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Why Do Citizens Prefer Highly Skilled Immigrants to Low-Skilled Immigrants? Identifying Causal Mechanisms of Immigration Preferences with a Survey Experiment*

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Abstract

Why do citizens prefer highly skilled immigrants to low-skilled immigrants? To understand the causal mechanism behind this tendency among citizens, we conducted a vignette survey experiment that enables us to clarify the role of multiple mediators. We specifically focused on three key factors that have been proposed in existing research as those that could lead citizens to be more welcoming to highly skilled immigrants: expectations of economic contributions, welfare contributions, and smaller potential for increases in crime rates. Our findings revealed that the effect of immigrants' skill levels on citizens' attitudes was fully mediated by the economic factor. In other words, people welcome high-skilled immigrants simply because they welcome the economic benefits of those immigrants, not because of the expected contributions to welfare or assumptions of low crime levels related to highly skilled immigrants.

Keywords: Immigration, attitudes, voters, political economy, survey experiment

JEL classification: J15, D91

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For decades, it has been claimed that citizens do not prefer immigrants who possess similar skill levels to theirs because skill level evokes economic competition between citizens and immigrants over scarce jobs (i.e., natives are concerned about labor market competition). However, a simple experiment conducted by Hainmueller and Hiscox (2010) provided a strong counterargument to this economic competition theory, showing that citizens consistently preferred high-skilled immigrants to low-skilled immigrants, regardless of their own level of skills, income, and nationalism. Numerous studies have confirmed this tendency across North America, Europe, and Asia (Helbling and Kriesi 2014; Kage, Tanaka, and Rosenbluth 2018). The preference of citizens for high-skilled immigrants seems to be a universal trend.

Despite consistent findings, the reasons for the preference for high-skilled immigrants have not been uncovered. Why do citizens prefer high-skilled immigrants to low-skilled immigrants? Hainmueller and Hiscox (2010) explained citizens' preferences by sociotropic considerations or perceptions that immigrants may bring positive benefits to the local economy as a whole. However, their explanation remains theoretical and has not been empirically tested.¹ To answer this question, we utilized a newly developed experimental method that evaluates causal mediators (Acharya, Blackwell, and Sen, 2018). Conducting a survey experiment in Japan, where citizens prefer high-skilled immigrants to low-skilled immigrants, similar to the U.S. and European contexts (e.g., Kage, Tanaka, and Rosenbluth 2018), we tested three potential mechanisms by which high-skilled immigrants contribute to the destination society: economy, welfare, and safety. Our results show that citizens prefer high-skilled immigrants to low-skilled immigrants because the former are expected to enrich

¹ Some studies attempted to uncover the mechanisms (e.g., Helbling and Kriesi 2014), but they did not directly test them (see Online Appendix A).

their country's economic situation, not because of expectations of welfare contributions or low crime potential.

Three mechanisms

Existing research has proposed three key factors as possible mechanisms that could lead citizens to welcome high-skilled immigrants: expectations of economic contribution, welfare contribution, and small crime potential. First, immigrants' skill level can be a strong signal of their productivity, which may eventually contribute to the country's overall economic situation. Because high-skilled immigrants are perceived to contribute to the economy of the destination society by increasing gross product (Peri 2016) and innovation (Bernstein et al. 2018), citizens are expected to welcome them. Second, immigrants tend to be attracted to destinations that provide high welfare benefits (e.g., Borjas 1999). Citizens tend to exhibit a negative attitude toward immigrants who disproportionately exploit welfare services (e.g., Fox 2004). Because high-skilled immigrants are less likely to increase the welfare burden of the destination country (e.g., Bonin, Raffelhueschen, and Walliser 2000), citizens may form a positive attitude toward such immigrants based on this perspective. Third, public safety concerns are one of the most important factors that shape citizens' attitudes toward immigrants (e.g., Burscher, van Spanje, and de Vreese 2015). Because groups with lower socioeconomic status tend to engage in crimes such as burglary (e.g., Pratt and Cullen 2005), low-skilled immigrants are likely to be associated with a high probability of committing crimes. Indeed, Flores and Schachter (2018) found that citizens associated unemployed and low-status immigrants with illegality in their experimental study. Therefore, citizens may welcome high-skilled immigrants owing to their small crime potential in society.

While multiple studies have shown that citizens prefer high-skilled immigrants to low-skilled immigrants (see Online Appendix A for the list of studies), few studies have carefully investigated the reasons for this tendency. A few exceptions are those that have examined welfare mechanisms. Gerber et al. (2017) asked Americans directly about the perceived influence of low-skilled and high-skilled

immigrants on society. Their findings indicated that low-skilled citizens tended to be more aware of the welfare burden placed on them by low-skilled immigrants. Similarly, Helbling and Kriesi (2014) showed that high-income citizens living in low-tax regions (who cared more about taxes than low-income workers) preferred high-skilled immigrants and concluded that welfare was a mediator. Naumann et al. (2018) also supported this view. However, their findings were based on observational data and have the potential for unobserved heterogeneity. Moreover, in these studies, the income level of citizens was not always linked to concerns about the welfare burden posed by immigrants. This motivated us to evaluate, through experimentation, the mechanisms by which citizens welcome high-skilled immigrants.

Experiment design

We examined the causal mechanisms with the experimental design proposed by Acharya, Blackwell, and Sen (2018). Specifically, we attempted to identify the overall average treatment effect as well as the controlled direct effect of treatment while holding a potential mediation fixed by providing or withholding information on mediating variables in a vignette. We conducted an online survey that included a vignette experiment in March 2020. To conduct the survey, we recruited around 3,000 Japanese participants aged 18–79 years from an opt-in panel, using quota sampling for gender, age group, and prefecture of residence. Detailed information on our survey, including question and vignette wording, is provided in Online Appendix B.

In our survey experiment, after responses to demographic questions, the respondents were exposed to a vignette that described a fictitious 32-year-old Chinese man who wanted to work in Japan and was seeking future permanent residency status. We asked Japanese respondents whether they would grant a three- to five-year working visa to this person if they were an immigration officer. Their responses were recorded as a dichotomous measure, which was the outcome variable of this study.

We manipulated both the main treatment (the immigrant’s skill level) and possible mediators (the immigrant’s economic contribution, welfare contribution, and criminal potential) simultaneously in the vignette. For some of the respondents, we informed them of only the immigrant’s skill level, manipulated by his educational attainment (technical high school or master’s degree in computer science) and former job type (plumber or software engineer). Following Acharya, Blackwell, and Sen (2018), we called this condition the natural-mediator arm (NMA). For the rest of the respondents, we provided information related to one of the possible mediators about the immigrant as well as his skills, which we call manipulated-mediator arms (MMAs). Thus, we randomly assigned respondents to one of eight groups: two patterns of NMA and six patterns of MMA.²

In our design, all mediator-related information was associated with concerns that could be used against the immigrant and possibly eliminate his skill bonus. In the economic MMA, the immigrant mentions that he wants to serve in a convenience store as a clerk (irrespective of his skill level; it is the same as the other MMAs). In the welfare MMA, the immigrant mentions that he is willing to use the public health insurance system to receive treatment for his chronic asthma. In the criminal MMA, the immigrant is said to have been caught shoplifting comic books when he was 16 years old.

The essence of this experimental design is that the mediators depend on the respondents’ guesses in the NMA, while a causal path through one of the possible mediators is blocked in the MMAs. This enables us to examine the extent to which each possible mediator works by comparing the treatment effect of an immigrant’s skill level on the approval rate between the NMA and corresponding MMA. For example, if respondents have a greater preference for high-skilled

² The results of equivalent tests as a covariate balance check and factual manipulation check are shown in Online Appendix C.

immigrants because they expect them to contribute to the country’s economy, they should not welcome immigrants when they know they will engage in low-skilled jobs with limited contributions to the economy (i.e., store clerk), even if the immigrant is, in fact, a high-skilled person. Conversely, if the effect of skill level remains positive in the economic MMA, we can conclude that the economic contribution factor does not function as a mediator.

Formally, for each possible mediator, we pooled respondents in the NMA and corresponding MMA and estimated the following linear probability model:

$$Y_i = \alpha + \beta_1 W_i + \beta_2 Z_i + \beta_3 W_i Z_i + \varepsilon_i, \quad (1)$$

where, for respondent i , Y_i is an outcome variable (1 = approve a visa, 0 = do not approve a visa), W_i indicates a treatment condition (1 = high skill, 0 = low skill), Z_i indicates a mediator arm (1 = NMA, 0 = MMA), and ε_i is an error term.³

Using Acharya, Blackwell, and Sen’s (2018) terms, our quantity of interest was the average natural indirect effect (ANIE). For our case, this quantity indicated the difference in the approval probability between when respondents would guess a mediator based on the high-skill information and when they would guess so based on the low-skill information, holding the actual immigrants’ skill level constant at a high level. If the ANIE is positive, we can conclude that the mediator mediates an immigrant’s skill and the approval of a visa. The related quantity is the eliminated effect (EE), defined by subtracting the average controlled direct effect (ACDE), which is the effect of having high skill when information about the mediator is provided, from the average treatment effects (ATE) of an immigrant’s high skill in the NMA. In the above model, ACDE and EE are represented by β_1 and β_3 , respectively. Table 1 summarizes the relationships between these quantities and parameters in Model (1).

³ The details of our inference of this model are shown in Online Appendix D.

Table 1. Relationship between the parameters of the linear probability model and the ATE, ACDE, and EE.

	Treatment $W = 1$	Control $W = 0$	Difference
NMA $Z = 1$	$\alpha + \beta_1 + \beta_2 + \beta_3$	$\alpha + \beta_2$	ATE $\beta_1 + \beta_3$
MMA $Z = 0$	$\alpha + \beta_1$	α	ACDE β_1
Difference	$\beta_2 + \beta_3$	β_2	EE β_3

Note. This table derives from Table 1 of Acharya, Blackwell, and Sen (2018), but we replaced the original potential-outcome notations in the cells with our regression parameters for our explanation purposes.

EE is the ANIE plus average reference interaction (ARI). In our experiment, the ARI was the difference between the effect of an immigrant’s skill level when the mediator was inferred, given that he was low-skilled, and the effect of his skill level when the information about the mediator was provided. If we assume that the ARI is negligible, we can see the ANIE by estimating the EE (i.e., β_3).⁴ That is, we can infer which of the three factors (economy, welfare, and crime) mediate the effects of high-skilled workers by estimating the parameters of Model (1).

Results

Figure 1 illustrates the results of our analyses.⁵ In the NMA, the approval rate for a low-skilled immigrant was 63.2%, and the corresponding value for a high-skilled immigrant was 73.7%, indicating that respondents generally welcomed the immigrant whose profile was displayed in our survey. These results also indicate that, in line with the findings of previous studies, respondents were more likely to give a visa to a high-skilled immigrant than a low-skilled immigrant by 10.4 percentage points. This

⁴ We summarize these quantities applied to our experiment using the potential outcome framework in Online Appendix E.

⁵ More detailed results are shown in Online Appendix F.

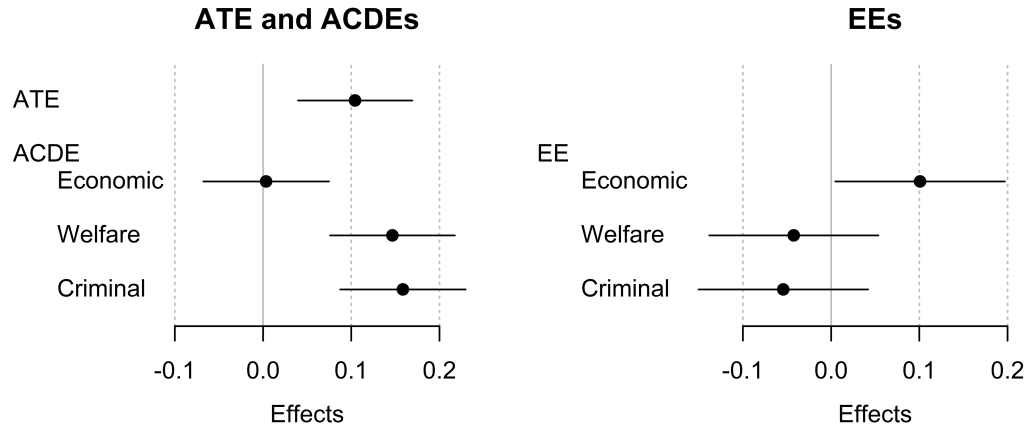


Figure 1. Estimation results of the average treatment effect (ATE) of an immigrant’s high skill on respondents’ approval of his visa, the average controlled direct effect (ACDE) of high skill fixing each mediator, and the eliminated effect (EE) for each mediator. Dots are point estimates, and segments represent 95% confidence intervals based on HC2 robust standard errors.

difference corresponded to the ATE of the immigrant’s high skill on the respondents’ approval of his working visa, which is shown in the first row of the left panel of Figure 1.

We observed striking results for economic MMA. The ACDE was estimated to be almost zero. In contrast, the estimated EE was 10.1 percentage points, which was nearly equal to the estimated ATE and statistically significant at the 5% level. These results indicate that the effect of having high skill was perfectly eliminated by informing respondents of an immigrant’s plan to not seek a high-skilled job. Such a complete elimination of the skill premium by the economic contribution led us to expect that the other possible mediators would not work, and the results corroborate our expectations. As for the welfare MMA and the criminal MMA, the ACDEs were estimated to be positive, while the estimated EEs were not statistically distinguishable from zero. In other words, neither the information about an immigrant’s willingness to use welfare resources nor the information about an immigrant’s crime potential changed the effect of having high skill.⁶

⁶ For the crime condition, we used a history of shoplifting when the hypothetical immigrant was young. Some may wonder shoplifting is a weak stimulus. However, the difference between NMA

To identify the EE for the economic MMA with the ANIE, we must assume that the ARI is close to zero, which is a potential limitation of this experimental design. However, we believe this assumption is plausible in our case because most respondents were likely to expect that an immigrant would become an unskilled worker (consequently, his economic contribution would be limited) in Japan if they were informed that he was low-skilled (see Online Appendix H for more details). Therefore, we can conclude that the respondents' expectations of an immigrant's economic contribution mediated his skill level and their preference for his entrance into the country.

Conclusion

Numerous studies have shown that citizens consistently prefer high-skilled immigrants to low-skilled immigrants. However, it remains unclear why citizens prefer to accept high-skilled immigrants despite concerns that they would compete in the labor market. Citizens' concerns associated with ethnocentrism cannot solve this puzzle. To understand the causal mechanisms behind this tendency, we conducted a survey experiment using a newly developed method to evaluate competing mediators. Among the three key factors that have been proposed in existing research as a possible source of the premium attached to highly skilled immigrants, our findings revealed that neither the expected alleviation of the welfare burden nor the low crime potential mediated citizens' attitudes toward immigrants. We found the potential of their contributions to the economy to be the sole driver of citizens' preference for high-skilled immigrants.

and MMA is the largest for the crime condition than other conditions, indicating that shoplifting is a sufficiently strong stimulus. We illustrate this point in Online Appendix G.

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Online Appendix for

“Why Do Citizens Prefer High-Skilled Immigrants to Low-Skilled Immigrants?”

Identifying Causal Mechanisms of Immigration Preferences with a Survey Experiment”

A. List of experimental studies that compare preferences for high-skilled and low-skilled immigrants

(* Starred papers investigated the mediation mechanisms, described in the following paragraph.)

Aalberg, T., Iyengar, S., & Messing, S. (2012). Who is a ‘deserving’ immigrant? An experimental study of Norwegian attitudes. *Scandinavian Political Studies*, 35(2), 97-116.

Alrababa’h, A., Dillon, A., Williamson, S., Hainmueller, J., Hangartner, D., & Weinstein, J. (2019). Attitudes toward migrants in a highly impacted economy: evidence from the Syrian refugee crisis in Jordan. *Comparative Political Studies*, 0010414020919910.

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B. Details of this study's survey

B.1 Sample

The survey was conducted in March 2020. We asked Rakuten Insight, Inc., one of the largest online research companies in Japan, to recruit survey participants from its opt-in panel. We employed quota sampling to adjust the joint distribution of gender, age group (18–19, 20s, 30s, 40s, 50s, 60s, and 70s), and the prefecture of residence to the 2015 national census. The company provided the data of 3,000 respondents after dropping the following: (1) those who chose “other” as their gender, (2) those who chose “17 or less” or “80 or more” as their age, (3) those who chose “overseas” as their prefecture of residence, (4) those who failed to pass an instructional manipulation check (IMC) before our experiment.

The question phrasing of the IMC was, “Currently, many people access news from online media, rather than newspapers. We are trying to check whether you are reading the questions attentively. Regardless of how frequently you access news from online media, please choose both “everyday” and “not at all” from the answer options.” The options were “everyday,” “several times per week,” “several times per month,” “several times per year,” and “not at all.” For respondents who

failed to pass the IMC, we immediately asked them to answer the same question again. Those who failed to pass the follow-up IMC were excluded.

The survey included not only this study's experiment but also several other experiments. Because these other experiments addressed topics not related to immigration, we consider that they did not affect the results of this study.

B.2 Vignettes and question wording

The question and options were as follows:

次に示す中国出身の男性が、日本での就労を希望し、3～5年の在留資格を申請しています。あなたが審査官だとしたら、この男性に在留許可を与えますか、与えませんか。

1. 在留許可を与える
2. 在留許可を与えない

The man from China described below wants to work in Japan and is applying for a three- to five-year visa. If you are an immigration officer, do you approve his visa?

1. Approve his visa
2. Do not approve his visa

We randomly showed each respondent one of the following eight vignettes.

High skill, NMA

陳龍さんは中国出身の32歳の男性で、現在は上海に住んでいますが、日本で職を探して働きたいと考えています。大学院でコンピュータサイエンスの修士号を取得し、これまではシステムエンジニアとして働いていました。日本の漫画やアニメが好きで、日本語を少し話すことができます。将来的には、日本で永住権を取得したいと考えています。

Chen Long, a 32-year-old man born in China, who now lives in Shanghai, hopes to find a job and work in Japan. He received his master's degree in computer science from a graduate school and has

worked as a systems engineer. He likes Japanese manga and anime and can speak some Japanese. He wishes to obtain permanent residency in Japan in the future.

Low skill, NMA

陳龍さんは中国出身の 32 歳の男性で、現在は上海に住んでいますが、日本で職を探して働きたいと考えています。工業高校を卒業し、これまでは配管工として働いていました。日本の漫画やアニメが好きで、日本語を少し話すことができます。将来的には、日本で永住権を取得したいと考えています。

Chen Long, a 32-year-old man born in China, who now lives in Shanghai, hopes to find a job and work in Japan. He completed a technical high school and has worked as a plumber. He likes Japanese manga and anime and can speak some Japanese. He wishes to obtain permanent residency in Japan in the future.

High skill, economic MMA

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Chen Long, a 32-year-old man born in China, who now lives in Shanghai, hopes to find a job and work in Japan. He received his master's degree in computer science from a graduate school and has worked as a systems engineer, but he wants to serve in a convenience store as a clerk. He likes Japanese manga and anime and can speak some Japanese. He wishes to obtain permanent residency in Japan in the future.

Low skill, economic MMA

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High skill, welfare MMA

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Chen Long, a 32-year-old man born in China, who now lives in Shanghai, hopes to find a job and work in Japan. He received his master's degree in computer science from a graduate school and worked as a system engineer. He likes Japanese manga and anime and can speak Japanese. He has chronic asthma and plans to receive treatment using the Japanese health insurance system after coming to Japan. He wishes to obtain permanent residency in Japan in the future.

Low skill, welfare MMA

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Chen Long, a 32-year-old man born in China, who now lives in Shanghai, hopes to find a job and work in Japan. He completed a technical high school and has worked as a plumber. He likes Japanese manga and anime and can speak some Japanese. He has chronic asthma and plans to receive treatment using the Japanese health insurance system after coming to Japan. He wishes to obtain permanent residency in Japan in the future.

High skill, criminal MMA

陳龍さんは中国出身の 32 歳の男性で、現在は上海に住んでいますが、日本で職を探して働きたいと考えています。大学院でコンピュータサイエンスの修士号を取得し、これまではシステムエンジニアとして働いていました。日本の漫画やアニメが好きで、日本語を少し話すことができます。16 歳のときに書店で漫画を万引きして補導された過去があります。将来的には、日本で永住権を取得したいと考えています。

Chen Long, a 32-year-old man born in China, who now lives in Shanghai, hopes to find a job and work in Japan. He received his master's degree in computer science from a graduate school and has worked as a systems engineer. He likes Japanese manga and anime and can speak some Japanese. He was arrested for shoplifting comic books in a bookstore when he was 16 years old. He wishes to obtain permanent residency in Japan in the future.

Low skill, criminal MMA

陳龍さんは中国出身の 32 歳の男性で、現在は上海に住んでいますが、日本で職を探して働きたいと考えています。工業高校を卒業し、これまでは配管工として働いていました。日本の漫画

やアニメが好きで、日本語を少し話すことができます。16歳のときに書店で漫画を万引きして補導された過去があります。将来的には、日本で永住権を取得したいと考えています。

Chen Long, a 32-year-old man born in China, who now lives in Shanghai, hopes to find a job and work in Japan. He completed a technical high school and has worked as a plumber. He likes Japanese manga and anime and can speak some Japanese. He was arrested for shoplifting comic books in a bookstore when he was 16 years old. He wishes to obtain permanent residency in Japan in the future.

Table A1. Number of respondents in each experimental group

	Treatment group (high skill)	Control group (low skill)	Total
NMA	376	408	784
MMA			
Economic	369	386	755
Welfare	351	363	714
Criminal	360	387	747
Total	1,456	1,544	3,000

Table A1 shows the number of respondents assigned to each experimental condition.

C. Performance of randomized treatment assignment

C.1 Covariate balance check

Recent studies have recommended equivalence tests (instead of the null hypothesis testing of no difference) as a tool for balance checking (e.g., Hartman and Hidalgo 2018), and we also followed this trend. Because this study had eight experimental conditions, the two one-sided test, which is the most commonly used equivalence test method for balance checking in political science literature, was not suitable. Therefore, we adopted the *F*-test of equivalence for three or more independent groups, as proposed by Wellek (2010).

Because the survey was omnibus one, it included some demographic and pretreatment political variables prepared for studies other than ours, and we checked the balance of these variables across

the eight groups. These variables included gender, age, education (we created three dummies: high school or lower, more than high school and less than college, and college or higher), household income (there were 17 options from less than a million to 50 million yen or more, and we treated this as a continuous variable), self-reported political knowledge (five-point scale), partisanship (we created three dummies: government party supporters, opposition party supporters, and independents), and ideological self-identification (five-point scale from very progressive/left to very conservative/right). We set the significance level α to 0.05, and the tolerance parameter ε to 0.25, which is the conventional choice for strict comparisons. See Chapter 7.2 of Wellek (2010) for details of the testing procedure.

Table A2 shows the results of the equivalence tests, along with the means of covariates in each experimental condition. We found that the null hypotheses of nonequivalence were rejected for all the 11 covariates listed above. Therefore, we can conclude that the random assignment of respondents to experimental groups was properly conducted.

Table A2. Means of covariates in each experimental condition and results of equivalence tests

	Experimental condition								Equiv. test
	H-N	H-E	H-W	H-C	L-N	L-E	L-W	L-C	
Gender	0.45	0.48	0.49	0.56	0.52	0.50	0.51	0.50	Pass
Age	49.35	48.89	49.15	50.14	50.83	49.33	50.04	49.28	Pass
Low education	0.32	0.31	0.26	0.30	0.26	0.26	0.28	0.26	Pass
Middle education	0.20	0.21	0.23	0.26	0.24	0.20	0.19	0.21	Pass
High education	0.48	0.48	0.51	0.44	0.50	0.54	0.53	0.52	Pass
Income	5.82	5.69	5.70	5.84	5.48	5.60	5.73	5.42	Pass
Knowledge	3.26	3.27	3.24	3.39	3.31	3.18	3.28	3.29	Pass
Government party	0.34	0.36	0.34	0.32	0.30	0.32	0.36	0.29	Pass
Opposition party	0.18	0.20	0.22	0.20	0.18	0.21	0.20	0.20	Pass
Independent	0.48	0.44	0.44	0.48	0.52	0.47	0.44	0.51	Pass
Ideology	3.19	3.19	3.19	3.10	3.10	3.13	3.19	3.10	Pass

Note. For the experimental conditions, H and L refer to the high- and low-skill conditions, respectively; N means the NMA; and E, W, and C mean economic, welfare, and criminal MMA, respectively. The last column indicates whether each variable passed the F -test of equivalence.

C.2 Factual manipulation check

After the above question, we conducted the following factual manipulation check.

先ほど登場した中国出身の男性について、中国で働いていた時の職業は何でしたでしょうか。

次の選択肢の中から一つお選びください。

1. システムエンジニア
2. 配管工
3. 通訳
4. タクシー運転手
5. 覚えていない

What was the job that the man we described earlier occupied? Please select it from the following options:

1. Systems engineer
2. Plumber
3. Translator
4. Taxi driver
5. Do not remember

The proportion of respondents who were assigned to the high-skill condition and chose the correct answer (systems engineer) was 79.7%, and the corresponding value for the low-skill condition was 71.4%. Most respondents who did not pass this manipulation check said they did not remember the immigrant's former job (17.4% and 20.9% for the high- and low-skill conditions, respectively). Although our manipulation of the immigrant's skill may not have been perfect, it biased our estimates toward zero and provided conservative results.

D. Estimation procedure

We used R version 3.6.2 (R Core Team 2019) and estimate package version 0.22.0 (Blair et al. 2020) to estimate the parameters of the linear probability model introduced in the main text. The parameters were estimated using ordinary least squares. We employed White (HC2) robust standard errors, which coincide with the Neyman variance estimator and are suitable for randomized experiments (Samii and Aronow 2012) to evaluate estimation uncertainty.

E. Quantity of interest and related concepts

Based on Acharya, Blackwell, and Sen (2018), we summarize the definition of several quantities introduced in the main text and their relationship with each other and apply them to our case. We use the economic MMA as an example and assume that we analyze the pooled data of respondents assigned to either the NMA or the economic MMA, but the same is true for the other MMAs.

Let T_i, M_i, Y_i be respondent i 's main treatment, potential mediator, and potential outcome, respectively. $T_i \in \{H, L\}$, where H and L indicate that an immigrant is high-skilled and low-skilled, respectively. $M_i \in \{G, B\}$, where G and B indicate that respondent i considered the immigrant would make a good and bad (or no) contribution to the Japanese economy, respectively. Y_i is a dummy variable indicating that respondent i approved the immigrant's visa.

We introduce $D_i \in \{N, B\}$, which indicates whether respondent i is assigned to the NMA ($D_i = N$) or economic MMA ($D_i = B$). We notate $M_i(t, d)$ as respondent i 's potential mediator when $T_i = t$ and $D_i = d$. We assume that $M_i(t, B) = B$; that is, the respondents thought that an immigrant would make a bad (or no) contribution to the Japanese economy if they were informed that he would work as a shoe clerk.

We also note $Y_i(t, m, d)$ as respondent i 's potential outcome when $T_i = t$, $M_i = m$, and $D_i = d$. Here, we introduce the following manipulation exclusion restriction assumption: information on an immigrant's job in Japan influenced the respondents' decision on the approval of his visa only through their perception of his contribution to the Japanese economy. Then, $Y_i(t, m, d)$ is reduced to $Y_i(t, m)$.

Our quantity of interest, the ANIE, is expressed as follows:

$$ANIE(H, L) = E[Y_i(H, M_i(H, N)) - Y_i(H, M_i(L, N))].$$

The ANIE is the difference in the approval probability between when respondents would make guesses about an immigrant's economic contribution based on the high-skill information and when they would make such guesses based on the low-skill information, holding the actual immigrants' skill level constant at a high level.

We explain the relationship between ANIE and EE. EE is defined as the subtraction of the ACDE from the ATE. The ATE is

$$\begin{aligned} ATE(H, L) &= E[Y_i(H) - Y_i(L)] \\ &= E[Y_i(H, M_i(H, N)) - Y_i(L, M_i(L, N))]. \end{aligned}$$

The ACDE for mediator B is

$$ACDE(H, L, B) = E[Y_i(H, B) - Y_i(L, B)],$$

which represents the effect of the immigrant's skill when his economic contribution is perceived as bad. The (average of) EE is

$$\begin{aligned} EE(H, L, B) &= ATE(H, L) - ACDE(H, L, B) \\ &= E\left[\left(Y_i(H, M_i(H, N)) - Y_i(L, M_i(L, N))\right) - \left(Y_i(H, B) - Y_i(L, B)\right)\right] \\ &= ANIE(H, L) + E\left[\left(Y_i(H, M_i(L, N)) - Y_i(L, M_i(L, N))\right) - \left(Y_i(H, B) - Y_i(L, B)\right)\right]. \end{aligned}$$

The second part of the right-hand side is called the ARI. The ARI is the difference between the effect of the immigrant’s skill when the mediator is inferred, given that he is low-skilled (the first parenthesis in the expectation) and the effect of his skill when his economic contribution is perceived as bad (the second parenthesis in the expectation, which is equal to the ACDE).

F. Detailed results

Table A3 shows the estimation results of the parameters.

Table A3. Estimation results of the parameters

	ATE (only NMA)			Economic		
	Est.	S.E.	<i>p</i>	Est.	S.E.	<i>p</i>
Intercept	0.632	0.024	0.000	0.547	0.025	0.000
High skill	0.104	0.033	0.002	0.004	0.036	0.923
NMA				0.086	0.035	0.014
High skill × NMA				0.101	0.049	0.040
N		784			1,539	

	Welfare			Criminal		
	Est.	S.E.	<i>p</i>	Est.	S.E.	<i>p</i>
Intercept	0.540	0.026	0.000	0.411	0.025	0.000
High skill	0.147	0.036	0.000	0.159	0.036	0.000
NMA	0.092	0.035	0.009	0.222	0.035	0.000
High skill × NMA	−0.042	0.049	0.387	−0.054	0.049	0.268
N		1,498			1,531	

Note. Est. refers to point estimates based on ordinary least squares. S.E. represents HC2 robust standard errors.

G. Discussion of the strength of stimuli in the MMAs

We intended to reduce the approval rate of an immigrant’s visa among the respondents by providing them with additional information in the MMAs (i.e., information that the immigrant wanted to serve in a convenience store as a clerk, that the immigrant planned to receive treatment using the Japanese health insurance system after coming to Japan, or that the immigrant had been arrested for shoplifting comic books in a bookstore when he was 16 years old). We hypothesized that the reduction in approval

rate should be greater in the high-skill condition than in the low-skill condition. One possible criticism of our approach is that positive EEs may not have been observed in the welfare and criminal MMAs because their additional information stimuli were only weak. In particular, some readers may suspect that our scenario in the criminal MMA using the immigrant’s history of shoplifting at the age of 16 would fail to remind respondents of the possibility that he would commit a crime after coming to Japan.

We deliberately used information on minor crimes in his youth because, in reality, a person with a criminal record is highly unlikely to be approved to enter Japan. Moreover, the additional information in the MMAs was a sufficiently large stimulus, especially in the criminal MMA. We can see this from the values in the rows labeled “NMA” in Table A3, which show the estimated results of β_2 in Equation (1) in the main text. β_2 indicates how much higher the approval rate is when no additional information is given, compared to when it is, while fixing the immigrant’s skill level at a low level. This coefficient was estimated to be positive and statistically significant in all the MMAs. Specifically, given that the immigrant was low-skilled, information that he was hoping to work as a clerk in a convenience store reduced the approval rate by 8.6 percentage points. The same effect of the information that the immigrant intended to utilize the Japanese health insurance system was shown by 9.2 percentage points. Notably, the information that the immigrant had shoplifted during adolescence had a considerably larger effect (22.2 percentage points). These results suggest that the manipulations in the MMAs were adequately large and impactful.

H. Discussion of the negligible ARI assumption for the economic MMA

In our case, it is reasonable to assume that the ARI will be close to zero because we considered that most respondents would imagine the immigrant would be occupied in an unskilled job as a shop clerk if they knew he was low-skilled. For example, if we denote “the respondent’s estimate of an

immigrant's economic contribution given the information that he is low-skilled," then ARI is (A) "the average effect of his skill level on the visa approval rate when his economic contribution is X" minus (B) "the average effect of his skill level on the visa approval rate given the information that his economic contribution is low." Given the information that he is low-skilled, we can assume that "his economic contribution X is low" for most respondents because we can expect that most respondents will assume that he will get a low-skilled job in Japan (they will not expect a low-skilled person to come to Japan and suddenly get a high-skilled job). Then, (A) becomes "the average effect of his skill level on the visa approval rate when his economic contribution is low," which is exactly the same as (B). Because ARI is the difference between (A) and (B), we can claim that the API is zero.

More formally, given the manipulation exclusion restriction assumption, the negligible ARI assumption means that we can assume $M_i(L, N) = B$, which leads to the following equation:

$$\begin{aligned}
 EE(H, L, B) &= ANIE(H, L) + E[(Y_i(H, B) - Y_i(L, B)) - (Y_i(H, B) - Y_i(L, B))] \\
 &= ANIE(H, L).
 \end{aligned}$$

Therefore, if we estimate the EE, we can approximate this to the ANIE.

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