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Labor Market Competition and Attitudes toward Immigrants: New Evidence from Asia

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Abstract

Immigrants in a destination country both alter the prospects of economic development and influence the livelihood of natives. Using data from 10 Asian countries in the 2018-2020 World Value Survey (WVS), we provide new evidence regarding the impact of skill-driven labor market competition on natives' attitudes toward immigrants. Linking information on occupation-specific human capital accumulation from O*NET to WVS, we explore granular dimensions of natives' skills and their implications for labor market competition and vulnerability. To account for the possibility of reverse causality (selection in natives' occupational choices resulting from natives' inherent preferences toward immigrants), we run the two-stage instrumental variable estimator adopting the control function approach. Holding educational levels constant, we find that natives with greater manual skills and fewer communication skills are more likely to be pro-immigration. We also find that the links between manual skills and attitudes are driven primarily by the level of flexibility in natives' skills, while the negative impacts of communication skills are driven by natives' writing abilities. Our results offer important insights for policymakers in Asia to establish nuanced immigration policies and skill-development programs that account for their impacts on intergroup labor market competition and social cohesion.

Keywords: attitudes, immigration, labor market competition, skills, human capital accumulation, control function approach

JEL: F66, F68, J61, J68

Introduction

Migration is one of the most debated topics in public policy. Around the world, there is an active debate about how to manage the social, economic, and political pressures associated with migration, as well as public concerns about immigration. Immigration generates important benefits, such as filling labor shortages or stimulating growth, for economic development in destination countries. At the same time, immigration may fuel natives' concerns regarding increasing labor market competition, the burden on public safety-nets, and ethnic and cultural conflicts. Native sentiments toward immigration can influence not only a nation's future immigration policies and openness but also its social cohesion.

Fueled by these concerns, a large body of scholarly work has drawn attention to natives' attitudes toward international migration in destination countries. Natives may express hostility toward immigrants due to the cultural or economic threats immigrants pose (Scheve & Slaughter 2001; Mayda 2006; Brader et al. 2008; Adida et al. 2010, 2016; Hellwig & Sinno 2017). Cultural threats affecting natives' beliefs include religious affiliation (Anderson & Ferguson 2018; Deslandes & Anderson 2019), racial or cultural prejudice (Dustmann and Preston 2007), and stereotypes and misperceptions of immigrants (Grigorieff et al. 2020; Hainmueller & Hangartner 2013). Economic concerns affecting native attitudes towards immigrants include the fiscal burden of social welfare for immigrants (e.g., Borjas 1999; Facchini & Mayda 2009; Hanson 2007), and native workers' sense of financial security (Goldstein and Peters 2014). Heightened labor market competition from foreign workers is another major economic threat that drives natives' negative sentiments toward immigrants (Mayda, 2006; Ortega & Polavieja, 2012).

With respect to the nature of the labor market competition, the key insight from canonical frameworks is that workers compete against one another within their *own skill-levels* (Borjas 2003,

2006; Mayda 2006). Frameworks recognizing this are broader than those conjecturing that competition exists only within the same occupation or industry, and account for competition individuals face even after switching jobs. Past research typically focus on educational attainment as the main measure of workers' skill-levels. Studies have found a strong positive link between education and pro-immigration sentiments (Hainmueller et al., 2015; Mayda, 2006; Ortega & Polavieja, 2012; Scheve & Slaughter, 2001). Such positive attitudes of highly-educated natives need to be understood in light of the fact that the foreign-born workers in these countries are predominantly low-skilled. Faced with weaker competition from similarly- educated (i.e., highly educated) foreign labor, highly educated natives tend to display more favorable views towards immigrants than the less-educated natives do (Mayda, 2006; Scheve & Slaughter, 2001).¹

Increasingly, however, there is a growing recognition that education is an incomplete measure of individuals' skills. Recent research on labor market competition between native and foreign-born workers have explored various more refined skill measures based on the actual tasks that workers carry out, in addition to their formal education (Ortega & Polavieja, 2012; Peri & Ottaviano, 2006; Peri & Sparber, 2009). These studies examined the impact of *occupation-specific human capital* or '*skills*' on labor-market outcomes for native and foreign-born workers. Relatedly, research on skills and technology have shown that there is possibly a low correlation between education and skills—indicating that having more years of education does not imply that this individual has better skills across all dimensions than a worker with fewer years of education (Lee, 2021, 2023).² Moreover, education is not a good indicator of the extent of labor market

¹ A divergent finding comes from the work of Hainmueller et al. (2015), which suggested that highly educated natives have more positive attitudes toward both highly skilled and low-skilled immigrants. Having found that concerns about the labor market competition does not act as a powerful determinant, the authors explained their results with the open-economy model of Heckscher-Ohlin (Leamer and Levinsohn, 1995), which suggested that, for nations with open economies, trade can offset the negative impact of immigration on natives' wages.

² For example, while a bachelor's degree may help an individual become a better office-worker, it may not help that individual become a better hairdresser.

vulnerability a worker may face. Indeed, we have witnessed a non-monotonic relationship between education and labor market outcomes since the 1990s due to *job polarization*, leading to greater labor demands for both less-educated and highly-educated job-holders but less demands for those in the middle (Acemoglu & Autor, 2011, 2012; Buyst et al., 2018; Frey, 2019). These insights have prompted researchers to search for better, more refined measures of labor market competition between natives and immigrants.

In this paper, we examine the effect of skill-driven labor market competition on natives' attitudes toward immigration policies using more granular measures of skills than those in previous research. We analyze World Values Survey (WVS) data gathered from 2018 to 2020 in ten Asian countries: Bangladesh, Indonesia, Japan, Malaysia, Myanmar, Philippines, Singapore, South Korea, Thailand, and Vietnam. In addition to standard demographic and socioeconomic variables, the WVS includes questions on respondents' sentiments toward immigrants and immigration policies. We merge the WVS data with ILO (2018), OECD (2021), and national census data on the share that immigrants have of each occupation in a country. This allows us to assess natives' immigration policy preferences in light of the existing share of foreign labor in their occupational groups. We also merge WVS data with Occupational Information Network (O*NET) data on respondents' current occupations, in order to measure occupation-specific human capital accumulation, i.e., skills.

We analyze the effects of native workers' skills on their attitudes toward immigration in two ways. First, using two dimensions of skills (i.e., manual skills and communication skills) as the main explanatory variables, we run probit regressions to assess whether natives' skills—dictating their labor market vulnerabilities as well as competition from immigrants—affect their attitudes toward immigration policies. It is possible for natives with certain preferences toward

immigrants to self-select into jobs (e.g., those who fear competition from immigrants may select into jobs whose holders are homogenous by ethnicity or nationality). Acknowledging that such selection into jobs can dictate the extent of skills and human capital that natives accumulate, we account for potential endogeneity in our skill measures by instrumenting them with their regional averages—using the region of residence.³ Through control function approach (Wooldridge, 2015), we find, holding educational level constant, that natives with greater manual skills and fewer communication skills are more likely to support pro-immigrant policies. We also find natives with higher educational attainment have more pro-immigration sentiments.

Second, to examine *more granular dimensions* of skills than the those considered in previous research (Ortega & Polavieja, 2012; Peri & Sparber, 2009), we re-run the probit and control function two-stage estimations by replacing the manual and communication skills with their individual components (dexterity, flexibility, and strength for manual skills; oral and written abilities for communication skills). We find that the positive link between manual skills and pro-immigration attitudes is driven primarily by the level of flexibility that native workers have. The negative association between communication skills and pro-immigration attitudes is generated by natives' written communication abilities.

Our study makes several contributions. First, in addition to using actual skill dimensions, we explore more granular dimensions of skills than previously analyzed (e.g., Ortega & Polavieja, 2012; Peri and Sparber, 2009). As stated earlier, most studies only proxy individuals' skills with educational attainment (Haaland & Roth 2020; Hainmueller et al. 2015). By assessing how manual and communication skills and their components affect natives' attitudes towards immigration, we connect the framework on immigration and competition literature to that on technological changes.

³ The guiding assumption here is that the natives' preferences toward immigrants do *not* dictate where they choose to live—at least not at the regional level.

In doing so, we contend that natives' attitudes toward immigrants and immigration policies are shaped by *perceived overall labor market vulnerabilities*—which stem from a complex array of drivers including not only competition from immigrants but also other major determinants of labor demands, such as automation pressures. (Acemoglu & Autor, 2011; Acemoglu & Restrepo, 2019; Frey & Osborne, 2017).

Our second contribution lies in providing empirical evidence regarding these questions within Asia. Previous research tended to focus on Western contexts (e.g., Mayda, 2006; Ortega & Polavieja, 2012). Little is known about natives' sentiments—especially regarding how their skills affect them—in Asia. This is particularly notable given the growing popularity of many Asian nations as destinations for migration in the 21st century. While a few studies suggested that natives' views on immigrants in Asian countries are shaped predominantly by economic conditions rather than social, political, or cultural concerns (Barceló, 2016; Gonnot et al., 2020), there is scant evidence on whether the labor market competition can affect the natives' attitudes toward immigrants as it does in the West. We address this research gap in our present paper.

We organize our paper as follows. The 'Background' section presents a literature review of the influence of labor market competition on natives' attitudes toward immigrants. The 'Methods' section presents the data, skill variables, covariates, and the descriptive statistics of the sample. The 'Estimation' section describes our empirical methodology. The 'Results' section presents our empirical results on the links between the natives' skills and their immigration policy preferences. The 'Discussion' section interprets our results. Our 'Conclusion' section summarizes the key insights and policy implications.

Background

Labor Market Competition, Vulnerability, and Natives' Attitudes toward Immigrants

Existing studies examining the effect of labor market competition on natives' attitudes often proxy individual skills with educational attainment (Facchini & Mayda, 2009; Hainmueller et al., 2015; Hainmueller & Hiscox, 2010; Scheve & Slaughter, 2001).⁴ Yet, the canonical frameworks on the labor market competition suggest a broader interpretation: Workers compete against one another within their own *skill* levels (Borjas, 2003, 2006), which cannot be fully represented by the educational attainment. In the same vein, studies have shown that the labor market effect of immigration on the natives depends on the substitutability between natives and migrant workers with comparable characteristics—which is, in turn, dictated by individuals' *human capital accumulation* or *skills* (Ottaviano and Peri, 2006, 2008; Peri and Sparber, 2009). Ideally, possessing unique skills, native and immigrant workers of a similar educational background can specialize in different occupational tasks. Their different skills would mitigate the declines in employers' demands of the natives following the immigration inflows (Ottaviano & Peri, 2006, 2008).

Peri and Sparber (2009) further postulated that immigrants may have weaker communication skills but stronger physical or 'manual' skills than native workers with similar educational attainment. In such a scenario, there would not be large negative consequences on

⁴ Assuming that immigrants are—on average—less educated (less-skilled) than natives, we may expect less-educated natives will oppose immigration so as to avoid depressing their wages and job prospects. In contrast, we may expect highly educated natives to be relatively more pro-immigrant (Hainmueller & Hiscox 2010; Scheve & Slaughter 2001 in the United States; Dustmann & Preston 2007 in the United Kingdom). Previous research followed the insights from the *factors-proportions model*, which assumes that natives and immigrants are perfect substitutes at each educational level in a closed economy, i.e., one without trading activities with other nations (Borjas 2003, 2006). Given that they are often willing to work at lower wages, immigrants lower the demands for native workers with similar educational backgrounds, leading to reduced labor demand for native labor (Borjas, 2003; Aydemir and Borjas, 2007; Mayda, 2006).

natives' wages or labor demands when immigration is followed by productivity gains resulting from the specialization of foreign-borns and natives with similar educational backgrounds. Using decennial U.S. Census data from 1960 and 2000, Peri and Sparber (2009) demonstrated that the empirical evidence supported their key insights.⁵ In demonstrating this, Peri and Sparber (2009) operationalized the manual- and the communication-skill metrics using O*NET, for which immigrants or natives hold comparative advantages.

From the theoretical insights above, we can infer that the negative labor market impacts on natives occur when natives and immigrants with similar education levels are *highly substitutable due to their overlapping skills*—that is, when competition between natives and immigrants takes place within the same *skill strata* (holding constant the level of educational attainment). The more that natives are exposed to labor market competition, the more hostile they will be toward immigrants. This leads to our first hypothesis:

Hypothesis 1: Natives' immigration policy preferences are shaped by their skills, which dictate the extent of the labor market competition they face from immigrant workers.

One noteworthy study that explores natives' attitudes toward immigrants in light of their actual skills came from Ortega and Polavieja (2012). Using the *aggregate* manual and communication skill metrics, the authors demonstrate that, in line with the theory, natives with greater manual skills faced a greater exposure to competition and therefore were more anti-immigrant—while controlling for the educational attainment. Natives with greater communication skills displayed the opposite results. In **Hypothesis 1**, our goal is to evaluate the impact of skills on natives' attitudes toward immigrants using the same aggregate skill metrics of Ortega and

⁵ More specifically, Peri and Sparber (2009) found that the states faced with a surge of less-educated immigrants experienced a bigger shift of similarly-educated natives to jobs with more communication tasks and away from those with more manual tasks than other states did. Moreover, this led to a decrease in the total labor supply with communication skills relative to manual skills, as well as an increase in the market wages for communication skills relative to manual skills.

Polavieja (2012) in light of the Asian context. We expect our findings on the effect of natives' skills to deviate from that of Ortega and Polavieja (2012), given the different immigration histories of Asian and Western countries leading to, for instance, distinct skill distribution of immigrants.⁶ In our data, we do not observe the skills of immigrants (to which the native respondents refer when they express their immigration policy preferences). Absent studies proving otherwise, we assume that the innate comparative advantages of natives and immigrants—as suggested both in theory and research using Western and North American data (Peri and Sparber, 2009; Ottaviano and Peri, 2006; 2008)—remain the same in Asia.

Findings in the work of Ortega and Polavieja (2012), albeit important, are generated solely from their usage of *aggregate* skill metrics. In this paper, we go beyond following the authors' empirical strategies and operationalize *more granular* components of the manual- and communication- skills following the skill decomposition suggested in Peri and Sparber (2009). In doing so, we seek to provide a more nuanced understanding of natives' attitudes toward immigrants. Our exploration of the granular skills may allow us to interpret our findings in light of not only the competition from immigrants but also from another segment of the skill literature. Specifically, we refer to the literature documenting the skill-specific or task-specific impact of technological changes on *labor market vulnerabilities* (Acemoglu & Autor, 2011; Acemoglu & Restrepo, 2019; Deming, 2017; Frey & Osborne, 2017). One of the key insights of this literature is that not all manual skills lead to worsening market vulnerabilities, and that certain dimensions of manual skills (i.e., those that are less repetitive or routine) can improve labor market outcomes. By utilizing the measures of granular components of manual- and communication- skills, we are

⁶ For instance, in that many Asian countries' growth strategy involves attracting foreign talents (Abella, 1995), immigrants in Asia may be higher-skilled than those working in other regions.

able to delineate between skills that increase vulnerability due to technological changes separately from the skills that do so due to competition from immigrants.

We argue that natives' attitudes toward immigrants are shaped by *perceived overall labor market vulnerability*, which is jointly generated by multiple drivers including competition from immigrants. Yet, native workers often *cannot* ascertain the source of their labor market vulnerabilities. Therefore, their *perceived* threats in the labor market, which shape their attitudes toward immigration, need not be shaped solely by competition from immigrant workers but also by other factors that lower labor demands and exacerbate their labor market outcomes—such as automation pressures (Acemoglu & Restrepo, 2019; Frey & Osborne, 2017). This leads to our second hypothesis.

Hypothesis 2: Natives' immigration policy preferences are also determined by their *perceived overall labor market vulnerability*. This vulnerability—reflected in falling labor demands or worsening job insecurity—is generated from multiple sources in addition to labor market competition from immigrants.

The Asian context: Extent of exposure to foreign labor across countries

In recent decades, Asia has become a popular destination for immigration. Since the 1970s, several Asian economies have transformed from suppliers of agricultural and mineral products to major exporters of manufactured goods and services. Open economic policies succeeded in attracting large inflows of foreign capital and technology, which Asian countries used with great effectiveness to accelerate their industrialization and development (Abella 1995). As the region's economy has grown, it has experienced burgeoning labor migration, with cross-border flows of migrant labor mostly centered in the oil-producing countries of Western Asia and in the newly industrialized and industrializing economies of Asia. There are 65 million international migrants

currently living in Asia and the Pacific, with about 70% of these persons coming from within the region (UN 2021a). **Table A1** in the **Appendix** presents the international migrant stock at mid-year by destination region and economy in selected years.⁷ The international migrant stock reached 281 million in 2020, with the Asian region playing a considerable role in overall global migration (UN 2021b). The number of migrants in East and Southeast Asian countries has tripled in recent decades, from 6.8 million in 1990 to 19.6 million in 2020. The increased migration flows into Asia heightens the importance of the domestic sentiments toward the migrant or foreign workforce—which could affect the host nations’ immigration policies.

Table A1 also shows that the extent of migration varies across the region. While some economies in the region such as Malaysia (10.74%) and Singapore (43.14%) have relatively high percentages of international migrants in their population due to their long traditions of admitting migrant workers, other Asian economies such as South Korea and Japan have not been historical destinations for immigration. Yet, even in Japan and South Korea, migration is increasing. The international migrant stock as a percentage of the total population in Japan increased from 0.86% in 1990 to 2.19% in 2020, while that in South Korea increased from 0.65% to 1.59%. The variation in migrant stock leads us to recognize the rate of exposure to foreign labor in each country as a mediator in the links between skill-driven labor market competition, market vulnerability, and natives’ attitudes toward immigration.

The exposure to foreign labor varies not only across countries but also across occupations within each country. The conjecture that competition from immigrants and overall market vulnerability can alter natives’ attitudes even more in countries with high levels of foreign-born population leads to our third hypothesis.

⁷ Migrants include economic nomads (foreign-born, migrant workers), refugees, foreign students, and family members of overseas workers. Excluded are tourists or individuals who stay overseas for a few months.

Hypothesis 3: The links between skill-driven labor market competition, market vulnerability, and natives' attitudes toward immigrants is stronger in occupation-countries that have high exposures to foreign labor.

Methods

Data

We draw data from the seventh and most recent iteration of the World Values Survey (WVS), conducted between 2018 and 2020. The WVS is one of the largest, globally harmonized datasets on public attitudes and values. It consists of nationally representative and comparable surveys across 100 countries (Inglehart et al. 2000). Coordinated by the WVS Association, the WVS selects respondents for periodic cross-sectional surveys through a general population sampling method whereby interviewers obtain random household addresses and contact details from each country's census bureau or department of statistics. All WVS countries have standard questions on socio-demographics, economic values, financial and social capital, attitudes toward immigrants and institutions, social values, policy preferences, political interest and culture, and other issues of interest.

For this analysis, we selected all East and Southeast Asian countries available in the WVS, excluding a few countries that did not provide information on the respondents' preferences for immigration policies. Specifically, we included Bangladesh (most recent WVS conducted in 2018), Indonesia (2018), Japan (2019), Malaysia (2018), Myanmar (2020), Philippines (2019), Singapore (2020), South Korea (2018), Thailand (2018), and Vietnam (2020).⁸ We restrict our analysis sample to only native-born individuals *who are currently working* and between 18 and 89 years of age, a population hereafter referred to as 'native workers.' We combine this individual-level WVS

⁸ We exclude Mongolia (2020), whose data was not available at the time of this research, and China (2018), Hong Kong SAR (2018), Macau SAR (2019), and Taiwan ROC (2019), which lacked information on the respondents' preferences for immigration policy.

data with external data on country- and year-specific stocks of immigrants in each occupation, using the occupational category (ISCO-08) variable available in the WVS dataset.⁹ To construct the occupation-specific share of foreign labor, we merge external data from the International Labour Migration Statistics (ILMS) Database in ASEAN 2000-2019 (ILO 2018) for Southeast Asian countries, and national census data and OECD Migration Statistics for East Asian countries (OECD 2021).¹⁰ We also merge WVS data with O*NET data on respondents' current occupations. Specifically, we use O*NET's task ratings (i.e., the extent of occupational tasks performed in each job) to identify respondents' skills used at work. These serve as the basis for our skill metrics.

Skill Metrics Formulation

Native workers' human capital accumulation is measured by (1) level of educational attainment and (2) occupation-specific (manual and communication) skills, as derived from Peri and Sparber (2009). These serve as our main explanatory variables. We use these metrics to test **Hypothesis 1**, re-evaluating whether labor market competition between natives and immigrants takes place within the same skill strata, holding constant the level of educational attainment (Ortega & Polavieja, 2012; Peri & Sparber, 2009).

Our education variable is categorical, with indicators for having received less than a high-school education (reference), a high-school diploma, or a college degree. The manual and

⁹ Some of the statistics make use of International Standard Classification of Occupations (ISCO-08, International Labour Organization, 2016), while the rest use the preceding classification (ISCO-88) or slightly modified categories. In accounting for the deviations, we settle on the following occupational categories following the ISCO-08: (1) professionals and technical, (2) managers, (3) clerical support workers, (4) sales, (5) service, (6) craft and related trade workers (manual), (7) plant and machine operators and assemblers (manual), and (8) elementary occupations and agriculture/forestry occupations (manual).

¹⁰ For Myanmar, Singapore, and Vietnam, whose WVS was conducted in 2020 but that lack migration stock data for that year, we used the latest available migration information (2019 or 2018) in the ILMS-ILO data.

communication skill metrics are built from the *occupational task ratings* in O*NET, following the criteria proposed by Peri and Sparber (2009) and operationalized by Ortega and Polavieja (2012).

The U.S. Department of Labor provides various occupation-specific ratings, updated annually, in the O*NET. Among them is the occupational-task ratings, which represent the extent to which specific tasks are required in each job (e.g., those suggested by the list of responsibilities in employers' job postings). The occupational tasks rating evaluates, on a 0-to-5 scale, each Standard Occupational Classification (SOC) occupation based on a common pool of 52 tasks (e.g., getting information, monitoring processes or materials, identifying objects or actions, processing information, thinking creatively). Tasks not used in an SOC occupation receive a score of zero.

We link the occupational tasks information from the O*NET to the WVS using respondents' current jobs. We devise our manual skills metric by (1) selecting from the pool of 52 tasks those that pertain to limb/hand/finger *dexterity*, *flexibility*, and *strength* used at work, and (2) calculating the arithmetic mean of the ratings on the selected tasks for each SOC occupation. Similarly, we generate our communication skill metrics by selecting tasks that are related to *oral* and *written* language abilities and calculating the average of the selected tasks' ratings. Detailed task variables that comprise the manual- and the communication- skill metrics as well as their components are available in the work of Peri and Sparber (2009).^{11,12} For all measures, a higher metric score indicates that one possesses more of the said skill, as reflected in the major tasks one carries out at work. All measures are normalized to have a mean of zero and a standard deviation of one. While

¹¹ Dexterity is measured by—among the ONET pool of 52 tasks—arm-hand steadiness, manual dexterity, finger dexterity, control precision, multi-limb coordination, response orientation, rate control, reaction time, wrist-finger speed, and speed of limb movement. Flexibility is measured using extent flexibility, dynamic flexibility, gross body coordination, and gross body equilibrium. Strength is measured by static strength, explosive strength, dynamic strength, trunk strength, and stamina. Oral language ability is measured using oral comprehension and oral expression. Lastly, written language ability is measured using written comprehension and written expression.

¹² The detailed task variables are listed in Table 1 in Peri and Sparber (2009). Our metrics follow their 'basic definitions' of the manual and communication skill measures.

the O*NET task ratings are available at a highly disaggregated level using the six-digit Standard Occupation Classification (SOC) System, WVS's occupational codes are at a more aggregated two-digit level.¹³ We first calculate the manual- and communication-skill metrics at the six-digit disaggregated level, then calculate the two-digit metrics by taking an average of the metrics' values for all occupations that belong to the two-digit category.¹⁴

In addition to the overall manual- and communication- skill measures used in the literature (e.g., Ortega and Polavieja (2012)), we keep their components as *distinct metrics*. In other words, we calculate the average of the ratings on the O*NET tasks that represent *dexterity*, *flexibility*, and *strength* (i.e., components of manual skills) separately, into three distinct measures. We do the same for *oral* and *written* language abilities. All measures are normalized as above. We use these indices to generate insights on which specific skill dimensions drive the average effects of the manual- and communication- skill measures. In doing so, we are able to draw on insights from research regarding the impact of technological changes on skill demands and examine whether skill dimensions that worsen their overall labor market vulnerability can shape natives' attitudes toward immigrants, thereby testing **Hypothesis 2**.

We confirm that greater years of educational attainment do not necessarily mean that an individual possesses more occupational skills: The correlation coefficient between years of education and manual skills in our sample is only -0.46, and that between education and communication skills is 0.52. In **Table 1**, we show the average years of education as well as the

¹³ The WVS includes only ten categories of occupations, varying only the first two digits of the SOC codes (XX-0000). O*NET provides occupation-specific information at a more disaggregated level, varying all six digits of the SOC (XX-XXXX). See the U.S. Bureau of Labor Statistics for reference: https://www.bls.gov/oes/current/oes_stru.htm.

¹⁴ For example, for management jobs (11-0000), we calculate the two metrics for each of the jobs that fall in the management category (i.e., chief executives (11-1011), general and operation managers (11-1021), legislators (11-1031), through emergency management directors (11-9161)). Afterwards, we calculate the average manual ratings and the average communication ratings of all management jobs and set them as the metric values for management jobs (11-0000).

average manual- and communication- skill metric scores by occupation. Respondents in white-collar occupations (top of table) have more average years of occupation than those in blue-collar ones (bottom of table), with the gap between those in managerial/professional jobs and those in manual jobs being approximately five years. Communication skills are also greater among white-collar than blue-collar job holders. Conversely, the extent of manual skills of individuals decreases. A slight but noteworthy difference can be found in the strictly monotonic relationship between occupation and years of education (i.e., the more white-collar, the more years of education job-holders have), and the relatively noisy relationship between occupation and manual/communication skills. For instance, while professional job holders are more white-collar and higher-earning than clerical job holders, their communication skills are not significantly different. The non-monotonicity is even greater between occupation and components of the manual/communication metrics.

[Table 1]

Given these differences, we conclude that education and skill measures are not strictly interchangeable concepts. Assuming that labor market competition between natives and foreign workers takes place at the skill level as evidenced in the literature (Ottaviano & Peri, 2008; Peri & Sparber, 2009), whereby a worker pushes another worker out who has comparable skills, proxying workers' skills by the level of education may lead to inaccurate results. Such assumptions must rely on analysis of skill levels, not educational attainment. Our estimation model reflects these considerations by measuring the extent of competition among workers with similar levels of skills while separately controlling for years of education.

Sample

Outcome variable. For our outcome variable, we use the WVS question on immigration policy. This asks respondents' preferences among the following options: allowing unlimited entry of immigrants, allowing entry as jobs are made available, imposing strict limits to entry, or prohibiting entry entirely. For respondents who provided no response, we created a separate category, 'preference unknown.' From these responses, we created a binary variable indicating whether a respondent favors unlimited entry of immigrants or entry based on job availability (coded 1), as opposed to more restrictive policies (coded 0).

Independent variables. Our independent variables, chosen to reflect the competition that native workers may face from immigrants, are the extent of manual and communication skills they possess, as described above, and educational attainment. The variable formulation process for these measures is detailed in the previous section.

Covariates. We include as covariates demographic characteristics, economic and labor market statuses, and individual beliefs known to affect natives' attitudes toward immigrants (Gonnot et al., 2020; Hainmueller et al., 2015; Mayda, 2006; Ortega & Polavieja, 2012; Peri & Sparber, 2009; Scheve & Slaughter, 2001).

Our demographic covariates are gender (1 if female, 0 if male), age, number of children, marital status (single, married, or divorced/ separated/ widowed), immigration status of parents (either or both, neither, or unknown), and geographic location of residence (urban, rural). To account for country fixed-effects and systematic similarities in geographic regions, we collect information on WVS respondents' countries and regions of residence. The regions for each country are identified using the ISO 3166-2 regional classifications.¹⁵

¹⁵ More information is provided here: <https://www.iso.org/obp/ui/#search/code/>.

We measure respondents' economic conditions using total household income (a scale ranging from 1 to 10 (highest), with income represented by approximate deciles),¹⁶ perceived financial security (a scale of 1 to 3 (highest)), and self-reported social class (indicators for working-class, middle class, and upper class). Respondents with greater economic security may be concerned about the personal financial burden of providing welfare for immigrants (Borjas 1999; Dustmann and Preston 2007; Facchini & Mayda 2009; Hanson 2007), and therefore less inclined to support pro-immigration policies. Household income refer to all members' wages, salaries, and in-kind benefits. Perceived financial security may differ from actual financial conditions due to biases or subjective evaluations. We follow recent studies which include both objective and subjective data on individuals' financial conditions (e.g., Goldstein & Peters 2014). The WVS social class question asks respondents, "Which class, among working class, middle class, and upper class, do you consider yourself to belong?" Individuals perceive their social class based not only on their financial means but also by their sociopolitical capital (Eisenhauer 2008; McDowell et al. 2013).

Labor market covariates include respondents' labor force status, preferences toward work and leisure, and occupation-specific share of foreign workers. We include respondents' labor force status (indicators for full-time, part-time, and self-employed workers). As a proxy for individuals' innate preferences for work, we assess the relative preference respondents have for work over leisure (self-reported scale, ranging from 1 to 5 (valuing work the most)). The variable measuring the share of foreign labor is specific to native respondents' occupational groups in each country. This enables us to treat for omitted variable bias. Such bias may stem from, for instance, natives' working in occupations with high shares of foreign workers and being more pro-immigration if

¹⁶ The thresholds of the income deciles—different across the countries—remain undisclosed in the WVS public-use data.

they collaborate with foreign workers. In a highly competitive environment, high shares of foreign workers in a native's job can cause the native to be anti-immigrant. Using the exposure variable, we divide the respondents into high- and low-exposure groups by occupation in each country, allowing us to conduct a heterogeneity analysis for testing **Hypothesis 3**.

Previous research has shown strong links between natives' attitudes toward immigrants and their cultural and political beliefs (Adida et al. 2010, 2016; Brader et al. 2008; Chang and Welsh, 2016; García-Muñoz et al., 2021; Kim and Kim, 2021; Kunovich, 2013; Malhotra et al. 2013). Other studies have reported a statistically significant association between religiosity, religious affiliation, and anti-immigration sentiments (Anderson & Ferguson 2018; Cowling et al. 2019; Deslandes & Anderson 2019). Socio-psychological contributors to anti-immigration attitudes include prejudiced stereotypes and misperceptions of immigrants, xenophobia, lack of trust in others (i.e., low social capital), and ethnocentrism (Chang & Kang 2018; Grigorieff et al. 2020; Hainmueller & Hangartner 2013; Hjerm 2009). Accounting for these individual beliefs, we use in our estimations indicators for political ideology (1 most liberal to 10 most conservative), religiosity (1 least to 10 most religious), religious affiliations (1 affiliated, 0 unaffiliated), and level of social capital reflecting whether respondents generally trust others (1=yes, 0=no). As a proxy measure for respondents' concern about crime, we analyze the variable on whether a respondent or his family members were victims of a crime in the past year (1=yes, 0=no). We also assess whether the respondent has national security concerns regarding war, a terrorist attack, or a civil war (1=yes, 0=no). Finally, we measure whether respondents have a strong national identity (1=yes, 0=no).

Descriptive Statistics

Our sample includes native-born, currently working respondents between ages 19 and 89 from ten Asian countries. **Table 2** shows the summary statistics of the pooled sample of 10,217 respondents, by country. Table columns represent the outcome variable (pro-immigration policy sentiments), main explanatory variables (education and skills), and covariates. Each cell reports sample means.

Majorities in Bangladesh and South Korea, and a near majority in Japan, are pro-immigration. In the other nations, fewer than 40 percent are pro-immigration. These countries display varying extents of pro-immigration sentiments—indicating that there is not a strong unidirectional link between prevalence of immigrants in a country and the natives’ attitudes toward immigration. The 10 nations differ substantially in educational attainment; natives in Japan, South Korea, Singapore, Malaysia, and Vietnam have at least ten years of education, while those in the other nations have fewer than nine.

Next, our metrics on skills (manual, communication, and their components), normalized to be between -1 and 1, show that most countries’ average of manual skills used by their native workers are low (<0.4 for most), except in Thailand, Myanmar, and Philippines. Natives in Bangladesh, Thailand, Myanmar, and Philippines tend to possess higher dexterity, flexibility, and strength-related skills (>0.3) than those in other countries. Next, native workers in Japan, Malaysia, South Korea, and Singapore possess greater communication skills (≥ 0.5). The respondents in these four countries consistently show higher oral (>0.3) and written skills (>0.4). It should be noted that the components of the manual- and communication- skill measures are not additive.

[Table 2]

Respondents from most nations are roughly balanced between men and women, except in Bangladesh.¹⁷ Respondents in Japan, South Korea, Philippines, Singapore, and Thailand show signs of demographic aging, with average ages nearing 50. The average number of children for respondents ranges from 1.2 to 2.7. Most respondents are married, but Singapore, Malaysia, and South Korea have the highest proportions of singles. Singapore has the greatest proportion of natives with immigrant parents (29.2 percent), followed by Malaysia (7.0 percent). Fewer than 1 percent of native respondents in the other countries have immigrant parents. Singapore, a city-state, and South Korea have all urban respondents, with more than 90 percent of respondents in Japan being urban as well.

The countries average household income level ranges between 4.2 and 5.6 on a 10-point scale, and the perceived financial security ranges between 2.0 and 2.4 on a 3-point scale. More respondents identify as working-class rather than middle-class or upper-class in Bangladesh, Indonesia, Myanmar, Singapore, and Vietnam, while more identify as middle-class in Japan, Malaysia, Thailand, the Philippines, and South Korea. In contrast to Japan, Malaysia, South Korea, and Singapore, where most native workers are in full-time jobs, most workers in Bangladesh, Thailand, and Myanmar are self-employed.

Several cultural, political, and religious differences are evident among these countries. Self-reported religiosity is high except in Japan, Thailand, South Korea, and Vietnam. Levels of religious affiliation generally match self-reported religiosity except in Thailand, where all respondents claim a religious affiliation (mostly Buddhist). Native workers in Bangladesh, Indonesia, Myanmar, and Philippines show especially low levels of social capital, or trust toward

¹⁷ Only 5.5 percent of Bangladesh respondents in our sample are female. While, overall, Bangladeshi WVS respondents are 50.7% female, most of the female respondents report being out of the labor force.

others. Few respondents report concerns about domestic crime, but most express concerns about national security. Most respondents express strong national identity, albeit in varying levels.

All similarities and differences in demographic characteristics, economic conditions, labor market characteristics, and individual beliefs noted in this section are addressed as covariates in our estimations.

Estimation

First, we estimate a conditional probability model of the form

$$\Pr (IMM_{ijc} = 1) = G(\alpha + \beta educ_{ijc} + \gamma skills_{ijc} + \delta FB_{jc} + \mathbf{X}_{irc}\zeta + \eta_c + \varepsilon_{irc}), \quad (1)$$

where the binary outcome variable (IMM_{ijc}) represents immigration policy preferences of an individual i holding a job j and country c —whether he or she is pro-immigration. G represents the cumulative distribution function assumed to have a standard normal distribution. We estimate the model using a probit regression using a pooled cross-sectional data between 2018-2020.

In our baseline specification (Specification 1), we include the two measures of natives' human capital accumulation that dictate the level of labor market competition they face from foreign workers. These are level of education ($educ_{ijc}$),¹⁸ and a skill variable ($skills_{ijc}$) containing either the manual- or the communication- skill measure used in their jobs. Given the high, negative correlation between the manual and communication skills (correlation coefficient - 0.90), we include them separately in our estimations. To illuminate the effects of *more granular dimensions* of skills, we run separate regressions by replacing the manual and communication

¹⁸ In our regression estimations and figures, we use a categorical rather than continuous variable for highest educational attainment. We do so because we believe the impact of education on the labor market and any associated sentiments is not linear. In other words, it is not one extra year of education that makes a difference, but whether a respondent has attained the next degree.

skills with their components (dexterity, flexibility, and strength for manual skills; oral and written abilities for communication skills).

We also include \mathbf{X}_{ijc} , a vector of *demographic characteristics*: gender, age, number of children, marital status, geographic location, and parents' immigration statuses. By including country fixed-effects (η_c), we absorb the potential effects of time-invariant country-specific conditions such as social norms or cultural contexts on immigration policy preferences.

Specification 2 adds to the vector of covariates (\mathbf{X}_{ijc}) individuals' economic statuses and labor market engagements: household income, perceived financial security, perceived social class, labor force status, and how much respondents value work over leisure. We also add the share of foreign workers by occupation (FB_{jc}). In Specification 3, we further include individual beliefs as covariates: political ideology, religiosity, religious affiliations, social capital, concerns about domestic crime and national security threats, and national identity. All estimations are weight-adjusted for country sizes. Standard errors are clustered at the regional level.

Addressing Endogeneity

In the probit estimation above, our sample faces potential selection bias because natives in our sample may be sorting into jobs based on their preferences toward workplace diversity. For instance, natives who feel particularly hostile to foreign workers may choose to work in occupations with an ethnically homogenous profile and fewer foreign workers. This tendency can bias the extent of labor market competition natives face as well as their attitudes toward immigration policy. We address potential endogeneity using the control function approach (CFA), or two-stage residual inclusion method (Wooldridge, 2015). This approach is a type of IV estimator which consists of a two-stages—as in a two stage least squares estimator (2SLS). Fitted residuals from the first-stage linear model are used in the second-stage probit regression of the

outcome variable (i.e., immigration policy preferences) as covariates. The control function approach can address endogeneity when (1) the structural function of both stages are linear and additive in their error terms, (2) the first-stage elements can be identified and estimated recursively (Blundell and Powell, 2003; Blundell et al., 2013). This strategy has been formally justified for a binary outcome variable (estimated in the second-stage) and a continuous endogenous regressor (Vansteelandt et al., 2011).

We instrument the manual- and communication- skill measures (based on respondents' own occupations) with the regional averages of the measures, following the strategy in Ortega and Polavieja (2012). This methodology is based upon findings of existing research that immigrants tend to move into the same area where previous immigrants of similar characteristics or ethnic origin live (Card, 2001; Cortes, 2008; Ottaviano and Perio, 2007). The geographical proximity of immigrants' residential area renders the extent of labor market competition natives face from the immigrants to be *region-specific*. Because the skill measures dictate the degree of foreign competition that natives face, in using the instruments, we assume that natives (1) face skill-driven labor market competition similar to that experienced by others in the region, and (2) are more likely to obtain jobs highly exposed to foreign labor competition if they reside in the area where such jobs are abundant. Our identification strategy further assumes that individuals' choice of regions of residence is not primarily driven by their immigration policy preferences. In contrast to the skill metrics, respondents' educational attainment is *not* instrumented by the regional averages in that their level of education is neither driven by attitudes toward immigration policies or job choices—which are decided after education is complete.

Our control function approach assumes that the outcome is generated using the following two-equation model:

$$\Pr(IMM_{ijc} = 1) = G(\alpha + \beta educ_{ijc} + \gamma skills_{ijc} + \delta \hat{v}_{irc} + \theta FB_{jc} + \mathbf{X}_{irc}\zeta + \eta_c + \varepsilon_{irc}) \quad (2),$$

$$skills_{ijc} = \mathbf{X}_{irc}\kappa + \lambda Z_{rc} + \eta_c + v_{irc} \quad (3).$$

Equation (3) represents the first-stage estimation where we regress the (endogenous) skill variable on the instruments (Z_{rc}) to obtain reduced-form residuals (\hat{v}_{irc}). This residual, unexplained by Z_{rc} is presumed to be correlated with ε_{irc} —the unmeasured continuous confounder between the skills and pro-immigration policy preferences. The control function approach assumes that $\delta \neq 0$ in equation (2), providing evidence of endogeneity.

We estimate the second-stage by regressing our outcome variable (i.e., IMM_{ijc} , pro-immigration policy preferences) on the fitted residual (\hat{v}_{irc}) as a covariate. Z_{rc} consists of regional-averages of manual- and communication skills. Separate estimations are conducted for the two skill variables due to their high correlation. Once again, we re-run the two-equation models to explore the role of more granular skill dimensions, by replacing the two skill metrics with their components. Education, share of foreign workers by occupation, covariates, and country fixed-effects remain consistent as in equation (1). All estimations are weight-adjusted for country sizes, and standard errors are clustered at the regional level. Defining the correlation parameter as ρ_{irc} , the control function approach assumes that $E(\varepsilon_{irc}|Z_{rc}, skills_{ijc}) = E(\varepsilon_{irc}|v_{irc}) = \rho_{irc}v_{irc}$, where independence of $(\varepsilon_{irc}, v_{irc})$ and Z_{rc} is a sufficient restriction. To check for the endogeneity of the skill metrics, we conduct Wald test to see whether ρ_{irc} is statistically different from zero (Wooldridge, 2010). Our results allow us to reject the null hypothesis that the skill measures are exogenous.

Both the probit and the control function estimations help us test **Hypotheses 1-2**. For a robustness check, we re-run all estimations by replacing the outcome variable with a more extreme binary variable identifying whether respondents support a completely open immigration policy.

Lastly, we explore the heterogeneity of our results by re-running the estimations separately by the level of exposure to foreign labor by occupation-country—testing **Hypothesis 3**—and by gender. Of note, to test **Hypothesis 3**, which requires variations across countries, we refrain from including country fixed-effects in all estimations.

Results

First Stage

Table 3 shows the effects of an individual’s occupation-specific manual- and communication- skill metrics on the regional averages of the skills (i.e., our instruments), determined by ordinary least squares (OLS) equations. To provide further insights, we also regress individuals’ skill metrics on the regional averages of the components (i.e., regional averages of dexterity, flexibility, and strength for the manual skill; regional averages of oral and written abilities for the communication skill). For all estimations, our fullest covariate specification (Spec. 3) is used.

[Table 3]

The results indicate a statistically significant and positive link between the regional average of manual skills and respondents’ individual manual skills, as well as between the regional average of communication skills and respondents’ individual communication skills. The point estimate of the regional average of manual skills is 0.30, and the F test of the excluded instruments is 240.38; the point estimate for regional communication skills is 0.32, with the F test being 288.45. In all cases, the F-tests are well above 10, further demonstrating the strong relevance of our instruments. Meanwhile, the level of goodness varies across the components of manual metric. Specifically, while the regional averages of dexterity and strength are positively correlated with the individual manual skills, only the former is statistically significant. The regional average of flexibility holds

a negative relationship with the individual manual skills—suggesting that this association may require further investigation.

Natives’ skills and attitudes toward immigrants

Next, we show the linkage between the skill measures and the immigration policy preferences in **Table 4**. The outcome variable has a value of 1 if respondents prefer pro-immigration policy and 0 otherwise. Panel A displays results on the effect of the manual metric, while Panel B displays those of the communication metric. For both panels, we list the marginal effects of the probit regression results (columns 1-3), where individuals’ occupation-specific manual- and communication- measures are used directly as independent variables, as well as the marginal effects of the second-stage of control function estimation results (columns 4-8), where the individual skill measures are instrumented with regional averages. In the last two columns (7-8), we divide our sample into high-educated (i.e., holding a bachelor’s degrees) and low-educated groups (i.e., holding no higher credential than a high-school diploma).

[Table 4]

Across covariate specifications 1-3 in Panel A and Panel B, our probit regression results display counterintuitive effects of education. For instance, unlike what is shown in the literature (e.g., Borjas 2003; Mayda, 2006), we find natives with fewer years of education are more pro-immigration. The manual- and communication- skill metrics have insignificant effects.

We remind the reader that the probit models suffer from endogeneity of the skill metrics. Indeed, in the post-estimation test of independence of the error terms of the first- and the second-stage, we reject the null hypothesis of no endogeneity. As we correct for the bias through the implementation of control function estimation (columns 4-8) in Panel A and Panel B, we find the effects of education and skill measures to be in line with previous research and to have more

statistical strength. Specifically, natives with lower levels of education tend to be more anti-immigrant (6.9 percentage points for those without a high school diploma, 17.8 percentage points for those with only a high school diploma), using covariate Spec 3 (column 6). In the same column, natives with a one-standard deviation increase in the manual skills are more pro-immigrant by 37.5 percentage points (an 123.3% increase from the mean of 0.30), while those with a one-standard deviation increase in the communication skills are less pro-immigrant by 45.6 percentage points (a 150% decrease from the mean of 0.30). By dividing the sample into those with and without a bachelor's degree in columns 7-8, we find that the strong links between the skill metrics and attitudes toward immigrants are driven primarily by the less-educated respondents. Our empirical results for the covariates consistently show that respondents who are older, with fewer children, or divorced/ separated/ widowed are less likely to be pro-immigration. Natives in the working class are less pro-immigration than those in middle or upper class. Natives who perceive higher financial security and have a higher level of general trust toward others are more pro-immigration.

While the links between education and attitudes toward immigrants in the IV estimations shown in **Table 4** are in line with previous research (e.g., Hainmueller et al. 2015; Mayda 2006), the direction of the association between the skill measures and the attitudes toward immigrants contrasts with it (e.g., Ortega & Polavieja 2012). To illuminate the implications of our results, we have re-run the analyses using the components of the two skill metrics. Results are shown in **Table 5**. The results for the outcome variable, panel A and B set-ups, the display of marginal effects of the probit regressions (columns 1-3) and the second-stage of control function estimation (columns 4-8), and the results using sample breakdowns by level of education (columns 7-8), remain unchanged from those shown in **Table 4**. Shown here are results for the

components of the manual and communication skills measures and their links to attitudes toward immigrants.

[Table 5]

The effects of educational attainment on attitudes toward immigrants shown in the probit and control function estimation are consistent across **Table 5** and **Table 4**. We once again observe that, when un-instrumented, the selection in individuals' jobs biases the estimations—as shown in the probit results in both Panel A and Panel B. In Panel A, we see the positive association between the manual skill and immigration policy preferences seen in **Table 4** is driven primarily by the level of flexibility. Specifically, natives with a one standard-deviation increase in flexibility are more likely to prefer pro-immigration policies by 203.2 percentage points (a 668.42 percent increase from the mean of 0.30), using covariate Spec 3 (column 6). In contrast, natives with a one-standard deviation increase in dexterity and strength are less likely to be pro-immigration (a 411.51 percent decrease from the mean of 0.30) and 50.6 percentage points (a 166.45 percent decrease from the mean of 0.30), respectively (column 6). Next, in Panel B, we find that the negative link between communication skills and the immigration policy preferences shown in **Table 4** is driven by the written component across all covariate specifications. The oral component holds a divergent effect on the natives' attitudes. While natives with a one standard-deviation increase in written abilities are less likely to prefer pro-immigration policies by 68.3 percentage points (a 224.65 percent decrease from the mean of 0.30) using covariate Spec 3 (column 6), those with a one standard-deviation increase in oral abilities are more pro-immigration by 36.6 percentage points (a 120.39 percent decrease from the mean of 0.30). We discuss the implications of the differences across the manual- and the communication- skill components in the **Discussion Section**.

We check the robustness of the findings shown in Table 4 and Table 5 by replacing our outcome variable, pro-immigration policy preference, with a binary identifier of natives with a more extreme pro-immigration stance. The variable takes on a value of 1 if respondents support fully open immigration policy. This strategy differs from our original outcome variable which identified respondents who support fully open policy *or* entry based on job availability. Results are available in the **Table 6**. We confirm that the results are mostly consistent with those shown in **Tables 4-5**. One notable difference lies in the fact that, based on the control function estimation results, natives with higher communication skills display strong anti- open immigration policy sentiments, while their higher manual skills generate weaker (statistically insignificant) effects on their policy preferences.

[Table 6]

Next, **Table 7** shows the heterogenous effects of skills on natives' immigration policy preferences by the extent of exposure to foreign labor. After calculating the average of occupation-specific share of foreign labor, we classify respondents in our sample by deciles in their occupation-country specific averages of exposure to foreign labor. Then, we re-run control function estimations by dividing sample data into the above-median exposure group and the below-median exposure group. For all analyses, we use Spec. 3, the fullest specification. Estimated marginal effects of the independent variables of interest—level of education, manual skills, communication skills, and the skill components—are shown in the table.

[Table 7]

By comparing the estimated coefficients of skill metrics and their components in Panel A and Panel B, we find that the results for the overall sample in **Tables 4-5** (i.e., the positive link between manual skills and immigration policy preferences as well as the fact that it is driven

primarily by flexibility, and the negative link between communication skills and the outcome driven mostly by written abilities) remain consistent in the subsample of respondents with higher (above-median) exposure to foreign labor. In contrast, the links between skills and policy preferences among respondents with low-exposure (below-median) are noisier, with several points of diversion from the main results in **Tables 4-5**.

[Table 8]

We conduct another set of heterogeneity analyses by re-running the estimations separately by gender. The results are shown in **Table 8**. Estimation strategies used for the analyses and the table components remain the same as in **Table 7**. We observe that, while the effects of skill levels on immigration policy preferences remain consistent in direction for both male and the female respondents, the effects are statistically significant only among the male respondents. For instance, the control function estimation results among the female respondents (Panel B, columns 2, 4) indicate that manual and communication skills do not systematically dictate female native workers' attitudes toward immigration policies.

Discussion

Skill-driven labor market vulnerability, competition, and attitudes toward immigrants

This study evaluated the role of skill-driven labor market competition on native workers' attitudes toward immigrants in Asia. We analyzed the effects of actual skill levels based on human capital accumulation on people's attitudes toward immigrants, in addition to education levels. We also distinguished between manual versus communication skills, as well as the distinct components under each measure. While highly educated individuals are less likely to possess or exercise extensive manual skills in their jobs, there is no unidirectional link between education and

communication skills. In short, the two skill measures are not alternatives to education—as confirmed by the low correlation between the two. We account for potential endogeneity of respondents’ skill metrics (i.e., natives who work in certain occupational groups can hold a particular attitude toward immigrants) by instrumenting them on their regional averages.

In the control function estimations, we found support for **Hypothesis 1**—that natives’ policy preferences are shaped significantly by their skills—which dictate the level of competition from immigrants. Specifically, we find natives with more manual skills and fewer communication skills were more likely to support pro-immigration policies—holding constant the level of educational attainment. As for the level of education itself, we found that natives with higher education were more pro-immigration. While the fact that natives with higher education are more likely to be pro-immigration matches the findings of previous research (Hainmueller et al. 2015; Mayda 2006; Ortega & Polavieja 2012; Scheve & Slaughter 2001), the links between the two skill measures and attitudes toward immigrants shown in our paper are more difficult to comprehend.

Our findings on skills contrast some of the theoretical predictions and empirical observations of existing studies (e.g., Ortega & Polavieja, 2012; Peri & Sparber, 2009). Previous research found that natives with fewer manual skills and more communication skills were more pro-immigration. The difference between our findings and earlier research may stem in part from contextual differences. For instance, given the different immigration histories of Asian and Western countries, and the focus of previous research on Western contexts, it may be the case that the skill distribution of foreign labor in Asia differs from that in Western countries. While foreign laborers often engage in manual jobs and hence possess more manual skills than natives in the Western countries, foreign workers in Asian countries such as Japan and Singapore may oftentimes engage in more white-collar jobs. Such a scenario is possible because many Asian countries have

been successfully recruiting foreign talent and maintained open economic policies as parts of their growth strategies (Abella, 1995). For instance, the city-state of Singapore recently introduced new work visa rules to strengthen its appeal as a global hub for foreign talent by allowing high-earners and achievers to live in Singapore without the need to secure employment first.¹⁹ Consequently, it may be the case that natives with more manual skills (or manual jobs) in Asia face less labor market competition from foreign workers and thus hold favorable, pro-immigration views.

Beyond postulating that contextual differences are sole drivers of the divergent results in our paper, we rely on our empirical results for more concrete insights. Specifically, in examining the role of components of the manual skills (dexterity, flexibility, and strength) and the communication skills (oral and written), we find that the positive link between manual skills and pro-immigration attitudes were driven primarily by level of flexibility. On the contrary, natives with greater dexterity or strength (other two components of manual skills) were less likely to be pro-immigration. These findings could be interpreted in light of the broader skill literature that links specific worker skills to overall labor market vulnerabilities, including those resulting from technological changes (Acemoglu & Autor, 2011; Frey & Osborne, 2017).

Research on workers' skills has found that worker flexibility—despite the fact that it is a manual skill component—is increasingly in demand by employers who value it as a skill that cannot yet be easily automated (Acemoglu & Autor, 2011; Acemoglu & Restrepo, 2017). This stems from the *routinization hypothesis* of Acemoglu and Autor (2011), who contended that technology holds a comparative advantage over human workers at handling routinized tasks (i.e., tasks that can be codified or manualized as a set of rules). Flexibility, along with creativity or social intelligence, indicates an individual's ability to perform non-routine, non-repetitive tasks.

¹⁹ See <https://www.mom.gov.sg/passes-and-permits/overseas-networks-expertise-pass>

Humans hold a comparative advantage over machines in such tasks that are not readily automatable. Workers who can carry out these tasks—who possess skills that are unautomatable— tend to experience better labor market outcomes including increasing wages or greater job security (Lee, 2021, 2023). By contrast, dexterity and strength, the other two dimensions of manual skills, are not strongly linked to non-routine abilities. In sum, considering not only the labor market competition from immigrants but also broader market vulnerabilities, not all aspects of manual skills lead to falling labor demands or deteriorating market outcomes. If the net effects of immigration and automation on the labor demands are still positive for workers with flexibility, such workers may maintain positive attitudes toward immigrants.

Individuals often cannot identify the exact source of their labor market insecurity, nor can they decompose different sources of insecurity. It may be that workers whose skills are generally more vulnerable—due to an array of factors including technological changes, employers’ preference towards flexible labor, etc.—may be attributing their falling labor demands to a *highly salient source of their vulnerability*: labor market competitions from immigrants. This supports **Hypothesis 2**, that natives’ hostilities toward immigrants stem from perceived overall labor market vulnerability as dictated by natives’ skills.

We also find that natives with greater communication skills were less likely to be pro-immigration. The links were driven by the written component, but not the oral component. These findings cannot be explained by the insights from the existing skill literature, as we cannot distinguish the extent of routinization involved in oral and written communications. While we are unable to provide explanations of the divergent effects of the oral and the written abilities in this paper, we believe this is an important subject for the future research.

In our heterogeneity analyses, we find that the impacts of skills on natives' attitudes—regardless of the mechanisms—are driven by respondents with significant *existing* foreign labor competition (i.e. respondents with above-median share of foreign workers by occupation-country), and not by anticipation of future foreign labor competition (i.e., respondents with below-median share). This finding provided support for **Hypothesis 3**. Finally, we find our results were driven more by male than female respondents.

Limitations and Future Research

Some limitations of this study must be acknowledged. First, in measuring natives' human capital accumulation (i.e., manual- and communication- skills) by the tasks they carry out at work, using O*NET's occupation-specific task information, we assumed that respondents' skills are well-matched to the jobs they currently hold. This is a strict assumption, which may not be true if an individual is currently in a job that is different from their primary career occupation. For such individuals, their primary skills are those used in their career jobs rather than their current jobs (Lee, 2021). This means we may need to examine individuals' primary skills reinforced through their career jobs, not their current jobs. As our data provided information on respondents' current jobs and prevented us from identifying natives' primary skills, we maintained the strict assumption stated earlier. At the same time, we believe our inferring primary skills from workers' current jobs does not substantially weaken our findings because our respondents are predominantly young- and middle-aged individuals who are likely to be engaged in their career jobs.²⁰ Future studies that re-evaluate our research question by directly measuring individuals' skills could lend credibility to our findings.

²⁰ Our WVS sample ranges in age from 18 to 89, with a median age of 41 and an average age of 42. Almost half of the sample (46.8 percent) is between ages 35-55—which are prime ages in the labor market and ages in which workers are likely to be in their career jobs, where their primary skills are harnessed.

Another limitation lies in our lack of knowledge regarding the skill distribution of foreign labor in each country. Our analyses asked how natives, given their levels of education and skills, behaved towards immigrants. In doing so, we did not fully account for natives' varying exposure to labor market competition from the immigrants taking place within each skill strata (Borjas 2003, 2006; Mayda 2006). To do so, we would need to identify the skill profiles of the foreign labor. Because the WVS does not provide sociodemographic information on immigrants, we were unable to identify the skill levels of immigrants whom our native respondents would encounter. Future research could re-evaluate our research questions with additional data on the country-specific skill distribution of foreign labor linked to the data on the natives.

In this paper, we used data on the occupation-specific share of the *stock* of immigrants rather than the *flow* of immigrants. In doing so, we assumed that the skill compositions of immigrants do not change over time. This follows the estimation strategies of several existing studies (e.g., Borjas 1999; Mayda 2006). We could benefit from future research complementing our study with data on immigrant flows in each country. It is likely that immigration flows are more closely tied to changes in the destination country's demand for and attitudes toward immigrants.

Lastly, we did not conduct panel estimations due to the cross-sectional nature of the WVS. This prevented us from accounting for within-individual variations across time. This could have biased our estimations. To minimize bias, we controlled for natives' work-leisure preferences in our estimation models by using a WVS variable measuring how much the respondents value work over leisure—an attribute many other existing surveys fail to capture. Still, future panel research may add new insights on the questions we examined.

Conclusion

We consider our results to be new evidence on the skill-driven labor market competition between native and immigrant workers, as well as its impact on natives' preferences for immigration policies, in Asia. By shedding light on how much labor market competition from immigrants affects natives' attitudes toward immigrants, this study offers important insights for policymakers in Asia seeking to establish nuanced criteria for their immigration- and labor market-policies. With many Asian countries experiencing population aging, immigrants and foreign labor can help sustain current levels of domestic productions and labor market operations. At the same time, increasing reliance on foreign labor may generate more severe labor market competition for natives. In evaluating policy options, policymakers should be cognizant of natives' attitudes toward immigrants and potential strains that foreign labor may impose on the labor market for natives. Natives' hostilities can, in turn, worsen immigrants' experiences in and out of work. It is imperative for policymakers to take into account ongoing demographic changes, migration trends, and natives' labor market concerns when seeking to promote the sustainability of a nation's labor force and social cohesion.

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Table 1. Human capital accumulation by occupation

Educational Attainment:	years of educ	less than high-school (%)	high-school graduates (%)	college graduates or higher (%)			
Occupational Groups							
professional and technical	13.47	8.94	21.77	69.30			
managerial	13.00	12.19	29.09	58.73			
clerical	12.40	17.67	26.63	55.71			
sale	9.67	45.77	35.04	19.20			
service	10.07	42.13	34.02	23.85			
manual- crafts and related trade workers	9.60	47.47	38.31	14.22			
manual - plant and machine operators	8.44	65.33	26.67	8.00			
manual - elementary and agriculture	7.23	75.78	19.47	4.75			
Skills:	Manual skills, std	manual component: dexterity, std	manual component: flexibility, std	manual component: strength, std	Communication skills, std	Comm component: oral, std	Comm component: written, std
Occupational Groups							
professional and technical	-1.16	-1.07	-1.15	-1.13	1.22	0.87	1.85
managerial	-1.54	-1.56	-1.32	-1.55	2.63	1.70	1.57
clerical	-1.02	-0.83	-0.97	-1.22	1.03	1.34	0.95
sale	-0.93	-0.95	-0.99	-0.91	0.24	0.31	-0.32
service	0.07	-0.21	0.03	0.46	0.55	-0.12	0.88
manual- crafts and related trade workers	0.95	1.27	0.54	0.68	-0.62	-1.56	-0.56
manual - plant and machine operators	1.59	1.87	1.53	1.14	-1.09	-2.40	-0.47
manual - elementary and agriculture	0.91	0.77	1.04	1.00	-1.04	-0.21	-1.02

Table 2. Descriptive Statistics (Mean or %)

		outcome	educ	occupational tasks						
country	N	pro-immigration (1 yes, 0 no)	years of education	Manual, std (0-5)	manual comp - dexterity, std (0-5)	manual comp - flexibility, std (0-5)	manual comp - strength, std (0-5)	communication, std (0-5)	comm comp - oral, std (0-5)	comm comp - written, std (0-5)
Bangladesh	491	55.19	6.88	0.321	0.307	0.331	0.309	-0.413	-0.257	-0.431
Indonesia	2366	18.26	8.34	0.201	0.176	0.210	0.210	-0.304	-0.165	-0.332
Japan	766	45.30	12.80	-0.382	-0.374	-0.375	-0.362	0.553	0.316	0.622
Malaysia	964	17.74	10.62	-0.665	-0.601	-0.659	-0.699	0.812	0.566	0.779
Thailand	1196	38.46	8.22	0.437	0.369	0.466	0.488	-0.477	-0.223	-0.455
Myanmar	902	32.15	8.64	0.529	0.529	0.515	0.503	-0.558	-0.478	-0.522
Philippines	711	19.83	8.04	0.339	0.297	0.350	0.364	-0.331	-0.309	-0.290
South Korea	847	56.67	12.65	-0.449	-0.398	-0.467	-0.478	0.490	0.457	0.450
Singapore	1023	21.90	11.42	-0.602	-0.577	-0.602	-0.583	0.753	0.467	0.841
Vietnam	951	30.18	10.80	0.058	0.100	0.003	0.010	-0.169	-0.230	-0.263

		demographics							economic concerns				
country	female (1 yes, 0 no)	age	no. of children	marital status: single (1 yes, 0 no)	marital status: married (1 yes, 0 no)	marital status: divorced/ widowed/ separated (1 yes, 0 no)	have immigrant parents (1 yes, 0 no)	urban (1 yes, 0 no)	household income (1 - 10 highest)	financial security (1 - 10 most secure)	working class	middle class	upper class
Bangladesh	5.50	40.45	1.89	8.76	91.24	0.01	0.00	22.40	5.62	2.33	54.18	41.75	4.07
Indonesia	44.38	40.81	2.18	12.05	77.81	10.14	0.00	24.22	4.17	2.17	53.04	34.70	12.26
Japan	48.17	48.63	1.67	13.97	76.24	9.79	0.52	91.64	4.75	1.99	36.03	46.61	17.36
Malaysia	45.75	37.97	1.51	31.22	65.35	3.42	6.95	65.15	4.80	2.13	30.91	39.94	29.15
Thailand	49.50	45.32	1.56	10.70	82.86	6.44	0.42	35.45	4.78	2.09	30.18	52.68	17.14
Myanmar	42.79	40.40	1.91	19.29	75.28	5.43	0.11	27.05	4.66	2.11	47.78	25.06	27.16
Philippines	37.97	44.55	2.71	12.66	78.62	8.72	0.28	56.26	4.37	2.11	35.86	41.63	22.50
South Korea	39.67	45.35	1.42	23.97	73.67	2.36	0.71	100.00	4.95	2.07	7.79	76.51	15.70
Singapore	48.68	44.07	1.16	35.39	57.48	7.14	29.23	100.00	5.07	2.13	44.57	36.85	18.57
Vietnam	50.58	37.32	1.24	19.56	75.50	4.94	0.63	34.49	5.13	2.37	60.67	16.51	22.82

country	labor market characteristics					individual beliefs						
	labor status: full-time work	labor status: part-time work	labor status: self-employed work	Values work over leisure (1– 5 most)	share of immigrants out of total employed (%)	political ideology (1 – 10 most conservative)	religiosity (1– 10 most religious)	religious affiliations (1 affiliated, 0 not)	social capital (1 yes, 0 no)	Concerned about crime (1 yes 0 no)	Concerned about national security (1 yes 0 no)	National identity (1 strong 0 no)
Bangladesh	27.09	16.29	56.62	4.26	2.29	7.26	9.70	100.00	13.65	9.16	65.99	83.71
Indonesia	39.73	14.41	45.86	3.80	0.42	6.22	9.77	100.00	5.37	9.68	97.55	73.80
Japan	53.79	27.94	18.28	2.24	5.02	5.48	4.41	31.98	31.59	4.96	85.12	84.46
Malaysia	80.81	3.94	15.25	3.47	0.07	5.91	8.42	97.82	21.37	26.45	86.41	75.62
Thailand	22.58	17.39	60.03	3.52	6.71	5.71	5.12	100.00	31.86	18.98	56.35	53.09
Myanmar	13.53	12.42	74.06	4.34	0.01	5.00	9.75	93.57	14.52	5.99	99.33	78.49
Philippines	40.65	16.60	42.76	3.78	0.99	6.64	9.45	98.17	5.49	8.30	96.34	90.86
South Korea	83.12	4.96	11.92	3.38	3.56	5.24	4.99	33.41	33.41	7.56	63.40	90.08
Singapore	74.78	14.57	10.65	2.97	37.84	5.09	6.72	77.13	35.39	7.23	56.79	87.49
Vietnam	48.16	5.78	46.06	3.84	0.36	5.00	5.91	25.97	26.18	1.05	78.44	91.17

Notes: Sample includes only the native-born individual who are currently working. "Immig." stands for immigration. The ratio of skilled immigrants to skilled natives is equivalent to our 'relative skill ratio', following Mayda(2006)'s metric. The ratio of skilled- to unskilled- immigrants is used to identify whether the immigrant labor force is largely high-skilled, following Hainmueller et al. (2015)'s metric. "Std" refers to normalized variables with a mean 0 and standard deviation of 1.

Source: Authors' calculations using the World Values Survey, wave 7.

Table 3. Examining the links between individual skills and regional average skills

	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
Dependent variable:	Y=manual	Y=manual	Y=comm	Y=comm
avg manual_region, std	0.297*** (0.024)	-	-	-
avg dexterity_region, std	-	0.226*** (0.058)	-	-
avg flexibility_region, std	-	-0.094 (0.947)	-	-
avg strength_region, std	-	0.549 (0.772)	-	-
communication_region, std	-	-	0.322*** (0.023)	-
avg oral_region, std	-	-	-	0.065*** (0.021)
avg written_region, std	-	-	-	0.275*** (0.025)
Observations	10217	10217	10217	10217
R-squared, adjusted	0.337	0.337	0.429	0.427
Dependent variable mean	0.115	0.115	-0.146	-0.146
F test of excluded instruments	240.38	228.28	288.45	277.83

Notes: The dependent variables are respondents' individual extent of manual skills and communication skills used in their current jobs (normalized to have a mean 0 and standard deviation 1). The main explanatory variables are the regional averages of the skill variables. Covariate specification 3 has been used for all estimations, including country fixed-effects. All estimations are weighted for country size. Standard errors are clustered at the regional level.

p<0.1 **p<0.05 *p<0.01*

Source: Authors' calculations using the World Values Survey, wave 7.

Table 4. Effects of skill-specific labor market competition on natives' attitudes toward immigration policies: Marginal Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	probit	probit	probit	CFA	CFA	CFA	CFA	CFA
covariate specification	cov1	cov2	cov3	cov1	cov2	cov3	cov3, high-educ	cov3, low-educ
Panel A: Manual Intensity								
Education (reference = B.A or above)								
Less than high school	0.228*** (0.059)	0.250*** (0.060)	0.256*** (0.063)	-0.157 (0.202)	-0.108 (0.189)	-0.069 (0.188)	- -	- -
High school diploma	0.001 (0.046)	0.013 (0.046)	0.026 (0.047)	-0.239* (0.123)	-0.212* (0.116)	-0.178 (0.115)	- -	- -
Manual	0.012 (0.019)	0.016 (0.020)	0.017 (0.019)	0.395** (0.199)	0.411** (0.204)	0.375* (0.204)	0.523 (0.461)	0.369* (0.198)
DEMOGRAPHICS								
Female (1 yes 0 no)	-0.000 (0.037)	-0.008 (0.038)	0.001 (0.039)	0.129* (0.075)	0.123 (0.076)	0.120 (0.076)	0.173 (0.118)	0.108 (0.082)
Age group (reference = ages 10-34)								
Ages 35-49	-0.080* (0.043)	-0.080* (0.043)	-0.084* (0.043)	-0.079* (0.043)	-0.083* (0.043)	-0.086** (0.043)	-0.079 (0.091)	-0.086* (0.050)
Ages 50+	-0.232*** (0.055)	-0.239*** (0.053)	-0.242*** (0.054)	-0.208*** (0.056)	-0.227*** (0.053)	-0.231*** (0.055)	-0.076 (0.163)	-0.250*** (0.060)
Number of Children	0.030*** (0.011)	0.031*** (0.011)	0.028** (0.012)	0.026** (0.011)	0.028** (0.012)	0.025** (0.012)	-0.035 (0.036)	0.032*** (0.012)
Marital Status (reference = single)								
Married	-0.072 (0.056)	-0.075 (0.057)	-0.074 (0.057)	-0.050 (0.056)	-0.064 (0.056)	-0.063 (0.056)	-0.007 (0.099)	-0.057 (0.072)
Divorced, Separated, Widowed	-0.157** (0.071)	-0.153** (0.073)	-0.150** (0.073)	-0.123* (0.072)	-0.114 (0.074)	-0.115 (0.074)	0.010 (0.185)	-0.125 (0.085)
Immigrant parents (reference = Neither)								
Either or both	0.155 (0.144)	0.152 (0.146)	0.159 (0.136)	0.148 (0.144)	0.147 (0.145)	0.157 (0.136)	0.179 (0.186)	0.152 (0.149)
Unknown	0.292 (0.469)	0.265 (0.476)	0.358 (0.472)	0.334 (0.471)	0.315 (0.478)	0.409 (0.475)	0.186 (0.729)	0.667 (0.631)
Urban (1 yes 0 no)	-0.110** (0.051)	-0.110** (0.051)	-0.102** (0.050)	0.001 (0.070)	0.004 (0.071)	0.001 (0.070)	-0.013 (0.115)	0.011 (0.077)
ECONOMIC CONDITIONS, LABOR MARKET CONDITIONS								
Household income (1 low - 10 high)	- -	-0.008 (0.010)	-0.007 (0.010)	- -	0.007 (0.011)	0.007 (0.012)	0.037 (0.030)	0.002 (0.011)
Perceived financial security (1 least - 3 most secure)	-	0.050**	0.043*	-	0.056**	0.049**	0.055	0.051*

	-	(0.024)	(0.023)	-	(0.024)	(0.024)	(0.051)	(0.027)
Social class (reference = working class)								
Middle class	-	0.080	0.078	-	0.135**	0.128**	0.172*	0.119*
	-	(0.052)	(0.051)	-	(0.059)	(0.057)	(0.091)	(0.064)
Upper class	-	0.109**	0.100*	-	0.210**	0.191**	0.213	0.185**
	-	(0.055)	(0.055)	-	(0.084)	(0.083)	(0.150)	(0.084)
Labor force status (ref= full-time workers)								
Part-time workers	-	0.049	0.047	-	-0.017	-0.013	-0.132	0.028
	-	(0.054)	(0.054)	-	(0.059)	(0.060)	(0.159)	(0.067)
Self-employed	-	0.017	0.012	-	0.082	0.071	-0.117	0.106
	-	(0.047)	(0.048)	-	(0.057)	(0.058)	(0.189)	(0.075)
Values work over leisure (1 least – 5 most)	-	-0.010	-0.008	-	-0.010	-0.007	-0.032	0.000
	-	(0.015)	(0.015)	-	(0.015)	(0.014)	(0.036)	(0.018)
Share of foreign workers by occupation	-	0.002	0.001	-	-0.002	-0.002	-0.009	-0.000
	-	(0.003)	(0.003)	-	(0.003)	(0.003)	(0.010)	(0.003)
INDIVIDUAL BELIEFS								
Political ideology (1 most Liberal – 10 most Conservative)	-	-	0.010	-	-	0.005	-0.010	0.008
	-	-	(0.009)	-	-	(0.010)	(0.020)	(0.010)
Religiosity (1 least – 10 most religious)	-	-	-0.001	-	-	-0.002	-0.014	0.002
	-	-	(0.011)	-	-	(0.011)	(0.015)	(0.013)
Religious affiliations (1 affiliated 0 unaffiliated)	-	-	-0.035	-	-	-0.026	-0.075	0.028
	-	-	(0.061)	-	-	(0.061)	(0.094)	(0.071)
Social capital (1 yes 0 no)	-	-	0.264***	-	-	0.278***	0.132	0.331***
	-	-	(0.050)	-	-	(0.051)	(0.083)	(0.056)
Concerned about crime (1 yes 0 no)	-	-	0.166**	-	-	0.155**	-0.031	0.187**
	-	-	(0.079)	-	-	(0.077)	(0.126)	(0.087)
Concerned about national security (1 yes 0 no)	-	-	-0.089	-	-	-0.096	-0.167*	-0.071
	-	-	(0.064)	-	-	(0.064)	(0.085)	(0.073)
National identity (1 strong 0 no)	-	-	-0.056	-	-	-0.053	-0.179*	-0.041
	-	-	(0.040)	-	-	(0.040)	(0.105)	(0.047)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Dependent Variable	0.304	0.304	0.304	0.304	0.304	0.304	0.319	0.300
Mean								
N	10217	10217	10217	10217	10217	10217	2545	7672

	probit	probit	probit	CFA	CFA	CFA	CFA	CFA
covariate specification	cov1	cov2	cov3	cov1	cov2	cov3	cov3, high- educ	cov3, low-educ

Panel B: Communication Intensity

Education (reference = B.A or above)

Less than high school	0.212*** (0.058)	0.235*** (0.058)	0.242*** (0.061)	-0.278 (0.204)	-0.205 (0.187)	-0.147 (0.185)	-	-
High school diploma	-0.009 (0.046)	0.004 (0.046)	0.017 (0.047)	-0.312** (0.122)	-0.270** (0.113)	-0.224** (0.111)	-	-
Communication	-0.027 (0.022)	-0.033 (0.022)	-0.033 (0.022)	-0.479** (0.186)	-0.512*** (0.198)	-0.456** (0.198)	-0.330 (0.382)	-0.530*** (0.205)

DEMOGRAPHICS

Female (1 yes 0 no)	0.001 (0.036)	-0.006 (0.037)	0.002 (0.038)	0.099* (0.053)	0.101* (0.056)	0.097* (0.057)	0.080 (0.072)	0.102 (0.066)
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Age group (reference = ages 10-34)

Ages 35-49	-0.080* (0.044)	-0.081* (0.043)	-0.084* (0.043)	-0.092** (0.043)	-0.086** (0.042)	-0.089** (0.043)	-0.075 (0.093)	-0.092* (0.050)
Ages 50+	-0.232*** (0.055)	-0.239*** (0.052)	-0.241*** (0.054)	-0.226*** (0.055)	-0.225*** (0.053)	-0.229*** (0.055)	-0.119 (0.151)	-0.253*** (0.060)

Number of Children	0.030*** (0.011)	0.031*** (0.011)	0.028** (0.012)	0.025** (0.011)	0.029** (0.011)	0.027** (0.012)	-0.028 (0.035)	0.031** (0.012)
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Marital Status (reference = single)

Married	-0.072 (0.056)	-0.074 (0.057)	-0.073 (0.057)	-0.046 (0.056)	-0.055 (0.057)	-0.056 (0.057)	-0.029 (0.095)	-0.052 (0.072)
Divorced, Separated, Widowed	-0.156** (0.071)	-0.151** (0.073)	-0.149** (0.073)	-0.116 (0.071)	-0.097 (0.074)	-0.101 (0.075)	-0.004 (0.185)	-0.104 (0.086)

Immigrant parents (reference = Neither)

Either one or both	0.155 (0.144)	0.152 (0.146)	0.160 (0.136)	0.147 (0.145)	0.151 (0.146)	0.159 (0.136)	0.129 (0.176)	0.175 (0.149)
Unknown	0.289 (0.470)	0.263 (0.477)	0.356 (0.473)	0.270 (0.470)	0.272 (0.476)	0.367 (0.472)	0.005 (0.690)	0.655 (0.627)

Urban (1 yes 0 no)	-0.105** (0.051)	-0.105** (0.051)	-0.097* (0.051)	0.037 (0.070)	0.033 (0.070)	0.024 (0.070)	-0.040 (0.108)	0.065 (0.080)
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ECONOMIC CONDITIONS, LABOR MARKET CONDITIONS

Household income (1 low - 10 high)	- (0.010)	-0.007 (0.010)	-0.006 (0.011)	- (0.011)	0.014 (0.012)	0.013 (0.012)	0.030 (0.029)	0.010 (0.012)
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Perceived financial security (1 least - 3 most secure)	-	0.050**	0.044*	-	0.058**	0.051**	0.061	0.053**
	-	(0.023)	(0.023)	-	(0.024)	(0.024)	(0.051)	(0.027)
Social class (reference = working class)								
Middle class	-	0.081	0.080	-	0.143**	0.134**	0.162*	0.131**
	-	(0.052)	(0.051)	-	(0.058)	(0.056)	(0.091)	(0.063)
Upper class	-	0.113**	0.104*	-	0.231***	0.207***	0.174	0.215***
	-	(0.055)	(0.055)	-	(0.080)	(0.080)	(0.144)	(0.082)
Labor force status (ref= full-time workers)								
Part-time workers	-	0.043	0.042	-	-0.068	-0.056	-0.095	-0.017
	-	(0.055)	(0.055)	-	(0.064)	(0.065)	(0.163)	(0.069)
Self-employed	-	0.009	0.004	-	-0.060	-0.058	-0.159	-0.002
	-	(0.046)	(0.047)	-	(0.053)	(0.054)	(0.280)	(0.050)
Values work over leisure (1 least – 5 most)	-	-0.011	-0.008	-	-0.017	-0.013	-0.033	-0.007
	-	(0.015)	(0.015)	-	(0.015)	(0.015)	(0.037)	(0.018)
Share of foreign workers by occupation	-	0.001	0.001	-	-0.003	-0.002	-0.007	-0.001
	-	(0.003)	(0.003)	-	(0.003)	(0.003)	(0.010)	(0.003)
INDIVIDUAL BELIEFS								
Political ideology (1 most Liberal – 10 most Conservative)	-	-	0.009	-	-	0.005	-0.013	0.007
	-	-	(0.009)	-	-	(0.009)	(0.021)	(0.010)
Religiosity (1 least – 10 most religious)	-	-	-0.001	-	-	-0.003	-0.012	-0.001
	-	-	(0.011)	-	-	(0.011)	(0.016)	(0.013)
Religious affiliations (1 affiliated 0 unaffiliated)	-	-	-0.035	-	-	-0.018	-0.054	0.037
	-	-	(0.061)	-	-	(0.062)	(0.097)	(0.071)
Social capital (1 yes 0 no)	-	-	0.264***	-	-	0.273***	0.118	0.317***
	-	-	(0.050)	-	-	(0.050)	(0.078)	(0.055)
Concerned about crime (1 yes 0 no)	-	-	0.166**	-	-	0.165**	0.016	0.200**
	-	-	(0.079)	-	-	(0.077)	(0.118)	(0.087)
Concerned about national security (1 yes 0 no)	-	-	-0.089	-	-	-0.092	-0.163*	-0.066
	-	-	(0.063)	-	-	(0.064)	(0.087)	(0.072)
National identity (1 strong 0 no)	-	-	-0.056	-	-	-0.057	-0.164	-0.039
	-	-	(0.040)	-	-	(0.040)	(0.107)	(0.047)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dependent Variable Mean	0.304	0.304	0.304	0.304	0.304	0.304	0.319	0.300
N	10217	10217	10217	10217	10217	10217	2545	7672

Notes: Marginal effects are shown. "CFA" refers to the second-stage of the control function approach. The dependent variable is natives' attitudes toward immigration policy--whether they are pro-immigration. The main explanatory variables are skill variables and the educational attainment, normalized to have mean 0 and standard deviation 1. Country fixed-effects are included in covariate specifications 1-3. All estimations are weighted for country size. Standard errors are clustered at the regional level.

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

Source: Authors' calculations using the World Values Survey, wave 7.

Table 5. Effects of skill components on natives' attitudes toward immigration policies: Marginal Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	probit	probit	probit	CFA	CFA	CFA	CFA	CFA
covariate specification	cov1	cov2	cov3	cov1	cov2	cov3	cov3, high-educ	cov3, low-educ
Panel A: Manual Intensity								
Education (reference = B.A or above)								
Less than high school	0.224*** (0.059)	0.248*** (0.060)	0.253*** (0.062)	-0.111 (0.191)	-0.017 (0.178)	-0.017 (0.181)	-	-
High school diploma	0.010 (0.046)	0.023 (0.046)	0.034 (0.048)	-0.117 (0.121)	-0.062 (0.119)	-0.070 (0.121)	-	-
Manual Components								
Dexterity	-0.165*** (0.061)	-0.168*** (0.061)	-0.148** (0.063)	-1.377** (0.649)	-1.409** (0.651)	-1.251* (0.666)	-2.359 (1.671)	-1.060* (0.633)
Flexibility	0.329*** (0.108)	0.334*** (0.107)	0.289*** (0.107)	2.495** (1.100)	2.560** (1.116)	2.032* (1.132)	3.383 (2.595)	2.065* (1.137)
Strength	-0.155* (0.083)	-0.152* (0.081)	-0.125 (0.081)	-0.838 (0.790)	-0.882 (0.825)	-0.506 (0.837)	-0.365 (1.419)	-0.811 (0.948)
DEMOGRAPHICS								
Female (1 yes 0 no)	-0.001 (0.037)	-0.008 (0.038)	0.001 (0.038)	0.077 (0.070)	0.067 (0.069)	0.069 (0.070)	0.218* (0.122)	0.049 (0.076)
Age group (reference = ages 10-34)								
Ages 35-49	-0.084* (0.044)	-0.085** (0.043)	-0.087** (0.043)	-0.118*** (0.044)	-0.118*** (0.043)	-0.111** (0.044)	-0.145 (0.097)	-0.110** (0.049)
Ages 50+	-0.243*** (0.054)	-0.250*** (0.052)	-0.251*** (0.054)	-0.311*** (0.064)	-0.320*** (0.061)	-0.306*** (0.061)	-0.130 (0.161)	-0.318*** (0.065)
Number of Children	0.030*** (0.011)	0.030*** (0.012)	0.028** (0.012)	0.021* (0.012)	0.023** (0.012)	0.022* (0.012)	-0.041 (0.038)	0.030** (0.012)
Marital Status (reference = single)								
Married	-0.074 (0.055)	-0.077 (0.056)	-0.075 (0.056)	-0.059 (0.058)	-0.076 (0.058)	-0.071 (0.059)	0.023 (0.102)	-0.072 (0.075)
Divorced, Separated, Widowed	-0.156** (0.072)	-0.151** (0.073)	-0.149** (0.073)	-0.119 (0.073)	-0.108 (0.074)	-0.113 (0.074)	0.043 (0.189)	-0.130 (0.084)
Immigrant parents (reference = Neither)								
Either one or both	0.156 (0.142)	0.155 (0.143)	0.161 (0.134)	0.171 (0.141)	0.181 (0.143)	0.186 (0.134)	0.298 (0.193)	0.162 (0.145)

Unknown	0.309 (0.467)	0.285 (0.475)	0.374 (0.471)	0.461 (0.465)	0.472 (0.472)	0.526 (0.470)	0.562 (0.783)	0.802 (0.623)
Urban (1 yes 0 no)	-0.093* (0.051)	-0.092* (0.051)	-0.087* (0.051)	0.120 (0.082)	0.109 (0.079)	0.093 (0.080)	0.033 (0.120)	0.086 (0.088)
ECONOMIC CONDITIONS, LABOR MARKET CONDITIONS								
Household income (1 low - 10 high)	- (0.010)	-0.007 (0.010)	-0.006 (0.010)	- (0.011)	0.014 (0.012)	0.015 (0.012)	0.040 (0.029)	0.010 (0.012)
Perceived financial security (1 least - 3 most secure)	- (0.023)	0.051** (0.023)	0.045* (0.023)	- (0.024)	0.064*** (0.025)	0.059** (0.025)	0.070 (0.050)	0.057** (0.027)
Social class (reference = working class)								
Middle class	- (0.051)	0.083 (0.051)	0.081 (0.050)	- (0.059)	0.139** (0.058)	0.133** (0.058)	0.073 (0.115)	0.123* (0.065)
Upper class	- (0.056)	0.108* (0.056)	0.099* (0.056)	- (0.083)	0.168** (0.085)	0.166* (0.085)	0.107 (0.161)	0.162* (0.091)
Labor force status (ref= full-time workers)								
Part-time workers	- (0.055)	0.040 (0.055)	0.039 (0.056)	- (0.080)	-0.089 (0.082)	-0.090 (0.082)	-0.276 (0.185)	-0.049 (0.090)
Self-employed	- (0.046)	0.014 (0.046)	0.009 (0.046)	- (0.074)	0.015 (0.074)	-0.001 (0.074)	-0.221 (0.201)	0.007 (0.081)
Values work over leisure (1 least – 5 most)	- (0.015)	-0.011 (0.015)	-0.008 (0.015)	- (0.015)	-0.013 (0.015)	-0.009 (0.015)	-0.014 (0.038)	-0.005 (0.018)
Share of foreign workers by occupation	- (0.003)	0.002 (0.003)	0.002 (0.003)	- (0.004)	0.003 (0.004)	0.003 (0.004)	0.003 (0.015)	0.002 (0.004)
INDIVIDUAL BELIEFS								
Political ideology (1 most Liberal – 10 most Conservative)	- (0.009)	- (0.009)	0.008 (0.009)	- (0.010)	- (0.010)	-0.002 (0.010)	-0.013 (0.021)	0.002 (0.011)
Religiosity (1 least – 10 most religious)	- (0.011)	- (0.011)	-0.001 (0.011)	- (0.011)	- (0.011)	-0.002 (0.011)	-0.017 (0.015)	0.001 (0.013)
Religious affiliations (1 affiliated 0 unaffiliated)	- (0.061)	- (0.061)	-0.032 (0.061)	- (0.062)	- (0.062)	-0.005 (0.062)	-0.130 (0.109)	0.055 (0.072)
Social capital (1 yes 0 no)	- (0.049)	- (0.049)	0.258*** (0.049)	- (0.051)	- (0.051)	0.229*** (0.051)	0.090 (0.086)	0.290*** (0.056)
Concerned about crime (1 yes 0 no)	- (0.051)	- (0.051)	0.163** (0.051)	- (0.051)	- (0.051)	0.137* (0.051)	-0.026 (0.051)	0.162* (0.051)

	-	-	(0.079)	-	-	(0.076)	(0.128)	(0.086)
Concerned about national security (1 yes 0 no)	-	-	-0.088	-	-	-0.082	-0.213**	-0.052
	-	-	(0.064)	-	-	(0.062)	(0.089)	(0.070)
National identity (1 strong 0 no)	-	-	-0.057	-	-	-0.076*	-0.146	-0.069
	-	-	(0.040)	-	-	(0.045)	(0.108)	(0.052)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dependent Variable Mean	0.304	0.304	0.304	0.304	0.304	0.304	0.319	0.300
N	10217	10217	10217	10217	10217	10217	2545	7672

	OLS	OLS	OLS	CFA	CFA	CFA	CFA cov3, high-educ	CFA cov3, low-educ
covariate specification	cov1	cov2	cov3	cov1	cov2	cov3		

Panel B: Communication Intensity

Education (reference = B.A or above)

Less than high school	0.218***	0.243***	0.249***	-0.197	-0.144	-0.084	-	-
	(0.059)	(0.059)	(0.061)	(0.225)	(0.214)	(0.217)	-	-
High school diploma	-0.002	0.012	0.024	-0.245*	-0.217	-0.174	-	-
	(0.047)	(0.047)	(0.048)	(0.142)	(0.137)	(0.140)	-	-
Communication components								
Oral	0.049***	0.050***	0.044**	0.405**	0.415**	0.366**	0.170	0.392**
	(0.018)	(0.018)	(0.019)	(0.176)	(0.177)	(0.182)	(0.413)	(0.185)
Written	-0.058**	-0.066***	-0.062**	-0.697***	-0.782***	-0.683***	-0.279	-0.773***
	(0.025)	(0.025)	(0.025)	(0.233)	(0.259)	(0.257)	(0.484)	(0.247)

DEMOGRAPHICS

Female (1 yes 0 no)

	-0.011	-0.019	-0.009	-0.037	-0.024	-0.017	0.035	-0.047
	(0.036)	(0.037)	(0.038)	(0.051)	(0.053)	(0.056)	(0.101)	(0.062)

Age group (reference = ages 10-34)

Ages 35-49	-0.085*	-0.084**	-0.087**	-0.140***	-0.121***	-0.116***	-0.099	-0.120**
	(0.044)	(0.042)	(0.043)	(0.044)	(0.043)	(0.043)	(0.091)	(0.050)
Ages 50+	0.243***	-0.246***	-0.248***	-0.324***	-0.289***	-0.282***	-0.191	-0.309***
	(0.054)	(0.052)	(0.054)	(0.060)	(0.056)	(0.057)	(0.155)	(0.062)
Number of Children	0.030***	0.031***	0.028**	0.022*	0.028**	0.026**	-0.023	0.031**
	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)	(0.012)	(0.038)	(0.012)

Marital Status (reference = single)

Married	-0.070	-0.072	-0.070	-0.031	-0.027	-0.033	-0.039	-0.024
	(0.055)	(0.056)	(0.056)	(0.057)	(0.059)	(0.059)	(0.100)	(0.074)
Divorced, Separated, Widowed	-0.154**	-0.147**	-0.146**	-0.102	-0.068	-0.078	-0.003	-0.074
	(0.071)	(0.073)	(0.073)	(0.074)	(0.079)	(0.079)	(0.185)	(0.089)

Immigrant parents (reference = Neither)								
Either one or both	0.159	0.157	0.164	0.199	0.214	0.211	0.135	0.244
	(0.140)	(0.141)	(0.132)	(0.143)	(0.144)	(0.135)	(0.178)	(0.148)
Unknown	0.308	0.286	0.375	0.469	0.512	0.554	0.043	0.934
	(0.478)	(0.485)	(0.480)	(0.474)	(0.481)	(0.477)	(0.718)	(0.638)
Urban (1 yes 0 no)	-0.099*	-0.100*	-0.094*	0.065	0.056	0.041	-0.089	0.102
	(0.052)	(0.052)	(0.052)	(0.072)	(0.071)	(0.071)	(0.100)	(0.082)
ECONOMIC CONDITIONS, LABOR MARKET CONDITIONS								
Household income (1 low - 10 high)	-	-0.007	-0.006	-	0.016	0.014	0.019	0.014
	-	(0.010)	(0.011)	-	(0.012)	(0.012)	(0.026)	(0.012)
Perceived financial security (1 least - 3 most secure)	-	0.051**	0.044*	-	0.062**	0.057**	0.065	0.055**
	-	(0.024)	(0.023)	-	(0.024)	(0.025)	(0.052)	(0.027)
Social class (reference = working class)								
Middle class	-	0.080	0.079	-	0.123**	0.115**	0.125	0.117*
	-	(0.051)	(0.050)	-	(0.057)	(0.056)	(0.091)	(0.061)
Upper class	-	0.109**	0.100*	-	0.181**	0.163**	0.104	0.182**
	-	(0.055)	(0.055)	-	(0.077)	(0.078)	(0.142)	(0.079)
Labor force status (ref= full-time workers)								
Part-time workers	-	0.042	0.040	-	-0.085	-0.069	-0.002	-0.069
	-	(0.056)	(0.056)	-	(0.069)	(0.070)	(0.158)	(0.076)
Self-employed	-	-0.011	-0.014	-	-0.287***	-0.254**	-0.066	-0.258***
	-	(0.047)	(0.047)	-	(0.101)	(0.101)	(0.366)	(0.091)
Values work over leisure (1 least – 5 most)	-	-0.012	-0.009	-	-0.021	-0.017	-0.021	-0.017
	-	(0.015)	(0.015)	-	(0.015)	(0.015)	(0.035)	(0.019)
Share of foreign workers by occupation	-	0.002	0.002	-	0.002	0.002	-0.001	0.004
	-	(0.003)	(0.003)	-	(0.003)	(0.003)	(0.010)	(0.004)
INDIVIDUAL BELIEFS								
Political ideology (1 most Liberal – 10 most Conservative)	-	-	0.009	-	-	0.003	-0.016	0.007
	-	-	(0.009)	-	-	(0.009)	(0.023)	(0.010)
Religiosity (1 least – 10 most religious)	-	-	-0.002	-	-	-0.005	-0.011	-0.006
	-	-	(0.011)	-	-	(0.011)	(0.016)	(0.013)
Religious affiliations (1 affiliated 0 unaffiliated)	-	-	-0.033	-	-	-0.007	-0.060	0.055

	-	-	(0.061)	-	-	(0.063)	(0.094)	(0.073)
Social capital (1 yes 0 no)	-	-	0.258***	-	-	0.220***	0.083	0.267***
	-	-	(0.050)	-	-	(0.049)	(0.083)	(0.054)
Concerned about crime (1 yes 0 no)	-	-	0.168**	-	-	0.172**	0.063	0.196**
	-	-	(0.078)	-	-	(0.077)	(0.117)	(0.087)
Concerned about national security (1 yes 0 no)	-	-	-0.087	-	-	-0.072	-0.170**	-0.036
	-	-	(0.063)	-	-	(0.062)	(0.085)	(0.070)
National identity (1 strong 0 no)	-	-	-0.059	-	-	-0.084*	-0.131	-0.081
	-	-	(0.040)	-	-	(0.043)	(0.105)	(0.050)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dependent Variable Mean	0.304	0.304	0.304	0.304	0.304	0.304	0.319	0.300
N	10217	10217	10217	10217	10217	10217	2545	7672

Notes: Marginal effects are shown. "CFA" refers to the second-stage of the control function approach. The dependent variable is natives' attitude toward immigration policy. The main explanatory variables are skill variables and the educational attainment, normalized to have mean 0 and standard deviation 1. Country fixed-effects are included in all covariate specifications 1-3. All estimations are weighted for country size. Standard errors are clustered at the regional level.

p<0.1 **p<0.05 *p<0.01*

Source: Authors' calculations using the World Values Survey, wave 7.

Table 6. Robustness check: Link between skills and attitudes toward open immigration policy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	CFA	OLS	CFA	OLS	CFA	OLS	CFA
covariate specification:	cov3	cov3	cov3	cov3	cov3	cov3	cov3	cov3
Education (reference = B.A or above)								
Less than high school	0.289*** (0.092)	-0.058 (0.237)	0.286*** (0.091)	-0.013 (0.249)	0.283*** (0.090)	-0.251 (0.233)	0.273*** (0.091)	-0.495* (0.265)
High school diploma	0.069 (0.084)	-0.149 (0.152)	0.068 (0.084)	-0.115 (0.178)	0.066 (0.082)	-0.267* (0.147)	0.057 (0.083)	-0.456** (0.179)
Manual	0.023 (0.030)	0.404 (0.258)	- -	- -	- -	- -	- -	- -
Dexterity	- -	- -	-0.018 (0.078)	0.298 (0.695)	- -	- -	- -	- -
Flexibility	- -	- -	-0.001 (0.147)	0.275 (1.620)	- -	- -	- -	- -
Strength	- -	- -	0.044 (0.115)	-0.202 (1.543)	- -	- -	- -	- -
Communication	- -	- -	- -	- -	-0.029 (0.031)	-0.609** (0.248)	- -	- -
Oral	- -	- -	- -	- -	- -	- -	-0.014 (0.030)	-0.064 (0.199)
Written	- -	- -	- -	- -	- -	- -	-0.029 (0.036)	-0.798*** (0.270)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Econ/labor market conditions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Beliefs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dependent Variable								
Mean	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093
N	10217	10217	10217	10217	10217	10217	10217	10217

Notes: Marginal effects are shown. "CFA" refers to the second-stage of the control function approach. The dependent variable is natives' attitude toward a completely open immigration policy, i.e., whether they support such policies. "Std" refers to normalized variables with a mean 0 and standard deviation of 1. Country fixed-effects are included in all covariate specifications 1-3. All estimations are weighted for country size. Standard errors are clustered at the regional level. * $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$

Source: Authors' calculations using the World Values Survey, wave 7.

Table 7. Link between skills and attitudes toward open immigration policy, by exposure to foreign labor

Control Function Approach	(1)	(2)	(3)	(4)
Covariate specification:	cov3	cov3	cov3	cov3
Panel A: Above-Median Exposure Countries				
Education (reference = B.A or above)				
Less than high school	-0.212 (0.178)	-0.145 (0.190)	-0.236 (0.164)	-0.144 (0.168)
High school diploma	-0.165* (0.096)	-0.107 (0.120)	-0.176** (0.088)	-0.124 (0.102)
Manual, std	0.415 (0.255)	- -	- -	- -
Dexterity, std	- -	-1.39 (1.027)	- -	- -
Flexibility, std	- -	1.973 (1.547)	- -	- -
Strength, std	- -	-0.293 (1.071)	- -	- -
Communication, std	- -	- -	-0.491** (0.250)	- -
Oral, std	- -	- -	- -	0.202 (0.296)
Written, std	- -	- -	- -	-0.580* (0.317)
Demographics	Yes	Yes	Yes	Yes
Econ/labor market conditions	Yes	Yes	Yes	Yes
Individual Beliefs	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Dependent Variable Mean	0.351	0.351	0.351	0.351
N	4293	4293	4293	4293

Panel B: Low-Median Exposure Countries

Education (reference = B.A or above)

Less than high school	0.062 (0.272)	0.112 (0.252)	0.013 (0.235)	0.225 (0.277)
High school diploma	-0.102 (0.192)	-0.051 (0.175)	-0.143 (0.172)	-0.028 (0.210)
Manual	0.369 (0.424)	- -	- -	- -
Dexterity	- -	-1.854 (1.239)	- -	- -
Flexibility	- -	3.087 (2.321)	- -	- -
Strength	- -	-0.876 (1.677)	- -	- -
Communication	-	-	-0.415	-

	-	-	(0.340)	-
Oral	-	-	-	0.585**
	-	-	-	(0.296)
Written	-	-	-	-0.694
	-	-	-	(0.424)
Demographics	Yes	Yes	Yes	Yes
Econ/labor market conditions	Yes	Yes	Yes	Yes
Individual Beliefs	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Dependent Variable Mean	5924	5924	5924	5924
N	0.282	0.282	0.282	0.282

Notes: Marginal effects of the second-stage control function estimation are shown. The dependent variable is natives' attitude toward immigration policy, i.e., whether they are pro-immigration. "Std" refers to normalized variables with a mean 0 and standard deviation of 1. Country fixed-effects are included in all covariate specifications 1-3. All estimations are weighted for country size. Standard errors are clustered at the regional level.

p<0.1 **p<0.05 *p<0.01*

Source: Authors' calculations using the World Values Survey, wave 7.

Table 8. Link between skills and attitudes toward open immigration policy, by gender

Control Function Approach	(1)	(2)	(3)	(4)
Covariate specification:	cov3	cov3	cov3	cov3
Panel A: Male				
Education (reference = B.A or above)				
Less than high school	-0.207 (0.204)	-0.207 (0.202)	-0.238 (0.191)	-0.115 (0.219)
High school diploma	-0.226* (0.121)	-0.106 (0.128)	-0.240** (0.110)	-0.152 (0.134)
Manual, std	0.581*** (0.225)	- -	- -	- -
Dexterity, std	- -	-1.370* (0.721)	- -	- -
Flexibility, std	- -	3.124** (1.328)	- -	- -
Strength, std	- -	-1.222 (1.080)	- -	- -
Communication, std	- -	- -	-0.612*** (0.207)	- -
Oral, std	- -	- -	- -	0.343* (0.183)
Written, std	- -	- -	- -	-0.801*** (0.275)
Demographics	Yes	Yes	Yes	Yes
Econ/labor market conditions	Yes	Yes	Yes	Yes
Individual Beliefs	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Dependent Variable Mean	0.320	0.320	0.320	0.320
N	5767	5767	5767	5767

Panel B: Female

Education (reference = B.A or above)

Less than high school	0.17 (0.241)	0.217 (0.237)	0.058 (0.249)	0.05 (0.290)
High school diploma	-0.076 (0.164)	-0.026 (0.173)	-0.148 (0.170)	-0.134 (0.211)
Manual	0.09 (0.253)	- -	- -	- -
Dexterity	- -	-0.961 (0.845)	- -	- -
Flexibility	- -	0.81 (1.379)	- -	- -
Strength	- -	0.118 -	- -	- -

	-	(1.013)	-	-
Communication	-	-	-0.207	-
	-	-	(0.259)	-
Oral	-	-	-	0.424
	-	-	-	(0.284)
Written	-	-	-	-0.517*
	-	-	-	(0.310)
Demographics	Yes	Yes	Yes	Yes
Econ/labor market conditions	Yes	Yes	Yes	Yes
Individual Beliefs	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Dependent Variable Mean	0.281	0.281	0.281	0.281
N	4450	4450	4450	4450

Notes: Marginal effects of the second-stage control function estimation are shown. The dependent variable is natives' attitude toward immigration policy, i.e., whether they are pro-immigration. Country fixed-effects are included in all covariate specifications 1-3. All estimations are weighted for country size. Standard errors are clustered at the regional level. "Std" refers to normalized variables with a mean 0 and standard deviation of 1.

p<0.1 **p<0.05 *p<0.01*

Source: Authors' calculations using the World Values Survey, wave 7.

Online Appendix

Labor Market Competition and Attitudes toward Immigrants: New Evidence from Asia

Table A1 shows the international migrant stock of several countries as a percentage of the total population. These numbers are greater than the number of foreign-born workers because they include non-working spouses and dependents. Regardless, the cross-country differences are reliable indicators of global migration trends. The international migrant stock reached 281 million in 2020, with Asia playing a considerable role in overall global migration (UN 2021).

While the overall trend indicates a growing role Asia plays as a destination for international migration, the extent of migration varies across countries in the region. It can be seen from Table A1 in the Appendix that, while some economies in the region such as Malaysia (10.74%) and Singapore (43.14%) have relatively long traditions of admitting migrant workers, other Asian economies such as South Korea and Japan have not been major destinations for immigration historically. Nonetheless, Japan's international migrant stock as a percentage of the total population increased from 0.86% in 1990 to 2.19% in 2020, while that in South Korea increased from 0.65% to 1.59%.

Table A1: International migrant stock (in 000, and as a % of the total population) at mid-year by region or economy of destination, selected years

	1990		2000		2010		2020	
		<i>As % of population</i>		<i>As % of population</i>		<i>As % of population</i>		<i>As % of population</i>
World	152,986		173,231		220,983		280,598	
Eastern and South-Eastern Asia	6,836	-	10,506	-	15,760	-	19,591	-
Central and Southern Asia	26,169	-	20,140	-	19,677	-	19,428	-
Northern Africa and Western Asia	17,609	-	20,321	-	32,638	-	49,768	-
Oceania (exclude Australia and New Zealand)	259	-	297	-	298	-	313	-
Australia and New Zealand	4,473	-	5,065	-	6,830	-	9,068	-
Europe and Northern America	77,219	-	97,211	-	121,598	-	145,415	-
Latin America and the Caribbean	7,136	-	6,540	-	8,327	-	14,795	-
Sub-Saharan Africa	13,286	-	13,151	-	15,855	-	22,222	-
Eastern Asia	3,959		5,393		7,063		8,976	
China	376	0.03%	508	0.04%	850	0.06%	1,040	0.07%
China, Hong Kong SAR	2,218	38.73%	2,669	40.40%	2,780	39.91%	2,962	39.52%
China, Macao SAR	205	59.64%	241	56.29%	319	59.18%	403	62.14%
Dem. People's Republic of Korea	34	0.17%	36	0.16%	44	0.18%	50	0.19%
Japan	1,075	0.86%	1,686	1.32%	2,134	1.66%	2,771	2.19%
Mongolia	7	0.10%	8	0.52%	16	1.86%	21	3.37%

	1990		2000		2010		2020	
		<i>As % of population</i>		<i>As % of population</i>		<i>As % of population</i>		<i>As % of population</i>
Republic of Korea	43	0.65%	244	0.97%	920	1.46%	1,728	1.59%
South-Eastern Asia	2,877		5,113		8,698		10,615	
Brunei Darussalam	73	28.29%	96	28.90%	101	25.88%	112	25.59%
Cambodia	38	0.43%	146	1.20%	82	0.57%	79	0.47%
Indonesia	466	0.26%	292	0.14%	307	0.13%	356	0.13%
Lao People's Democratic Republic	23	0.54%	22	0.41%	33	0.53%	49	0.67%
Malaysia	696	3.86%	1,464	6.31%	2,417	8.57%	3,477	10.74%
Myanmar	134	0.32%	98	0.21%	76	0.15%	76	0.14%
Philippines	154	0.25%	318	0.41%	209	0.22%	226	0.21%
Singapore	727	24.14%	1,352	33.55%	2,165	42.19%	2,524	43.14%
Thailand	529	0.93%	1,258	2.00%	3,234	4.81%	3,632	5.20%
Timor-Leste	9	1.21%	11	1.20%	12	1.06%	8	0.64%
Viet Nam	28	0.04%	57	0.07%	62	0.07%	77	0.08%

Source: UN (2021).

References

United Nations, UN (2021). International Migrant Stock 2020. Department of Economic and Social Affairs, Population Division. Retrieved from <https://www.un.org/development/desa/pd/content/international-migrant-stock>