

THE MECHANISM BEHIND THE GREAT GATSBY CURVE

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Introduction

This essay is aimed to explore how the Chinese Household Registration system acts as a factor behind the Great Gatsby Curve (GGC) in China through the educational channel. The Great Gatsby Curve shows a positive correlation between the income inequality and the intergenerational immobility in a country. Although the empirical result of GGC is widely observed across the economies, only a few works have been done to explore the mechanism behind, especially in the economic developing countries. (John Jerrim 2015).

The economic development in China has been impressive since the Reform and Open-up policy was implemented in 1978. However, We have also observed rapid increases of both cross-sectional income inequality and intergenerational income elasticity in China amid its economic transition during the same period. As the Gini coefficient has raised rapidly from 0.26 to 0.43 over the period of 1980 to 2010, China became one of the most unequal countries in the world. And the intergenerational income elasticity increased from 0.315 to 0.442 between two cohorts born before and after 1970, according to the Chinese Household Income Project (CHIP).

We wonder about the exact role the distinctive population registration system of China might have playing in this trend of inequality and how it has affected its persistence, by influencing the education opportunities of urban/rural households. A better understanding of this question can help us to formulate possible policies to relieve the problem of inequality in countries under similar economic circumstances.

The Household Registration System (known as Hukou) was established in 1955 by the Chinese government, classifying each individual in the population into “agriculture” (rural) and “non-agriculture” (urban) citizens. (Wu and Treiman, 2004). One’s Hukou status is closely related to his/her income (Wang and Zuo, 1999), this will also be proved in the empirical model. The parental hukou will be passed to their offspring and the change of Hukou is highly restricted, therefore it has strong impacts on the offspring’s life chances and therefore, their income level. In this essay, we will only discuss how Hukou status affects one’s education attainment, other factors such the impacts of health care plans; rural-hukou discrimination will not be examined.

In the section of theoretical background of the essay, we will analysis how the Hukou system affects the educational attainments of offspring with different Parental Hukou status through the factors of the uneven distribution of the government public expenditure on education, Hukou status discrimination of urban school and the labour market and higher educational costs in the country. In the section of the empirical model, we first prove the fact that higher income households tend to have urban registration status, then we examine the effect of the parental Hukou status on their offspring’s school performance.

Theoretical background

The first factor contributing to the inequality persistence is the uneven distribution of education resources between the rural and urban areas in China, as the poorer population with rural Hukou status have less education opportunities, and hence may lead to lower income level later in life. While the public expenditure of Chinese government on education has increased significantly (Figure 1), a large proportion of this expenditure is concentrated in the economically developed, urban areas. (Fan et al., 2015). Hence, schools tend to be mainly located in the urban areas, and the rural schools tend to have significant inferior quality than in the urban (Lin, 1992). It means that in order to attend a higher-quality school, most rural students need to move away from their family and study in a strange environment at a young age, the psychological disadvantages which may arise from this factor may affect the rural students' school performance.

Furthermore, the admissions policies of urban schools tend to be discriminative against individuals with rural Hukou status, entering the urban schools are highly restricted to the local residents with permanent household registration. For a rural individual to enter an urban school will in general require additional score or a higher tuition fee. (Liu, 2014). As a result, the rural students are disadvantaged by fewer number and inferior quality of local school, and benefit significantly less from the rise of government's public expenditure on education than the urban students do, and may perform relatively poorer in the National College Entrance Examination. These factors can enhance the intergenerational immobility.

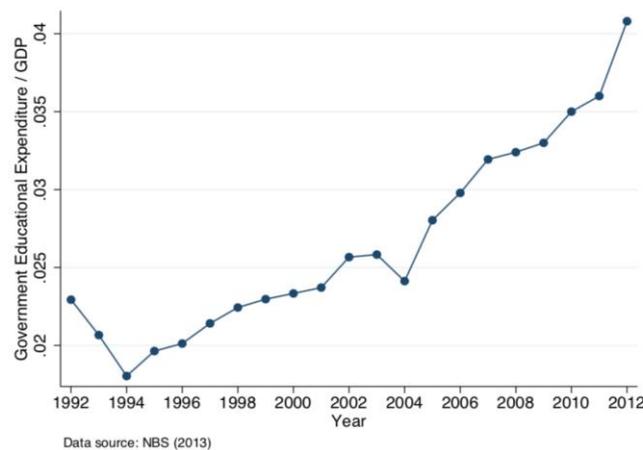


Figure 1: government educational expenditure/GDP

The second factor is that rural households tend to have lower incentives to invest in education. The return of human capital in rural area is significantly lower than the urban area. The labour market in China is heavily urban-biased and most of high-paid job opportunities requiring high qualifications are not accessible for rural households due to the Hukou system. (Liu 2004). However, the returns of schooling have risen sharply in the urban area due to the improvement of physical capital and technology, the urban households therefore are more motivated to obtain a higher qualification (Figure 2). In addition, the education costs have also increased considerably. (Fan et al., 2015), as the rural households in general have relatively lower income level, they tend to subject to a tighter budget constraint. The high

costs barrier further depresses the incentives for rural parents to invest in their offspring's education; the intergenerational immobility can therefore be persisted.

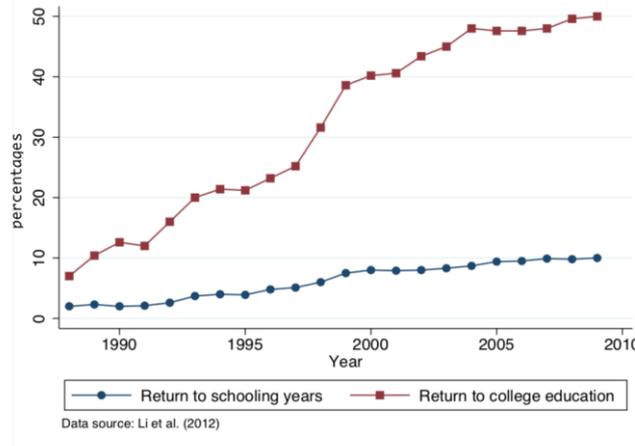


Figure 2: return to education in urban China

Empirical Strategy

In this section, we attempt to prove the positive correlation between the parental hukou status and the parental income. We then prove that the offspring's hukou status which is passed from their parents have strong impact on their education performance.

The parental registration status is determined by the family income per capita quantile, in order to prove the relation between parental hukou status and the parental income we use the logit model. The main reasons to use this model are as following. The first is that the dependent variable is a binary variable (1=urban, 0=rural). The second is that the logit model produces outcome exactly between 0 and 1. If we use other models such as linear probability model under OLS procedure, then we may well produce outcomes beyond this range. The last one is that the data is not distributed perfectly normal but censoring to the right. Therefore, using multi-regression under OLS we are able to produce inconsistent estimators.

The model is shown below:

$$\hat{p}(Urban = 1 | \text{quantile of net family income per capita}) = \varphi(\hat{\beta}_0 + \hat{\beta}_1 \text{ quantile of net family income per capita})$$

Where φ is the logit function. $\varphi(z) = \frac{\exp(z)}{1+\exp(z)}$.

The urban takes 1 if $\hat{\beta}_0 + \hat{\beta}_1 \text{ quantile of net family income per capita}$ is positive and takes value of 0 if otherwise.

In the second part of this section, we attempt to use a multiple linear regression model to measure the effect of parental hukou status on the offspring's educational performance. A multi-regression under OLS is used as OLS produces the best linear unbiased estimator under large sample size. The sample contains over 14000 observations, satisfy the requirement for large sample size.

The model we use here is:

$$\text{school performance} = \beta_0 + \beta_1 \text{HuKou} + \widetilde{\beta}_x X_i + u$$

The dependent variable “school performance” is defined as children’s total math and verbal score of a standardized test in 2014. For verbal test contains 8 questions with similar difficulty and math test is a test with four groups of questions, which contains addition, subtraction, multiplication, division, exponents, logarithms, trigonometric functions, sequence, permutation and combination, etc. The independent variable “Hukou” is defined as parental Hukou status of the students. (Hukou=1 if urban). X_i is a vector of control variables including number of family numbers, the amount of money saved by family for children’s education, parent’s expectation on children’s highest education degree and total cost on children’s education.

Data

In this section, the data is from the Chinese Family Panel Studies (CFPS) of Peaking University. In the previous studies, researchers used after tax income (Chetty *et al.*, 2014) or life time income (YiFan Et al., 2015) of each household as a measure of income inequality. Here we use “quantile of net family income per capita” as the indicator of income inequality. The higher net family income per capita, the higher the quantile. We use data of family as under current household registration system, the offspring’s Hukou status is determined by the parental Hukou status. Things will be slightly different if the parents are not registered in a same region. In most cities of China, children can choose either mother or father’s registration status according the current household registration law. In order to compare the income level of different households in a fairer way, “family income per capita” is used, as a measurement to eliminate the effects of family size on the total income level, as the assumption of every family shares a same size is a rather unrealistic assumption, the family size usually differs between urban and rural area. (Zachary Zimmer & Julia Kwong., 2003) The income inequality is indicated as different positions in quantile.

For the first model, we use data from three years: 2012, 2014 and 2016 to create a large sample with over 40000 observations.

For second model, we use data only from year 2014 as this data set contains additional information of the families.

Results

The results from first regression is shown in the table below:

```

-----
                                (1)
                                urban hukou~f
-----
urban hukou and ru~f
the percentile of ~c          0.609***
                                (61.05)

Constant                      -1.601***
                                (-57.80)
-----
Observations                   38001
-----
t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

```

The dependent variable here is the Urban Hukou status and the independent variable here is the percentile of net family income per capita.

A strong positive correlation between the quantile of the net family income per capita and the urban status has been found. This result can be interpreted as with rise of the quantile, the possibility these families have an urban Hukou status raises. Besides, the result is shown to be statistically significant as the P value is very close to 0.

The result from the second regression is shown below:

```

. esttab, label
-----
                                (1)
                                performance
-----
Urban area (Census~i         0.542*
                                (2.30)

Number of family m~s         -2.060***
                                (-16.40)

Amount of money sa~c         0.0000145
                                (0.51)

Expectation for ch~          -1.494***
                                (-7.40)

Confirm total cost~         0.000685***
                                (6.07)

Constant                     18.44***
                                (13.19)
-----
Observations                  8071
-----
t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

```

A positive correlation between parental Hukou status and children's school performance has been found. Keeping other variables constant, parents having urban Hukou status are expected to bring their children 0.405 marks higher in the test. The result is significant in 10% significance level (P value=0.085). Therefore, we conclude that the difference in Hukou status influences children's education performance.

Conclusion

The Chinese population household registration system that classifies the population into “agriculture” and “non-agriculture” creates unequal education opportunities for the offspring of two groups in two following ways. Firstly, the urban children have better access to quality schools, gaining them great advantages in the National College Entry Examination and higher chance of entering tertiary level education, which rural children don't. Secondly, the urban-biased labour market and rapidly increased educational costs have depressed the incentives for rural parents to invest on the human capital but increase the urban households'.

These factors pass the increasing income gap between the urban households and the rural households to their offspring; the intergenerational income elasticity hence increases.

There are several policies the government can implement to eliminate the inequality persistence, such as increasing the public expenditure on education in the rural areas to improve the quality of schools, regulation of the labour market to relieve the Hukou status discrimination to encourage rural children to invest in education, or finance the rural households to reduce their credit constraints to invest in human capital.

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