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Self-Selection in Employment of Chinese Immigrants and Its Impact on the U.S. Labor Market

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Abstract

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This paper sets Chinese immigrants as research subjects, classifies immigrants into self-employed and offered-employed in order to correspond to the two self-selection patterns - “self-employment” and “offered employment” and further divides “self-employed” into “general self-employed” and “entrepreneur”. In consideration of economic income, economic expenditure, and human and social capitals, data from Chinese immigrants based in California was used. Information was combined with the data from the U.S. census and other information to complete the study of self-selection effect in employment and its impact on the U.S. labor market.

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I. Introduction

In 2012, George Borjas and Kirk Doran published an article titled “The collapse of the Soviet Union and the productivity of American mathematicians”, which uses the Roy self-selection model to study the impact caused by Soviet mathematicians immigrating to the U.S. after the collapse of the Soviet Union, and its impact on the U.S. labor market. The core concept of the Roy self-selection model proposed by A. D. Roy in 1951 is that, assuming the incomes of different occupations are decided by not only external factors but also personal choice, preference, and capability. Thus, the self-selection behavior exists in the employment selection.

Inspired by the article of Borjas & Doran (2012) and referring to the articles by A.D. Roy (1951), Borjas (1986), Borjas (1999), Eisenhauer, Heckman, Vytlacil (2015)et al., this paper sets the research objects as Chinese immigrants and classifies the immigrants into “self-employed” and “offered-employed” in order to correspond to the two self-selection patterns “self-employment” and “offered-employment” and further divides “self-employed” into “general self-employed” and “entrepreneur”. In consideration of economic income, economic expenditure, and human and social capitals, data from Chinese immigrants based in California was used. Information was combined with the data from the U.S. census and other information to complete the study of self-selection in employment of Chinese immigrants and its impact on the U.S. labor market.

II. Researcsh setting and modeling

(1) Research setting

It is Chinese immigrants themselves that select to immigrate but not randomly. Referring to the analysis of Eisenhauer, Heckman, and Vytlacil (2015) on the impact of going to college on students' salaries, and using the data available in the 2010 American community survey (updated every 10 years) issued by U.S. Census Bureau, this paper proposes the research setting as:

(1) First, set Chinese immigrants as the subjects of the research.

(2) Based on findings of Borjas (1986), the immigrants were classified into "self-employed" and "offered-employed", which is similar to the division of students into those who go to college and those who do not in the article of Eisenhauer, Heckman, and Vytlacil (2015).

The self-employed are mainly comprised of two groups. One group is self-employees who possess high capitals and earn incomes as private entrepreneurs or employers in the U.S. In this paper, this group is termed as "entrepreneur". The other group is self-employees who possess low capitals and earn incomes as general self-employees other than entrepreneurs in the U.S. This group is termed as "general self-employed". The employees are the community working at U.S. enterprises, and they are termed as "offered-employed" because they are employed by others.

(3) Regarding human capital, it is necessary to investigate immigrants' incomes,

marital statuses, genders, years of education, variables of years of immigration, occupational training, etc. Regarding economic expenditures, it is necessary to investigate housing expense, social engagement expense, food expense, etc. However, in fact, since the expenses above cannot be subdivided, immigrants' "daily expenditure" in the U.S. is used.

(4) According to the findings of Borjas (1986), "keeping spouse in company or not" is used as the constraint variable of social capital and immigrants' self-selection in employment, therefore it is required to investigate whether the spouse is in the company.

(5) Study the influence factors and the self-selection effect of Chinese immigrants' selection in employment considering human capital, social capital, economic expense, etc., and analyze the economic income difference between their "self-selection" patterns.

(6) Study the impact of Chinese immigrants' self-selection in employment on the U.S. local labor market. First, since the 2010 American community survey issued by U. S. Census Bureau only provides "income per capita of Americans". Therefore, it was used to verify the difference between immigrants' "average salary". Second, according to the average salary of native American employees with different education backgrounds in 2018, it is feasible to analyze the difference between the average salary of immigrants and natives American with different education levels.

(2) Description of Model and Estimation Method

In 1951, Roy proposed the Roy model to study the relationship between immigrants and the labor market of the destination country. Eisenhauer, Heckman, and Vytlacil (2015) revised the Roy model for the self-selection behavior and thereby completed an analysis of the impact of going to college on salary. There paper refers to the research method of Eisenhauer, Heckman, and Vytlacil (2015) to build a research model to study the self-selection effect in employment and the impact on U.S. labor market's wage structure.

1. Construction of Selection Equation

According to the aforementioned model setting, Chinese immigrants have two employment options in their job seeking in the U.S.: self-employment and offered-employment. Therefore, the corresponding economic incomes can be set as w_1 (self-employed) and w_0 (offered-employed). According to the research conclusion of Kanbur (1982) and Hamilton (2000), if immigrants satisfy the hypothesis of rationalization (namely, their goal is to maximize their economic interests) and Chinese immigrants, as risk averters, demand higher compensation for the uncertainty in the economic income due to their self-employment behavior, their expected economic income from self-employment will be higher than the expected economic income as an employee. However, if Chinese immigrants do not satisfy the hypothesis of rationalization and are inclined to enjoy the freedom of self-employment (self-organized time, a more comfortable working environment, etc.) without the need of high compensation for the uncertainty in the economic income

due to self-employment, their expected economic income from self-employment is not necessarily higher than the economic income as an employee.

On the basis of the analysis above, Chinese immigrants' employment selection behavior can be described as the following:

$$E(\ln w_{1i}) - E(\ln w_{0i}) > \ln w_i^* \qquad \text{Equation (1)}$$

In equation (1), $E(\ln w_{1i})$: the logarithm of Chinese immigrants' expected economic income of "self-employment"; $E(\ln w_{0i})$: the logarithm of Chinese immigrants' expected economic income of "offered-employment"; $\ln w_i^*$: the logarithm of the critical value of Chinese immigrants' economic income difference that is undifferentiated between "self-employment" and "offered-employment", i.e. the logarithm of the difference of retained economic income. Therefore, it can be known that $\ln w_i^*$ reflects Chinese immigrants' preference for "self-employment" when choosing between "self-employment" and "offered-employment".

According to equation (1), in "self-selection" of employment in the U.S., Chinese immigrants' would choose "self-employment" when they believe their income will be higher than that of "offered-employment"; the definition of $\ln w_i^*$ indicates that the value could be positive or negative.

Assumption: When Chinese immigrants choose between "self-employment" and "offered-employment", their preference for "self-employment" ($\ln w_i^*$) is decided by their individual characteristics, social capital variables as well as the unobservable personal capabilities and choice preference behind the "self-employment" behavior. Hence, this can be described as follows:

$$\ln w_i^* = \gamma Z_i + \varepsilon_i$$

Equation (2)

In equation (2), Z_i is Chinese (s_i). Among them, Chinese immigrants' individual characteristics (x_i) affect their selection of "self-employment" through its impact on their economic incomes and therefore, can enter the expected income model below. However, the social capital variable (s_i) only affects the retained economic income through its impact on the selection of the "self-employment" behavior and has no direct effect on economic income, and thus it is predicted that it will not enter the expected income model below. As stated by Borjas (1986), social capital variable (s_i) has become an "exclusion constraint" identified by the Roy model. According to the analysis above, equation (2) can be further represented as the following:

$$\ln w_i^* = \gamma_1 x_i + \gamma_2 s_i + \varepsilon_i$$

Equation (3)

ε_i represents Chinese immigrants' unobservable personal capability and selection bias behind their "self-employment" behavior and is normally distributed. The correlation is predicted to be negative due to the fact that, the stronger the personal capability is, the lower the absolute difference in the acceptable economic incomes between "self-employment" and "offered-employment" is. In another word, the more capable a person is, the more likely he/she is to start a business instead of being employed by a company and receiving a fixed salary.

The combined equation of equations (1) and (3):

$$E(\ln w_{1i}) - E(\ln w_{0i}) > \gamma_1 x_i + \gamma_2 s_i + \varepsilon_i$$

Equation (4)

Equation (4) is the condition that Chinese immigrants to choose “self-employment”.

Based on the Probit model, convert equation (4) and set:

$$I_i^{*}=E(\ln w_{1i})-E(\ln w_{0i})-\gamma_1 x_i-\gamma_2 s_i+\varepsilon_i$$

Equation (5)

Therefore, the conversion of the Probit model is as below:

$$I_i=\begin{cases}1, & I_i^{*}>0\\ 0, & I_i^{*}\le 0\end{cases}$$

Equation (6)

2. Construction of Expected Income Equation and Generalized Roy Model

According to the construction of the selection model above, after having chosen between “self-employment” and “offered-employment”, Chinese immigrants can find out the expected economic income from their “self-employment” and that from “offered-employment”. Therefore, $\ln w_{1i}$ and $\ln w_{0i}$, the expected income equations can be described as follows:

$$\ln w_{1i}=\alpha x_i+\varepsilon_{1i}$$

Equation (7)

$$\ln w_{0i}=\beta x_i+\varepsilon_{0i}$$

Equation (8)

ε_{1i} And ε_{0i} as the random error term of equations (7) and (8), it represents all the unobservable random influence factors and can be set as $\varepsilon_{1i}\sim N(0,\sigma_1^{2})$ and $\varepsilon_{0i}\sim N(0,\sigma_0^{2})$.

Equation (5) can be further written as:

$$I_i^* = (\alpha - \beta - \gamma_1)\ x_i - \gamma_2 s_i + (\varepsilon_{1i} - \varepsilon_{0i})$$

Equation (9)

Set $\theta_1 = \alpha - \beta - \gamma_1$, $\theta_2 = -\gamma_2$. Meanwhile, since the two random error terms ε_{1i}, and ε_{0i} all satisfy the joint normal distribution with a mean value of 0, it can be jointly set as: $\mu_i = \varepsilon_{1i} - \varepsilon_{0i}$, and then equation (9) can be written as:

$$I_i^* = \theta_1 x_i + \theta_2 s_i + \mu_i$$

Equation (10)

Therefore, the Probit model can be written as follow:

$$\ln w_i = \begin{cases} \ln w_{1i}, & I_i = 1 \ or \ I_i^* > 0 \\ \ln w_{0i}, & I_i = 0 \ or \ I_i^* \le 0 \end{cases}$$

Equation (11)

3. Description of Estimation Method

According to equations (10) and (11) above, the data obtained show Chinese immigrants' work statuses of "self-employed" and "offered-employed". $\ln w_1 \left| I = 1 \right.$ can be found in the "self-employed" group; $\ln w_0 \left| I = 0 \right.$ can be found in the "offered-employed" group.

According to equation (10), set:

$$\theta Z = \theta_1 x + \theta_2 s$$

Equation (12)

The following can be concluded:

(1) The economic income from the "self-employment" of the "self-employed" Chinese immigrants:

$$E(\ln w_1 \left| I = 1 \right.) = \alpha x + \rho_{1\mu} \phi(\theta Z / \sigma_\mu) / \Phi(\theta Z / \sigma_\mu) = \alpha x + \rho_{1\mu} \sim \lambda(\theta Z / \sigma_\mu)$$

Equation (13)

Their potential income as "offered-employment":

$$E(\ln w_0 \mid I=1) = \beta x + \rho_{0\mu} \sim \lambda(\theta Z / \sigma_\mu) \qquad \text{Equation (14)}$$

(2) The income from the "offered-employment" of "offered-employed" Chinese immigrants:

$$E(\ln w_0 \mid I=0) = \beta x + \rho_{0\mu} \sim \lambda(-\theta Z / \sigma_\mu) \qquad \text{Equation (15)}$$

Their potential "self-employment" income:

$$E(\ln w_1 \mid I=0) = \alpha x + \rho_{1\mu} \sim \lambda(-\theta Z / \sigma_\mu) \qquad \text{Equation (16)}$$

Description of the parameters from (13) to (16):

(1) $\rho_{1\mu}$, and $\rho_{0\mu}$ are random error terms (namely the unobservable factors in the economic income) ε_1, ε_0, and the coefficient of μ.

(2) $\lambda(\theta Z / \sigma_\mu) = \phi(\theta Z / \sigma_\mu) / \Phi(\theta Z / \sigma_\mu)$ is the "Inverse Mills Ratio".

(3) $\phi(\bullet)$ is the probability density function with a standard normal distribution.

(4) $\Phi(\bullet)$ is the cumulative distribution function with a standard normal distribution.

On the basis of the description above, the estimation method is as follows:

(1) According to the content above, $\ln w_1 \mid I=1$, and $\ln w_0 \mid I=0$ are observable. Hence, the data of the samples of "self-employed" and "offered-employed" can be used to estimate parameters α and β.

(2) $\lambda(\bullet)$ represents the selection bias brought by unobservable capability and selection preference to Chinese immigrants' choice between "self-employment" and "offered-employment" and can be estimated using the Probit model.

In short, the research is conducted with Heckman two-stage method. In the first step, Chinese immigrants' total samples are used to conduct the probit estimation of

the selection equations of (11) and (12) to get parameters θ_1 and θ_2. In the second step, parameters θ_1 and θ_2 are used to calculate $\lambda(\theta Z / \sigma_\mu)$ and $\lambda(-\theta Z / \sigma_\mu)$. In the third step, the calculated $\lambda(\theta Z / \sigma_\mu)$ and $\lambda(-\theta Z / \sigma_\mu)$ are substituted into equations (15) and (17) to get α, $\rho_{1\mu}$ as well as β, and $\rho_{0\mu}$.

Then the estimated parameters are substituted into equations (14) - (17) to get the equation about Chinese immigrants' economic incomes from "self-employment" and "offered-employment" and thereby analyze their economic incomes and employment decisions.

II. The empirical analysis of self-selection of Chinese immigrants and its impact on the U.S. labor market

(1) Data

According to the previous research setting, this paper uses the data that collected from Chinese immigrants in California. The number of respondents in the was 2000. After excluding incomplete (N/A) data, 1936 valid sample were retained.

(2) Variable Description and Cleaning

Categories of employment choices of Chinese immigrants are divided into two categories: self-employed and offered-employed. Among them, self-employed are further subdivided into: "entrepreneur" and "general self-employed".

Variables used in the study:

(1) Economic income: data collected are in annual income, because data released by the U.S. Census are annual data.

(2) Human capital: Data used contains variables of gender, years of education, vocational training whether they have participated in work, and years of immigration. Among them, the number of years of education, due to the inconsistencies in the original data set, such as part of the year and part of the education level. The role to convert into numerical is: "Graduate from junior high school = 9 ", "Graduate from high school = 12", "Graduate from

undergraduate = 16", "Graduate from master = 19", "Graduate from doctoral = 22".

(3) Variables of economic expenditure: Collected by means of annual economic expenditure. Data is processed in the same way as the "economic income variable".

(4) Social capital variable: Based on the approach taken by Rees and Shah (1986), “whether the spouse is around” is adopted as the social capital variable. According to the results of Borjos (1986) and Hammarstedt (2001), married status can help increase the starting capital for "self-employment," while the presence of a spouse can help individuals get more realistic support at work. "Married and spouse is around" can be more inclined to "rational person" setting, that is: the goal of maximizing the overall economic income of the family. Therefore, individuals who have the “married and spouse around” constraint will be more likely to choose “self-employment” in their job choices than individuals who are married with their spouse not around or unmarried.

The above classification and variable description are summarized in Table 1:

Table 1 Classification and Variable Description

Model	Name	Code
Category	Business owners General self-employment Employment	BOS GSE EMP
Variable	Income MALE？（male=1）	INCOME MALE MARRIED EDUCATION

	Married？（married=1） Years of education Received vocational training? (Received =1) Immigration years Expenditure Spouse in the U.S.? (Yes=1)	TRAINING IMMIGRATION EXPENDITURE SPOUSE

The overall sample does not control the annual economic income of immigrants before immigration. According to the research results of Meng (2001), as the increase of time of migration, the relationship between the economic status of migrant groups before migration and the income status after migration is very weak. Therefore, the annual economic income of Chinese immigrants before immigration to the U.S. was not considered as a variable.

（3）Empirical Analysis of the Employment Self-selection Effect of Chinese Immigrants

1.Descriptive statistical analysis

The following uses a total sample of "self-employed", a sub-sample of "entrepreneur " and "general self-employed", and a total sample of "offered-employed" to complete the descriptive statistical analysis of the data.

Results are shown in Table 2, Table 3, Table 4, and Table 5.

Table 2. Descriptive statistics of "self-employed"

Variable	Mean	Median	Maximum	Minimum	SD	Skewness	Sum	Sum Sq.

INCOME	62362.79	62000	99500	47500	8497.402	0.794932	37043500	4.28E+10
MALE	0.523569	1	1	0	0.499865	-0.094381	311	148.17
MARRIED	0.698653	1	1	0	0.45923	-0.865887	415	125.0589
EDUCATION	13.72391	12	19	9	3.464764	0.127935	8152	7118.721
TRAINING	0.294613	0	1	0	0.456253	0.901081	175	123.4428
IMMIGRATION	8.925926	8.5	18	1	4.711713	0.178161	5302	13164.74
EXPENDITURE	43888.42	43207.5	76615	29925	6820.494	0.920431	26069720	2.76E+10
SPOUSE	0.511785	1	1	0	0.500282	-0.047151	304	148.4175

Note: sample size: 594

Table 3. Descriptive statistics of "entrepreneur"

Variable	Mean	Median	Maximum	Minimum	SD	Skewness	Sum	Sum Sq.
INCOME	67969.65	67000	99500	58500	7015.656	1.571981	21274500	1.54E+10
MALE	0.485623	0	1	0	0.500594	0.500594	152	78.1853
MARRIED	0.769968	1	1	0	0.421527	-1.282957	241	55.4377
EDUCATION	14.11821	12	19	9	3.484685	0.012815	4419	3788.626
TRAINING	0.284345	0	1	0	0.451824	0.956125	89	63.69329
IMMIGRATION	10.19169	10	18	3	4.895216	0.080793	3190	7476.498
EXPENDITURE	47928.59	47850	76615	36855	6190.541	1.290164	15001650	1.20E+10
SPOUSE	0.623003	1	1	0	0.48541	-0.507613	195	73.51438

Note: sample size: 313

Table 4. Descriptive statistics of "general self-employed"

Variable	Mean	Median	Maximum	Minimum	SD	Skewness	Sum	Sum Sq.
INCOME	56117.44	56000	64000	47500	4877.655	-0.009617	15769000	6.66E+9
MALE	0.565836	1	1	0	0.496531	-0.265658	159	69.03203
MARRIED	0.619217	1	1	0	0.486446	-0.49103	174	66.25623
EDUCATION	13.2847	12	19	9	3.394967	0.252283	3733	3227.224
TRAINING	0.30605	0	1	0	0.461673	0.841705	86	59.67972
IMMIGRATION	7.516014	8	14	1	4.065613	-0.030465	2112	4.63E+03
EXPENDITURE	39388.15	39330	48895	29925	4152.924	0.146511	11068070	4.83E+09
SPOUSE	0.3879	0	1	0	0.488141	0.460111	109	66.71886

Note: sample size: 281

Table 5. Descriptive statistics of "offered-employed"

Variable	Mean	Median	Maximum	Minimum	SD	Skewness	Sum	Sum Sq.

INCOME	58026.08	56500	89500	19000	17233.54	-0.546917	77871000	3.98E+11
MALE	0.64456	1	1	0	0.478825	-0.604038	865	307.4553
MARRIED	0.436662	0	1	0	0.496157	0.255411	586	330.1162
EDUCATION	16.61848	16	22	9	3.16801	-0.700148	22302	13458.66
TRAINING	0.496274	0	1	0	0.500173	0.014904	666	335.4814
IMMIGRATION	6.676602	7	12	1	3.442902	-0.043592	8960	15895.65
EXPENDITURE	40949.69	42180	69030	11970	12469.34	-0.449928	54954485	2.09E+11
SPOUSE	0.198212	0	1	0	0.398801	1.514042	266	213.2757

Note: sample size: 1342

Tables 2 to 5 show:

(1) The number of “self-employed” is 594 (of which, the number of “entrepreneurs” is 313 and the number of “general self-employed” is 281.) The sample size of “offered-employed” is 1342, and the total number of sample is 1936.

(2) The average annual economic income of "self-employed" is $62,332.79, with a standard deviation of $8497.402. The average annual economic income of “offered-employed” is $59026.08, with a standard deviation of $17233.54. The average annual economic income of "self-employed" is higher than that of "offered-employed" and the standard deviation is smaller than that of "offered-employed ". Therefore, it shows the economic income advantage of "self-employed" in Chinese immigrants is greater than "offered-employed".

(3) The average annual economic expenditure of "self-employed" is $43,888.42, with a standard deviation of $6820.494, and the average annual economic income of "offered-employed" is $40,949.69, with a standard deviation of $12,469.34. The average annual economic expenditure of "self-employed " is larger than that of "offered-employed" and the standard deviation is

smaller than that of "offered-employed ".

(4) The average number of years of education for “self-employed” is 13.72391, which is less than 16.61848 for “offered-employed”. The rate of receiving vocational training for “self-employed” was 29.46%, which was less than 49.63% of the " offered-employed". The average immigration year for "self-employed" is 8.9, while it is 6.7 for “offered-employed”.

(5) The marital rate for "self-employed" reached 69.87%, which is higher than 43.67% for “offered-employed”. At the same time, the ratio of whether spouse is around for "self-employed" is 51.18%, which is greater than 19.82% for " offered-employed". It verified the research results of Borjos (1986) and Hammarstedt (2001) that Individuals with a "spouse around" constraint will be more likely to choose "self-employment" in their job choices.

2、Overall Sample Regression Analysis

According to the previous model construction and estimation method description, the regression analysis of the overall sample ("self-employed" and " offered-employed ") was completed, and the results are shown in Table 6:

Table 6. Overall sample regression ("self-employed" and "offered-employed")

	（1）	（2）	（3）
	“self-employed” =1	“self-employed”	“offered-employed”
MALE	-0.25275***	0.070676	0.172754***
	(0.072124)	(0.0835)	(0.032295)
MARRIED	0.045969	0.203817*	0.095055***

	(0.099098)	(0.112812)	(0.035493)
EDUCATION	-0.015243	0.028365**	0.032241***
	(0.013703)	(0.012102)	(0.005122)
TRAINING	-0.441322***	-0.061469	0.078312**
	(0.074947)	(0.09919)	(0.032136)
IMMIGRATION	0.079014***	0.05849***	0.04529***
	(0.017763)	(0.020952)	(0.007093)
EXPENDITURE	0.0191574	0.027136	0.0361248
	(0.032314)	(0.027315)	(0.017451)
SPOUES	0.662508***		
	(0.095209)		
$\lambda(\theta Z / \sigma_{\mu})$		0.362195*	
		(0.205567)	
$\lambda(-\theta Z / \sigma_{\mu})$			-0.004523
			(0.101244)
C	-0.475411***	44.419559***	6.845901***
	(0.165165)	(0.086142)	(0.083848)
obs	1936	594	1342

Note: t statistics in parentheses *p<.05, **p<.01, ***p<.001

Table 6 shows:

(1) The difference in economic income between men and women for "self-employed" is not significant; however, for "offered-employed", the difference in economic income between men and women is significant, men earn higher income than women.

(2) The years of education of "self-employed and "offered-employed" have a significant effect on economic income, and "offered-employed" have a higher return on education than the "self-employed". The number of years of education has a significant effect on the economic income of "self-employed". This result does not align with Giulietti's (2011) study that "the number of years of education has no significant effect for self-employed person.

(3) The difference in economic income between "trained" and "untrained" for "self-employed" is not significant; however, there is a significant difference in economic income between "training" and "untrained" for "offered-employed". The "trained" group has higher economic income than the "untrained" group.

(4) The immigration years of "self-employed" and "offered-employed" has a significant impact on economic income, and "self-employed" have a higher rate of return on immigrant years than "offered-employed".

(5) The economic expenses of "self-employed " and "offered-employed" does not have a significant impact on economic income. The reason may be that both groups' economic expenditures will change as the amount of economic income changes.

(6) The married status of "self-employed" and "offered-employed" has a significant impact on economic income. At the same time, the influence of spouse's state of being around has a significant impact on economic income. Married status can help increase the "self-employed" start-up capital, and the presence of the spouse can help individuals get more realistic support in the work.

(7) $\lambda(\bullet)$, the characterization of unobservable ability and selection preferences gives a choice bias between "self-employment" and "offered-employment". The coefficient is positive, and the regression result is significant for "self-employed", indicating that in the "self-selection" of employment, the group of Chinese immigrants choosing "self-employment" has a positive self-selection effect. In other words, the "self-employed" group has unobservable abilities or other factors that

cause them to choose a "self-employment" working style, which can obtain higher economic income than the "offered-employment" working style. For “offered-employed”, the coefficient is negative, and the regression result is not significant, indicating that in the "self-selection" of employment, the group of Chinese immigrants choosing "offered-employment" does not have a self-selection effect.

3、Sub-sample regression analysis

The first sub-sample is "general self-employed" and "offered-employed". The regression results are shown in Table 7:

Table 7. Sub-sample regression (“general self-employed” and “offered-employed”)

	(4)	(5)	(6)
	“self-employed” = 1	“General Self-Employed”	“Offered-Employed”
MALE	-0.149599*	-0.027384	0.166854***
	(0.089587)	(0.113434)	(0.031907)
MARRIED	0.037306	0.139519	0.096137***
	(0.118157)	(0.132631)	(0.035343)
EDUCATION	-0.031827**	0.019953	0.032277**
	(0.015916)	(0.017444)	(0.005924)
TRAINING	-0.313093***	-0.138463	0.072410**
	(0.091053)	(0.135713)	(0.036695)
IMMIGRATION	0.045015**	0.063852**	0.045883***
	(0.020805)	(0.028385)	(0.007344)
EXPENDITURE	0.0351684	0.0212693	0.0423914
	(0.017632)	(0.021374)	(0.014217)
SPOUES	0.354078***		
	(0.120172)		
$\lambda(\theta Z / \sigma_{\mu})$		0.517042	
		(0.423066)	
$\lambda(-\theta Z / \sigma_{\mu})$			-0.073037
			(0.230758)
c	-0.523974***	6.187965***	6.886100***
	(0.186323)	(0.55515)	(0.128812)
obs	1623	281	1342

Note: t statistics in parentheses *p<.05, **p<.01, ***p<.001

Table 7 shows:

(1) For "general self-employed", the difference in economic income between men and women is not significant; however, for "offered-employed", the difference in economic income between men and women varies significantly, and men earn higher income than women.

(2) The education length of "general self-employed " has no significant impact on economic income, while the education length of "offered-employed" has a significant impact on economic income. "Offered-employed" have a positive return on education.

(3) The difference in economic income between "trained" and "not trained" for "general self-employed" is not significant; however, for “offered-employed”, there is a significant difference in economic income between “trained” and “untrained”. The “trained” group has higher economic income than the “untrained” group.

(4) The immigration years of "general self-employed " and "offered-employed" have a significant impact on economic income, and the immigration years of "general self-employed" has higher rate of return than “offered-employed”.

(5) The economic expenditure of "general self-employed" and "offered-employed" does not have a significant impact on economic income.

(6) The married status of "general self-employed" has no significant effect on economic income, while the married status of "offered-employed" has a significant impact on economic income.

(7) For $\lambda(\bullet)$: The coefficient is positive and the regression result is not significant for “general self-employed”, and the coefficient is negative and the regression result is not significant for “offered-employed”. It shows that in the "self-selection" of employment, Chinese immigrants choose "general self-employed" has “self-selection” effect and “offered-employed" has no self-selection effect.

The second sub-sample is "entrepreneur" and " offered-employed". The regression results are shown in Table 8:

Table 8. Sub-sample regression ("entrepreneur " and "offered-employed")

	（7）	（8）	（9）
	“self-employed”=1	“entrepreneur”	“offered-employed”
MALE	-0.341569***	0.141899	0.173452***
	(0.088773)	(0.123693)	(0.030923)
MARRIED	0.061024	0.258103	0.090090***
	(0.129819)	(0.171126)	(0.034382)
EDUCATION	0.004810	0.0196800	0.0325040***
	(0.017179)	(0.019773)	(0.005003)
TRAINING	-0.507858***	-0.131109	0.080353***
	(0.091532)	(0.139957)	(0.029225)
IMMIGRATION	0.102474***	0.052352*	0.045270***
	(0.021746)	(0.030577)	(0.007017)
EXPENDITURE	0.0092416	0.0286172	0.0376241
	（0.019632）	（0.0213891）	（0.015127）
SPOUES	0.848084***		
	(0.116117)		
$\lambda(\theta Z / \sigma_{\mu})$		0.570063**	
		(0.228846)	
$\lambda(-\theta Z / \sigma_{\mu})$			-0.000303
			(0.096018)
c	-1.265219	6.651392	6.960197
	(0.209194)	(0.477659)	(0.066155)
obs	1655	313	1342

Note: t statistics in parentheses *p<.05, **p<.01, ***p<.001

Table 8 shows:

(1) The difference of economic income between men and women is not significant; however, for "offered-employed", the difference between men and women is significant, and men earn higher incomes than women.

(2) The impact of the number of years of education of "entrepreneur" on economic income is not significant, while the number of years of education for "offered-employed " has a significant impact on economic income.

(3) The difference in economic income between "trained" and "not trained" for “entrepreneur" is not significant; however, for "offered-employed”, the difference in economic income between "trained" and "untrained" is significant. The "trained" group has higher economic income than the "untrained" group.

(4) The immigration years of "entrepreneur" and "offered-employed" has a significant impact on economic income, and "entrepreneur" have a higher return rate of immigration years than “offered-employed”.

(5) The economic expenditure of "entrepreneur" and "offered-employed" does not have a significant impact on economic income.

(6) The married state of "entrepreneur" has no significant effect on economic income, while the married state of "offered-employed" has a significant effect on economic income.

(7) For $\lambda(\bullet)$ The coefficient is positive and the regression result is significant for “self-employed”, indicating that in the "self-selection" of employment, the group of Chinese immigrants choosing to be a "entrepreneur" has a positive self-selection

effect. In other words, the "entrepreneur" group has unobservable abilities or other factors that cause them to choose a "self-employment" working style that can obtain higher economic income than "offered-employment" working style. The coefficient for “offered-employed” is negative and the regression result is not significant, indicating that in the "self-selection" of employment, the group of Chinese immigrants choosing "offered-employment" does not have a self-selection effect.

The "general self-employed" coefficient is positive but the regression result is not significant, and for "entrepreneur ", the coefficient is positive and the regression result is significant. There is a positive self-selection effect, which indicated that in addition to the unobservable ability or other factors, the amount of capital ownership also has a significant positive impact on the "self-selection" of the Chinese immigrant working style.

IV、Empirical Analysis of the Impact of Chinese Immigrants on the U.S. Labor Market

According to the 2010 Census report published by the U.S. Census Bureau, using the average annual salary statistics report specifically for "employed person" in the U.S., the results show that the average income for all occupations in the U.S. is $51,960. According to the OECD Economic Cooperation and Development Organization's statistical report, the average annual salary of Americans is $60,555. Due to the inconsistent statistics, this paper uses the average of 51,960 and 60,555 to set the average annual salary of "offered-employed" in the U.S. in 2018. Thus, 56257.5 is used to complete an analysis of per capita annual income difference between Chinese immigrants and native American.

The test results are shown in Table 9:

Table 9. Differences between Chinese immigrants and natives' "per capita income"

Type	N	M	SD	T	df	P
Self-Employed	594	62362.79	8497.402	17.51111	1000	0.0000
Offered Employed	1342	58026.08	17233.54	3759470	1000	0.0002
General Self-Employed	281	56117.4	4877.655	-0.481353	1000	0.6306
Entrepreneur	313	67969.65	7015.656	29.53524	1000	0.0000
Total Sample	1936	59356.66	15230.05	8.953559	1000	0.0000

Note: t statistic with df of 1000

Table 9 shows:

(1) The average annual economic income of all Chinese immigrants is significantly different from the average annual salary of the "offered-employed" in the United

States in 2018, and it is higher than $5,625,7.5.

(2) The average annual economic income of "self-employed" and “offered-employed” is significantly different from the average annual salary of “offered-employed” in the U.S. in 2018, and it is higher than $5,625,7.5.

(3) According to further subdivision, the test results of "general self-employed" show no significant difference from the average annual salary of Americans, but from a numerical perspective, the average annual economic income of "general self-employed " is less than $5,6257.5. The average annual economic income of "entrepreneur" is significantly different from the average annual salary of "offered-employed" in the U.S. in 2018, and it is higher than $56257.5.

(4) As a whole, "general self-employed" has a lowering effect on the average annual salary of "offered-employed" in the U.S., while "entrepreneur" and "offered-employed" have a raising effect on average annual salary of in the U.S.

1、Analysis of the income gap between immigrants and the native Americans based on different educational backgrounds

According to the 2018 U.S. education and income comparison data, among the employed people, the average annual salary of a PhD is $103,000; the annual salary of a master degree is $74,000; the annual salary of a bachelor degree is $57,000; the annual salary of a high school graduate is $31,000 and the average annual salary of a junior high school graduate is $20,000. Therefore, based on the above average data, this paper completes the analysis of the gap between the “employee's per capita

income” of Chinese immigrants and native American based on different education backgrounds. The statistics method is t-test, and the results are shown in Table 10.

Table 10. Income gap between "offered-employed" and "per capita income of native American" from different educational backgrounds

Type	N	M	SD	T	df	P
PhD	67	86007.46	2000.933	-69.51254	66	0.0000
Master	572	71677.45	2066.003	-26.88629	571	0.0000
Bachelor	426	53671.36	2008.213	-34.21068	425	0.0000
High School	217	31854.84	2052.313	6.106037	216	0.0000
Junior High	60	22208.33	1823.323	9.381596	59	0.0000

Note: t statistic with df n-1

From Table 10:

(1) For Chinese immigrant “offered-employed” with a college degree or higher, their annual salary is lower than the average annual salary in the U.S. with the same academic background, specifically: For PhD, $86007.46 is less than $103000; for masters, $71677.45 is less than $74000; for bachelor, $53671.36 is less than $57000. The results show that the average annual salary obtained by Chinese "offered-employed" with a college degree or higher is significantly different from the average annual salary obtained by people with the same academic background in the U.S. The reason may be because native Americans still occupy key positions in local companies. "Offered-employed" of Chinese immigrants with a college degree or above have a lowering effect on the average annual salary of with equivalent education in the U.S.

(2) For "offered-employed" immigrants with high school and junior high school

education, the annual salary is higher than the average annual salary than native Americans with same education. Specifically: for high school, $31854.84 is greater than $31,000; for junior high, $22208.33 is greater than $20,000. The average annual salary obtained by "offered-employed" immigrants in high school and junior high school education is significantly different from the average annual salary obtained by people with the same education background in the U.S. The reason may be that in local companies, relatively small number of native Americans work for low-skilled jobs. “Offered-employed” immigrants with high school and junior high school education have a role in raising the average annual salary in the U.S.

IV. Conclusion

This paper considers economic income, economic expenditure, human capital (marital status, gender, years of education, whether have worked in vocational training, years of immigration, etc.), social capital (whether your spouse is around as an exclusion constraint). Through the research model and estimation method constructed in this paper, the research on the self-selection of Chinese immigrants and its impact on the U.S. labor market was completed.

The main findings of the study are as follows:

(1) the years of education of “self-employed” and “offered-employed” has a significant effect on economic income, and the education returns of “offered-employed” are greater than that of “self-employed”.

(2) The immigration years of “self-employed” and “offered-employed” has a significant effect on economic income. The returns of immigration years of “self-employed” are greater than that of “offered-employed”.

(3) The economic expenditures of “self-employed” and “offered-employed” do not have significant effect on economic income.

(4) Being married and keeping spouse in company spur both “self-employed” and “offered-employed” to earn a higher economic income.

(5) In the “self-selection” set up, the population who choose “self-employed” among Chinese immigrants has a positive self-selection effect. That is, the “self-employed” population processes unobservable capability or other factors that make

them to earn higher economic income when choosing "self-employed" than choosing to be “offered-employed”. The “offered-employed” community among Chinese immigrants does not has significant self-selection effect.

(6) The economic income of “self-employed” is higher than “offered-employed” and the annual economic income of “entrepreneur” is the highest. The remunerations of “offered-employed” with different education backgrounds are hierarchical. According to the T test, the “general self-employed” hold down the average annual salary while “entrepreneur” and “offered-employ” drive up the average annual salary. The analysis of the difference in the “per capita income” between “offered-employed” immigrants and Americans with the same education background has drawn the conclusion that “offered-employed” immigrants with bachelor's degree and above pull down the average annual salary in the U.S. “Offered-employed” immigrants with high school and junior high diplomas drive up the average annual salary in the U.S.

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