

Different Immigrants, Same Attitudes?

A Bayesian Bivariate Ordered Probit Analysis of Public Opinion in Taiwan*

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Abstract

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1 Introduction

In the age of globalization, population movements across national boundaries has evidently accelerated due to economic and political reasons. The increase in international migration inevitably brings about debates on immigration issues in the receiving countries. In democratic countries, whether the public supports or opposes granting legal status and work permits to immigrants plays an important role in shaping immigration policy. Are these attitudes different when the immigrants refer to different groups in terms of occupation skills? In so, is the public more supportive of an influx of foreign professionals than workers or vice versa, and what are the factors contributing to these differences?

A great amount of research has examined the determinants of individual attitudes toward immigration, including immigrants (e.g., ??) and immigration policy (e.g., ??). In the literature, economic competition and cultural threat are commonly analyzed sources of anti-immigrant sentiments. The former, based on labor-market competition, hypothesizes that individual workers will oppose immigration of workers with similar skills to their own due to the fear of competing for material resources (??). The latter postulates that native people will be against immigration because of the perceived intergroup threat on cultural and/or national identity, and symbolic prejudice toward immigration (???). Although both theories have been found supported by empirical evidence, more work is needed to identify the causal mechanisms and their effects on attitude toward immigration (??).

The economic and cultural concerns are applied to explaining two broad types of attitudes on immigration issues: opinion on immigrants and opinion on immigration policy (?). Regarding public attitudes toward immigrants, much of the literature does not consider the differences of skill levels among immigrants and presumes the referred immigrants are low-skilled, blue-collar workers. There are at least two reasons to differentiate between different types of workers. First, the implicit presumption of immigrants as blue-collar workers

is highly unreasonable since international migration involves not only blue-collar workers but also white-collar ones. Well-educated immigrants are willing to use their expertise in their professions in different countries. Unfortunately, many countries and employers have concerns about the newcomers' language skills, educational backgrounds, and lower wages compared with the native-born. Second, it has been shown that, however, the differentiation between skill levels of workers is appropriate to test alternative theoretical arguments that explain the source of negative sentiments toward immigration (?).

To answer the above questions, we follow the research that examines public attitudes toward immigrants with different skill levels. In this article, we investigate public attitudes toward two categories of immigrants—professionals and laborers. By differentiating between professionals and laborers based on occupation skills, first, we are able to test both economic and cultural explanations to public support for/opposition to immigration. Second, we further examine how government performance on the issues related to migrant workers influences public views on immigrants.

We investigate the determinants of public attitudes toward two categories of immigrants by analyzing a nationally representative sample of 1,966 respondents in Taiwan. We select Taiwan as our case for several reasons.

According to the data analysis, we find that

The remainder of this article proceeds as follows. Section 2 reviews the extant literature on public opinion toward immigration. We then develop theoretical arguments that explain the effects of economic and cultural concerns on attitudes toward immigrants with the testable hypotheses. Section 3 discusses the case of Taiwan and provides an illustration of the data and measurements. The statistical model employed in the empirical analysis and the results of the data analysis are displayed in Section 4. Section 5 concludes the article.

2 Public Attitudes toward Immigration

In the age of globalization and open-economy countries, international migration has undoubtedly accelerated and simultaneously brought about the discussions on immigration issues in host countries. One of the most important issues is the extent of immigration restrictions, which is shaped by public evaluations of the economic and social impacts of immigration on its own countries. In the following, we start with a review on the literature on public opinion toward immigration. Then we demonstrate public support for citizenship granted to migrant workers induced by economic and cultural concerns. Finally, we provide several testable hypotheses appropriate for countries worldwide in general and for the particular case discussed in the third section.

2.1 Economic and Cultural Concerns about Immigration

As international migration has gradually increased in the past two decades, both international migrants and native population have encountered numerous challenges. The immigrants leave their home countries due to economic or political reasons for some places where they seek for a better life. In these new lands, however, they face certain issues such as immigration restriction and immigration attitudes of the natives. Regarding immigration restriction, immigration policies involve regulations concerning entry to, residence in, and the citizenship of a country and vary around world, ranging from allowing most types of migration to allowing no migration at all. Generally speaking, the less restrictive the regulations, the more likely the influx of immigrants.

Concerning immigration attitudes of the natives, the native-born residents may have two types of attitudes about immigration that contradict each other. The natives, on the one hand, have an open mind on immigration due to the labor shortage, especially in developed countries where the population is gradually aging. The native people, on the other

hand, are concerned with the economic impact of immigration such as native wages and job displacement (?), and/or social impact of immigration such as cultural homogeneity (??) and national security (?). According to the recent studies of public views on immigration, unfavorable attitudes toward immigrants and immigration are widespread and similar across receiving countries (??).

There are two main schools of thoughts explaining public attitudes toward immigration: political economy and socio-psychological approaches (??). Within the political economy literature which emphasizes self-interest, one strand is based on the factor-proportions analysis model which focuses on the connection between individual skill levels and immigration-policy preferences (?). This model predicts that the inflow of immigrants affects the wages of the natives with similar skills and, therefore, skilled individuals are more likely to favor immigration if natives are more skilled than immigrants and to oppose it otherwise (??). The other strand in the political economy literature focuses on the welfare systems and immigration's fiscal impacts (?). It argues that immigrants receives a large share of the welfare and increases fiscal pressures to raise taxes. In this regard, natives with higher incomes are more supportive of restrictive immigration policy than those with lower incomes (?).

Instead of underscoring material self-interest, the other school of thoughts emphasizes perceptions of sociotropic threats on the receiving country as a whole, including economic and cultural threats. Some research shows that personal economic situation matters little to public attitudes toward immigration, but the assessments of the impact of immigration on national economy and the general feelings about immigrants are important determinants of opinion formation (?). This finding opens up an alternative avenue into the study of formulating opinions on immigration. That is, natives' opinion toward immigration is a result of the racial and ethnic stereotyping. For example, ? shows that the fear of economic insecurity is related to people's negative stereotypes of racial and ethnic groups, which leads to a desire for restrictive immigration policy.

Furthermore, symbolic predispositions, such as preferences for cultural unity and prejudice against reference groups, are influential on attitudes toward immigration (e.g., ?). Under the broad framework of social comparison theories, individual attitudes and behavior can be influenced by community relationships. For one thing, the categorization of people causes in-group members to favor their own group and disapprove of the out-group (?). For the other, the influx of the out-group changes the composition of the population and compositional amenities (?). It has been shown that the perceptions of immigration's cultural impacts on the receiving countries are prevalent in the United States and European countries (??). In this regard, individuals with higher levels of tolerance of out-group members and/or less perceived cultural threats are supportive of increased immigration.

2.2 Immigration Composition and Diverse Attitudes

Most, if not all, of the studies of public attitudes toward immigration do not differentiate among immigrants and implicitly refer immigrants to blue-collar workers. This is because scholars focus more on immigration issues in economically developed countries, such as the United States (Canada?) and Western European countries, than those in other countries and most immigrants in these countries are nonspecialists (labors?) from developing countries. Failing to account for the differences among immigrants may cause inferential problems. For example, the finding of the positive correlation between natives' skills and support for immigration results from the premise that respondents think of low-skilled labor when answering survey questions about immigration policy (?).

To fill this gap, we extend the discussion to native's attitudes toward both immigrant workers and professionals from the perspectives of political economy and socio-psychological approaches, respectively. According to the factor proportion model, which assumes perfect substitutability between natives and immigrants, the inflow of immigrants might lead to an decrease in the wages of similarly skilled natives (?). It has been shown that the natives

tend to oppose to the inflow of immigrants with similar skill level (?). The logic can be further applied to contrast two types of occupations—workers and professionals. As a result, native workers are likely to favor less restrictive policy for immigrant specialists **immigrant professionals** but more restrictive one for immigrant labor. By the same token, native professionals are likely to support an increase of immigrant labor while opposed to an influx of immigrant specialists **skilled immigrants**.

Moreover, concerning immigration’s fiscal impacts, the literature shows that income is negatively correlated to supportive attitudes toward immigration (??). It is also shown that, however, the negative correlation between income and pro-immigration attitudes is found in countries where natives are more skilled than immigrants and that there is a positive correlation between individual skill and pro-immigration preferences (?). These results suggest that the negative relationship between income and pro-immigration preferences found in the previous studies is likely due to the premise that respondents think of low-skilled labor when answering survey questions about immigration policy. In this regard, low-skilled immigration increases fiscal pressures to raise taxes while high-skilled immigration has the opposite effects. By differentiating between skill levels of immigrants, ? shows that natives with higher incomes are more supportive of high-skilled immigrants and more opposed to low-skilled immigrants than those with lower incomes. In terms of occupations, we expect that natives with higher incomes are likely to favor immigration policy for immigrant specialists **immigrant professionals**.

The socio-psychological approach discusses sociotropic threats on the receiving country and the general impression about immigrants perceived by the natives. It argues that the natives are concerned about the difficulties that the immigrants fit in with the culture in the receiving countries and the social problems caused by the immigrants (e.g., ?). In this regard, the natives should have the same concerns with both workers and specialists **professionals**. That is to say, in terms of cultural unity, the natives are opposed to the influx of immigration

no matter the immigrants are workers or specialists **regardless of the immigrant's profession**.

The natives, however, usually differentiate among particular immigrant groups based on certain content of stereotypes such as nationality, race, and ethnicity (?). The stereotypes of immigrants further influences information processing (?) and the formation of prejudice (?), which makes some particular immigrant groups be more preferred to others. For example, Swiss voters are more likely to be opposed to the inflow of immigrants from Turkey and Yugoslavia than that from elsewhere in Europe (?). In the Britain, by the same token, the respondents prefer white immigrant groups to non-white ones (?).

From the perspective of socio-psychological approach, public attitudes toward immigrant workers and immigrant specialists **immigrant professionals** are shaped by stereotyping along with nationality, race, and ethnicity. The general perception of immigrants as low competence is due to the fact that most of the immigrants are less-skilled workers who are from developing countries, non-white, or non-Anglo-Saxons (??). The stereotypes of immigrants further trigger the formation of negative emotions—in particular, anxiety—and shape anti-immigration attitudes (?). In the United States, for example, people with negative stereotypes of Latinos or Asian more favor restrictive policy of immigration (?). Unlike the perception of workers, people usually have a positive impression on specialists **skilled immigrant** such as intelligence, gentleness, neatness, good manners, etc. These features of specialists **immigrant professionals** usually attach to a reflection of white, Anglo-Saxons from economically developed countries. In this regard, the natives are less likely to oppose inflows of immigrant specialists **foreign-born professionals**.

In sum, we have several predictions according to the above discussions. Concerning labor market competition, first of all, the factor proportion model suggests that native workers are opposed to immigrant workers while native specialists **professionals** favor restrictive policy for immigrant specialists **skilled immigrant**. Second, the strand within the political economy approach that focuses on fiscal impacts of immigrants states that natives with higher

incomes are more supportive of immigrant specialists **immigrant professionals** and more opposed to immigrants workers than their poorer counterparts. Third, considering sociotropic effects of immigrants, the natives with preferences for cultural unity are equally opposed to immigrant specialists **immigrant professionals** and immigrant workers. Finally, natives with group-specific stereotypes in mind have different magnitudes of tolerance toward immigrant specialists **immigrant professionals** and immigrant workers.

3 Case Selection, Data, and Measurements

In this section, we discuss the case of Taiwan—a newly consolidated democracy and economically developing country in East Asia. Taiwan is a largely mono-ethnic country where native-born residents have strong stereotypical thinking on the connections between the images of ethnicities, countries, and occupations. This feature makes Taiwan as an appropriate case for us to test the predictions developed from different theoretical approaches.

3.1 The Case of Taiwan

Most of previous studies of immigration attitudes focus on economically developed countries such as the United States (e.g., ??), European countries (e.g., ??), and Japan (?). In these countries, immigrants with different skill levels or occupations probably have the same countries and the types of occupation are not strongly correlated to the stereotypes of immigrants' countries of origin, races, or ethnicities. For developing countries such as Taiwan, in contrasts, the differences between specialists **professionals** and workers is obvious, in particular the overlaps over the images of races, countries, or occupations.

In Taiwan, public perceptions of citizenship are strongly linked to ethnicity, which means that an immigrant can be easily recognized by their appearance, because **(for)** two reasons. First, Taiwan is one of the countries that adopt jus sanguinis, in which a person's citizenship

is determined by their parents. Second, Taiwan has strict immigration regulations, by which immigrants hardly get residency and citizenship. Generally speaking, there are three types of migration in Taiwan: marriage migration, immigrant workers, and white-collar foreign professionals. Foreigners in Taiwan can apply for citizenship or permanent residency if they marry to Taiwanese. Otherwise, only managers, investors, and professionals can apply for permanent residency. In the future, mid-level technical personnel and caretakers can apply for permanent residency after working for seven consecutive years¹.

In recent years, the transformation of demographic and economic structure resulted in the unbalanced labor supply and demand in Taiwan. On the one hand, the birth rate has dropped from 2.297% in 1981 to 0.823% in 2017. Population size increased by 327,947 people in 1981, but it only increased by 31,411 in 2017. On the other hand, the economic structure gradually changed from agriculture to production and service industries. The number of people who worked in production and service industries increased from 2.3 million in 1971 to 8 million in 2011. The population transition creates demand for labors, while the economic development requires more investment and educated professionals.

In October 1989, the Council of Labor Affairs (MOL) decided to open up Taiwan's job market to immigrant workers to respond to these issues. Foreign blue-collar workers from Thailand, Philippines, Indonesia, Malaysia, Vietnam, China and Mongolia are now allowed to work in Taiwan as part of solution of labor shortages. According to MOL, as of the end of December 2017, there were 676,142 foreign workers in Taiwan. Among them, 60.43% are employed as manufacturing workers, 0.76% as construction workers, 1.82% on fishing crews, 36.71% as caretakers and 0.29% as domestic helpers.²

About the same time, marital immigrants entered into Taiwan in a large scale. One of the

¹The Legislative Yuan passed the Act for the Recruitment and Employment of Foreign Professionals on November 22, 2017. The Executive Yuan approved New Economic Immigration Law on May 15, 2018. The former eases policies regarding certification, residency, health insurance, tax, and pensions for foreign professionals and the latter broaden the scope by including mid-level technical workers in the industrial and social care sectors.

²These employees can work as long as 12 years.

major reasons is young male in the rural area lack opportunities of knowing young female as the service industry attracts many female labors. Up to the end of 2017, it is estimated that about 350 thousand of couples whose spouses are from China and 176 thousand from other countries. (Gender Equality Committee of the Executive Yuan). Among them, 40 percent of Chinese spouses get residence permits and 68 percent of international spouse are granted national identity cards.³ There are mixed evidences about the birth rate of foreign spouses (??). Many foreign spouses are working full-time or part-time as caretakers, waitress, and domestic helpers.

Although migrant workers and marital immigrants may attenuate the problem of labor supply as the birth rate is getting lower, brain drain becomes a serious problem for the economy that needs to be re-configured. In 2015, it is estimated that 724,000 people worked overseas, which is about 10% higher than 2009. Stagnant salary is often cited as the major reason of emigration. ? analyzed data from 1980 to 2012 and pointed out that the the gross domestic product per capita (GDP) is negatively correlated with real wage in Taiwan; labors have limited share of economic growth. Despite that, Taiwan's government has aggressively attracted foreign talents. According to MOL, the number of foreign professionals increased from 11,228 in 2004 to 18,412 in 2017. The remarkable gap between the scale of immigration and emigration pushes the government to amend the Act for the Recruitment and Employment of Foreign Professionals, which is passed by the Legislative Yuan in 2017. The new law allows foreign professionals to extend their work permission from 3 years to 5 years. Foreigners can apply for temporary visa to find a job. Certainly, it remains to be seen whether more foreign professionals are coming to work in Taiwan.

The abuse or mistreat of migrant workers is often made local headlines. They include lack of freedom to change employer, live-in situations with employers, and high broker fees in

³According to Cross-Strait People's Relations Ordinance, Chinese spouses can become naturalized after living in Taiwan for six years. Other countries' spouses also need six years to become citizens, and they have to renunciate their nationality afterwards.

mother countries (Jeremy Oliver, 2017). In 2016, the government amended the Employment Service Act to improve the structures. After being hired, migrant workers do not have to leave the country every three years, which reduces the brokerage fees for re-entering Taiwan. The employers also cannot refuse to give them paid leave as it is required by Labor Standards Act, a statute that mainly regulates domestic labor and employer. According to a survey conducted by MOL, the average salary of foreign manufacturing workers and caretakers have been increasing for the past three years. (Ya-wen Li, 2018)

Like other countries, Taiwanese are concerned that migrant workers replace vanishing Taiwanese workers. Lin (2001) investigated the geographical distribution of migrant workers and concluded that it is difficult for domestic workers to move to the area that are populated by migrant workers. ? found that foreign labor has a negative effect for the semi- and less-skilled construction workers but benefits employment for managerial/professional workers. Lan (2010) found that employers of migrant workers tend to agree that migrant work forces can supplement local workers but employers of local workers tend to have a perception that local workers are replaced by migrant labors. In sum, the previous literature has mixed evidence about the influence of foreign labors in terms of employment.

Human trafficking is another pressing challenge for Taiwan. The victims are girls and women from Vietnam, Thailand, and China. ? examined the characteristics of victims in 132 court proceedings related to the Human Trafficking Prevention Act (HTPA) enacted in 2009. She found that about half of the cases (56.8%) involve adult foreign victims. Lured by higher wages and not allowed to switch employers, some migrant workers choose sex industry (Liu, 2015). MOL estimated that the number of missing foreign workers has declined over the years and reached at 52,000 up until 2017(Central News Agency, 2018).

In brief, Taiwan government well managed migrant workers regarding their salary and impact on domestic job market. But the abuse and mistreat of migrant workers remains a serious issue. They range from age exploitation, verbal abuse to physical violence. The

issue of human trafficking also needs to be addressed by law enforcement and prosecution. As the government intends to make the society more inclusive and diverse, it is important to examine public opinion toward the immigration.

3.2 Data Description and Measures

We analyze survey data in Taiwan with a nationally representative sample of 1966 respondents conducted by the Taiwan Social Change Survey Project (?). The survey data were collected by face-to-face interview from August 7th to November 27th in 2016. In addition to a series of questions about background demographic, the questionnaire also covers questions about immigration.⁴ In Table 1, as can be seen, a majority of the respondents (77.16%) think that the Taiwan government should allow foreign professionals to become citizens of Taiwan while only 16.94% of the respondents think that the Taiwan government should not do so. In contrast, about a half of the respondents (47.45%) agree that the government should allow foreign professionals to become citizens of Taiwan and a half of the respondents (47.92%) think that the Taiwan government should not do so. The distributions in Table 1 suggest that Taiwanese people welcome foreign professionals more than foreign workers.

Table 1: Public Attitudes toward Immigration in Taiwan, 2016

| Questions | Definitely not | Probably not | Probably | Definitely | Missing |
|------------------------------|----------------|--------------|----------|------------|---------|
| Professionals being citizens | 5.65 | 11.29 | 42.37 | 34.79 | 5.90 |
| Workers being citizens | 17.60 | 30.32 | 32.60 | 14.85 | 4.63 |

Note: Data are weighted to reflect the characteristics of the national population and presented in percentage.

We are interested in the determinants of attitudes toward the inflow of foreign professionals and workers. According to the discussion above, people’s socioeconomic status such as occupation and income influences how they view immigration. Regarding the classifica-

⁴The questions are provided in Appendix A.

Table 2: Cross-tabulation of Occupations and Attitudes toward Immigration

| Occupations | Allow foreign professionals to become the citizens | | | |
|---------------------|--|--------------|------------|------------|
| | Definitely not | Probably not | Probably | Definitely |
| Professionals | 3.24(19) | 7.51(44) | 44.37(260) | 44.88(263) |
| Skilled-workers | 5.88(42) | 14.15(101) | 46.08(329) | 33.89(242) |
| Low-skilled workers | 9.87(47) | 13.24(63) | 43.49(207) | 33.40(159) |
| Armed forces | 0.00(0) | 16.67(4) | 33.33(8) | 50.00(12) |

| Occupations | Allow foreign workers to become the citizens | | | |
|---------------------|--|--------------|------------|------------|
| | Definitely not | Probably not | Probably | Definitely |
| Professionals | 13.45(78) | 30.17(175) | 38.10(221) | 18.28(106) |
| Skilled-workers | 18.77(137) | 33.56(245) | 33.15(242) | 14.52(106) |
| Low-skilled workers | 23.67(116) | 30.20(148) | 31.22(153) | 14.90(73) |
| Armed forces | 9.09(2) | 22.73(5) | 54.55(12) | 13.64(3) |

Note: Data are weighted to reflect the characteristics of the national population; row percentages are presented and frequencies are in the parentheses; 166 and 144 samples are missing, respectively.

tion of occupations, we regroup the respondents into four categories based on international standard classification of occupations (ISCO-08): professionals, skilled workers, low-skilled workers, and armed forces occupations.⁵ Table 2 displays the distributions of public attitudes toward immigration across occupations. In Table 2, we do not observe different attitudes toward professionals or workers among different types of occupations. The result in Table 2 shows the same pattern with that in Table 1, that is, Taiwanese people welcome foreign professionals more than foreign workers no matter the occupations.

We also show cross-tabulation of income and public attitudes toward immigration. In Table 3,

⁵There are ten major groups in ISCO-08 provided by International Labor Organization: (1) managers; (2) professionals; (3) technicians and associate professionals; (4) clerical support workers; (5) services and sales workers; (6) skilled agricultural, forestry and fishery workers; (7) craft and related trades workers; (8) plant and machine operators and assemblers; (9) elementary occupations; (0) armed forces occupations. The classification of occupations in this article is as follows: professionals include (1) and (2); skilled workers include (3), (6), (7), and (8); low-skilled workers include (4), (5), and (9); armed forces occupations.

Table 3: Cross-tabulation of Income and Attitudes toward Immigration

| Income (US dollar) | Allow foreign professionals to become the citizens | | | |
|-----------------------|--|--------------|------------|------------|
| | Definitely not | Probably not | Probably | Definitely |
| 1000 and below | 7.65(72) | 15.94(150) | 45.48(428) | 30.92(291) |
| 1000-2000 | 4.40(27) | 9.14(56) | 46.49(285) | 39.97(245) |
| 2000-3000 | 0.78(1) | 3.12(4) | 42.97(55) | 53.12(68) |
| 3000-4000 | 0.00(0) | 4.17(2) | 45.83(22) | 50.00(24) |
| 4000 and above | 6.06(2) | 0.00(0) | 33.33(11) | 60.61(20) |

| Income (US dollar) | Allow foreign workers to become the citizens | | | |
|-----------------------|--|--------------|------------|------------|
| | Definitely not | Probably not | Probably | Definitely |
| 1000 and below | 20.68(200) | 32.26(312) | 33.30(322) | 13.75(133) |
| 1000-2000 | 14.78(90) | 33.17(202) | 34.98(213) | 17.08(104) |
| 2000-3000 | 11.72(15) | 26.56(34) | 39.06(50) | 22.66(29) |
| 3000-4000 | 10.64(5) | 27.66(13) | 44.68(21) | 17.02(8) |
| 4000 and above | 21.21(7) | 18.18(6) | 39.39(13) | 21.21(7) |

Note: Data are weighted to reflect the characteristics of the national population; row percentages are presented and frequencies are in the parentheses; 203 and 182 samples are missing, respectively.

4 Empirical Analysis of Individual Attitudes toward Immigrants

We examine public attitudes toward immigrants in Taiwan. In specific, we investigate the determinants of different attitudes toward foreign professionals and migrant laborers.

4.1 The Bayesian Bivariate Ordered Probit Model

A bivariate ordered probit model (BOPM) is applied to analyzing the survey data, which is useful for modeling the correlation between two ordered response variables (?, p. 227).⁶

We can derive the bivariate ordered probit model from the latent variable model. Suppose that, for the two response variables $y_{i,1}$ and $y_{i,2}$, respondent $i = 1, \dots, N$ provides a set of

⁶Bivariate ordered probit models can be considered as an extension of bivariate probit models, where the two response variables are binary.

Table 4: Cross-tabulation of Transnational Marriage and Attitudes toward Immigration

| Transnational marriage | Allow foreign professionals to become the citizens | | | |
|------------------------|--|--------------|------------|------------|
| | Definitely not | Probably not | Probably | Definitely |
| Definitely not | 30.56(44) | 12.50(18) | 22.92(33) | 34.03(49) |
| Probably not | 5.39(32) | 20.37(121) | 48.15(286) | 26.09(155) |
| Probably | 2.27(17) | 8.13(61) | 55.87(419) | 33.73(253) |
| Definitely | 4.14(11) | 4.51(12) | 17.67(47) | 73.68(196) |

| Transnational marriage | Allow foreign workers to become the citizens | | | |
|------------------------|--|--------------|------------|------------|
| | Definitely not | Probably not | Probably | Definitely |
| Definitely not | 52.45(75) | 17.48(25) | 14.69(21) | 15.38(22) |
| Probably not | 18.30(110) | 42.26(254) | 29.12(175) | 10.32(62) |
| Probably | 12.70(96) | 28.97(219) | 45.37(343) | 12.96(98) |
| Definitely | 15.71(41) | 22.22(58) | 25.67(67) | 36.40(95) |

Note: Data are weighted to reflect the characteristics of the national population; row percentages are presented and frequencies are in the parentheses; 212 and 205 samples are missing, respectively.

response $(y_{i,1} = j, y_{i,2} = k)$ for $j = 1, 2, \dots, J$ and $k = 1, 2, \dots, K$ based on unobserved, latent traits $y_{i,1}^*$ and $y_{i,2}^*$ and threshold parameters $\tau_{1,j}$ and $\tau_{2,j}$. The two latent variables can be represented by:

$$\begin{cases} y_{i,1}^* = \mathbf{x}'\boldsymbol{\beta} + \varepsilon_{i,1} \\ y_{i,2}^* = \mathbf{z}'\boldsymbol{\gamma} + \varepsilon_{i,2}, \end{cases} \quad (1)$$

where $\mathbf{x} = (x_{i,1}, x_{i,2}, \dots, x_{i,M})$ and $\mathbf{z} = (z_{i,1}, z_{i,2}, \dots, z_{i,G})$ are M -variate and G -variate predictors, respectively, $\boldsymbol{\beta} \in \mathbb{R}^M$ and $\boldsymbol{\gamma} \in \mathbb{R}^G$ are corresponding unknown parameter vectors, and $\boldsymbol{\varepsilon}_i = (\varepsilon_{i,1}, \varepsilon_{i,2})$ is the error term. The predictors in \mathbf{x} and \mathbf{z} can be the same or different (?). Given $y_{i,1}^*$, $y_{i,2}^*$, $\tau_{1,j}$, and $\tau_{2,j}$, we observe the responses as follows:

$$\begin{cases} y_{i,1} = j \text{ if } \tau_{1,j-1} < y_{i,1}^* \leq \tau_{1,j} \\ y_{i,2} = k \text{ if } \tau_{2,k-1} < y_{i,2}^* \leq \tau_{2,k} \end{cases} \quad (3)$$

$$(4)$$

where it is assumed that $\tau_{1,0} = \tau_{2,0} = -\infty$.

To relax the assumption that the two latent variables are independent, the error term ε_i is assumed to follow a bivariate standard normal distribution as follows:

$$\begin{pmatrix} \varepsilon_{i,1} \\ \varepsilon_{i,2} \end{pmatrix} \sim N_2 \left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \right]. \quad (5)$$

The correlation parameter ρ captures the association between the two response variables.

We take a Bayesian approach to constructing the proposed bivariate probit model, so we complete the model specification by defining the prior distributions. We use uninformative prior distributions for the unknown parameters as follows:

$$\beta_m \sim N(0, 100) \quad \text{for } m = 1, \dots, M, \quad (6)$$

$$\gamma_g \sim N(0, 100), \quad \text{for } g = 1, \dots, G, \quad (7)$$

$$\rho \sim N(0, 1) \mathbf{I}(-1 \leq \rho \leq 1), \quad (8)$$

where the large prior variances are assigned values to give diffuse forms and the truncated standard normal distribution for parameter ρ reflects the fact that it takes values between -1 and 1 . This setting indicates an a priori expectation of no correlation between two outcome variables.⁷

4.2 Results of Analysis

⁷One widely used prior distribution for the correlation parameter ρ is the uniform distribution between -1 and 1 . However, assuming a uniform distribution for ρ does not indicate a priori correlation with zero. It turns out that the specification of uniform distribution for ρ does not change the results of analysis.

Table 5: Determinants of Public Attitudes in 2016

| Outcome Variable | Attitudes toward | |
|----------------------------------|-----------------------------|-----------------------------|
| | Professionals | Workers |
| Occupation (Military=0) | | |
| Professionals | -0.002 [-0.466, 0.483] | 0.134 [-0.397, 0.593] |
| Skilled Worker | -0.202 [-0.633, 0.223] | -0.068 [-0.571, 0.396] |
| Low-skilled Worker | -0.103 [-0.516, 0.338] | -0.075 [-0.593, 0.406] |
| Country Eco. (Same=0) | | |
| Better | 0.059 [-0.230, 0.342] | 0.326 [0.060, 0.585] |
| Worse | 0.076 [-0.074, 0.221] | 0.044 [-0.091, 0.187] |
| Household Eco. (Same=0) | | |
| Better | -0.116 [-0.329, 0.124] | 0.030 [-0.195, 0.251] |
| Worse | -0.085 [-0.252, 0.096] | -0.238 [-0.402, -0.071] |
| Income (below US\$1000=0) | | |
| 1000-2000 | 0.290 [0.111, 0.466] | 0.072 [-0.090, 0.243] |
| 2000-3000 | 0.747 [0.431, 1.038] | 0.333 [0.047, 0.615] |
| 3000-4000 | 0.713 [0.263, 1.137] | 0.343 [-0.094, 0.742] |
| above 4000 | 0.830 [0.288, 1.352] | 0.206 [-0.274, 0.719] |
| Tolerance | 0.783 [0.645, 0.928] | 0.588 [0.449, 0.730] |
| Social Status | -0.070 [-0.117, -0.031] | 0.007 [-0.033, 0.047] |
| Unemployment | 0.171 [0.011, 0.344] | -0.031 [-0.189, 0.128] |
| Education (Illiteracy=0) | | |
| Junior high | -0.025 [-16.681, 16.450] | 0.149 [-15.857, 16.463] |
| Senior high | 0.018 [-16.449, 16.331] | 0.115 [-16.612, 16.028] |
| College | -0.069 [-16.114, 16.662] | -0.037 [-16.650, 15.903] |
| University and above | 0.008 [-17.360, 15.244] | 0.011 [-16.748, 16.324] |

Table 5: Determinants of Public Attitudes in 2016 (Continued)

| Outcome Variable | Attitudes toward | |
|--|------------------|------------------|
| | Professionals | Workers |
| Solving Problems (Unsuccessful=0) | | |
| Neither | — | −0.239 |
| | — | [−0.438, −0.048] |
| Successful | — | −0.195 |
| | — | [−0.315, −0.061] |
| Cutpoint 1 | −2.356 | −1.131 |
| | [−2.865, −1.808] | [−1.657, −0.667] |
| Cutpoint 2 | −1.272 | 0.164 |
| | [−1.744, −0.718] | [−0.354, 0.630] |
| Cutpoint 3 | 0.603 | 1.715 |
| | [0.121, 1.148] | [1.187, 2.187] |
| ρ | 0.957 | |
| | [0.915, 0.997] | |

Data source: 2016 Taiwan Social Change Survey (Round 7, Year 2)

Note: 90% HPD intervals are presented.

5 Conclusion

Appendix A Question Wordings

Below, we provide the prompts and questions that the respondents were asked about immigrants. We also provide the labels used in the main text of the article in parentheses. The choice-options provided for questions F3, F4 and F5 are: *Definitely should*, *Probably should*, *Probably should not*, and *Definitely should not*.

Next, we are going to ask you some questions about fertility decline and immigration.

Table A1: Survey Questions about Immigration

| | |
|-----|--|
| F4. | Do you think the Taiwan government should or should not allow foreign professionals to become citizens of Taiwan, with the same rights and obligations (such as voting rights and paying taxes) as we have? (Professionals being citizens) |
| F5. | Do you think the Taiwan government should or should not allow migrant laborers and care workers to become citizens of Taiwan, with the same rights and obligations (such as voting rights and paying taxes) as we have? (Workers being citizens) |
| F3. | Do you think the Taiwan government should or should not actively encourage Taiwanese to marry foreigners and live in Taiwan? (Transnational marriage) |

Data source: 2016 Taiwan Social Change Survey (Round 7, Year 2).