all individual questions by dividing by its standard deviation. Third, we compute the mean across the standardized items that enter a specific summary index. The advantage of using summary indices is their robustness to overtesting because only few indices are used. Another advantage is that measurement error is reduced if measurement error is not perfectly correlated across individual items (see also Anderson 2008).

Information treatments

To identify a causal effect of beliefs about refugees' education level on attitudes toward them, we randomly assigned respondents to one of three groups (control group, treatment *High Skilled*, and treatment *Low Skilled*) that differed by the type of information on refugees' education level they were provided at the beginning of the survey.

Control group. Participants in the control group were shown the following text: "*With this survey, we would like to learn about your opinion on refugees. Please think of the current refugee situation in Germany when answering the survey.*" Note that this text does not contain any information about refugees' education level.

Treatment *High Skilled*. Participants in this group were given the following information: "*With this survey, we would like to learn about your opinion on refugees. Please think of the current refugee situation in Germany when answering the survey. In this context, a study has found that the education level of refugees is rather high since 43% of the refugees from Syria have attended a university."* The information on refugees' education level in this treatment is based on the UNHCR (2015) study (see

Section 2).

Treatment *Low Skilled*. Participants in this group were given the following information: "*With this survey, we would like to learn about your opinion on refugees. Please think of the current refugee situation in Germany when answering the survey. In this context, a study has found that the education level of refugees is rather low because 65% of the school students in Syria do not reach the basic level of academic competencies."* The information on refugees' education level in this treatment is based on Woessmann (2016) (see Section 2).

Note that we did not deceive our participants since the information provided reflects the interpretation of the authors of the two studies (and is not our interpretation of their results).[22]

3.2 Follow-up survey experiment

The information on refugees' education level provided in the main survey has two potential drawbacks: First, due to the lack of available data for other source countries, the information only refers to refugees from Syria, the major source country of refugees in Germany. Second, the information provided not only includes the study results (i.e., 43% university attendance rate versus 65% of 8th-grade students lacking basic academic competencies), but also reflects the interpretations of the respective authors (i.e., refugees are rather highly educated versus low-educated). While the interpretations of authors are typically provided when study results are disseminated by the media, explicitly incorporating authors' interpretations in our information treatments may trigger experimenter demand effects. To address this issue and to assess the robustness of the findings from the main survey experiment, we conducted a follow-up experiment on a new sample of university students one year after the main survey.

The follow-up survey experiment, conducted in June and July 2017, had a similar general setup as the main survey experiment. The 582 respondents[23] were randomized into two experimental groups (control group and treatment *Information*). The follow-up survey, which repeated a subset of six questions from the main survey,[24] was designed to address three issues:

First, it investigates the robustness of our main findings to using an alternative information treatment. The information on refugees' education level was based on a recently published study, the *IAB-BAMF-SOEP Survey of Refugees in Germany* (see Section 2 for details). The text in the information

[22] Note that providing information on results from specific academic studies is not unusual for information experiments. See, for instance, Haaland and Roth (2017), who inform their survey respondents about Card's (1990) results on the Mariel Boatlift, explicitly choosing a study with a non-negative finding on the impact of immigration on natives.

[23] The follow-up survey was conducted with students from the University of Munich, the University of Konstanz, the Technical University of Chemnitz, and the Catholic University of Eichstätt-Ingolstadt. To identify respondents who had already participated in the main survey one year earlier, we included a screening question. We excluded 12 respondents who reported having already participated in our main survey. Including them in the sample does not change the results.

[24] The following questions were asked again: beliefs about refugees' education level; labor market competition concerns (both questions: "for me personally" and "in general"); concern about fiscal revenues and costs; and two aspects governing opinion formation process (humanitarian aspects and economic aspects).

treatment reads as follows: "*With this survey, we would like to learn about your opinion on refugees. Please think of the current refugee situation in Germany when answering the survey. In this context, a study has found that 32% of adult refugees have a high school degree; the respective share among the German population is 29%. 13% of refugees hold a university degree; the respective share among the German population is 21%"* (see Brücker, Rother, and Schupp 2016).[25] We supplemented this text information with a graphical depiction (see Appendix Figure A1). Note that the direction in which this information treatment shifts respondents' beliefs about refugees' education level (if any) is unclear a priori, since it depends on respondents' initial beliefs about the statistics provided (i.e., high school and university completion rates of refugees versus those of Germans). In Section 4.2, we show that this information treatment shifted beliefs about refugees' education level upward.

Second, the follow-up survey investigates the persistence of the shift in respondents' beliefs about refugees' education level that is triggered by the information treatment. To this end, we invited all respondents of the follow-up survey to participate in a re-survey about one week later, which again elicited respondents' beliefs about refugees' education level. We also asked respondents to estimate the share of refugees with a high school degree and university degree, respectively, i.e., the information provided in the *Information* treatment one week before. Out of the 582 respondents to the first survey, 292 (50%) participated in the re-survey.[26]

Third, since some questions on attitudes toward refugees might be sensitive questions, we used the item count technique (ICT) to assess the extent of social desirability bias in the questions on labor market competition and fiscal burden concerns as well as aspects of attitude formation (see also Coffman, Coffman, and Ericson 2017). The ICT provides a "veil" of anonymity for sensitive questions that reduces the risk of biases through socially desirable answers. Appendix B provides a detailed description of the item count technique.

3.3 Empirical model

To estimate the impact of respondents' beliefs about refugees' education level on their attitudes toward refugees, we use an instrumental-variables (IV) strategy. In the first stage, we instrument the belief of respondent *i* about refugees' education level with the randomly assigned information treatment indicators:

$$Belief\ education\ level_i = \alpha_0 + \alpha_1 High\ Skilled_i + \alpha_2 Low\ Skilled_i + \delta' X_i + \mu_i + \varepsilon_i, \quad (1)$$

where $High\ Skilled_i$ and $Low\ Skilled_i$ are binary treatment indicators.[27] X_i is a vector of control variables, including the respondent's demographic characteristics. Importantly, we include fixed effects for

[25] As with the information provided in the main survey experiment, we remain agnostic about the accuracy of these study results and merely use them as an alternative information treatment.

[26] This rate is comparable to other recent studies: For instance, take-up in the follow-up surveys was 14 percent in Alesina, Stantcheva, and Teso (2018) and Kuziemko et al. (2015), and 66 percent in Haaland and Roth (2017).

[27] Results are very similar when we instead use one instrument which is coded -1 for treatment *Low Skilled*, 0 for the control group, and +1 for treatment *High Skilled* (results available upon request).

university*faculty combinations (μ_i) such that we effectively compare only students in the same faculty in the same university.[28] ε_i is the idiosyncratic error term. Since treatment *High Skilled* tends to shift respondents' beliefs about refugees' education level upward, while treatment *Low Skilled* tends to shift them downward, including both instruments should yield a strong first stage. In the analysis of the follow-up survey, we instrument respondents' education beliefs with a binary indicator for whether respondents have been assigned to the information treatment.

In the second stage, we regress the respective outcome of interest (y_i) on the predicted education beliefs of the first stage:

$$y_i = \beta_0 + \beta_1 \widehat{Belief\ education\ level_i} + \delta' X_i + \mu_i + \varepsilon_i. \quad (2)$$

Our coefficient of interest is β_1, which gives us the local average treatment effect (LATE). Identification of β_1 relies on the untestable assumption that the information treatments affect our outcomes of interest only through their effects on respondents' beliefs about refugees' education level. In Section 4.6, we provide evidence that suggests the validity of this exclusion restriction and show that our results hold when estimating reduced-form effects instead.

3.4 Balancing test

To test whether the randomization balanced the socio-demographic characteristics of respondents across experimental groups in the main survey, we compare the characteristics of respondents in the control group with respondents in the two treatment groups (Table 1). We find statistically significant, but small, differences (at the 5% level) in only six out of 90 pairwise comparisons (see columns 2 to 4); six additional coefficients are very small and only marginally significant at the 10% level. Interestingly, note that some of the statistically significant differences go in the same direction for the *High Skilled* and *Low Skilled* treatment. For example, the share of parents without college degree is slightly lower in both information treatment groups compared to the control group. This implies that only few characteristics differ statistically significantly between treatment *High Skilled* and treatment *Low Skilled*. Overall, while some differences exist between the control group and treatment groups, they seem to emerge for random, and not systematic, reasons. In line with this interpretation, the information treatment has – as expected – opposite effects on respondents' education beliefs in the *High Skilled* treatment and *Low Skilled* treatment (see Section 4.2). In our regression analyses, we control for all characteristics reported in Table 1.

Since the *High Skilled* and *Low Skilled* samples are slightly smaller than the control group sample (by 4% and 2%, respectively), selection into survey participation might be a threat to internal validity. If the information treatments decreased respondents' likelihood to finish the survey, then differences in answers across experimental groups might be driven by attrition rather than by the information provided.

[28] Across the four universities, there are 11 different faculties in total. Given that not all faculties are represented in each university (or in our sample), our sample contains 24 faculty*university cells.

To test for non-random attrition, we compare the shares of participants who have been assigned to a treatment group and subsequently completed the survey (see second last row of Table 1). Reassuringly, survey completion rates do not differ across treatment groups, indicating that the lower numbers of observations in the information treatments are due to pure chance and that our estimates are internally valid.[29]

Appendix Table A2 shows that characteristics are also well balanced between control and treatment groups in the follow-up survey; only one out of 30 differences is statistically significant at conventional levels.

4. Results

4.1 Correlation between attitudes, beliefs about refugees' education, and respondents' socio-demographic characteristics

Using the control group, Appendix Table A3 presents bivariate correlations between beliefs about refugees' education level and general attitudes toward them.[30] Respondents with more positive beliefs about refugees' education level also have more positive attitudes toward refugees. This is true for the summary index of general attitudes as well as for the three individual items it comprises. In Section 4.4, we analyze whether these correlations represent a causal effect of education beliefs on attitudes.

In Appendix Tables A4 and A5, we investigate how respondents' socio-demographic characteristics are related to attitudes toward refugees and to beliefs about refugees' education level, respectively.[31] Overall, males are more skeptical toward refugees, whereas students who spoke to refugees and students who receive need-based student aid (an indicator for low family income) have more positive attitudes (column 1 of Appendix Table A4). Consistent with the strong correlations reported in Appendix Table A3, respondents' socio-demographic characteristics also predict their beliefs about refugees' education level (see Appendix Table A5): Males, older respondents, and students born abroad are less likely to believe that refugees' education level is high. In contrast, students who spoke to refugees and recipients of need-based student aid are more optimistic. Interestingly, additional

[29] Note that Table 1 compares respondents who are included in our analysis sample. Several participants had to be excluded for the analysis: First, we excluded all individuals (482 persons) who clicked on the survey link, but terminated the survey *before* having been assigned to an information treatment. Second, we excluded 524 participants who answered only the four general attitude questions on the first screen, but nothing else. Third, we excluded 414 participants aged 40 years and older since it is unlikely that these persons are regular students. Fourth, and similarly, we excluded 47 participants who reported that they were not studying (e.g., guest auditors). Finally, we excluded one participant whose comments at the end of the survey strongly suggested that he or she did not answer the survey truthfully. In the full sample (i.e., before applying these sample restrictions), 2,015 participants (34.2%) were randomly assigned to the control group, 1,925 participants (32.7%) to treatment *High Skilled*, and 1,947 participants (33.1%) to treatment *Low Skilled*. All remaining participants completed the survey and are included in the analysis. The completion rates reported at the bottom of Table 1 refer to the full sample before applying the sample restrictions (except the first restriction since individuals had not been assigned to a treatment yet). Note that the numbers of observations in our regression analyses are slightly smaller because we excluded respondents with missing covariates from the analyses.

[30] See Appendix Figure A2 for histograms of answers to the general attitude questions.

[31] Note that the numbers of observations in the regressions are slightly lower than the numbers reported in the balancing tables because of item non-response. Importantly, treatments status is unrelated to item non-response.

heterogeneity analyses (not shown) reveal that the information treatment effect on education beliefs is very similar across socio-demographic groups.

4.2 Impact of information treatment on beliefs about refugees' education level

Figure 1 shows that the two opposing information treatments shift the beliefs about refugees' education level in opposing directions. The information provided in the *Low Skilled* treatment shifts education beliefs downward (left panel); in contrast, the information in the *High Skilled* treatment shifts education beliefs upward (right panel). Table 2 presents the results in regression form. The dependent variable in columns 1 and 2 equals 1 if the respondent *agrees* completely or somewhat that refugees are well educated, and equals 0 otherwise; in columns 3 and 4, the dependent variable equals 1 if the respondent *disagrees* completely or somewhat (0 otherwise). In columns 5 and 6, we use the original, five-point scale, outcome, with higher values indicating more agreement with the statement that refugees are well-educated on average. The *High Skilled* treatment increases the share of respondents who agree with the statement by 14 percentage points. Since the respective share is only 18% in the control group, this is a very strong effect. In contrast, the *Low Skilled* treatment strongly decreases the share of respondents with positive views on refugees' education level by 5 percentage points (or 28%).[32, 33]

Table 3 reports the information treatment effect in the follow-up survey. The information provided in this survey (32% of adult refugees have a high school degree and 13% a university degree; respective shares among the German population are 29% and 21%) strongly increases the share of respondents who agree that refugees are well-educated by 29 percentage points. This finding has two important implications: First, the information treatment effect in the follow-up survey is very similar to the strong positive effect of the *High Skilled* treatment in the main survey. Second, and more importantly, the strong information treatment effects in the main survey are not due to the way the information was presented, in particular, these effects are not driven by the included interpretation of the numbers (e.g., "…a study has found that the education level of refugees is rather *high* since…").

Persistence of information treatment effect and effect heterogeneities by initial beliefs

One potential issue with information experiments is that the information provided might trigger experimenter demand effects or priming effects instead of genuine belief updating.[34] We provide two pieces of evidence that suggest that the strong effects of the information treatments on beliefs about

[32] Since we elicited beliefs about refugees' education level on a five-point-scale, we can also investigate how the information treatments affect each answer category. It turns out that the information treatments did not only affect those who "somewhat agree" or "somewhat disagree" with the statement, but also changed the shares of respondents who articulated strong agreement and strong disagreement, respectively (see Figure 1).

[33] In Appendix Table A6, we regress respondents' education beliefs on the treatment indicator, respondents' characteristics, and interactions between treatment indicator and characteristics, separately for treatment *High Skilled* (columns 1 to 3) and *Low Skilled* (columns 4 to 6). The coefficients on the interaction terms allow us to characterize the compliers in both treatments: Respondents in the diploma-track (male and older respondents) are significantly less likely to react to treatment *High Skilled* (*Low Skilled*) than their counterparts.

[34] Experimenter demand effects occur if the information provided contains indications about the experimenter's intentions and respondents answer accordingly to please the experimenter (Zizzo 2010; de Quidt, Haushofer, and Roth 2018). Similarly, specific words in the information might activate certain concepts in respondents' memory that influence their answering behavior unconsciously (priming effects).

refugees' education level are not driven by experimenter demand effects or by priming effects.

First, the effects of the information treatment persist for one week. Combining data from the follow-up survey and the re-survey one week later, we regress respondents' beliefs about refugees' education level on an *information* treatment dummy, a re-survey dummy, and an interaction term of these two indicators (Appendix Table A7). The information treatment not only increases the share of respondents who agree that refugees are well-educated at the moment the information is provided, but substantially increases this share still one week later when the information is not provided (again). As expected, the immediate treatment effect is stronger than the longer-run impact, which is likely due to imperfect recall.

Appendix Table A8, using alternative outcomes, again shows that the information treatment has longer-run impacts on respondents' beliefs about refugees' education level: While respondents in the control group underestimate the share of refugees who hold a high school degree by almost 12 percentage points (the control mean in column 1 is 21 percent, the true value is 32 percent), the treatment group holds significantly more accurate beliefs (columns 2 and 3). Interestingly, the treatment does not improve estimates of refugees' university graduation rate (columns 5 and 6). Thus, the positive treatment effect on education beliefs in Table 3 stems from correcting respondents' initial beliefs about refugees' high school graduation rate upward. Respondents who were provided the information on these education shares one week earlier are also more confident about their estimates (column 7).[35] Similar to previous studies (Grigorieff, Roth, and Ubfal 2016; Haaland and Roth 2017; see also Cavallo, Cruces, and Perez-Truglia 2017), we argue that it is very unlikely that experimenter demand effects or priming effects persist until one week later in the re-survey. This interpretation is consistent with recent evidence by Mummolo and Peterson (2018) who show that survey experiments are robust to experimenter demand effects.

Second, the large sample in the main survey allows estimating heterogeneous treatment effects by respondents' *baseline* beliefs about refugees' education level. For this analysis, we first have to predict the baseline beliefs of respondents in the two information treatments.[36] Column 1 of Appendix Table

[35] In Appendix Table A9, we regress an indicator for participation in the re-survey on the treatment indicator and covariates. While a few covariates are significantly related to re-survey participation, they are jointly insignificant (p=0.89, joint *F*-test performed on regression of column 2). Most importantly, the insignificant coefficients on the treatment indicator show that attrition does not differ across treatment arms. Thus, providing information to respondents does not affect their probability of participating in the re-survey one week later.

[36] To verify that the information provision indeed affects beliefs about refugees' education level, it was necessary to elicit the education beliefs *after* providing the information to respondents in the two treatment groups. While it would have been possible to elicit these beliefs twice, *before* and *after* information provision, we abstained from this design choice to avoid behavioral anomalies such as backfire effects where individuals respond defiantly to information which corrects their previously stated beliefs (Nyhan and Reifler 2010). Our design choice *not* to elicit baseline beliefs, which follows previous studies (e.g., Kuziemko et al. 2015), is important to keep in mind when interpreting the treatment effects. To recover baseline beliefs, we imputed the *baseline* beliefs of respondents in the two treatment groups. To do so, we regressed the education beliefs (using the original five-point scale) of the respondents in the *control group* on all socio-demographic background characteristics, university, faculty, and opinion formation aspects (except *economic aspects* since they were affected by the information provision; see Section 4.5). We then used the estimated coefficients from the control group and imputed the baseline beliefs of respondents in the two treatment groups, using their background characteristics and opinion aspects. Finally, we split the imputed baseline belief at the median to define high and low baseline beliefs. This imputation procedure turns out to work well: First, among respondents in the control group, reported beliefs and imputed beliefs are

A10 shows that, while treatment *High Skilled* increases beliefs about refugees' education level (measured on the original five-point scale) among respondents with high and low baseline beliefs, treatment *Low Skilled* only decreases beliefs about refugees' education level among respondents with high baseline beliefs, but not among those with low baseline beliefs. Using dichotomized measures of education beliefs as outcome variables (see columns 2 and 3), the pattern is identical for treatment *Low Skilled*, which only decreases (increases) the probability that respondents agree (disagree) with the statement that refugees are well educated among those with high baseline beliefs. Similarly, treatment *High Skilled* increases (decreases) the probability to agree (disagree) with the statement if baseline beliefs are low. Interestingly, this treatment particularly increases the probability to agree among those with relatively high baseline beliefs.[37] Since almost all patterns in the table indicate belief updating, we consider it highly unlikely that our information treatment effects are driven by experimenter demand effects or priming effects.[38]

4.3 Impact of beliefs about refugees' education level on labor market competition and fiscal burden concerns

We now assess the relevance of the two competing theories, the labor market competition model and the fiscal burden model, in the context of the European refugee crisis. Table 4 presents results from IV estimates of the effects of beliefs about refugees' education level (instrumented with the the two information treatment indicators) on labor market competition and fiscal burden concerns.[39] The dependent variables in columns 1 and 4 are the summary indices of labor market competition and fiscal burden concerns, respectively (see Section 3.1). The outcomes in the remaining columns are binary indicators of agreement with the individual statements that make up the two summary indices.

Consistent with the *labor market competition model*, respondents are more concerned about competition from refugees on the labor market if they believe that refugees are well-educated, rather than low-educated (column 1). This applies to concerns about increased competition for the respondent personally, but particularly to concerns about increased competition on the labor market in general (control mean: 26 percent; see column 3). A post-estimation test reveals that the treatment effect in column 3 is marginally significantly larger than the effect in column 2 (p=0.11). This moderate effect, together with the low level of baseline concerns that refugees increase labor market competition for the

substantially correlated (r=0.58). Second, again using only the control group, the standard deviation of the imputed beliefs is rather large (57%) relative to the standard deviation of the reported beliefs.

[37] One possible explanation for the positive effect of treatment *High Skilled* on the probability to agree to the statement of persons with high baseline beliefs is that the specific information provided (i.e., 43% of refugees have attended a university) constitutes a positive shock to their beliefs about the *share* of refugees who have attended a university (which we did not measure). This finding is also consistent with the notion that these respondents hold motivated beliefs, which they update selectively (e.g., Bénabou and Tirole 2016).

[38] This approach of distinguishing information effects from other unintended effects was developed by Lenz (2009) and has been applied to various survey experiments, e.g., Cruces, Perez-Truglia, and Tetaz (2013), Schueler and West (2016), and Lergetporer et al. (2018).

[39] All results are robust to including survey date fixed effects, indicating that results do not depend on the day when respondents answered the survey.

respondent personally (control mean is only 4%, see column 2), suggests that, while a relevant share of students is concerned about increased general labor market competition, most respondents do not perceive refugees as their direct competitors on the labor market.[40]

In contrast, we do not find any evidence for the *fiscal burden model*. Treatment effects on both the summary index (column 4) and on its components (columns 5 to 7) are precisely estimated zeros. While 30 percent of respondents think that refugees will bring more revenues than costs for the government, this share is unaffected by shifts in respondents' education beliefs (column 5). Similarly, the treatment does not affect respondents' concerns that they will have to pay more taxes (control mean: 24 percent, see column 6) or that they will have to forgo future government benefits because of the refugees (control mean: 11 percent, see column 7). Beliefs about refugees' education level also do not affect agreement to other refugee-related statements, for instance, that refugees are a cultural enrichment, or concerns that they increase crime levels (see Appendix Table A11).

To account for the fact that we estimate effects of education beliefs on multiple outcomes, we also conduct a multiple hypotheses correction using the procedure of Romano and Wolf (2005). Reassuringly, when accounting for the multiple hypotheses tests performed on the four summary indices in Tables 4, 5, and A11, the coefficient on the labor-market-concerns index remains highly statistically significant ($p < 0.01$).

4.4 Impact of beliefs about refugees' education level on general attitudes toward refugees

Next, we investigate whether the increased labor market competition concerns translate into a change in general attitudes toward refugees. Again using the IV model in equations (1) and (2), we find no effect of beliefs about refugees' education level on general attitudes toward refugees (Table 5). This is true for the summary index of general attitudes (column 1) as well as for the individual items that make up the summary index (columns 2 to 4). While attitudes toward refugees are strongly correlated with beliefs about their education level (see Appendix Table A3), Table 5 implies that these correlations are not driven by a causal impact of education beliefs on attitudes.

The finding that increased labor market competition concerns do not translate into more negative general attitudes may be surprising at first sight, given that potential labor market impacts of the large refugee inflow in Germany play a prominent role in the public debate. However, our finding is consistent with existing studies on attitudes toward immigration, which find that economic considerations play only a minor role in the attitude formation process (see Dustmann and Preston 2007; Hainmueller and

[40] Consistently, the effect of education beliefs on concerns that refugees increase labor market competition for the respondent personally is basically zero in the follow-up survey experiment, which provides a different type of information (result not shown). This result is consistent with Appendix Table A8, which shows that the information treatment only shifts beliefs about the share of refugees with a high school degree, but does not change beliefs about university graduation rates. Since our sample of university students is unlikely to consider refugees with (only) a high school degree as competitors on the labor market, it is therefore not surprising that this information treatment does not affect concerns about increased personal labor market competition.

Hiscox 2010). In the next section, we provide direct empirical evidence that this interpretation also applies to our study.

4.5 Aspects shaping attitudes toward refugees

To investigate the connection between respondents' beliefs about refugees' education level and general attitudes more closely, we elicited the importance that respondents attribute to various aspects when forming their attitude toward refugees. Table 6 presents results of IV regressions in which all outcomes are binary and equal 1 if the respondent considers the given aspect as important, respectively unimportant, for her attitude formation process, and 0 otherwise.[41]

Table 6 contains two interesting findings: First, beliefs about refugees' education level do not affect the importance of any aspect of opinion formation except for economic aspects, which become more important (i.e., less unimportant) with higher education beliefs.[42] This suggests that providing information about refugees' education level only triggers respondents' economic considerations. This result is related to an open question in the literature on attitudes toward immigration as to what extent respondents associate the education level of refugees, or immigrants more generally, with economic aspects rather than with social or cultural aspects (Hainmueller and Hiscox 2010).

The second key finding of Table 6 concerns the relative importance of economic aspects versus other aspects when individuals form their attitude toward refugees. Using only respondents from the control group (who have not been affected by any information treatment), we find that *refugees' willingness to integrate* and *humanitarian aspects* are important for most respondents (88% and 86%, respectively). These aspects are followed by *personal experience with refugees* (70%), *refugees' criminal behavior* (54%), and *religion/culture of refugees* (45%). Intriguingly, *economic aspects* are the least important aspect: Only 39% of respondents consider them important when forming their attitudes toward refugees. This pattern also holds when regressing general attitudes on all opinion aspects simultaneously (Appendix Table A13): Compared to all other opinion aspects, the relationship between economic aspects and general attitudes is considerably weaker. The great importance attributed to humanitarian aspects in our sample is similar to Bansak, Hainmueller, and Hangartner (2016), who find that humanitarian aspects play a major role in whether natives are willing to accept refugees. However, while these authors also identify employability and religion as being important for shaping natives' attitudes toward refugees, religious and economic aspects are relatively unimportant in our context.

In sum, our results show that shifting beliefs about refugees' education level upward (i.e., refugees are more likely to be considered highly educated) increases labor market competition concerns. However, these economic concerns do not translate into more negative attitudes toward refugees because economic aspects are rather unimportant when individuals form their attitudes toward refugees.

[41] Appendix Table A12 reports bivariate correlation coefficients between all opinion formation aspects.

[42] This treatment effect remains significant (p=0.03) after correcting for the multiple hypotheses tested in Table 6 using the step-down procedure described in Romano and Wolf (2005).

4.6 Validity of the exclusion restriction

The validity of our IV estimates hinges on the assumption that the only channel through which the information treatments impact the outcome variables of interest is through shifting respondents' beliefs about the education level of refugees. One important potential concern may be that the treatments in our main survey experiment did not only inform respondents about refugees' education level, but also mentioned their country of origin (Syria). Any direct effect (i.e., not operating through education beliefs) of this information on respondents' concerns or attitudes toward refugees would invalidate our IV approach. For several reasons, we consider such direct effects unlikely. First, the fact that most refugees in Germany come from Syria has already been well known within the German public.[43] Therefore, this part of the treatment hardly constituted new information for our survey respondents. Second, the fact that both information treatments mentioned Syrians, but had opposing effects on respondents' labor market concerns (treatment *High Skilled* increased those concerns, treatment Low Skilled reduced them; see below) is hard to reconcile with the notion that information about refugees' origin is important. Third, our findings that the treatments do not affect any other statements/concerns about refugees, such as concerns about increased crime levels (see Appendix Table A11), speaks against the presumption that the treatment operates through other channels than education beliefs.

Finally, our reduced-form results are in line with our findings from our IV estimates: In Appendix Table A14, we regress respondents' labor market competition and fiscal burden concerns on the two information treatment indicators. Consistent with the IV results in Table 4, the treatment *High Skilled* (*Low Skilled*) significantly increases (decreases) the summary index for respondents' labor market concerns (column 1), but does not affect fiscal burden concerns. In line with the IV results in Table 5 and Appendix Table A11, the reduced-form results in Appendix Tables A15 and A16 reveal precisely estimated null effects on respondents' general attitudes and other refugee-related statements, respectively. Similarly, Appendix Table A17 yields significant and positive treatment effects of treatment *High Skilled* on the importance of economic aspects for shaping respondents' attitudes toward refugees, which corroborates our IV findings in Table 6. In sum, the fact that these intention-to-treat effects are in line with our findings in Sections 4.3 to 4.5 is reassuring since their causal interpretation does not depend on the validity of the exclusion restriction.

4.7 Social desirability bias

Respondents might perceive some questions on their attitudes toward refugees as sensitive. One prominent concern with sensitive survey questions is that respondents might give socially desirable answers instead of answering honestly. A widely used technique to reduce, or even avoid, social

[43] This notion is corroborated by the fact that in 2015, Google documented on average 18 search requests each day in Germany for the German equivalent of "refugees Syria", whereas there were only two requests (one request) for "refugees Afghanistan" ("refugees Iraq") (Google Trends, https://trends.google.de/trends/explore?date=2015-01-01%202015-12-31&geo=DE&q=Fl%C3%BCchtlinge%20Syrien,Fl%C3%BCchtlinge%20Afghanistan,Fl%C3%BCchtlinge%20Irak; [accessed 7 August 2018]).

desirability bias is the so-called *item count technique* (ICT). The ICT is designed to foster truthful reporting by providing respondents a "veil" that prevents researchers from inferring an individual's answer to a specific sensitive item. Researchers, however, are still able to draw probabilistic inferences for groups of respondents (see Coffman, Coffman, and Ericson 2017 for a detailed description and validation of the ICT). The ICT randomly assigns survey respondents to a *direct response group* whose members are directly asked whether they agree with a sensitive item. Respondents in the *veiled response group*, in contrast, report on how many of N+1 items (which include the sensitive item and N other items) they agree with. In our case N=4 since we use four additional, non-sensitive items to veil answers to the sensitive item. See Appendix B for a detailed description of how the ICT works.

In the follow-up survey, we used this technique to assess the social desirability bias for five potentially sensitive items: labor market competition concerns (both for respondent personally and in general); concerns about fiscal revenues and costs; and aspects shaping the attitude toward refugees (humanitarian aspects and economic aspects). In Table 7, we regress the number of items (out of five items) that respondents agree with on a binary indicator for respondents in the *veiled response group*. The small and statistically insignificant coefficients on the veiled indicator in the first three columns indicate that reported labor market competition and fiscal burden concerns are not affected by social desirability bias. On the other hand, the negative, and statistically significant, coefficient for humanitarian aspects suggests that social desirability bias leads to some *over*-reporting of the importance of humanitarian aspects when respondents are asked directly (i.e., when no veil is provided). Less intuitively, we also find a negative coefficient on veiled answers for economic aspects, suggesting that respondents more often report economic aspects to be important when asked directly. Using a non-sensitive placebo item ("*I used a laptop computer for completing this survey*") shows that the significant coefficients in columns 4 to 6 do not arise mechanically from the ICT. Adding up the mean answers in the direct response group (see "Mean (direct response)" in Table 7) and the respective regression coefficient yields social-desirability-bias-adjusted average responses (see Coffman, Coffman, and Ericson 2017). Results show that the adjusted share of respondents – in this sample – who consider humanitarian aspects and economic aspects important for their attitude formation process toward refugees is 68% (i.e., 95% minus 27%) and 49% (i.e., 69% minus 20%), respectively. This finding underscores the conclusion of the main survey that economic aspects are much less important than humanitarian aspects. In sum, the evidence from Table 7 makes us confident that the direct questions in the main survey experiment generally provide accurate information, especially concerning labor market competition and fiscal burden concerns.

5. Discussion and conclusion

We conducted randomized online survey experiments with more than 5,000 university students in Germany to investigate how beliefs about refugees' education level affect attitudes toward them. We randomly provided information from existing studies on refugees' education level that strongly shifted

respondents' education beliefs in the expected direction. Consistent with the labor market competition model, we find that beliefs about refugees' education affect labor market competition concerns. In contrast, we find no effects on fiscal burden concerns or other specific concerns such as increasing crime levels. The labor market competition concerns, however, do not translate into general attitudes toward refugees because economic aspects are rather unimportant for shaping respondents' attitudes.

Our findings have important policy implications. First, the fact that humanitarian aspects are very important for shaping respondents' attitudes toward refugees shows that public opinion is in line with the legal requirements of the Geneva Convention, which stipulates that the decision of granting prosecuted asylum seekers temporary refugee status is independent of their characteristics. This result is similar to that of Bansak, Hainmueller, and Hangartner (2016) and indicates that policy makers might have some leeway to increase public acceptance of refugees by highlighting humanitarian, instead of economic, aspects. Second, while the effects of the large refugee inflow on the labor market and on the government budget remain to be seen, our findings suggest that developments in these areas will only have limited impact on public attitudes, at least among high-skilled natives.[44]

We focus on university students as an interesting group of the population since the two economic theories on natives' attitudes toward refugees make opposing predictions for how education beliefs affect attitudes. Yet, one potential shortcoming of our study is that we focus only on the upper part of the skill distribution, but remain silent about less educated natives. To put our results into a broader perspective, we compare university students with other population groups. To do so, we draw on the 2016 wave of the *ifo Education Survey*, a representative opinion survey on education policy in Germany that contains two questions on beliefs about refugees' education level.[45] Comparing respondents with a vocational degree, university graduates, and university students reveals that the latter two groups are more optimistic about refugees' education level: While 35% of university students and 27% of university graduates believe that refugees' education level is "rather high" or "very high", this view is shared by only 20% of respondents with a vocational degree. Similarly, while 47% of university students and 43% of university graduates believe that refugees will help to reduce the shortage of skilled labor in Germany, only 33% of those with a vocational degree hold this belief. This pattern of beliefs, together with the positive relationship between beliefs about refugees' education level and general attitudes toward them (see Appendix Table A3), is consistent with the finding that more highly educated natives exhibit more positive attitudes toward immigrants (e.g., d'Hombres and Nunziata 2016). While this suggests that

[44] This result differs somewhat from Bansak, Hainmueller, and Hangartner (2016), who find that economic concerns are important in the sense that respondents are more likely to accept asylum seekers if they worked in higher-skilled occupations in their home country.

[45] Similar to our survey, one question asked respondents about their beliefs about refugees' average education level on a four-point scale (from 1="very low" to 4="very high"). The second question elicited respondents' agreement with the following statement: "*The refugees will help to reduce the skill shortage of the German economy*" on a five-point scale (from 1="completely disagree" to 5="completely agree"). Note that differences in question wording and the number of answer categories, respectively, hamper a direct comparison of results between the *ifo Education Survey* and our survey. For more information on the *ifo Education Survey*, see Lergetporer et al. (2017).

providing information about refugees' education level may affect natives with different education backgrounds very differently, Bansak, Hainmueller, and Hangartner (2016) find that the effects of asylum seekers' attributes on their acceptance is homogeneous with respect to respondents education level. In order to investigate the external validity of our findings, we consider the application of our experimental design to other groups of the population an interesting avenue for future research.

While survey experiments are certainly subject to some artificiality, we have three reasons for considering this method informative and well-suited for answering our research question. First, in order to identify the causal effect of beliefs about refugees' education level on attitudes with naturally occurring data, one would need detailed measures of attitudes as well as exogenous variation in education beliefs. We are not aware of any data source that fulfills both requirements. Second, Barabas and Jerit (2010) provide evidence for the external validity of survey experiments: They show that the information effects in their survey experiment are also present in a natural setting, in which news exposure covers the same information. Therefore, survey experiments are able to uncover information effects that are also present in a natural environment. Similarly, survey responses on attitudes toward migration have been shown to correspond closely to incentivized, actual political behavior (see footnote 21). Third, Blinder and Krueger (2004) argue that public opinion surveys are important for the political process as politicians devote enormous resources to assessing public opinion through surveys. In the light of the European refugee crisis, much of the political debate has focused on natives' attitudes toward refugees and asylum policies, which are typically measured in opinion surveys. The present paper aims at contributing to understanding the underlying determinants that drive public attitudes that may strongly affect the political feasibility of asylum policy.(Alesina, Miano, and Stantcheva 2018)

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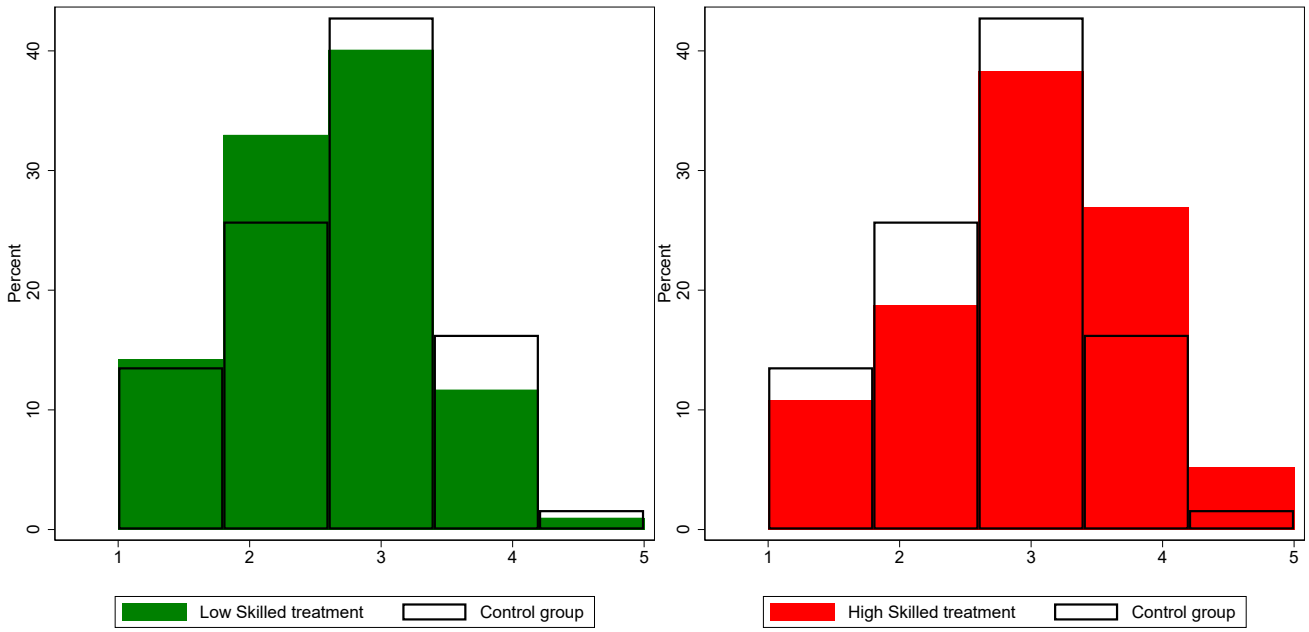
Figures and Tables

Figure 1: Effect of information treatment on beliefs about refugees' education level



Notes: Agreement to statement "On average, refugees are well educated." Answer categories: 1="completely disagree", 2="somewhat disagree", 3="neither agree nor disagree", 4="somewhat agree", and 5="completely agree."

Table 1: Comparison of socio-demographic characteristics across control and treatment groups

	Mean	Difference to control group		Difference b/w
	Control group	High skilled	Low skilled	High and Low skilled
	(1)	(2)	(3)	(4)
University				
Dresden	0.81	-0.00	0.00	-0.00
Konstanz	0.09	-0.01	-0.01	0.00
Munich	0.08	0.01	0.00	0.01
Chemnitz	0.02	0.00	0.01	-0.00
Male	0.54	-0.02	0.03*	-0.05***
Age	24.37	0.11	0.06	0.05
Bachelor	0.30	0.02	-0.01	0.03*
Master	0.20	0.02	0.02*	-0.01
Diploma	0.28	-0.02	-0.01	-0.01
PhD	0.09	0.00	0.00	0.00
Other study level	0.14	-0.01	-0.00	-0.01
Semester	5.63	-0.10	0.02	-0.12
Born abroad	0.07	0.02**	0.00	0.02*
No parent born abroad	0.86	-0.02	-0.01	-0.01
One parent born abroad	0.06	-0.01	0.01	-0.01
No parent has college degree	0.37	-0.05***	-0.03**	-0.01
Receives need-based student aid	0.42	-0.04**	-0.04**	-0.00
Not encountered refugees	0.14	-0.00	0.01	-0.02
Faculty				
Language, Culture	0.12	-0.00	-0.01	0.00
Psychology	0.00	0.00	0.00	-0.00
Social Sciences and Pedagogy	0.11	-0.00	-0.01	0.00
Law	0.02	0.01*	0.00	0.01
Commercial Information Systems	0.06	-0.00	0.01	-0.01
Business and Economics	0.04	0.01	0.01	0.01
Maths and Science	0.09	0.01	0.01	0.00
Medicine	0.06	0.01	-0.01	0.01
Engineering	0.35	-0.01	0.01	-0.02
Arts and Music	0.00	-0.00	0.00	-0.00
Other faculty	0.13	-0.02*	-0.02	-0.01
Survey completed	0.89	-0.00	0.00	-0.01
Respondents	1,668	1,604	1,629	

Notes: Column (1) reports means of the control group. Columns (2) and (3) report the difference in means between control group and respective treatment group. Column (4) reports the difference in means between low skilled treatment and high skilled treatment group. Significance levels of differences come from linear regressions of characteristics on the respective treatment dummies. All statistics refer to the analysis sample, except for the survey completion rates, which refer to the sample before applying sample restrictions; see Section 3.4. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 2: Effect of information treatment on beliefs about refugees' education level

	Agree		Disagree		Five-point scale	
	(1)	(2)	(3)	(4)	(5)	(6)
High skilled information	0.144***	0.140***	–0.100***	–0.104***	0.307***	0.312***
	(0.015)	(0.015)	(0.017)	(0.016)	(0.035)	(0.034)
Low skilled information	–0.051***	–0.048***	0.078***	0.071***	–0.142***	–0.125***
	(0.013)	(0.013)	(0.017)	(0.017)	(0.033)	(0.032)
Covariates	No	Yes	No	Yes	No	Yes
Control mean	0.18	0.18	0.39	0.39	2.67	2.67
Observations	4,831	4,831	4,831	4,831	4,831	4,831
Adj. R2	0.04	0.07	0.02	0.07	0.04	0.10

Notes: Dependent variables: agreement to statement "On average, refugees are well educated": Columns (1)+(2): binary variable (1="completely agree" or "somewhat agree", 0 otherwise); Columns (3)+(4): binary variable (1="completely disagree" or "somewhat disagree", 0 otherwise); Columns (5)+(6): integer values from 1 to 5 (1="completely disagree", 2="somewhat disagree", 3="neither agree nor disagree", 4="somewhat agree"; 5="completely agree"). *Covariates* include all characteristics from Table 1. *Control mean* is the mean of the indicated outcome of respondents in the control group. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 3: Effect of information treatment on beliefs about refugees' education level (follow-up survey)

	Agree		Disagree		Five-point scale	
	(1)	(2)	(3)	(4)	(5)	(6)
Information treatment	0.284***	0.295***	–0.193***	–0.204***	0.597***	0.619***
	(0.037)	(0.037)	(0.040)	(0.039)	(0.081)	(0.080)
Covariates	No	Yes	No	Yes	No	Yes
Control mean	0.17	0.17	0.45	0.45	2.62	2.62
Observations	555	555	555	555	555	555
Adj. R2	0.09	0.13	0.04	0.08	0.09	0.14

Notes: Dependent variables: agreement to statement "On average, refugees are well educated": Columns (1)+(2): binary variable (1="completely agree" or "somewhat agree", 0 otherwise); Columns (3)+(4): binary variable (1="completely disagree" or "somewhat disagree", 0 otherwise); Columns (5)+(6): integer values from 1 to 5 (1="completely disagree", 2="somewhat disagree", 3="neither agree nor disagree", 4="somewhat agree"; 5="completely agree"). *Information treatment* indicates whether the respondent was assigned to the information treatment group (=1) or to the control group (=0). *Covariates* include all characteristics from Table A2. *Control mean* is the mean of the indicated outcome of respondents in the control group. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 4: Effect of beliefs about refugees' education level on labor market and fiscal burden concerns

	Labor market concerns			Fiscal burden concerns			
	Index	Increase competition for me	Increase competition in general	Index	More revenues than costs	Pay more taxes	Less gov't benefits
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Refugees are well educated on average	0.267***	0.041**	0.096***	–0.008	0.035	0.007	0.015
	(0.069)	(0.017)	(0.036)	(0.064)	(0.035)	(0.035)	(0.026)
Control mean	-0.01	0.04	0.26	-0.02	0.30	0.24	0.11
Instrument F statistic	85.9	85.9	85.9	85.9	85.9	85.9	85.9
Respondents	4,818	4,818	4,818	4,818	4,818	4,818	4,818

Notes: Results from two-stage least-squares regressions. In the first stage, beliefs about refugees' education level are instrumented with the two binary indicators *high skilled information* and *low skilled information* (for first-stage results, see Table 2). Dependent variables: Column (1): index of labor market concerns, consisting of the two indicators in Columns (2) and (3). Column (4): index of fiscal burden concerns, consisting of the three indicators in Columns (5) to (7). Columns (2), (3), (5), (6), and (7): dummy variables which express agreement with the respective statement (1="completely agree" or "somewhat agree", 0 otherwise). See Appendix A for the wording of all survey questions and Section 3.1 for the construction of the summary indices. All regressions include the characteristics reported in Table 1. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 5: Effect of beliefs about refugees' education level on general attitudes

	Index	Admit more refugees in future	#Refugees admitted last year	Allowed to stay permanently
	(1)	(2)	(3)	(4)
Beliefs about education	–0.043	–0.011	0.004	–0.007
	(0.071)	(0.035)	(0.032)	(0.037)
Control mean	0.02	0.31	0.22	0.65
Instrument F statistic	86.2	86.0	85.3	86.2
Respondents	4,830	4,805	4,810	4,829

Notes: Results from two-stage least-squares regressions. In the first stage, beliefs about refugees' education level are instrumented with the two binary indicators *high skilled information* and *low skilled information* (for first-stage results, see Table 2). Dependent variables: Column (1): index of general attitudes, consisting of the three indicators in Columns (2), (3) and (4). Columns (2)-(4): dummy variables which express agreement with the respective statement (1="completely agree" or "somewhat agree", 0 otherwise). See Appendix A for the wording of all survey questions and Section 3.1 for the construction of the summary index. All regressions include the characteristics reported in Table 1. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 6: Effect of beliefs about refugees' education level on opinion formation aspects

	Refugees' willingness to integrate		Humanitarian aspects		Personal experience w/ refugees	
	Important	Unimportant	Important	Unimportant	Important	Unimportant
	(1)	(2)	(3)	(4)	(5)	(6)
Refugees are well educated on average	0.005	–0.006	–0.022	0.007	0.019	–0.002
	(0.025)	(0.016)	(0.028)	(0.019)	(0.034)	(0.024)
Control mean	0.88	0.04	0.86	0.06	0.70	0.12
Instrument F statistic	86.1	86.1	86.7	86.7	86.1	86.1
Respondents	4,831	4,831	4,830	4,830	4,831	4,831
	Refugees' criminal behavior		Religion/culture of refugees		Economic aspects	
	Important	Unimportant	Important	Unimportant	Important	Unimportant
	(1)	(2)	(3)	(4)	(5)	(6)
Refugees are well educated on average	0.022	–0.040	0.070*	–0.059	0.051	–0.107***
	(0.039)	(0.034)	(0.040)	(0.038)	(0.039)	(0.038)
Control mean	0.54	0.26	0.45	0.37	0.39	0.37
Instrument F statistic	86.2	86.2	86.1	86.1	86.2	86.2
Respondents	4,830	4,830	4,831	4,831	4,828	4,828

Notes: Results from two-stage least-squares regressions. In the first stage, beliefs about refugees' education level are instrumented with the two binary indicators *high skilled information* and *low skilled information* (for first-stage results, see Table 2). Dependent variables: importance of various aspects for respondents' opinion formation process toward refugees; respondents rated each aspect on a five-point scale: very important, somewhat important, neither important nor unimportant, somewhat unimportant, and very unimportant. *Important* equals 1 for "very important" or "somewhat important", 0 otherwise; *unimportant* equals 1 for "very unimportant" or "somewhat unimportant", 0 otherwise. All regressions include the characteristics reported in Table 1. *Control mean* is the mean of the indicated outcome of respondents in the control group. See Appendix A for the wording of all survey questions. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

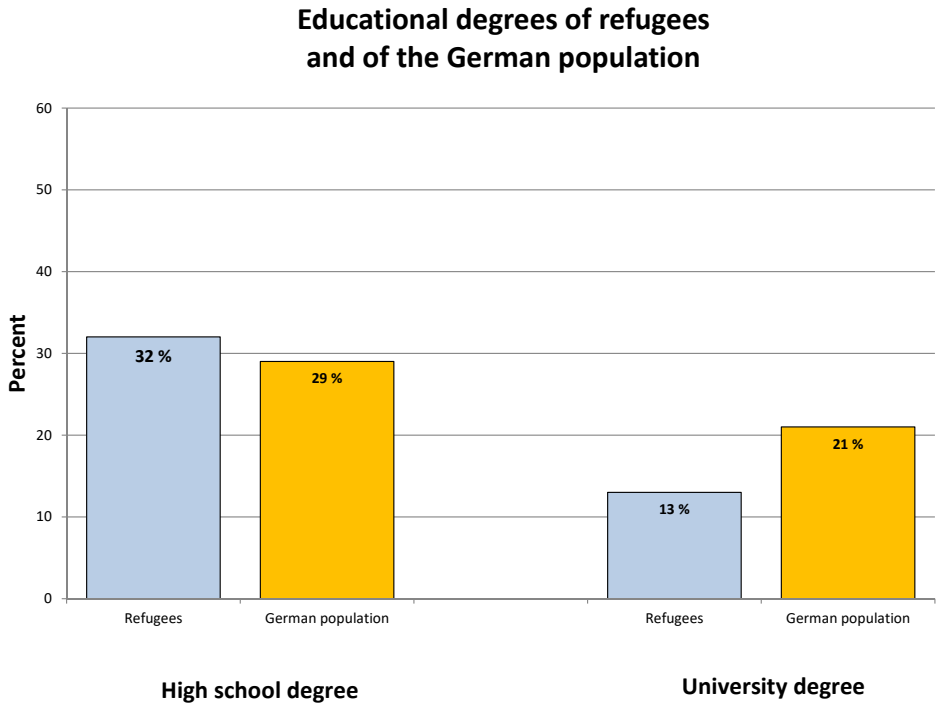
Table 7: Effect of veiled response treatment (follow-up survey)

	Increase competition for me	Increase competition in general	More revenues than costs	Refugees' criminal behavior	Humanitarian aspects	Economic aspects	Laptop usage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Veiled	–0.045	–0.045	–0.113	–0.202**	–0.270***	–0.206***	–0.112
	(0.076)	(0.076)	(0.081)	(0.082)	(0.094)	(0.075)	(0.090)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean (direct response)	0.06	0.44	0.38	0.41	0.95	0.69	0.42
Observations	554	554	553	555	554	555	555
Adj. R2	0.13	0.13	0.07	0.01	0.07	0.03	0.05

Notes: Dependent variables: agreement to the statements indicated in the top row (only two answer categories: agree or disagree). *Veiled* equals 1 if respondent has been assigned to veiled response group and 0 if assigned to direct response group; see Section 4.6. *Mean (direct response)* is the mean of the outcome of respondents in the direct response group. *Covariates* include all characteristics from Appendix Table A2. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

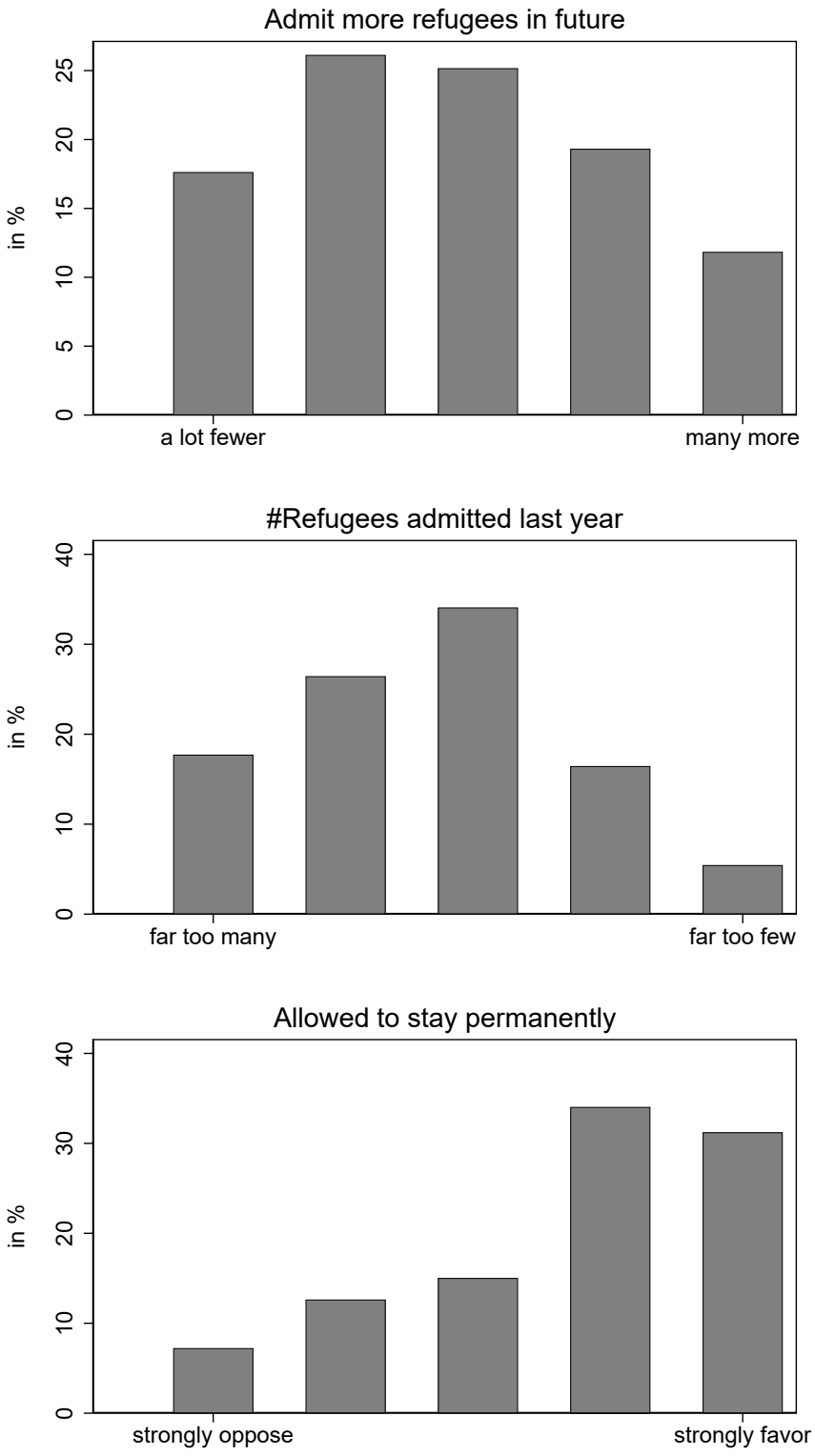
Appendix A

Figure A1: Graphical depiction used in information treatment in follow-up survey



Notes: This figure shows the graphical depiction used in the information treatment in the follow-up survey, which was provided (in German) to participants in addition to written information; see Section 3.2. The original German labels in the graph were: "Weiterführender Schulabschluss " (high school degree) and "Universitäts- oder anderer Hochschulabschluss" (university degree).

Figure A2: General attitudes toward refugees



Notes: Figure shows distribution of answers to the general attitude questions, measured on a five-point scale. Figures are based on respondents in control group only.

Table A1: Comparison of sample characteristics to university student populations

University of Munich			Technical University Dresden		
	Admin Data	Our Sample		Admin Data	Our Sample
Female	59.9%	62.6%	Female	42.4%	44.1%
Non-German	16.2%	8.7%	Non-German	13.1%	8.1%
Faculty			*Faculty*		
Catholic Theology	1.6%	1.9%	Mathematics and Science	11.7%	10.0%
Protestant Theology	1.5%	0.9%	Education and Pedagogy	11.5%	7.9%
Law	8.9%	6.6%	Law	2.8%	3.0%
Business Administration	5.5%	3.8%	Philosophy	6.1%	10.7%
Economics	2.3%	3.8%	Linguistics and Literature	2.8%	4.4%
Medicine	12.6%	12.0%	Economics and Business	7.8%	6.2%
Veterinary	3.6%	4.3%	Electrical and Computer Engineering	7.3%	6.1%
History and Art History	4.2%	4.7%	Computer Science	5.1%	5.9%
Philosophy	2.2%	2.4%	Mechanical Science and Engineering	17.1%	15.9%
Psychology and Pedagogy	6.4%	9.9%	Architecture	3.2%	2.0%
Cultural Studies	5.9%	3.8%	Civil Engineering	5.2%	4.9%
Linguistics and Literature	15.5%	15.8%	Environmental Sciences	6.9%	7.0%
Social Sciences	4.9%	7.6%	Transportation and Traffic Science	4.1%	8.9%
Mathematics, Computer Studies and Statistics	9.2%	9.9%	Medicine	8.5%	7.1%
Physics	4.8%	4.5%			
Chemistry and Pharmacy	4.3%	2.8%			
Biology	3.9%	2.8%			
Geology	2.7%	2.6%			

Notes: The administrative data refer to the summer term 2016 for the University of Munich and to the winter term 2015/2016 for the Technical University Dresden. For the University of Konstanz (University of Chemnitz), we only had access to the faculties of "Business Administration and Economics" and "Political Science" ("Business Administration and Economics") and therefore cannot compare faculty compositions. However, the share of females in our sample also match the administrative records of these two universities.

Table A2: Comparison of socio-demographic characteristics across control and treatment group (follow-up survey)

	Mean Control group	Difference between control group and information treatment
	(1)	(2)
Ingolstadt	0.07	-0.01
Munich	0.59	0.02
Konstanz	0.21	0.01
Chemnitz	0.13	-0.03
Male	0.41	0.06
Age	25.53	-0.85
Bachelor	0.49	-0.00
Master	0.24	-0.00
PhD	0.09	0.01
Other study level	0.18	0.00
Semester	4.84	-0.19
Born abroad	0.09	-0.02
Mother born abroad	0.17	-0.03
Father born abroad	0.18	-0.03
No parent has college degree	0.38	0.05
Government aid	0.26	-0.01
Spoken to refugees	0.62	0.03
Language, Culture	0.10	0.04
Psychology	0.03	-0.01
Social Sciences and Pedagogy	0.10	0.02
Law	0.03	0.00
Commercial Information Systems	0.09	-0.01
Business and Economics	0.27	0.02
Maths and Science	0.18	0.02
Medicine	0.11	-0.06**
Engineering	0.00	-0.00
Arts and Music	0.04	0.00
Other faculty	0.06	-0.02
Participated in both waves	0.52	-0.03
Veiled	0.49	0.01
Respondents	293	289

Notes: Column (1) reports means of the control group. Column (2) reports the difference between control group and information treatment group. Statistical significance is based on linear regressions of characteristic on information treatment dummy. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A3: Correlations between beliefs about refugees' education level and general attitudes

Bivariate correlations with beliefs about refugees' education level:	
Attitudes index	0.593***
Germany should admit more refugees in future	0.524***
Number of refugees Germany admitted last year	0.506***
Refugees should be allowed to stay in Germany permanently	0.571***

Notes: Correlations between beliefs about refugees' education level and general attitudes toward refugees. Correlations are based on control group only. *Attitude index* is based on the three indicators in rows 2, 3 and 4. See Appendix A for the wording of all survey questions and Section 3.1 for the construction of the summary index. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A4: Relationship between general attitudes toward refugees and socio-demographic characteristics

	Attitude index	Admit more refugees in future	Too few refugees last year	Allow permanent stay
	(1)	(2)	(3)	(4)
Male	–0.172***	–0.029	–0.014	–0.082***
	(0.046)	(0.025)	(0.022)	(0.024)
Age	–0.016**	0.003	0.004	–0.012***
	(0.007)	(0.004)	(0.003)	(0.004)
Born abroad	–0.212*	–0.002	0.017	–0.174***
	(0.119)	(0.057)	(0.051)	(0.063)
At least one parent born abroad	–0.077	–0.040	–0.043	–0.026
	(0.079)	(0.043)	(0.038)	(0.045)
At least one parent w/ college degree	0.033	0.022	0.035	0.028
	(0.047)	(0.025)	(0.022)	(0.025)
Spoken to refugees	0.307***	0.196***	0.155***	0.132***
	(0.060)	(0.032)	(0.028)	(0.036)
Seen refugees	–0.017	0.059*	0.038	–0.011
	(0.062)	(0.032)	(0.028)	(0.038)
Need-based student aid	0.109**	0.002	0.006	0.065***
	(0.047)	(0.025)	(0.022)	(0.025)
Field of study and degree indicators	Yes	Yes	Yes	Yes
University indicators	Yes	Yes	Yes	Yes
Observations	1,646	1,636	1,641	1,645
Adj. R2	0.06	0.03	0.03	0.06

Notes: Dependent variables: Column (1): index of general attitudes, consisting of the three indicators in Columns (2), (3) and (4). Columns (2)-(4): dummy variables which express agreement with the respective statement (1="completely agree" or "somewhat agree", 0 otherwise). See Appendix A for the wording of all survey questions and Section 3.1 for the construction of the summary index. Includes only respondents from the control group. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A5: Relationship between beliefs about refugees' education level and respondents' socio-demographic characteristics

	Agree	Disagree	Five-point scale
	(1)	(2)	(3)
Male	–0.120***	0.156***	–0.392***
	(0.021)	(0.025)	(0.049)
Age	–0.011***	0.013***	–0.030***
	(0.003)	(0.004)	(0.007)
Born abroad	–0.017	0.150**	–0.248**
	(0.046)	(0.064)	(0.120)
At least one parent born abroad	–0.012	0.014	–0.019
	(0.034)	(0.047)	(0.084)
At least one parent w/ college degree	0.004	0.013	–0.030
	(0.021)	(0.026)	(0.050)
Spoken to refugees	0.060**	0.005	0.030
	(0.028)	(0.036)	(0.067)
Seen refugees	0.017	0.045	–0.090
	(0.028)	(0.038)	(0.070)
Need-based student aid	0.010	–0.064**	0.099**
	(0.021)	(0.026)	(0.049)
Field of study and degree indicators	Yes	Yes	Yes
University indicators	Yes	Yes	Yes
Observations	1,638	1,638	1,638
Adj. R2	0.04	0.05	0.07

Notes: Dependent variables: agreement to statement "On average, refugees are well educated": Column (1): binary variable (1="completely agree" or "somewhat agree", 0 otherwise); Column (2): binary variable (1="completely disagree" or "somewhat disagree", 0 otherwise); Column (3): integer values from 1 to 5 (1="completely disagree", 2="somewhat disagree", 3="neither agree nor disagree", 4="somewhat agree"; 5="completely agree"). See Appendix A for exact wording of outcome. Estimations based on control group only. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A6: Characterizing compliers of information treatment effects on beliefs about refugees' education level

	Agree	Disagree	Five-point scale	Agree	Disagree	Five-point scale
	(1)	(2)	(3)	(4)	(5)	(6)
High skilled information	0.060	–0.036	0.098			
	(0.117)	(0.131)	(0.274)			
x_male	0.014	–0.029	0.064	0.054**	–0.009	0.072
	(0.032)	(0.034)	(0.072)	(0.027)	(0.036)	(0.067)
x_age	0.003	–0.004	0.009	0.010***	–0.010*	0.017*
	(0.005)	(0.005)	(0.011)	(0.004)	(0.005)	(0.010)
x_born_abroad	0.040	–0.144*	0.268	–0.001	0.002	–0.079
	(0.072)	(0.087)	(0.180)	(0.058)	(0.089)	(0.165)
x_atleastoneparentforeign	–0.044	0.091	–0.222*	–0.006	–0.039	0.034
	(0.056)	(0.066)	(0.132)	(0.044)	(0.065)	(0.113)
x_parentuniversity	0.006	0.016	–0.023	0.018	–0.011	0.045
	(0.033)	(0.036)	(0.075)	(0.028)	(0.037)	(0.069)
x_spoketorefugee	0.048	0.001	0.084	0.001	–0.055	0.081
	(0.044)	(0.050)	(0.099)	(0.036)	(0.050)	(0.090)
x_metrefugeepers	0.007	–0.013	0.030	–0.017	–0.027	0.040
	(0.045)	(0.053)	(0.103)	(0.037)	(0.053)	(0.095)
x_bafoeg	0.001	0.034	–0.067	0.025	0.000	0.071
	(0.033)	(0.036)	(0.075)	(0.027)	(0.036)	(0.068)
x_master	–0.015	–0.005	0.011	–0.032	–0.006	–0.032
	(0.045)	(0.050)	(0.103)	(0.037)	(0.052)	(0.095)
x_diplom	–0.085**	0.069	–0.180*	0.006	0.011	–0.027
	(0.040)	(0.046)	(0.095)	(0.035)	(0.047)	(0.090)
x_promotion	0.001	0.023	–0.023	–0.047	0.050	–0.022
	(0.061)	(0.070)	(0.148)	(0.051)	(0.074)	(0.133)
x_other	–0.024	–0.018	0.011	–0.010	–0.040	0.081
	(0.053)	(0.053)	(0.115)	(0.044)	(0.056)	(0.105)
Male	–0.117***	0.157***	–0.386***	–0.121***	0.158***	–0.395***
	(0.020)	(0.025)	(0.048)	(0.020)	(0.025)	(0.048)
Age	–0.011***	0.013***	–0.030***	–0.011***	0.013***	–0.030***
	(0.003)	(0.004)	(0.007)	(0.003)	(0.004)	(0.007)
Born abroad	–0.020	0.148**	–0.249**	–0.014	0.152**	–0.256**
	(0.046)	(0.064)	(0.119)	(0.046)	(0.064)	(0.119)
At least one parent born abroad	–0.015	0.018	–0.025	–0.017	0.008	–0.014
	(0.034)	(0.047)	(0.083)	(0.034)	(0.047)	(0.083)
At least one parent w/ college degree	0.004	0.014	–0.032	0.003	0.014	–0.032
	(0.021)	(0.026)	(0.049)	(0.021)	(0.026)	(0.049)
Spoken to refugees	0.060**	0.010	0.024	0.055**	0.005	0.022
	(0.028)	(0.036)	(0.067)	(0.028)	(0.035)	(0.067)
Seen refugees	0.018	0.048	–0.090	0.012	0.047	–0.101
	(0.028)	(0.038)	(0.070)	(0.028)	(0.037)	(0.070)
Need-based student aid	0.015	–0.069***	0.114**	0.010	–0.066***	0.106**
	(0.020)	(0.025)	(0.049)	(0.020)	(0.025)	(0.049)
Master	0.016	–0.036	0.035	0.009	–0.037	0.030
	(0.028)	(0.037)	(0.069)	(0.028)	(0.037)	(0.069)
Diploma	0.005	–0.026	0.016	0.001	–0.015	0.006
	(0.027)	(0.035)	(0.068)	(0.027)	(0.035)	(0.067)
PhD	0.028	–0.117**	0.183*	0.029	–0.103**	0.178*
	(0.039)	(0.052)	(0.098)	(0.038)	(0.052)	(0.098)
Other study level	0.002	–0.046	0.044	0.005	–0.070*	0.090
	(0.035)	(0.042)	(0.084)	(0.035)	(0.042)	(0.083)
Low skilled information				–0.320***	0.358***	–0.679***
				(0.097)	(0.137)	(0.253)
University*faculty FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,227	3,227	3,227	3,242	3,242	3,242
Adj. R2	0.06	0.05	0.08	0.03	0.06	0.08

Notes: Dependent variables: agreement to statement "On average, refugees are well educated": Columns (1)+(4): binary variable (1="completely agree" or "somewhat agree", 0 otherwise); Columns (2)+(5): binary variable (1="completely disagree" or "somewhat disagree", 0 otherwise); Columns (3)+(6): integer values from 1 to 5 (1="completely disagree", 2="somewhat disagree", 3="neither agree nor disagree", 4="somewhat agree"; 5="completely agree"). Variables starting with "$x\_$" are the respective treatment interactions with the indicated covariates (High Skilled in columns 1-3 and Low Skilled in columns 4-6). Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A7: Persistence of information treatment effects on beliefs about refugees' education level (follow-up survey)

	Agree	Disagree	Five-point scale
	(1)	(2)	(3)
Information treatment	0.357***	–0.276***	0.770***
	(0.052)	(0.053)	(0.105)
Re-survey	0.043*	–0.057*	0.106**
	(0.023)	(0.032)	(0.046)
Information treatment * re-survey	–0.143***	0.114***	–0.292***
	(0.048)	(0.042)	(0.075)
Covariates	Yes	Yes	Yes
Control mean	0.16	0.44	2.66
Information treatment effect in re-survey	0.214***	-0.162***	0.478***
	(0.054)	(0.054)	(0.103)
Observations (respondents)	281	281	281
Adj. R2	0.15	0.13	0.19

Notes: Dependent variables: agreement to statement "On average, refugees are well educated." Column (1): binary variable (1="completely agree" or "somewhat agree", 0 otherwise); Column (2): binary variable (1="completely disagree" or "somewhat disagree", 0 otherwise); Column (3): integer values from 1 to 5 (1="completely disagree", 2="somewhat disagree", 3="neither agree nor disagree", 4="somewhat agree"; 5="completely agree"). *Information treatment effect in re-survey* is the linear combination of the coefficients on *Information treatment* plus *Information treatment * re-survey*. *Covariates* include all characteristics from Appendix Table A2. Regressions only include respondents who participated in the follow-up survey and in the re-survey about one week later; see Section 3.2. Robust standard errors, adjusted for clustering at the respondent level, in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A8: Persistence of information treatment effects on beliefs (follow-up survey)

	Estimates high school degree			Estimates university degree			Confidence
Outcome	Raw	Abs. deviation	Within 5pp	Raw	Abs. deviation	Within 5pp	7-point scale
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Information treatment	9.260***	–4.809***	0.301***	3.572***	0.433	0.082	0.934***
	(1.605)	(1.120)	(0.054)	(1.114)	(0.866)	(0.063)	(0.160)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control mean	21.34	14.01	0.17	13.64	6.46	0.50	3.13
Observations	281	281	281	281	281	281	281
Adj. R2	0.10	0.05	0.11	0.02	–0.06	–0.02	0.11

Notes: Dependent variables: Columns (1)-(3): respondents' estimates of the share of refugees in Germany who hold a high school degree; Col. (1): raw estimate (in percent); Col. (2): absolute deviation of estimate from the respective value provided in the information treatment in the survey one week before; Col. (3): dummy variable indicating that estimate is within 5 percentage points from the respective value provided in the survey one week before. Columns (4)-(6): respondents' estimates of the share of refugees in Germany who have a university degree; Col. (4): raw estimate (in percent); Col. (5): absolute deviation of estimate from the respective value provided in the information treatment in the survey one week before; Col. (6): dummy variable indicating that estimate is within 5 percentage points from the respective value provided in the survey one week before. Column 7: respondents' confidence (on a seven-point scale) that their estimates are correct. *Covariates* include all characteristics from Appendix Table A2. *Control mean* is the mean of the indicated outcome of respondents in the control group. Includes only respondents who participated in the follow-up survey and in the re-survey about one week later; see Section 3.2. Robust standard errors, adjusted for clustering at the respondent level, in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A9: Effect of information treatment on participation in re-survey

	(1)	(2)
Information treatment	–0.033	–0.328
	(0.041)	(0.374)
Munich	0.391***	0.251
	(0.111)	(0.169)
Chemnitz	–0.104	–0.250
	(0.146)	(0.217)
Konstanz	0.190**	0.274**
	(0.092)	(0.133)
Male	–0.016	–0.016
	(0.044)	(0.067)
Age	–0.007**	–0.008**
	(0.003)	(0.003)
Bachelor	0.018	0.017
	(0.076)	(0.123)
Master	0.032	0.054
	(0.080)	(0.127)
PhD	0.023	–0.095
	(0.091)	(0.138)
Semester	0.001	0.002
	(0.008)	(0.011)
Born abroad	–0.167*	–0.170
	(0.100)	(0.129)
Mother born abroad	–0.018	–0.001
	(0.092)	(0.119)
Father born abroad	–0.034	0.046
	(0.080)	(0.108)
No parent has college degree	–0.013	–0.001
	(0.043)	(0.064)
Government aid	–0.002	–0.012
	(0.050)	(0.076)
Spoken to refugees	–0.006	–0.044
	(0.043)	(0.062)
Language, Culture	0.025	0.036
	(0.108)	(0.157)
Social Sciences and Pedagogy	0.083	0.055
	(0.109)	(0.169)
Law	0.097	0.006
	(0.162)	(0.242)
Commercial Information Systems	0.147	0.146
	(0.134)	(0.195)
Business and Economics	0.090	–0.068
	(0.119)	(0.172)
Maths and Science	0.149	0.136
	(0.104)	(0.153)
Medicine	0.066	0.083
	(0.125)	(0.182)
Arts and Music	–0.074	–0.152
	(0.138)	(0.208)
Information x covariates	No	Yes
Control mean	0.52	0.52
Observations	555	555
Adj. R2	0.09	0.07

Notes: Dependent variable: dummy variable that equals 1 if respondent participates in re-survey one week later; 0 otherwise. *Information treatment* indicates whether the respondent has been assigned to the information treatment group (=1) or to the control group (=0). *Covariates* include all characteristics from Appendix Table A2. *Control mean* is the mean of the indicated outcome of respondents in the control group. Column (2) additionally includes interactions between the information treatment dummy and all covariates. An F-test that all interaction terms in Column (2) are jointly insignificant is not rejected (p-value = 0.89). Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A10: Effect of information treatment on beliefs about refugees' education level by baseline beliefs

	Five-point scale	Agree	Disagree
	(1)	(2)	(3)
High skilled information	0.329***	0.108***	–0.140***
	(0.050)	(0.017)	(0.025)
× high baseline education belief	–0.010	0.070**	0.060**
	(0.063)	(0.029)	(0.030)
Low skilled information	–0.004	0.004	0.020
	(0.046)	(0.014)	(0.024)
× high baseline education belief	–0.226***	–0.103***	0.091***
	(0.059)	(0.024)	(0.032)
High baseline education belief	0.832***	0.176***	–0.417***
	(0.043)	(0.018)	(0.023)
Controls	Yes	Yes	Yes
Respondents	4,829	4,829	4,829
Adj. R2	0.22	0.11	0.19

Notes: Dependent variables: agreement to statement "On average, refugees are well educated": Column (1): binary variable (1="completely agree" or "somewhat agree", 0 otherwise); Column (2): binary variable (1="completely disagree" or "somewhat disagree", 0 otherwise); Column (3): integer values from 1 to 5 (1="completely disagree", 2="somewhat disagree", 3="neither agree nor disagree", 4="somewhat agree"; 5="completely agree"). Baseline beliefs about refugees' education level have been imputed for respondents in the High Skilled and Low Skilled treatments. The imputation procedure is described in Section 4.2. *Covariates* include all characteristics from Table 1. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A11: Effect of beliefs about refugees' education level on other refugee-related statements

	Index	Cultural enrichment	Integrate into society	Beneficial for Germany	Increase crime	Integrate into labor market	Language skills obstacle	Good for economy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Refugees are well educated on average	–0.031	–0.006	0.038	0.049	0.035	0.041	–0.018	0.061*
	(0.057)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.024)	(0.037)
Instrument F statistic	85.8	85.8	85.8	85.8	85.8	85.8	85.8	85.8
Respondents	4,824	4,824	4,824	4,824	4,824	4,824	4,824	4,824

Notes: Results from two-stage least-squares regressions. In the first stage, beliefs about refugees' education level are instrumented with the two binary indicators high skilled information and low skilled information (for first-stage results, see Table 2). Dependent variable: Column (1): summary index, consisting of the outcomes in Columns (2) to (8); see Section 3.1 for the construction of the summary index. Columns (2) to (8): dummy variables that express agreement to the indicated outcomes; 1="completely agree" or "somewhat agree", 0 otherwise. See Appendix A for the wording of all survey questions. All regressions include the characteristics reported in Table 1. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A12: Correlations between opinion aspects

	Humanitarian aspects	Economic aspects	Refugees' criminal behavior	Religion/culture of refugees	Refugees' willingness to integrate
Humanitarian aspects	1				
Economic aspects	-0.150***	1			
Refugees' criminal behavior	-0.252***	0.311***	1		
Religion/culture of refugees	-0.126***	0.228***	0.245***	1	
Refugees' willingness to integrate	0.00819	0.262***	0.407***	0.205***	1
Personal experience with refugees	0.184***	-0.00687	0.0288	0.118***	0.155***

Notes: Pairwise correlations between the six opinion aspects reported. Correlations are based on control group only. See Appendix A for the wording of all survey questions. Each aspect is measured on a five-point scale: very important, somewhat important, neither important nor unimportant, somewhat unimportant, and very unimportant. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A13: Relationship between opinion formation aspects and general attitudes toward refugees

	Index	Admit more refugees in future	#Refugees admitted last year	Allowed to stay permanently
	(1)	(2)	(3)	(4)
Refugees' willingness to integrate	–0.135***	–0.104***	–0.104***	–0.002
	(0.024)	(0.014)	(0.014)	(0.013)
Humanitarian aspects	0.341***	0.096***	0.082***	0.153***
	(0.021)	(0.011)	(0.009)	(0.012)
Personal experience with refugees	0.064***	0.037***	0.029***	0.012
	(0.017)	(0.010)	(0.009)	(0.010)
Refugees' criminal behavior	–0.256***	–0.091***	–0.052***	–0.108***
	(0.016)	(0.010)	(0.009)	(0.009)
Religion/culture of refugees	–0.103***	–0.027***	–0.007	–0.051***
	(0.013)	(0.008)	(0.007)	(0.008)
Economic aspects	–0.055***	–0.030***	–0.027***	–0.008
	(0.016)	(0.009)	(0.009)	(0.009)
Covariates	Yes	Yes	Yes	Yes
Control mean	0.02	0.31	0.22	0.65
Observations	1,644	1,634	1,639	1,643
Adj. R2	0.50	0.27	0.19	0.31

Notes: Dependent variables: Column (1): index of general attitudes, consisting of the three indicators in Columns (2), (3) and (4). Columns (2)-(4): dummy variables which express agreement with the respective statement (1="completely agree" or "somewhat agree", 0 otherwise). See Appendix A for the wording of all survey questions and Section 3.1 for the construction of the summary index. *Covariates* include all characteristics from Table 1. Regressions include only respondents from control group. *Control mean* is the mean of the indicated outcome. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A14: Information treatment effects on labor market and fiscal burden concerns

	Labor market concerns			Fiscal burden concerns			
	Index	Increase competition for me	Increase competition in general	Index	More revenues than costs	Pay more taxes	Less gov't benefits
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
High skilled information	0.070**	0.013	0.032**	0.023	–0.004	0.018	0.010
	(0.030)	(0.008)	(0.016)	(0.029)	(0.016)	(0.015)	(0.011)
Low skilled information	–0.051*	–0.006	–0.008	0.036	–0.024	0.021	0.006
	(0.029)	(0.007)	(0.015)	(0.028)	(0.016)	(0.015)	(0.011)
Respondents	4,827	4,827	4,827	4,827	4,827	4,827	4,827

Notes: Dependent variables: Column (1): index of labor market concerns, consisting of the two indicators in Columns (2) and (3). Column (4): index of fiscal burden concerns, consisting of the three indicators in Columns (5) to (7). Columns (2), (3), (5), (6), and (7): dummy variables which express agreement with the respective statement (1="completely agree" or "somewhat agree", 0 otherwise). See Appendix A for the wording of all survey questions and Section 3.1 for the construction of the summary indices. All regressions include the characteristics reported in Table 1. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A15: Information treatment effects on general attitudes

	Index	Admit more refugees in future	#Refugees admitted last year	Allowed to stay permanently
	(1)	(2)	(3)	(4)
High skilled information	–0.034	–0.023	0.001	–0.006
	(0.031)	(0.016)	(0.014)	(0.016)
Low skilled information	–0.017	–0.023	–0.001	–0.002
	(0.030)	(0.016)	(0.014)	(0.016)
Respondents	4,852	4,823	4,828	4,851

Notes: Dependent variables: Column (1): index of general attitudes, consisting of the three indicators in Columns (2), (3) and (4). Columns (2)-(4): dummy variables which express agreement with the respective statement (1="completely agree" or "somewhat agree", 0 otherwise). See Appendix A for the wording of all survey questions and Section 3.1 for the construction of the summary index. All regressions include the characteristics reported in Table 1. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A16: Information treatment effects on other refugee-related statements

	Index	Cultural enrichment	Integrate into society	Beneficial for Germany	Increase crime	Integrate into labor market	Language skills obstacle	Good for economy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High skilled information	–0.014	–0.002	0.012	0.023	0.008	0.023	–0.006	0.025
	(0.026)	(0.016)	(0.017)	(0.017)	(0.016)	(0.017)	(0.011)	(0.017)
Low skilled information	–0.003	0.002	–0.003	0.004	–0.008	0.008	0.001	0.001
	(0.026)	(0.016)	(0.017)	(0.017)	(0.016)	(0.017)	(0.010)	(0.017)
Respondents	4,834	4,834	4,834	4,834	4,834	4,834	4,834	4,834

Notes: Dependent variable: Column (1): summary index, consisting of the outcomes in Columns (2) to (8); see Section 3.1 for the construction of the summary index. Columns (2) to (8): dummy variables that express agreement to the indicated outcomes; 1="completely agree" or "somewhat agree", 0 otherwise. See Appendix A for the wording of all survey questions. All regressions include the characteristics reported in Table 1. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A17: Information treatment effects on opinion formation aspects

	Refugees' willingness to integrate		Humanitarian aspects		Personal experience w/ refugees	
	Important	Unimportant	Important	Unimportant	Important	Unimportant
	(1)	(2)	(3)	(4)	(5)	(6)
High skilled information	0.011	–0.002	–0.013	0.003	0.009	–0.004
	(0.011)	(0.007)	(0.012)	(0.008)	(0.015)	(0.011)
Low skilled information	0.011	0.002	–0.005	0.000	0.000	–0.004
	(0.011)	(0.007)	(0.012)	(0.008)	(0.015)	(0.011)
Control mean	0.88	0.04	0.86	0.06	0.70	0.12
Respondents	4,853	4,853	4,852	4,852	4,854	4,854
	Refugees' criminal behavior		Religion/culture of refugees		Economic aspects	
	Important	Unimportant	Important	Unimportant	Important	Unimportant
	(1)	(2)	(3)	(4)	(5)	(6)
High skilled information	–0.000	–0.017	0.028	–0.023	0.032*	–0.063***
	(0.017)	(0.015)	(0.018)	(0.017)	(0.017)	(0.017)
Low skilled information	–0.013	–0.000	–0.001	0.001	0.014	–0.026
	(0.017)	(0.015)	(0.017)	(0.017)	(0.017)	(0.017)
Control mean	0.54	0.26	0.45	0.37	0.39	0.37
Respondents	4,852	4,852	4,853	4,853	4,850	4,850

Notes: Dependent variables: importance of various aspects for respondents' opinion formation process toward refugees; respondents rated each aspect on a five-point scale: very important, somewhat important, neither important nor unimportant, somewhat unimportant, and very unimportant. *Important* equals 1 for "very important" or "somewhat important", 0 otherwise; *unimportant* equals 1 for "very unimportant" or "somewhat unimportant", 0 otherwise. All regressions include the characteristics reported in Table 1. *Control mean* is the mean of the indicated outcome of respondents in the control group. See Appendix A for the wording of all survey questions. Robust standard errors reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table A18: Wording of survey questions (main survey)

Content	Wording	Type of question
Perceived education level	"On average, the refugees are well educated."	Agreement with statement, closed-ended, 5 answer categories: completely agree, somewhat agree, neither agree nor disagree, somewhat disagree, completely disagree
Labour market concerns 1: "Increase competition for me"	"The refugees will increase competition on the labour market for me personally."	See above
Labour market concerns 2: "Increase competition in general"	"In general, the refugees will increase competition on the labour market."	See above
Fiscal concerns 1: "More revenues than costs"	"The refugees will bring more revenues than costs for the government."	See above
Fiscal concerns 2: "Pay more taxes"	"Due to the government spending for refugees, I will have to pay more taxes in the future."	See above
Fiscal concerns 3: "Less government benefits"	"Due to the government spending for refugees, I will have to forgo government benefits in the future."	See above
Other concerns 1: "Cultural enrichment"	"The refugees are a cultural enrichment for Germany."	See above
Other concerns: "Integrate into society"	"Germany will succeed in integrating the refugees into society."	See above
Other concerns 3: "Beneficial for Germany"	"Generally speaking, the refugees are beneficial for Germany."	See above
Other concerns 4: "Increase crime"	"The crime rate will rise due to refugees' criminal behaviour."	See above
Other concerns 5: "Integrate into labour market"	"Germany will succeed in integrating the refugees into the labour market."	See above
Other concerns 6: "Language skills obstacle"	"Lack of language skills of the refugees are an obstacle for their labour market integration."	See above
Other concerns 7: "Good for economy"	"Overall, the refugees are good for the German economy."	See above

Notes: Table continues on next page.

Table A18 (continued): Wording of survey questions (main survey)

Content	Wording	Type of question
General attitudes 1: "Admit more refugees in future"	"Compared to the current situation, should Germany admit more refugees, less refugees, or the same number in the future?"	Closed-ended, 5 answer categories: much more, somewhat more, the same amount, somewhat less, much less
General attitudes 2: "Number of refugees admitted last year"	"What do you think about the number of refugees which Germany admitted last year?"	Closed-ended, 5 answer categories: far too many, somewhat too many, about the right amount, somewhat too few, far too few
General attitudes 3: "Allowed to stay permanently"	"Do you favour or oppose that refugees are allowed to stay in Germany permanently?"	Closed-ended, 5 answer categories: strongly favour, somewhat favor,neither favor nor oppose, somewhat oppose, strongly oppose
Aspects governing opinion formation process 1: "Humanitarian aspects"	"Humanitarian aspects"	Importance of aspect, closed-ended, 5 answer categories: very important, somewhat important, neither important nor unimportant, somewhat unimportant, very unimportant
Aspects governing opinion formation process 2: "Economic aspects"	"Economic aspects"	See above
Aspects governing opinion formation process 3: "Refugees' willingness to integrate"	"Refugees' willingness to integrate"	See above
Aspects governing opinion formation process 4: "Religion/culture of refugees"	"Religion/culture of refugees"	See above
Aspects governing opinion formation process 5: "Refugees' criminal behaviour"	"Refugees' criminal behaviour"	See above
Aspects governing opinion formation process 6: "Personal experience with refugees"	"Personal experience with refugees"	See above

Appendix B: Description of item count technique (ICT)

The item count technique (ICT) is a well-established experimental survey method to measure the extent of social desirability bias. This bias arises when respondents, instead of answering truthfully, provide answers they believe to be socially desirable (Maccoby & Maccoby 1954, Edwards 1957, Fisher 1993). Our ICT design largely follows that in Coffman et al. (2017). Respondents are randomly assigned to either a direct response group or a veiled response group. (Respondents keep their group assignment for all questions.) Participants in the direct response group are asked to answer a sensitive question directly (e.g., agreement with statement "Economic aspects are important for my opinion formation process toward refugees"). In addition, they are asked to indicate how many other N statements they agree with. These N statements can include sensitive and nonsensitive items. We decided to include other statements on refugees that were not related to the sensitive item of interest. In contrast, respondents in the veiled response group report how many of all N+1 statements (the sensitive statement plus the N other statements) they agree with. These N+1 statements are the same as in the direct response group. The difference in the average agreement with the N+1 statements between the veiled response group and the direct response group is interpreted as the extent of under- or over-reporting due to social desirability bias. Adding this difference to the share of respondents who agree with the sensitive statement in the direct response group yields the true mean share of agreement with the sensitive statement. In addition to using the ICT technique for sensitive statements, we followed Coffman et al. (2017) and conducted an additional ICT experiment for a nonsensitive placebo item ("I used a laptop computer for completing the survey"). This (non-critical) placebo item is unlikely to be affected by social desirability bias, which means that the average agreement with the placebo item should not differ between the direct response group and the veiled response group. To compare average numbers of agreement across the two groups of respondents, the ICT requires that all items are binary. Therefore, we use dummy variables to measure our ICT outcomes in the follow-up survey experiment ("agree" versus "disagree") instead of using five-point scales as in the main survey. Note that the randomization of respondents for the information treatment was completely independent of the randomization of respondents for the ICT.

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