Tsukuba Economics Working Papers
No. 2014-006

The Effect of Inflow of Unskilled Immigrants on Natives' Human Capital Accumulation: Difference of Differences Estimation Using Policy Changes in Japan

by

Hisahiro Naito

September 2014

UNIVERSITY OF TSUKUBA
Department of Economics
1-1-1 Tennodai
Tsukuba, Ibaraki 305-8571
JAPAN

The Effect of Inflow of Unskilled Immigrants on Natives' Human Capital Accumulation: Difference of Differences Estimation Using Policy Changes in Japan

Hisahiro Naito *
Department of Economics
Gradutate School of Humanities and Social Sciences
University of Tsukuba

Current version, September 2014

Abstract

Utilizing changes of Japanese immigration law in 1990s, I study the effect of the inflow of unskilled immigrants on native's human capital accumulation by applying the difference of differences estimation method. Using 10 percent sample of the Japanese census data, I show that for individual aged 19-20 one percentage point increase of the immigrant-native ratio increased the probability of going to college by 1.3 percentage point for males and 0.8 percentage point for females. Consistently, one percentage point increase of the immigrant-native ratio reduced the probability work by 1.2 percentage point for males and 1.0 percentage point for females. For unemployment, an increase of immigrant ratio did not affect the probability of unemployment for males and decreased it for females. The regression results are robust with respect to several specifications. The results suggest that the inflow of unskilled immigrant increases the human capital accumulation of young natives.

*email: naito@dpipe.tsukuba.ac.jp Address: The author is responsible for all remaining errors of this paper.

1 Introduction

When a young individual faces a large inflow of unskilled immigrants in the local labor market, there are several choices for a native high school student. One choice would be to go to labor market after graduation and compete with unskilled immigrants. A more natural choice would be that he/she proceeds to college, accumulates more human capital and attempts not to compete with those unskilled immigrants. If a large numbers of native high school graduates decide to accumulate more human capital, then the change of relative wage between the unskilled labor and the skill labor caused by the inflow of unskilled immigrants can be mitigated. Thus,examining how a native young individual responde to the inflow of unskilled immigrant is important from the point of policy.

In addition, studying the effect of the inflow of immigrants on young individuals is useful from the following reason. In many developed countries, the unemployment rate of the youth is usually higher that the unemployment of the old or middle aged individuals. This is partly due to the fact that young individuals have less experience in jobs and thus it is not essential to continue the firm's operation. As a result, young workers are the one who are fired first when firms are hit by the negative shocks. This implies that young individual can be affected more strongly than the middled or old aged individual by the inflow of immigrants. The purpose of this paper is to examine whether such a behavioral response exists in the data using substantia policy change on immigration law in 1990s in Japan.

Before and just after the world war II, many Japanese families immigrated to the South America especially Brazil and Peru. This is primarily due to the poor economic condition in the rural area of Japan. However, after 1960s, Japanese economy started to recover from the worst state after the world war II. In the mid 1980s, Japanese economy kept growing and was started to experience a shortage of labor. On the other

hand, Japanese government consistently closed the door of accepting immigration[1]. In 1990, as a compromise, the Japanese government allowed unskilled Brazilian and Peru immigrants to work in Japan if his/her father, grand-father or grand-grander father was Japanese. Thus at 1990, the Japanese immigrant policy changed from a practically zero immigration to a limited acceptance of immigration. In 1993, Japanese government made another exception. Japanese government allowed unskilled workers to work in Japan if his or her purpose of work is to get knowledge of Japanese factory system and they go back to their home country after working for three years for immigrants from specific countries. Those two changes of immigration law increased the number of immigrant in 1990s. Those two changes of the law increased the share of foreigners from 0.3 percent to 1 percent. As in many other countries, the ratio of immigrant to native did not increase evenly in Japan. Immigrant tended to live in particular cities. This implies that in some cities, the ratio of immigrant to native become bigger than ten percent. The presence of such cities provide us useful natural experiments. We take advantage of those cases as natural experiments.

In the economics literature, many papers analyzed the effect on wages, employment, labor supply. Regarding the effect of inflow on unskilled immigrant on natives' human capital accumulation, there are two strand of the literature that analyzes the effect of inflow of immigrants on native's human capital accumulation. The first stand of the literature analyzes the effect of immigrant inflow on human capital accumulation through a change of school quality. When a immigrant arrives at the US, many children of immigrant have difficulty of speaking and understanding English. Teacher often need to pay more attends to children of immigrants, resulting in a lower over-all quality of the class. Recently, the second strand of the literature

[1]This was partly due to the concern that once the inflow of unskilled immigrants are allowed, the a huge volume of Chinese immigrant will overflow to Japanese airport and harbor since in 1980s the Chinese economic development is not started and the population size of China is almost ten times as the size of Japan.

2 Data

I use two data sets for our analysis. The first data set is the Japanese National Census of 1980, 1985, 1990, 1995, 2000. The census of 1980, 1990, 2000 is the lange national census and those Census sets ask very detailed questions such as residence of five years ago. The sensus 1985, 1995 is the small census and ask only important questions such as current employment and student status.

The second data set is the current labor force survey, which is similar to CPS in the US. There are advantage and disadvantage of using two data sets. The advantage of using the census is its large sample size. Since we focus on the schooling information of aged 19-21, it is critical to have a large sample size. The second advantage of using the census is the availability of information regarding the residence of five years ago. When a student graduates from high school and decide to go to college, some of them commute from home and others leave their home and live near college. This implies that we need to college the residential information whey they were high school students to connect the ration of immigrant in an area and tendency to go to college. The availability of information on the residence t five year ago allow us to do this.

However, there are several disadvantages of using the national Census too. The first disadvantage of using the national Census is the lack of the detailed economics information compared with labor force survey. Although the national census college whether a persian is working or not and largely industry category, other information such as income and wage rate are not available. This lack of economic information make us difficult to control household income when we analyze the children's schooling decision. To overcome the disadvantage of using the national census, we use the labor force survey which has economic information such as the parent's wage and income. However, the labor force surrey has several disadvantages. First, the sample size is relatively small compared with the national census if we focus on the schooling

behavior of those aged 19-21. The second, due to the sampling structure, not all cities are sampled. This implies that it is difficult to make the pseudo panel data since the same cities are often not sampled in two surveys. This force us to use the labor force surrey only as a cross sectional data rather than multi-year cross sectional data. Thus, both the national census and the labor force surrey has advantage and disadvantage. As a result, we use two data sets to complement each other.

3 Empirical Strategy

To examine the effect of inflow of unskilled immigrant on native schooling decision, consider an young individual $i$aged from 15-18, who live in economic area c, at the period t. Let

$$y_{t+5,c,i} = D_t + D_c + \beta_1 \text{immigrant ratio}_{t+5,c,i} + \beta_2 X_{c,t} + \varepsilon_{ict}$$

where D_t is the year dummy and D_c is economic area dummy in which a young individual live at time t . $y_{t+t,c,i}$ is the dummy variable of indicating whether an individual i who live in c at time t is attending university or community college at time t+5. immigrant ratio$_{ict}$is the hypothetical immigrant ratio that individual i would face in year $t+5$ if he or she keeps living in the same city c that he or she lived in five years ago. In Japan, most of high school student decide to go to collage or work at the age of 16 or 17 due to difficulty of entrance examination and the time needed to prepare for the college entrance examination. Thus, this model specification assumes that , a young individual of aged 16-17 at the time t decide to go to collage or to work after graduation by expecting the labor market condition $t+5$ in a community that he lives. When a young person goes to university, often they leave the home and live an area which is near the college. Thus, it is misleading to regress college attendance dummy at time $t+t$ on the immigrant ratio at time $t+5$ of the area in which this person is living. In order to avoid this endogeniety, I use immigrant ratio

in period t at the place in which this person lived. When individuals are 14-16 years old, for the most of cases they live with their parents in Japan. Thus, the endogeniety of residential place is not likely to occur. The parameter of our interest is $\beta 1$ and it shows that how the predicted immigrant ratio affect school decision of person i. X_c is the vector of the economic condition of the economic area c at time t.

Although equation (1) is useful at the starting point, there are several concern. Since we pick up all individuals whether they live with parent or not, we cannot collect information on parents. Thus, with the above regression, it is impossible to control parent education and parent income.Parent income is only controlled through average education level and average income level of the economic area. Due to the difficulty of controlling parent education level and parent income, we use labor force survey to control parent income and parent education. However, using labor force survey has its own problem. The sample size of the labor force survey is relatively small compared with the 10 percent national census. It is so particularly if we restrict our sample to those aged between 19-21. This implies that it is difficult to construct area level panel by combining labor force surveys in several years. This means that we use only the labor force survey in a single year. In addition, to use the information on parent income and parent education, we need to restrict the individual of aged 19-21 who are living with parent at the time of the survey. This implies that we have selection problem when we use the labor force survey. In principle, if we can find some exogenous variables that affect the co-residence with parents but does not affect the decision to go to college, we can control this selection problem by using an appropriate econometrics technique. However, it is quite difficult to find such a variable. As a result, in this paper, we restrict our sample in area where there are many university and public transportation such as rail-line are fully available. In such an area, a person i is more likely to commute from home either for school or work.

However, it is still possible that my control is not sufficient, thus I use this information only as circumstantial evidences.

4 Result

Table 2 to table 8 are my main results. In all tables, ratio1 is the ratio of immigrant to natives. In the ratio 1, the immigrant includes Koreans. Including Koreans is likely to overestimate the effect of immigrants since most of Korean in Japan live from the world war II from the historical reason. Thus, I also calculate the ratio of immigrant to natives where Korean are not included in the number of immigrant. This is represented by ratio2. ratio1 at old and ratio2 at old the ratio of immigrant to native at the place where the sampled individuals lived five years ago. Predictedratio1 and Predicted ratio2 is the ratio of immigrants to native that an individual face at the period t if he or she kept living in the same place that he or she lived in at the period $t-5$. The coefficients of Predicted ratio1 and Predicted ratio2 are our main interests.

In Table 2 column(1) and (2)show how the immigrant ratio in five year ago affects the current probability to attend the college for individual who are aged 19-20. This implies that they are aged 14-15. Thus, the at the immigrant ratio that they faced at the age of 14-15 does not affect the probability of going to college. Column (3) and column (4) examine how the immigrant ratio that an individual, who is aged 14-15 at the period $t-5$, predicted for the period t affect the school attendance choice at the period t. The column (3) and column (4) shows that when an individual predicts that immigrant ratio would increase five years later, then they decide to go to college at the age of 14-15. More specifically, column (3) shows that one percentage point increase of immigrant ratio, which include Korean, will increase the probability of going to college by 1.4 percentage point for male young individual aged 19-20. In column

(4), it shows that one percentage point increase of the immigrant ratio that does not include Korean will increase the probability of going to college by 1.3 percentage point for male young individual aged 19-20. Column (5)-(8) show the results for female.

Table 4 looks at the result regarding having jobs. Column (3) and (4) show that one percentage point increase of the immigrant ratio will decrease the probability that an young male individual, aged 19-20, mainly are working, not attending a school Column (7) and (8) also show that the effect of an increase of the immigrant ratio on the probability of having job for young female individual is negative, but it is not significant.

Table 5 looks at the probability of unemployment. Column (3) and (4) show that the an increase of immigrant native ratio does not affect the probability of becoming unemployed for male individuals and column (7) and (8) shows that one percentage point increase of the immigrant ratio will decrease the probability of unemployment by 0.2 percentage point.

Table 6 examines how an increase of immigrant ratio affects the probability of going to college for male individuals aged 21-22. For individual aged 21-22, the age at the five years ago correspond to the age 16-17, at which age a typical Japanese high-school determine their career. As predicted, the immigrant-native ratio that youn individual face at the age of 16-17 started to affect the probability that they go to college five years later. Also, the predicted immigrant ratio affected the probability of going to college. The column (3) and column (4) show that one percentage point increase of immigrant ratio increase the probability of going to college by 1.4 percentage point for male and 0.56 percent for female. Table 7 look at the effect of increasing immigrant ratio on the probability of working. It shows that one percentage point increase of immigrant ratio will reduce the probability of working by 0.74 percent for male and 0.7 percent for female.

Table 8 show the robustness checks. At the age of 23, it shows that past immigrant ratio and the current immigrant ratio does not affect the probability of work, neither probability of going to college. It seems to suggest that at the age of 23, individual graduate college and work where job is available. As a result, the immigrant ratio at the place that an young individual lives is not correlated with the works status.

Table 9 show the same result for schooling for individuals aged 23. At the age 23, the current or the past immigrant ratio does not have any explanatory power to explain the probability of work or schooling.

5 Conclusion

This paper analyzes the effect of the inflow of unskilled immigrants on native's decision to go to college. As predicted by the economic theory, young native decide to go to college when they expect an increase of the share of unskilled immigrant. Using 10 percent sample of the census data, I show one percent point increase of immigrant-native ratio will increase the probability of going to college by 1.3 percentage point and 0.8 percentage point for female of those aged 19-20. Consistently, one percentage point increase of immigrant-native ratio will reduce of work by 1.2 percentage point for male and 1.0 percentage point for female. For unemployment, an increase of immigrant ratio did not affect the probability of unemployment for male and decrease it for female. The result is robust regarding several specifications.

Table 2 The effect of foreign ratio on career of young: decision to go to school: (mea-based)

estimation method: fixed effect

aged 19-20

dependent var=attending 4 or 2 year college

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ratio1_at_old	0.168				-0.330			
	(0.24)				(0.37)			
ratio2_at_old		0.219				-0.226		
		(0.35)				(0.29)		
predicted_ratio1_at_old			1.429				0.880	
			(3.70)**				(1.94)	
predicted_ratio2_at_old				1.310				0.833
				(3.62)**				(2.11)*
locaiton unit	mea	mea	mea	mea	mea	mea	mea	mea
sample age	19-20	19-20	19-20	19-20	19-20	19-20	19-20	19-20
sample gender	male	male	male	male	female	female	female	female
N. of obs	331786	331786	331786	331786	322088	322088	322088	322088
R-squared	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05

Clustering robust t statistics in parentheses

* significant at 5%; ** significant at 1%

Table 3: The effect of foreign ratio on young career: having some job: fixed effect (mea-based)

	aged 19-20							
	dependent var=having some job dummy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ratio1_at_old	0.479				0.187			
	(0.62)				(0.22)			
ratio2_at_old		0.406				0.124		
		(0.60)				(0.16)		
predicted_ratio1_at_old			-0.979				-0.711	
			(2.49)*				(1.53)	
predicted_ratio2_at_old				-0.885				-0.608
				(2.51)*				-1.47
Constant	-0.456	-0.453	-0.445	-0.450	-0.735	-0.734	-0.728	-0.732
	(22.80)**	(22.09)**	(21.33)**	(21.47)**	(20.89)**	(20.98)**	(20.75)**	(20.91)**
location unit	mea	mea	mea	mea	mea	mea	mea	mea
sample age	19-20	19-20	19-20	19-20	19-20	19-20	19-20	19-20
sample gender	male	male	male	male	female	female	female	female
N. of obs	331786	331786	331786	331786	322088	322088	322088	322088
R-squared	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05

Clustering robust t statistics in parentheses

* significant at 5%; ** significant at 1%

Table 4: The effect of foreign ratio on young career: decision to work mainly: fixed effect

	aged 19-20							
	dependent var= mainly workingdummy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ratio1_at_old	-0.494				-0.715			
	(1.16)				(1.48)			
ratio2_at_old		-0.592				-0.777		
		(1.52)				(1.75)		
predicted_ratio1_at_old			-1.200				-1.035	
			(4.22)**				(3.29)**	
predicted_ratio2_at_old				-1.218				-1.006
				(4.24)**				(3.18)**
locaiton unit	mea	mea	mea	mea	mea	mea	mea	mea
sample age	19-20	19-20	19-20	19-20	19-20	19-20	19-20	19-20
sample gender	male	male	male	male	female	female	female	female
N. of obs	331786	331786	331786	331786	322088	322088	322088	322088
R-squared	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08

Clustering robust t statistics in parentheses

* significant at 5%; ** significant at 1%

Table 5: The effect of foreign ration on career: being unemployed: fixed effect(mea-based)

	aged 19-20							
	dependent var=job search dummy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ratio1_at_old	-0.541				-0.161			
	(1.97)*				(1.30)			
ratio2_at_old		-0.458				-0.155		
		(1.84)				(1.21)		
predicted_ratio1_at_old			-0.105				-0.205	
			(0.75)				(2.14)*	
predicted_ratio2_at_old			-0.044					-0.194
				(0.37)				(2.01)*
sample unit	mea	mea	mea	mea	mea	mea	mea	mea
sample age	19-20	19-20	19-20	19-20	19-20	19-20	19-20	19-20
sample gender	male	male	male	male	female	female	female	female
N. of obs	331786	331786	331786	331786	322088	322088	322088	322088
R-squared	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Clustering robust t statistics in parentheses

* significant at 5%; ** significant at 1%

Table 6: The effect of foreign ratio on career: going to school: fixed effect(mea-based)

	aged 21-22							
	dependent var=going to school dummy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ratio1_at_old	1.302				0.665			
	(3.78)**				(2.92)**			
ratio2_at_old		1.421				0.695		
		(4.24)**				(3.14)**		
predicted_ratio1_at_old			1.545				0.506	
			(5.90)**				(2.49)*	
predicted_ratio2_at_old				1.537				0.564
				(5.64)**				(3.34)**
location unit	mea	mea	mea	mea	mea	mea	mea	mea
samle age	21-22	21-22	21-22	21-22	21-22	21-22	21-22	21-22
sample gender	male	male	male	male	female	female	female	female
N. of obs	333271	333271	333271	333271	328538	328538	328538	328538
R-squared	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04

Clustering robust t statistics in parentheses

* significant at 5%; ** significant at 1%

Table7: The effect of foreign ratio on career: decision to work mainly: fixed effect(mea based)

	aged 21-22							
	dependent var= mainly working dummy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ratio1_at_old	-1.442				-1.196			
	(3.15)**				(2.84)**			
ratio2_at_old		-1.523				-1.206		
		(3.40)**				(2.99)**		
predicted_ratio1_at_old			-0.657				-0.640	
			(1.82)				(2.07)*	
predicted_ratio2_at_old				-0.748				-0.697
				(2.40)*				(2.58)**
location unit	mea	mea	mea	mea	mea	mea	mea	mea
sample age	21-22	21-22	21-22	21-22	21-22	21-22	21-22	21-22
sample gender	male	male	male	male	female	female	female	female
N. of obs	333271	333271	333271	333271	328538	328538	328538	328538
R-squared	0.07	0.07	0.07	0.07	0.05	0.05	0.05	0.05

Clustering robust t statistics in parentheses

* significant at 5%; ** significant at 1%

Table 8: The effect of foreign ratio on career: decision to work mainly (mea-based) fixed effect

	age 23							
	dependent var= mainly working dummy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ratio1_at_old	−0.304				0.184			
	(0.43)				(0.47)			
ratio2_at_old		−0.220				0.385		
		(0.34)				(0.91)		
predicted_ratio1_at_old			0.668				0.310	
			(1.49)				(0.86)	
predicted_ratio2_at_old				0.628				0.533
				(1.67)				(1.36)
location unit	mea	mea	mea	mea	mea	mea	mea	mea
sample age	23	23	23	23	23	23	23	23
sample gender	male	male	male	male	female	female	female	female
N. of obs	169333	169333	169333	169333	167229	167229	167229	167229
R-squared	0.03	0.03	0.03	0.03	0.01	0.01	0.01	0.01

Clustering robust t statistics in parentheses

* significant at 5%; ** significant at 1%

Table 9: The effect of foreign ratio on career: going to school : fixed effect(mea-based)

	aged 23							
	dependent var=going to school dummy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ratio1_at_old	0.154				0.055			
	(0.51)				(0.34)			
ratio2_at_old		0.120				0.058		
		(0.39)				(0.37)		
predicted_ratio1_at_old			0.124				−0.112	
			(0.51)				(0.91)	
predicted_ratio2_at_old				0.135				−0.093
				(0.58)				(0.83)
location unit	mea	mea	mea	mea	mea	mea	mea	mea
sample gakureki	no condition	no condition	no condition	no condition	no condition	no condition	no condition	no condition
sample age	23	23	23	23	23	23	23	23
sample gender	male	male	male	male	female	female	female	female
Observation	169333	169333	169333	169333	167229	167229	167229	167229
R-squared	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01

Clustering robust t statistics in parentheses

* significant at 5%; ** significant at 1%

References

[1] Fairlie, Robert W.; Meyer, Bruce D."The Effect of Immigration on Native Self-Employment ",National Bureau of Economic Research, Inc, NBER Working Papers: 7561 2000

[2] George J. Borjas, Jeffrey Grogger, Gordon H. Hanson"Immigration and African-American Employment Opportunities: The Response of Wages, Emloyment, and Incarnation to Labor Supply Shocks", NBER Working Paper No. 12518

[3] Borjas, George. "The Economics of Immigration." Journal of Economic Literature, December 1994, 32(4), pp. 1667-1717.

[4] Borjas, George; Freeman, Richard and Katz, Lawrence. "Searching for the Effect of Immigration on the Labor Market." American Economic Review, May 1996 (Papers and Proceedings), 86(2), pp. 246 -5 1. .

[5] Borjas, George; Freeman, Richard and Katz, Lawrence, "How Much Do Immigration and Trade Affect Labor Market Outcomes?" Brookings Papers on Economic Activity 1997, (I), pp. 1-67.

[6] Butcher, Kristin F. and Card, David. "Immigration and Wages: Evidence from the 1980's." American Economic Review, May 1991 (Papers and Proceedings), 81(2), pp. 292-96.

[7] Butcher, Kristin F. and DiNardo, John. "The Immigrant and Native-Born Wage Distributions: Evidence from United States Censuses." National Bureau of Economic Research (Cambridge, MA) Working Paper, No. 6630, July 1998.

[8] Card, David. "The Impact of the Mariel Boatlift on the Miami Labor Market." Industrial and Labor Relations Review, January 1990, 43(2), pp. 245-57.

[9] Card David, "Immigrant Inflows, Native Outflows and the Local Labor Market Impacts of Higher Immigration." Journal of Labor Economics, 2000 (forthcoming).

[10] DiNardo, John. "How Much Do Immigration and Trade Affect Labor Market Outcomes? Comments." Brookings Papers on Economic Activity, 1997, (I), pp. 68-76.

[11] Filer, Randall K. "The lmpact of Immigrant Arrival on Migratory Patterns of Native Workers," in George Borjas and Richard B. Freeman, eds., Immigration and the work force. Chicago: University of Chicago Press, 1992, pp. 245-69.