Different Immigrants, Same Attitudes? A Bayesian Bivariate Ordered Probit Analysis of Public Opinion in Taiwan

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Research Question, Method, and Finding

- Research Questions:
  1. Previous studies of public opinion on immigration focus on economically developed countries and implicitly refer immigrants to blue-collar laborers.
  2. 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.
  3. We extend the discussion to Taiwan and investigate public attitudes toward immigrants with different occupations.
- Method: Bayesian bivariate ordered probit model (BOPM)
- Findings:
  1. Different economic factors are the source of different attitudes toward immigrants
  2. Cultural tolerance is consistently correlated to pro-immigration attitudes regardless of professions.

Immigration Attitude

1. Economic: individual workers will oppose immigration of workers with similar skills to their own due to the fear of competing for material resources (Mayda, 2006; Scheve and Slaughter, 2001)
2. Culture: social impact of immigration on cultural homogeneity (Card, Dustmann and Preston, 2012; Citrin and Sides, 2008)
3. Symbolic: native people will be against immigration because of symbolic prejudice toward specific immigrant groups (Lee and Fiske, 2006)
4. Threat: the perceived intergroup threat on cultural unity and/or national identity (Blumer, 1958; Burns and Gimpel, 2000; Quillian, 1995)

Critics

Two approaches:

- Economic: material self-interest, social welfare
- Socio-tropic: culture threats of out-group

1. 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.
2. The differentiation between skill levels of immigrants is appropriate to test alternative theoretical arguments that explain the sources of negative sentiments toward immigration (Hainmueller and Hiscox, 2007).

Hypotheses

1. H_1: Native workers oppose immigrants while native professional oppose skilled immigrants.
2. H_2: Natives with higher incomes are more supportive of immigrant professionals.
3. H_3: Cultural unity has negative impact on immigration.

Why Taiwan?

- In Taiwan, public perceptions of citizenship are strongly linked to ethnicity; an immigrant can be easily recognized by their appearance. Taiwan has strict immigration regulations, by which immigrants hardly get residency and citizenship.
- There are three types of migration in Taiwan: marriage migration, immigrant laborers, 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.
- Taiwan government well managed migrant workers and is targeting at more foreign professionals.
- Taiwan is a good case for the society that wants to be more inclusive and diverse.

Bivariate Ordered Probit Model (1)

- A bivariate ordered probit model (BOPM) is applied to analyzing the survey data with the correlation between two ordered response variables (Greene and Hensher, 2010:227).
- Suppose that, for the two response variables $y_{i,1}$ and $y_{i,2}$, respondent $i = 1, \cdots, N$ provides a set of response $(y_{i,1} = j, y_{i,2} = k)$ for $j = 1, 2, \cdots, J$ and $k = 1, 2, \cdots, K$ based on unobserved, latent traits $y^*_{i,1}$ and $y^*_{i,2}$ and threshold parameters $\tau_{1,j}$ and $\tau_{2,k}$. The two latent variables can be represented by:

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

Bivariate Ordered Probit Model (2)

- $\boldsymbol{x} = (x_{i,1}, x_{i,2}, \cdots, x_{i,M})$ and $\boldsymbol{z} = (z_{i,1}, z_{i,2}, \cdots, z_{i,G})$ 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 $\boldsymbol{x}$ and $\boldsymbol{z}$ can be the same or different (Greene, 2012). Given $y^*_{i,1}$, $y^*_{i,2}$, $\tau_{1,j}$, and $\tau_{2,k}$, we observe the responses as follows:

$$\begin{cases} y_{i,1} = j \text{ if } \tau_{1,j-1} < y^*_{i,1} \leq \tau_{1,j} & (3) \\ y_{i,2} = k \text{ if } \tau_{2,k-1} < y^*_{i,2} \leq \tau_{2,k} & (4) \end{cases}$$

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

Bivariate Ordered Probit Model (3)

- To relax the assumption that the two latent variables are independent, the error term $\boldsymbol{\varepsilon_i}$ is assumed to follow a bivariate standard normal distribution as follows:

$$\begin{pmatrix} \varepsilon_{i,1} \\ \varepsilon_{i,2} \end{pmatrix} \sim \mathrm{N}_2 \left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \right]. \tag{5}$$

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

Data

- Data: a nationally representative sample of 1966 respondents conducted by the Taiwan Social Change Survey Project. They were collected by face-to-face interview from August 7th to November 27th in 2016, which is a part of the seventh round of Taiwan Social Change Survey Project from 2015 to 2019. The theme of the survey in 2016 is *Citizens and State*.

Dependent Variables

- Dependent Variables:
  - 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)
  - 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)

Independent Variables

Table A1: Independent Variables:

Do you think the Taiwan government should or should not actively encourage Taiwanese to marry foreigners and live in Taiwan? (Transnational marriage)
How successful do you think the government in Taiwan deals with problems regarding foreign laborers (Solving problems)
National economic condition
Household economic condition
Social status: 0-10
Unemployment: 1=unemployed
Occupation
Education

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

Attitudes toward Two Types of Immigrants

Table 1: Cross-tabulation of Attitudes toward Two Types of Immigrants

Allow foreign professionals to become citizens	Allow foreign workers to become citizens			
	Definitely not	Probably not	Probably	Definitely
Definitely not	80.18(89)	11.71(13)	6.31(7)	1.80(2)
Probably not	20.72(46)	65.77(146)	11.26(25)	2.25(5)
Probably	13.12(108)	33.78(278)	49.70(409)	3.40(28)
Definitely	13.39(90)	20.39(137)	28.27(190)	37.95(255)

Note: Spearman's rank correlation coefficient is 0.45 and polychoric correlation is 0.54.

Occupations and Immigration

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

	Allow foreign professionals to become the citizens			
Occupations	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)

	Allow foreign workers to become the citizens			
Occupations	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)

Income and Immigration

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)

Transnational Marriage and Immigration

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

Table 5: Determinants of Public Attitudes in 2016

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

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

Outcome Variable	Attitudes toward	
	Professionals	Workers
	[−16.449, 16.331]	[−16.612, 16.028]
College	−0.069	−0.037
	[−16.114, 16.662]	[−16.650, 15.903]
University and above	0.008	0.011
	[−17.360, 15.244]	[−16.748, 16.324]
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.

Summary

1. People with higher incomes are more likely to allow foreign professionals.
2. People with positive assessment of national economy are more likely to allow granting citizenship to foreign laborers while those with negative assessment of household economy are less likely to allow granting citizenship to foreign laborers.
3. Natives with greater cultural tolerance are more willing to grant citizenship to foreign professionals and foreign laborers.
4. People who think that the government do not fail to deal with problems regarding foreign laborers are less likely to support the inflow of immigrant workers.

Conclusion

1. We contribute to our understanding of how natives view immigrants across occupations in Taiwan, a economically developing and mono-ethnic country. Both economic and cultural factors are related to public attitudes toward immigration but in a different way.
2. We develop the Bayesian bivariate ordered probit model that considers the positive correlation between the two response variables. The explicit modeling of the association between the two response variables potentially reflects DGP, which in turn possibly leads to more correct inferences.
3. Next step: Estimating the model with two ordinal variables that have different number of categories.