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Migration, Wages and Unemployment in Thailand

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Abstract

Migrants from Myanmar to Thailand have increased rapidly during the last decade. The impact of immigration on labor market outcome has become a concern for native workers and policy makers. This paper provides new evidence on the impact of immigration on native wages and unemployment rates, using geographic approach. Our estimation suggests no significant impact of immigration on native wages. However, we find that immigration has a substantial adverse effect on natives' unemployment. The estimates indicate that a 1-percent increase in the migrant-to-native ratio of a province in 2001 raises the natives' unemployment rate about 0.5 percent in 2005. Moreover, we find that the workers who are most affected by the immigration are the unskilled, the young and the agricultural workers. The result that immigration affects only unemployment rates but does not affect wages implies that the Thai labor supply is flat.

Keywords: Migration, Unemployment, Wage

1. Introduction

Thailand was one of the world's fastest growing economies in the last decades. The country has been transforming from an agricultural to an industrial based. Much of the economic growth can be attributed to the adoption of an export-oriented policy in the mid-1980s. As a consequence of the economic expansion, the demand for labor and other factors of production has soared.

The Thai booming economy has become a magnet for migrants from neighboring countries. Recent surveys and estimates indicate that up to two million migrants which are about 6 percent of the Thai labor force work as undocumented labors in Thailand. Manning and Bhatnagar (2004) report that the total number of illegal migrant workers in Thai land and Malaysia is around 2-3 millions which is probably about the same as that in Europe during late 1990s.

Up to 90 percent of the migrant workers are from Myanmar. They escape political and economic difficulties and uncertainties. While migrants from Myanmar comprise most of the migrants in Thailand, there are also sizable, though comparatively small, migrants from Cambodia and Lao P.D.R. seeking jobs in Thailand.

The presence of illegal foreign workers in some districts and provinces of Thailand is said to be a major factor depressing wages in those areas. Pitayanon (2001) argued that employers in these areas prefer migrants to native workers since migrants accept wages lower than the minimum wages required by law. If a native worker applies for the jobs, he must accept the same wage as migrants. Immigration became a public debate during the economic crisis in 1997 when the unemployment rate rose markedly. The availability of cheap migrant labor was viewed as a cause reducing the opportunities for employment of native workers and their wages. The Thai government reacted to this concern by preventing new entrants, regularizing those already employed

by employers, and repatriating unemployed illegal migrants.

Theoretically, immigration increases the labor supply of a host country. Consequently, wages will fall and employment will rise. However the rise in employment will be less than the size of the immigration. Immigrants will therefore displace some natives in employment and raise unemployment rates. Despite the popular belief that immigrants have a large adverse impact on the wages and employment opportunities of native workers, it has not been empirically supported. See Borjas (1994), Friedberg and Hunt (1995), and LaLonde and Topel (1997) for reviews. In general, estimated impacts of immigration on unemployment are statistically insignificant. Although the effect of immigration on wages is found statistically significant in some studies, it is small and not economically significant. For example, Borjas (1987), Altonji and Card (1991) and LaLonde and Topel (1991) have found that a 1-percent increase in the number of migrants over the number of natives reduces native wages by 0.1 percent at most.

Previous work on international migration has followed three major approaches: the geographic approach, the factor proportions approach and the natural-experiment approach. The geographic approach studies the relationship between immigration and changes in native outcomes across cities or regions (Altonji and Card (1991); Goldin (1994); LaLonde and Topel (1991); Pischke and Velling (1997)). The factor proportions approach simulates the changes in the supply implied by immigration and combines them with the estimates of labor demand elasticities to obtain the change in native wages (Borjas, Freemand and Katz (1992, 1996, 1997); Jaeger (1996)). This approach yields more sizable effects of immigration than the geographic approach. Finally, studies of natural experiments analyze migrations induced by political factors in the sending country (Card (1990); Hunt (1992); Carrington and DeLima (1996)). These studies have not found a significant effect of immigration on native wages and unemployment.

Existing studies on immigration in Thailand are either descriptive or simulation based. To our knowledge, there are no previous studies on

immigration in Thailand that employs a formal statistical method. Using a computational general equilibrium (CGE) model, the Thailand Development Research Institute (TDRI) found that 700,000 unauthorized migrants in 1995 decreased the wages of Thai workers with primary or lower level of education by 3.5 percent. Using another CGE model, Martin (2004) estimates that the real income of the poorest 60 percent of households fell by 0.4 percent as a result of migrant labor, while the real income of the richest 40 percent rose by 0.3 percent.

In this paper, we provide the first empirical study on immigration's impact on native wages in Thailand, using the geographic approach. While previous empirical studies have so far focused almost exclusively on immigration from less developed countries (LDCs) to developed countries, notably Australia, Canada, Germany and the USA, our study focuses on immigration that occurred between LDCs[3].

The organization of this paper is as follows. First, we study the basic determinants of migrant concentration. Then, we study how immigration affects wages of natives. In particular, we test whether provinces with high density of migrants have low wages than those with low density of migrants. Our estimates suggest that immigration has no significant impact on wages. Then, we study the impact of migration on the unemployment rate of each province and find that a 1-percent increase in the migrant-native population ratio of a province increases its unemployment rate by 0.5 percent. Moreover, we find that the groups of native workers that are most suffered from this unemployment effect are the unskilled, the young and the agriculture workers.

2. The Determinants of Migrant Density

Migrants are concentrated by provinces. Bangkok, in the 2001 registration exercise, had 19 percent of registered migrants, more than

[3] According to an UN report, as of 2006 37 percent of the world's total migrants lived in developing countries. In addition to the oil-producing Gulf states, which host millions of foreign contract laborers, several developing countries, including Gabon, Malaysia, Singapore and Thailand, have been receiving relatively large numbers of labor migrants.

twice as many as the second most migrant province, Samut Sakhon. The five provinces with the most migrants had almost half of the total, the top 10 had two-thirds, and the top 15 provinces had 75 percent of all registered migrants. Ranong had the highest migrants per capita at 15 percent, following by Samut Sakhon and Tak at 10 percent. The provinces that migrants stay and work tend to be large (in term of output) and/or close to a Thailand-Myanmar border.

To investigate formally on the determinants of migrant density in each province, we estimate the following simple gravity model:

$$\frac{m_i}{n_i} = \beta_0 + \beta_1 \ln(y_i) + \beta_2 \ln(n_i) + \beta_3 \ln(d_i) + \varepsilon_i \qquad (1)$$

where i denotes a province, m_i, n_i, y_i are the number of register migrants, the gross product in province i and the number of natives in province i. The term d_i is the road distance from province to the closest

Table 1 The Determinant of Migrant Density[a]

Dependent Variable	ln(y)	ln(n)	ln(d)
m/n	.877 (0.01)	-1.97 (0.00)	-.419 (0.00)
R^2=0.34			

[a]Numbers in parentheses are p-values.

Thailand-Myanmar border. The terms β's and ε_i are coefficients and an error term. The OLS estimate of equation (1) using data in 2001 is shown in table 1. The estimate confirms our hypothesis that migrants tend to be concentrated in rich and close-to-border provinces.

3. Theories on Wage and Employment Effect of Immigration

In this section, we review a few basic models of wage and employment determinant and study how immigration might affect the labor market equilibrium. Figure 1 depicts a textbook model of a labor market. The wage and employment are determined by the

intersection of the demand curve and the supply curve. Initially, the equilibrium is at point 0. Immigration with size *M* has a direct impact on the labor supply. As a result of the immigration, the labor supply shifts outward with size *M*. The new equilibrium is at point 1. The migration clearly decreases the equilibrium wage. The level of employment increases from e_0 to e_1. However, the increase in the employment level (e_1 - e_0) is less than the increase in the labor supply (*M*). Therefore, the equilibrium unemployment rate is lower.

With an imperfectly elastic labor supply, how much immigration affects the wage and the unemployment rate depends on the slope of the labor demand. Figures 2 and 3 depict two extreme cases. In figure 2, the labor demand is flat and immigration has no impact on the wage and unemployment rate of natives. Conversely, in figure 3, with a vertical supply, immigration has an adverse effect on both wage and unemployment.

Figure 4 considers the case where the labor supply is perfectly elastic. In such case, immigration only affects unemployment but has no impact on wages. Although a perfectly elastic labor supply seems rare, it might be relevant to developing economies with abundant labor surplus and unemployment in agricultural sectors.

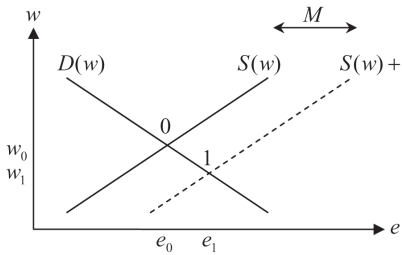

Figure 1

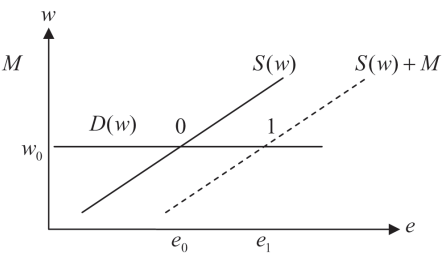

Figure 2

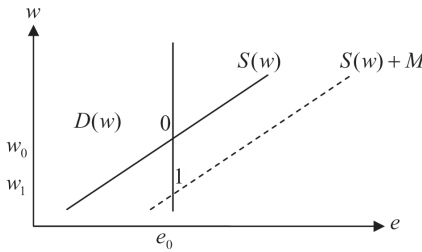

Figure 3

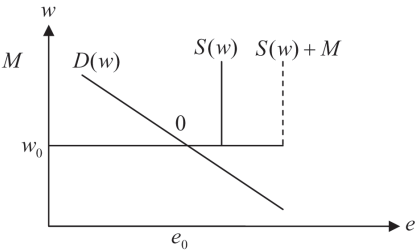

Figure 4

The model we have just discussed assumes homogeneous labor. With heterogeneous labor, the effect of immigration on natives' labor market outcomes depends on the degree of substitutability between migrants and native workers in each group. Immigrants will raise (reduce) the wages of the native workers with whom they are complements (substitutes) in production. For example, if the production function of the economy is $y = \sqrt{s(u+m)}$, where *s, u* and *m* are skilled natives, unskilled natives and migrants, respectively. This production function assumes perfect substitutability between migrants and unskilled natives. Under a competitive market, the wage of skilled (w_s) and unskilled (w_u) is equal to its marginal product; $w_s = \frac{\partial y}{\partial u}$ and $w_u = \frac{\partial y}{\partial u}$. It can be shown that $\frac{\partial w_s}{\partial m} > 0$ and $\frac{\partial w_u}{\partial m} < 0$; immigration increasesthe age of skilled natives and decreases the wage of unskilled natives.

Another crucial assumption of the above models is that allocation of other factors such as capital are unaffected by immigration. In the presence of free trade and factor movements within the recipient country, factor price equalization is likely to obtain. Under international factor price equalization, immigration would not affect factor prices. Similarly, international capital movement also offsets the effect of immigration on wages. However, it is reasonable to assume that

factor price equalization and international capital movement are not so rapid or complete as to render our analysis of immigration useless.

4. Estimation Framework

We next turn to the estimation framework. The estimation framework used in this paper is similar to the one used in Altonji and Card (1991) and Borjas, Freeman and Katz (1996). For the sake of clarity and concreteness, in this section, we focus on the framework to investigate the impact of immigration on wages. However, this framework can be applied to investigate the effect of immigration on unemployment as well.

A basic approach to study the impact of immigration on wages is to regress wages on the migrant-to-native ratio (migrant density) in the relevant labor market. In this paper, the unit of observation is province. We look at a cross-section of provinces in Thailand and use variations in migrant density to identify the effect of immigrants on wages. Our first cross-sectional estimating equation has the following form:

$$\ln(w_i) = \mathbf{X}_i'\boldsymbol{\beta} + \gamma \frac{m_i}{n_i} + \varepsilon_i \qquad (2)$$

where w_i is the average wage of province i and $\mathbf{X}_i$ is a vector of standard control variables comprising of the means of age and education, the logarithm of population and the logarithm of output. The terms m_i and n_i are the number of migrants and natives in province i, respectively. The term ε_i is an error term. The term γ is the parameter of interest. It shows how the change in the migrant density in province i affects its average wage.

Equation (2) is a reduced form widely used in the literature and feasible for estimation regarding data availability in Thailand. Despite its popularity, it has a well-known problem. The problem with this estimation approach is endogeneity. Migrants may choose where to settle in provinces whose demand and supply shocks have led to higher wages. The demand and supply shocks are unobserved information and are in the error term ε_i. The estimate of γ from equation

(1) would capture the effect of immigration on wages plus the correlation of immigration and wages due to other factors such as supply and demand shocks. Therefore, it is likely that an endogeneity problem is present in equation (2) and the estimate of γ is biased toward infinity.

A way to solve this endogeneity problem is to use the first-difference method. If migrants are shortsighted and choose their locations only from their current wage levels, but not from their prospective wage growth, the change in migrant density will not be affected by the change in local wages, and any correlation between the two changes will be attributable to the effect of the change in migrant density on the change in wages. Therefore, we may circumvent the endogeneity problem by estimating the first difference of equation (2). Differencing also eliminates location-specific effects that do not vary over time. Our first-differenced estimating equation has the form

$$\Delta \ln(w_i) = \Delta \mathbf{X}_i' \boldsymbol{\beta} + \gamma \Delta \frac{m_i}{n_i} + \varepsilon_i \tag{3}$$

where ΔZ_i refers to the change in variable Z_i between two time periods.

However, if migrants foresee changes in wages and choose locations with growing wages, the endogeneity problem is still present in the first-difference estimation. A method to alleviate the endogeneity problem in the first-difference estimation is to use the lag of migrant density rather the density itself. Altonji and Card (1991) use migrant density in 1970 instead of its change during 1970 to 1980. The rationale is that new migrants tended to move to places where similar migrants already resided. As suggested by Bartel (1989), migrant inflows are strongly correlated with the initial migrants in a province. However, the initial concentration of migrants is not directly influenced by changes in wages.

Another popular econometric technique to deal with endogeneity problems is the two-stage least square method (2SLS). This technique will be discussed in the subsequent sections.

5. Data

Our empirical analysis employs data in 2001 and 2005. The Thai labor force survey from the National Statistical Office of Thailand (NSO) provides us individual-level samples regarding to employment, wages, ages and education levels of the Thai labor force. We construct provincial means of wages of 76 provinces from individual monthly salary. The shortest road distance from each province to the Burmese border is from the Department of Land Transport, Thailand. The data on provincial population and output are from the National Economic and Social Development Board of Thailand (NESDB). Similar to the provincial means of wages, the provincial means of ages and years of education attainment are constructed from individual data on age and education from the labor force survey.

Data on the number of registered migrants are from the Ministry of Interior, Thailand. It should be noted that by law immigrants could work only in the province that they are registered. We only use the migrant data in the 2001 registration because it is clean and easy to interpret.

The 2001 registration is the first registration that was unfettered by restrictions to provinces, or sectors, or even to having an employer. After registering, a migrant is able to work legally for one to two years. The Ministry of Interior reports only the number of migrants who register each year. In this data, migrants who registered for the first time and migrants who re-registered to renew their work permits are mixed together. Therefore, the data of the number of registered migrants after 2001 is difficult to interpret whether they are stocks or flows.

A total of 585,000 migrants were registered for work permits in 2001. International Organization of Migration estimates that the 2001 registration captured roughly a half of all the migrant workers in the country.

6. The Effect of Immigration on Native Wages

6.1 Homogeneous Labor

To study how immigration affects wages of natives, we first regress the provincial average of wages with the migrant density in each province and standard controls for wages, which include average years of education and age, the log of output (y) and the log of population (n). The structural model of this reduced-form estimation can be found in Altonji and Card (1991).

The second column of table 2 reports the OLS estimate of equation (1) using data in 2001. The coefficient of migrant density (γ) is .009. The estimate indicates that immigration has no adverse effect on wages. However, for the reasons discussed above, the estimate is biased toward infinity. It is therefore not surprising that the estimate is positive, although the theory predicts a negative impact of immigration on wages.

As mentioned in section 3, to solve this endogeneity problem, the first-difference estimation is applied and presented in the last two columns of table 2.

Column 3 reports the estimate of equation (3) using the difference between 2005 and 2001. To mitigate the endogeneity problem, the migrant density in 2001[4] is used as a proxy for the change of migrant density between 2005 and 2001. We find that there is a positive but not significant relationship between the migrant density in 2001 and the change in wages during 2001 to 2005. Although the coefficient of migrant density is still positive, it is smaller than that from the levels estimation in column 1. This may indicate that a component of the positive correlation between immigration and native wages in 2001 is due to that provinces with high migrant density were indeed high-wage provinces even before migrants arrived.

Although estimating the first-difference equation using the OLS method yields a better result (smaller estimate of γ), it may still suffer

[4] Another reason for using the migrant density in 2001 as a proxy for the change of migrant density is that we do not have reliable data of migrant density in 2005. This problem was previously discussed in section 5.

from endogeneity if migrants foresee changes in wages and choose to locate in places with growing wages. We then employ the 2SLS estimation to eliminate this endogeneity problem.

Table 2 Immigration and Wages[a, b, c]

Explanatory/ Independent Variables	ln(w)	Δ ln(w) (OLS)	Δ ln(w) (2SLS)
age	-0.005	0.008	.004
	(0.67)	(0.53)	(0.79)
education	0.148	0.04	.035
	(0.00)	(0.01)	(0.00)
ln(n)	-0.091	0.05	.062
	(0.00)	(0.63)	(0.56)
ln(y)	0.095	0.105	.094
	(0.00)	(0.19)	(0.25)
m/n	*0.009*	*0.001*	*-.004*
	(0.14)	*(0.877)*	*(0.61)*
R^2	0.73	0.19	-

[a] Numbers in the parenthesis are p-values.

[b] For the first-difference estimations, all the explanatory variables except m/n is in first-differences.

[c] R^2 for the 2SLS estimation is not reported because it has no statistical meaning in this context and can be negative.

Motivating by equation (2), we use the logarithms of the distance from the border, population, and output of each province as additional exogenous (instrumental) variables for the migrant density in 2001 in our 2SLS estimation of equation (3). It is reasonable to believe that these instrumental variables are uncorrelated with the error terms, which are mainly governed by the changes in supply and demand shocks. The instrumental-variable technique should be able to eliminate the endogeneity and positive bias.

The 2SLS estimation results are shown in the last column of table 2. The effect of migrant density on wages is negative as expected but still not statistically significant.

All estimation results in this section suggest that on the aggregate provincial level, we could not conclude that immigration has significant adverse effects on wage.

6.2 Heterogeneous Labor

In this section, we investigate the results found in section 6.1 in more details. An interesting question is whether the immigration's impact on wages varies across native workers in different groups. The sign of the coefficient of m/n might actually be ambiguous a priori under a model with heterogeneous labor because immigrants might affect workers in different groups differently. For example, as shown in section 3, immigration has negative effects on unskilled wages but positive effects on skilled wages. Aggregating these two effects together would bring an ambiguous result.

Therefore, we split the samples of native workers according to the 3 following classifications: skilled and unskilled, young and old, and agricultural and non-agricultural. Then we examine the effect of immigration on the wages of each group.

First, we spilt the samples into two groups: skilled and unskilled. We define skilled workers as those with more than six years of education attainment and unskilled workers as those with six or fewer years of education attainment. Columns 2 to 4 of table 3 show the estimation results of the unskilled group. Columns 3 to 6 show the estimation results of the skilled group. For both groups, their estimates of equation (1) in columns 2 and 5 show that the estimated coefficients of migrant density are positive but insignificant. The first-difference estimates of the unskilled group in columns 3-4 report that the coefficients of migrant density are negative but statistically insignificant. For the skilled group, although the coefficients of migrant-density in columns 6-7 are positive, they are not significant either. It should be noted that the signs of the first-difference estimates are consistent with the belief that migrants tend to compete with unskilled natives.

Next, we spilt the samples into young (15-34 years old) and old (35-65 years old) groups. The estimates are shown in table 4. For the levels specification, the estimated coefficients of migrant density are reported in columns 2 and 5. They are positive for both young and old workers. The first-difference estimates in columns 3-4 and 5-6 are negative for the young but remain positive for the old. However, they are not statistically significant.

Table 3 Immigration and Wages of Skilled and Unskilled Natives[a, b, c]

Explanatory/ Independent Variables	Unskilled			Skilled		
	ln(w)	Δ ln(w)[b] (OLS)	Δ ln(w)[b, c] (2SLS)	ln(w)	Δln(w) (OLS)	Δln(w) (2SLS)
age	-.018	-.008	-.016	.030	. .019	.028
	(0.10)	(0.47)	(0.32)	(0.005)	(0.08)	(0.03)
education	.154	-.062	-.010	.194	.127	.033
	(0.00)	(0.76)	(0.91)	(0.00)	(0.05)	(0.47)
ln(n)	-.231	.063	-.043	-.084	.055	.127
	(0.00)	(0.25)	(0.79)	(0.00)	(0.18)	(0.04)
ln(y)	.224	.069	.074	.114	.098	.108
	(0.00)	(0.31)	(0.31)	(0.00)	(0.22)	(0.18)
m/n	*.006*	*-.001*	*-.013*	*.003*	*.005*	*.012*
	(0.58)	*(0.73)*	*(0.37)*	*(0.34)*	*(0.25)*	*(0.13)*
R^2	0.71	0.04	-	0.70	0.42	-

[a, b, c] See the notes below table 2.

Table 4 Immigration and Wages of Old and Young Natives[a, b, c]

Explanatory/ Independent Variables	Young			Old		
	ln(w)	Δln(w) (OLS)	Δln(w) (2SLS)	ln(w)	Δln(w) (OLS)	Δln(w) (2SLS)
Age	-.034	.002	-.013	-.022	.008	.007
	(0.17)	(0.91)	(0.62)	(0.41)	(0.77)	(0.82)
Education	.112	.044	.036	.166	.031	.037
	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)
ln(n)	-.083	-.000	.008	-.154	.027	.006
	(0.00)	(0.99)	(0.95)	(0.00)	(0.81)	(0.95)
ln(y)	.117	.057	.036	.148	.128	.131
	(0.00)	(0.30)	(0.54)	(0.00)	(0.28)	(0.28)
m/n	*.015*	*-.000*	*-.011*	*.008*	*.003*	.010
	(0.00)	*(0.94)*	*(0.11)*	*(0.20)*	*(0.62)*	*(0.39)*
R^2	0.71	0.21	-	0.80	0.09	-

[a, b, c] See the notes below table 2.

Table 5 Immigration and Wages in Agriculture and Non-agriculture Sectors[a, b, c]

Explanatory/ Independent Variables	Agriculture			Non-Agriculture		
	ln(w)	Δln(w) (OLS)	Δln(w) (2SLS)	ln(w)	Δln(w) (OLS)	Δln(w) (2SLS)
Age	-.001	-.009	-.011	.003	.010	.012
	(0.97)	(0.58)	(0.52)	(0.63)	(0.35)	(0.32)
Education	.234	.216	.175	.138	.094	.076
	(0.00)	(0.04)	(0.15)	(0.00)	(0.00)	(0.00)
ln(n)	-.250	.692	.780	-.051	.028	.017
	(0.01)	(0.32)	(0.26)	(0.02)	(0.74)	(0.83)
ln(y)	.187	.477	.626	.073	.023	.133
	(0.04)	(0.29)	(0.24)	(0.00)	(0.00)	(0.09)
m/n	*.057*	*-.002*	*-.034*	*.008*	*.006*	.005
	(0.02)	*(0.80)*	*(0.49)*	*(0.02)*	*(0.09)*	*(0.51)*
R^2	0.78	0.39	-	0.69	0.42	-

[a, b, c] See the notes below table 2.

Table 5 reports the regression results using the samples from agricultural workers and non-agricultural workers. The coefficients in the levels specification are positive and significant for both groups of workers. The first-difference estimates are shown in columns 3-4 and 6-7. The estimated coefficients of migrant density are either statistically insignificant or small and not economically significant.

As a summary of this section, we have tried classifying samples in various ways. However, after correcting the endogeneity problem, we could not find a significant adverse effect of immigration on native wages.

7. The Effect of Immigration on Native Unemployment Rates

7.1 Homogenous Labor

In this section, we examine the effect of immigration on native unemployment rates. The estimation framework is similar to the one used in section 6.1 except that the dependent variable is now native unemployment rates. The explanatory variables are the same as those in section 6.

We investigate the impact of immigration on the unemployment rate in each province. We first estimate of the following equation:

$$u_i = \mathbf{X}_i'\boldsymbol{\beta} + \gamma \frac{m_i}{n_i} + \varepsilon_i \tag{4}$$

where u_i is the unemployment rate of province *i*. The other terms in equation (4) were defined in section 4. Equation (4) is analogous to equation (2). It is likely this equation is suffered from a similar endogeneity problem. Migrants might choose to locate in places with low unemployment rates and the estimate of γ is bias toward minus infinity. Column 2 in table 6 shows the estimate of equation (1) using the data in 2001. Though biased toward minus infinity, the estimate of γ is positive and significant. This result indicates that the adverse effect of immigration on unemployment rates is strong.

To correct the endogeneity problem, we estimate the first-difference of equation (4) using the OLS and 2SLS methods and data in 2001 and 2005. For the 2SLS estimation, the additional exogenous (instrumental) variables for $\frac{m_i}{n_i}$ are the same as those in section 6. The estimation results are shown in columns 2 and 3 in table 6. The 2SLS estimation in the last column yields a much higher estimate of γ than that from the levels estimation in column 1. This result is consistent with the hypothesis that the estimate in column 1 is biased toward minus infinity. The 2SLS estimate indicates that immigration has a huge adverse effect on unemployment rates; a 1-percent increase in the migrant density of a province in 2001 increases its unemployment rate in 2005 about 0.5 percent.

Table 6 The Effect of Immigration on Native Unemployment Rates[a, b, c]

Explanatory/ Independent Variables	u	Δu (OLS)	Δu (2SLS)
Age	.028	-1.038	-.361
	(0.57)	(0.00)	(0.49)
Education	.150	.0714	.793
	(0.20)	(0.89)	(0.46)
ln(n)	.531	-4.378	-4.78
	(0.01)	(0.07)	(0.06)
ln(y)	-.198	.020	-.129
	(0.06)	(0.97)	(0.90)
m/n	*.054*	*.060*	*.464*
	(0.02)	*(0.41)*	*(0.01)*
R^2	0.15	0.21	-

[a, b, c] See the notes below table 2.

7.2 Heterogeneous Labor

As an analog of section 6.2, this section explores how immigration affects the unemployment rates of native workers in different groups. The samples are spitted according to the 3 classifications used in section 6.2.

Table 7 reports the estimation results when splitting samples into skilled and unskilled groups. As mentioned earlier, the 2SLS estimates do not suffer from the endogeneity problem and are most reliable. Therefore, we focus on the 2SLS estimates. The 2SLS estimates in columns 4 and 7 show that migration has significant adverse effect on the unemployment rates of both skilled and unskilled natives. A 1-percent increase in migrant density increases the unemployment rates of unskilled natives and skilled natives about 0.9 percent and 0.3 percent, respectively. The impact of immigration on the unskilled is much stronger.

Table 8 reports the estimation results when splitting samples into old and young groups. The 2SLS estimates in columns 4 and 7 show that immigration has significant adverse effects on the unemployment

rates of both young and old workers. Moreover, the unemployment rate of the young is more affected by the immigration.

Similarly, the estimation results when splitting samples into agricultural and non-agricultural groups are reported in table 9. From the 2SLS estimates, immigration has significant adverse impact on both native workers in agricultural and non-agricultural sectors. However, the adverse impact on the agricultural workers is much stronger.

Table 7 Immigration and Unemployment Rates of Unskilled and Skilled Workers[a, b, c]

Explanatory/ Independent Variables	Unskilled			Skilled		
	U	Δu (OLS)	Δu (2SLS)	Δu	Δu (OLS)	Δu (2SLS)
age	.031 0.50	-.761 0.57	.279 0.68	.078 0.41	-.047 0.79	.264 0.18
education	-.027 0.93	1.331 0.50	8.737 0.08	-.03 0.93	.568 0.44	-1.05 0.49
ln(n)	.650 0.00	-3.309 0.26	-4.19 0.21	.355 0.01	-3.472 0.04	-3.83 0.03
ln(y)	-.096 0.32	.431 0.53	-.039 0.97	-.227 0.02	.253 0.71	.217 0.82
m/n	*.105* *0.02*	*.123* *0.23*	*.905* *0.001*	*-.005* *0.81*	*.034* *0.31*	*.353* *0.04*
R^2	0.19	0.08	-	0.15	0.09	-

[a, b, c] See the notes below table 2.

Table 8 Unemployment Rates of Young and Old Workers

Explanatory/ Independent Variables	Young			Old		
	U	Δ*u* (OLS)	Δ*u* (2SLS)	*u*	Δ*u* (OLS)	Δ*u* (2SLS)
age	-.112 (0.78)	.844 (0.32)	1.04 (0.32)	. .030 (0.84)	.177 (0.76)	.332 (0.63)
education	.040 (0.84)	-.083 (0.87)	1.64 (0.19)	.232 (0.05)	.014 (0.97)	.171 (0.80)
ln(*n*)	.785 (0.00)	-4.85 (0.09)	-5.73 (0.06)	.349 (0.03)	-2.11 (0.39)	-2.885 (0.22)
ln(*y*)	-.354 (0.01)	1.54 (0.02)	.586 (0.58)	-.087 (0.40)	-.671 (0.35)	-.867 (0.48)
m/n	*.000 (0.99)*	*.080 (0.18)*	*.643 (0.01)*	*.088 (0.01)*	*.147 (0.02)*	*.490 (0.01)*
R^2	0.21	0.11	-	0.15	0.20	0.14

[a, b, c] See the notes below table 2.

Table 9 Unemployment Rates of Workers in Agriculture and Non-agriculture

Explanatory/ Independent Variables	Agriculture			Non-Agriculture		
	U	Δ*u* (OLS)	Δ*u* (2SLS)	*u*	Δ*u* (OLS)	Δ*u* (2SLS)
age	.048 (0.18)	-.694 (0.04)	-.123 (0.72)	.012 (0.81)	-.232 (0.25)	.050 (0.86)
education	.073 (0.71)	.827 (0.28)	1.837 (0.15)	.004 (0.97)	.293 (0.45)	.739 (0.34)
ln(*n*)	.765 (0.00)	-5.14 (0.34)	-5.518 (0.29)	.677 (0.00)	-2.86 (0.03)	-3.275 (0.02)
ln(*y*)	-.155 (0.22)	1.506 (0.30)	.830 (0.67)	-.351 (0.00)	-.120 (0.85)	-.327 (0.70)
m/n	*.099 (0.03)*	*.104 (0.22)*	*.803 (0.04)*	*.030 (0.27)*	*.078 (0.06)*	.365 (0.01)
R^2	0.21	0.13	0.10	0.22	0.10	0.07

[a, b, c] See the notes below table 2.

In this section, we find that immigration has a negative effect on unemployment of all native groups that we considered. We also find that the workers whose unemployment is most affected by the immigration are the unskilled, the old and the agricultural workers. Our finding is consistent with the conventional belief that migrants tend to compete with the young, the unskilled and the agricultural workers.

8. Concluding Remarks

In this paper, we provide new evidence on the impact of immigration on native wages, using the case of Thailand. In particular, we investigate whether the wages of provinces with high migrant density are lower than those of the other provinces. Our estimates suggest that immigration has no significant effect on native wages. However, we find a negative impact of immigration on native unemployment rates. A 1-percent increase in the migrant-native ratio of a province raises its unemployment rate 0.5 percent. The result that immigration does not affect native wages but affects native unemployment rates suggests that the Thai labor supply is flat as shown in figure 4. In addition, we find that the workers most affected by the immigration are the unskilled, the young and the agricultural workers. Our finding is different from that in previous studies. Previous studies find that immigration has no significant impact on native wages and unemployment. An explanation is that the previous studies only consider immigration in developed countries but our paper uses data from a developing country. An interesting question for further studies is that why the impact of immigration in developed and developing countries is different.

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