

# **The Effect of the Chinese 9-year Compulsory Education Policy on Household Consumption Behaviors**

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## **Introduction**

The low household consumption as share of GDP in China was discussed frequently by economists. According to the International Monetary Fund's report in 2016, China's national savings as share of GDP is at 46 percent, which is 26 percentage points higher than the global average (IMF, 2016). Being the outliers compared to other economies, this low consumption rate could bring detrimental effects to the Chinese economy system. As demonstrated by the report of IMF, the low consumption rate as share of GDP would decrease the welfare of Chinese citizens, leading the high-level investment absorbed inefficiently, eventually worsening global imbalances (IMF, 2016). Based on this view, IMF suggests that boosting the consumption would be necessary for China's economy to grow strongly and sustainably. Based on the suggestion to boost the consumption rate, one question has been brought out: Whether the expansion of the current free-education policy could stimulate the consumption rate. This is the research topic of this paper.

China's Compulsory Education Law was passed on April 12, 1986 and officially went into effect on July 1, 1986. This was the first time that China used a law to specify educational policies for the entire country (Fang, Hai, et al., 2012) Recently, there is a proposal of the

nationwide 12-year Compulsory Education Policy. During the Chinese National People's Congress in March 2017, some congress members proposed to apply the 12 years of compulsory education nationwide, but other members have different views, believing that the time is not yet mature. Therefore, although in July 2007, Zhuhai city of Guangdong Province became the first city implementing the 12-years free education policy in China, the proposal on nationwide 12-year compulsory education is still suspended (“Education in China”, 2018). In this paper, I will examine the effect of a Chinese compulsory education policy on the consumption behavior of household.

In the following part, I will conduct the literature reviews on the effects of compulsory education both in China and other countries, with further literature review on the education effect on the consumption. Then, I will introduce the data set used for this paper and specification of variables. In the next empirical method section, I will introduce the two-stage regression method as to evaluate the effect of compulsory education policy on the consumption behaviors of household. The first-stage results suggest that the cohort who was affected by the compulsory education policy receives about 0.663 more schooling years than the one who was not affected by the compulsory education policy. The second stage results show the one additional year of schooling will induce the household have 8% more consumption out of the income. Therefore, we conclude the this Chinese 9- year compulsory education law, by raising people’s education attainment, encouraged people to consume a little bit more (5.304%) out of their income.

## **Literature Review**

Free education policy did affect individual in the U.S. For example, in the natural experiment conducted by Angrist and Krueger (1991), the authors concluded that the students who gained longer schooling years due to compulsory schooling laws earn higher wages as a result of their additional schooling. First, the authors recognized that the children born in the beginning of the year usually start school at an older age than that of their classmates, so under the compulsory education policy, these students are allowed to drop out of school after attaining less education. The paper suggests that the season of birth of an individual own statistically significant effect on the level of education men ultimately attain. For example, men born in the last quarter of the year have one tenth of a year higher of schooling than those born in the first quarter of the year. The paper uses the season of birth as exogenous variation in education because one's birthday is not correlated with other personal explanatory variables except the age at the school entry. This exogenous variable can be used to estimate the impact of compulsory schooling on education and earnings. This paper applies two-stage least squares (TSLS) estimates to identify the variation in education that is only generated from the differences in season of birth. And the season of birth results from the effect of compulsory education law. The results of the paper indicates that people who are affected by the compulsory schooling laws earn higher wages as a result of their increased schooling. The estimated monetary return to an additional year of schooling for those who are affected by the laws is about 7.5 percent. This paper further examines the estimated return of education as result of compulsory schooling. By exploring the relationship between earnings and season of birth for the subsample of college graduates, the paper suggests, for men who are not affected by compulsory schooling, there is no relationship between earnings and season of birth. Because these individuals were not affected by compulsory schooling requirements, they form a control group to examine whether season of

birth affects earnings for some other factors other than compulsory schooling. This result strengthens the interpretation that the TSLS estimate estimated return of education is truly a result of compulsory schooling.

The paper by Acemoglu and Angris further examined the compulsory attendance law and child labor laws in U.S. states between 1920 and 1960. They treat this education policy as an exogenous instrument variable on the individual's future wage, since the policy is determined by the social forces at that time but not the future wage of the individual. This paper use the variation of schooling years caused by the exogenous compulsory policy to examine the private and external return of education. The paper studies white man aged 40 to 49 from 1950 -1980 Censuses. By examining the compulsory schooling law on individual schooling, the paper shows that men in states with a child labor law that requires 9-year in school before allowing work end up with 0.26 more years of school completed than those born in states that require 6 or fewer years. By examining the return on schooling years, the OLS results show that the schooling years have a significantly positive effect on the individual wage. One year more schooling are associated with about seven percent of average wage increase. However, by using IV method, the results show great difference, where the return of schooling is only about one to two percent. And the different results from those two methods imply that the major reason of income differences cross the country may not be the difference in education. Further, this paper also examines the dataset in 1990, finding the significant return of schooling around 4%, which is much higher than 1-2% return derived from the 1960-1980 dataset. This improvement may imply the increased importance of human capital after 1980.

The paper by Acemoglu and Angris also discussed about the methodologies regarding the examination of the effect of education. Evaluating consistent treatment effects allows for estimation of local average treatment effects and estimation of returns based on the impact that an undertaking has on specific or general population. There are various methods of evaluating and estimating treatment effects. Instrumental variable (IV) and Ordinary least square (OLS) are the most commonly used method of evaluating and estimating treatment effect. Ordinary least squares however attract debate on its effectiveness on estimation of consistent treatment effects and how it interprets its estimated treatment effects. Responses to treatment may vary. This therefore calls for the need for different instruments required to measure the varying effects. Local Average Treatment Effects is the only identifiable parameter that can measure these varying effects. This article reviews Philip Oreopoulos's review on "Estimating Average and Local Average Treatment Effects of Education When Compulsory Schooling Laws Really Matter" This paper reviews the author's specific findings and his recommendations thereof. It shall ultimately draw reasonable conclusion based on the author's argument. In the context of schooling literature, most scholars apply the Instrument variable method to evaluate and estimating treatment effects (Oreopoulos 152). However, according to Philip, this instrument only affects a mere 10 percent that is exposed to this instrument. He insists that the method generates treatment effects that exceed those of the Ordinary test square. The method's higher effect is a result of approximating average effects based on peculiar population. This contradicts Ordinary test squares that approximate average effects based on a large population. LATE parameter estimates from instruments variable method exceed the estimates from Ordinary test squares. The instruments because, when evaluating return to schooling literature the method evaluates more credit-constrained individuals affect this. Such population presents the peculiarity

of their greater immediate need for work to meet individual needs. The author has used the returns-to-schooling literature to estimate high school returns. With the help of the magnitude of response the review established that Instruments variable test estimates match or exceed OLS. It establishes that, as an effective parameter, local average treatment effects that inform raising school leaving age ought to come closer to the average treatment effects. This is based on the backdrop that approximately half the student population in United Kingdom leaves school. The comparison of the compulsory school law effects among countries helps verifies how close local average treatment effects are to average treatment effects. Substantive variance of local average treatment effects parameter estimates based on the compulsory North American's school laws which only affect fewer students compared to United Kingdom's at higher effects suggest a higher value for  $\rho$ . A small variance could otherwise suggest the relation between the average gains and dropping out school is small. Striking a smaller correlation is a likely explanation for why Ordinary test squares and instruments variable returns to schooling. Oreopoulos has used Instrumental Variables to analyses the returns to compulsory schooling in Britain. He establishes that his regression discontinuity gives an imprecision those earnings taper for successive older cohorts during his discontinuity. The analysis is also anchored on the analysis of instrumental variables analysis that combines the U.K. data sets. He regresses attainment of average education based on a quartic birth cohort, and now an indication for Northern Ireland. Philip finds out that there is an increased number of years schooled from high school leaving age of data by 0.42 years, in comparison to a 0.44 for British data. However, his standard error fell to 0.04 of. His results are a strong presentation that includes controls. The age indicates corresponding plots of Northern Irish and British education. In this way, Philip demonstrates the variance in attainment of school laws. The local average treatment effects for compulsory

schooling for the US, UK and Canada estimation is similar across the three countries. This finding overlooks the gender and race restriction that had initially been set. In addition, it is true that the dropouts who are forced a extra year in school earn 10 percent more compared to those without the extra year. These returns are equal in all the three countries.

Free education policy did affect individuals in China. The Chinese education attainments have been improved since the Reform and Opening Policy in 1978. According to the international dataset compiled by Barro and Lee, China's population aged 15 and above had an average of 3.4 years of schooling in 1970, rising to 7.6 years by 2005—higher than values for Brazil, India or Indonesia (Fang, 2012). Furthermore, the paper by Fang shows that the Compulsory Education Law of 1986 lifted up overall educational attainment in China by about 0.8 years of schooling during the 1997-2006 period, and that the impact varied systematically by location and by gender. With implementation of the compulsory education law, the years of schooling for all subgroups increases, but most strongly for girls (1.17 years) rather than for boys (0.4 years). The paper explains the reason behind this phenomenon is that low schooling attainment implies that more girls would be on the margin of being impacted by the compulsory education policy than boys. This policy also owns stronger effect on in rural area compared to urban area, and stronger in coastal area compared to inland areas.

It is been known that the influence of education on individual's behaviors is pervasive, including their income, choice of occupation, residential location, and consumption expenditure, and so on. In this case, much discussion of the benefits of the more schooling attainment has

been associated with higher lifetime income.

However, there are different interpretations regarding the effects of education on the consumption behaviors. On the one hand, some argue that more educated people will consume more than less educated people since they should expect more promising prospects of the future and high future income. In this case, the less they would expect the value of future goods, thus they will hence save less out of any level of income today (Solmon, Lewis C, 1975).

On the other hand, Harold Watts has pointed out higher education are associated with stronger retirement motives so that they will save more money out of their current income” (Solmon, Lewis C). In addition, the more-educated person is accompanied with higher possibility to run their own business and the income of business is instable, which could lead to their higher saving rate (Solmon, Lewis C). For further empirical evidence on this side, the paper by Solmon (1975) reveals a strong positive relation between education and saving, that is, the marginal propensity to save is higher for those with four years of college than those with less than four years of college. In addition, the paper examines the consumption of household on various categories of goods and reveals that one percent increase in the number of years of schooling completed by the head-of household (say, from 10 years to 10.1 years) lowers the expenditure for goods by 7 percent, but raises the expenditure for services by 19 percent (controlling the income variable). The positive effect of education are observed for foods away from home, housing, utilities, clothing, traveling, education. Thus, we know education does affect the way people spend money and the education will shift expenditure toward services.

Beyond the previous opposite views regarding the effect of education on people’s consumption behaviors, we have to admit this effect is uncertain. One of reasons is that the



consumption behavior could be a reflection of personal characteristics and subjective, as part of people are prefer to consumer more in the future while other people are prefer to consume right away. Becker states that since higher education leads to higher income, which is associated to higher opportunity cost of time. Thus, for producing utility (combination of goods and time) of a household, a household with higher education will have a combination of more goods and less time. That is, with more education, both income and consumption rises. However, the change of ratio  $C/Y$  (consumption to income) is still uncertain (Solmon, Lewis C,1975). In conclusion, the effect of education and consumption during working life could be different or even opposite due to various factors.

Based on all theses literature reviews, I will also use the similar methods of IV and RD in the this paper, but rather than examine the return on the education as all those previous paper have completed, I will examine the effect of exogenous education policy on the average propensity of consume rate of household, which combines the similar methodology that is used to examine the return of schooling but add APC as an new variable of interests in the framework.

## **Data**

This paper uses the Chinese Household Income Project, 2002 as the data source. The purpose of this project was to measure and estimate the distribution of personal income and related economic factors in both rural and urban areas of the People's Republic of China. Data were collected through a series of questionnaire-based interviews conducted in rural and urban areas at the end of 2002. The first, second and the fourth dataset were used for the analysis of

this paper. These dataset were derived from the urban questionnaire. The first contains data about individuals living in urban areas. The second contains data about urban households. The fourth contains household-level economic variables copied from the initial urban interview form. Dataset 1 contains 151 variables and 20,632 cases (individual urban household members). Dataset 2 contains 88 variables and 6,835 cases (urban households). Dataset 4 contains 212 variables and 6,835 cases, which match those in dataset 2. For the study design, five main questionnaire forms were filled in by interviewers at the various locations, based on questions asked of respondents. Individuals were not all interviewed directly; household members were allowed to answer questions on behalf of other members. In addition, interviewers made some direct observations about the households.

The next paragraph will show the specification of each variables used in the empirical model. The household income of each household is obtained by adding the annual income of each family member. The consumption of the household is based on the annual consumptive expenditure of each household. And here we treat the “ Hukou Type” —the born registration province as the province an individual obtained the education until high school. The variable household asset is based on the household financial asset. Since the distribution of the household asset is far away from normal distribution as figure 2 shows, we transfer the household asset to natural log household asset, bringing it back to normal distribution also as figure 2 shows.

Table 2: Summary Statistics Table

	count	mean	sd	min	max
HHAPC	4595	.8501145	.540286	.0641937	13.18949
Household Income	4603	24268.15	15982.99	0	227400
HHinc_inv	4595	.0000592	.0000462	4.40e-06	.0009641
Age	4603	47.41321	10.3631	21	92
Marriage	4603	2.070606	.384413	1	4
Years of education	4603	10.79579	2.950705	1	23
Total financial assets	4293	43761.26	77058.71	100	2450000
ln_HHassets	4293	9.989464	1.277378	4.61512	14.7116
consumptive expenditure (yuan)	4603	18648.74	13265.8	1261.5	211912.9
ln_HHcons	4603	9.653465	.5907863	7.140849	12.26394
Urban	4603	.9882685	.1076864	0	1
Female	4603	.3465131	.4759107	0	1
comp_educ	4603	.0232457	.1506993	0	1

The Table 2 is the summary statistics of all variables applied in the following empirical model. In the table, the unit of age, marriage, years of education, hukou type, sex, Policy dummy variable are all on the individual level. The unit of APC, income, consumption, and asset are all on the household level.

### Empirical Framework

For testing the effect of the Chinese compulsory education treatment on households' consumption behavior, we use a two-stage least squares estimation method to examine the effect of the schooling years, due to the education policy treatment, on the consumption behavior of the

household. In the first stage, we examine the effect of the education policy on the schooling years of the household head; and in the second stage, we examine the effect of the predicted schooling years on the consumption behaviors of the corresponding household. Here, we use the average propensity of consumption (APC) as an indicator of household's consumption behavior.

For the framework of the first stage regression, we introduce the instrumental variable  $D_{ht}$ —a dummy variable representing the policy treatment to estimate the effect of this education policy taking effect around 1986 on the schooling years obtained by the household head by 2002:

$$\text{School\_Years}_{ht} = a_0 + a_1(\text{Policy treatment}_{ht}) + a_2(\text{age}_{ht}) + a_3(\text{sex}_{ht}) + a_4(\text{urban}_{ht}) + a_5(\text{Hukou place}_{ht}) + e_{ht}$$

where  $\text{SCHOOL}_{ht}$  is the schooling years obtained by the head of household by 2002,  $D_{ht}$  is the dummy variable for the policy where this dummy equals to 1 if the household head is affected by Chinese compulsory education policy, and the dummy equals to 0 if the household head is not affected by the policy. Control variables include age, dummy variable representing urban/rural areas, and sex, Hukou place (provinces) of the household head.

In the first stage regression framework, it is necessary to introduce the method to determine this policy dummy variable. China's Compulsory Education Law was passed on April 12, 1986 and officially went into effect on July 1, 1986 (Fang, Hai, et al., 2012). This was the first time that China used a law to specify educational policies for the entire country. Essentially, among the selected individuals, the general principle for telling whether the subject is affected by the policy or not is that we use the age of the subject at the policy's effective date. Since Chinese

children were required to have begun primary school when he or she reached 6 years of age, in this way, child was supposed to complete the 9-year compulsory education when he or she reached 15 years of age (Fang, Hai, et al., 2012). If the age of the individual is less than 15 years old when the law became effective in his/her province, then this person was affected by the policy for years of 15 minus the age of that individual at the policy's effective date. Otherwise, if the age of the individual is bigger than 15 years old when the law became effective in his/her province, then this person was not affected by the policy at all. Considering the difference of period length of policy's impact on individuals of different ages, in which the younger the individual was at the policy's effective date, the longer period the individual would be affected by this policy, we select adults who are between 12 and 17 years old in 1986 (28-33 years old in 2002) to select treatment group and cohort group that are as restricted as possible. However, provinces were allowed to have different effective dates for implementing the law: July 1, 1986 in Heilongjiang and Liaoning; September 9, 1986 in Jiangsu; September 12, 1986 in Shandong; October 1, 1986 in Henan, March 1, 1987 in Hubei; January 1, 1988 in Guizhou; and September 1, 1991 in Hunan and Guangxi, etc. (Fang, Hai, et al., 2012). Due to the lack of exact date information for the rest of provinces in China, we generalized the effective date as 1986, as it is the year that this policy went into effect and most of the previously mentioned effective date for different provinces is few years around 1986. Due to the various effective dates of the policy in different province, we should calculate the age of those people when the education policy became effective in their province, by which we could know if they are impacted by this education policy. As noted before, we define a dummy variable  $D_{it}$  for each household head that it is 1 if he/she was affected by this education policy, and it is 0 otherwise. More specifically, the table 1 below shows examples of determining this dummy variable  $D_{it}$  for each province. As

shown by the table, if the household head' province is Heilongjiang and was 32 years old in 2002, indicating that this individual was 16 years old in 1986 when this education policy went into effective in his/her province. Thus, we determine that individual was not affected by the 9-year compulsory education at all since he was older than 15 years old at the effective date.

Table1: The Method of determining the policy treatment variable  $D_{it}$

Household Head code	Age of household in 2002	Province	Year when policy became effective	Age when the policy became effective	Policy Dummy
1	X=32	Heilongjiang	1986	x-16=16	0
2	X=33	Hubei	1987	x-15=18	0
3	X=28	Liaoning	1986	x-16=12	1
4	X=26	Jiangsu	1986	x-16=10	1
5	X=33	Guizhou	1988	x-14=19	0
6	X=25	Hunan	1991	x-11=14	1
7	X=31	Guangxi	1991	x-11=20	0
8	X=28	Shandong	1986	x-16=12	1
9	X=30	Other provinces	1986	x-16=14	1

To further visualize the effect of compulsory education policy on the education attainment in the first stage regression for the entire country, we apply the discontinuity regression design, by generalizing the year 1986 as the policy effective of the whole country and calculate policy dummy variable based on this base year. In this case, we determine the threshold age in 2002 as

30.5 years old and restrict the population from 25.5 to 35.5 years old. Thus, we could compare observations lying closely on either side of this threshold, to estimate the treatment effect of the compulsory education policy. Both the graph and the table of this discontinuity regression design are shown in the appendix below.

For the framework of the second stage regression, we build it upon to the Keynesian consumption model:  $C_t = a + b \cdot Y_t$ , where  $C_t$  represents the consumption and  $Y_t$  represents the disposable income. Then,  $APC = C_t / Y_t = (a + bY_t) / Y_t = a(1/Y_t) + b$ , where APC is a function of  $1/Y_t$ . For establishing the framework to test the average propensity of consumption (APC) of a household, we regress the APC on the independent variable “ $1/Y_t$ ” of the household, Schooling years of the household head “ $SCHOOL_{ht}$ ”, and other control variables, in seek of the coefficient of the schooling years, to estimate the effect of the schooling years of the household head on the consumption behavior of the corresponding household. However, in the first-stage function above, the variable “ $School\_Years_{ht}$ ” may have endogenous effects on other independent variables in the second stage regression function, such as the inverse of household income, asset of household, when those variables also affect APC. In this case with endogenous issue, the estimation of the effect of schooling years on the APC might be biased. Thus, for solving this endogeneity issue, it is time to substitute the variable “ $School\_Years_{ht}$ ” with the estimated schooling years “ $Predicted\_School\_Years_{ht}$ ” from the function (1), and we get the second-stage estimation function:

$$\begin{aligned} Consumption_{ht}/Income_{ht}(APC) = & b_0 + b_1 (1/Income_{ht}) + b_2 (Predicted\_School\_Years_{ht}) + b_3 \\ & (Asset_{ht}) + b_4 (age_{ht}) + b_5 (age^2_{ht}) + b_6 (Household\_size_{ht}) + b_7 (marriage\_status_{ht}) + b_8 (urban_{ht}) + b_9 \\ & (sex_{ht}) + b_{10} (Hukou\ place_{ht}) + e_{ht} \quad (2), \end{aligned}$$

where  $C_{ht}/Y_{ht}$  is average propensity to consume (APC) of each household in 2002,  $C_{ht}$  is total consumption of a household in 2002,  $Y_{ht}$  is Total Disposable Income of a household in 2002,  $Predicted\_School\_Years_{it}$  is obtained from the function (1). The control variables include household asset, age, age<sup>2</sup>, sex, marriage status, dummy variable of urban/rural areas, Hukou (province) of the household head, family size of the household. Therefore, in this second-stage function, we excluded endogenous effect inside the variable schooling years. Thus, this second-stage function meets the goal of this paper to examine the effect of the schooling years due to the policy treatment on the average propensity to consume (APC).

### Empirical Results

Table 3: First Stage-Regression: The effect of schooling years of household head on the policy treatment dummy

(1)	
Years of education	
Policy Treatment	0.663 <sup>*</sup> (0.290)
Age	-0.0693 <sup>***</sup> (0.00428)
Urban	2.434 <sup>***</sup> (0.389)
Female	0.0928 (0.0904)
PROVINCE=11	0 (.)
PROVINCE=14	-1.513 <sup>***</sup> (0.206)
PROVINCE=21	-0.973 <sup>***</sup> (0.186)
PROVINCE=32	-1.100 <sup>***</sup> (0.192)
PROVINCE=34	-0.975 <sup>***</sup> (0.207)



PROVINCE=41	-1.359*** (0.203)
PROVINCE=42	-0.960*** (0.202)
PROVINCE=44	-1.260*** (0.203)
PROVINCE=50	-1.105*** (0.251)
PROVINCE=51	-1.671*** (0.200)
PROVINCE=53	-1.291*** (0.200)
PROVINCE=62	-0.922*** (0.241)
Constant	12.72*** (0.457)
Observations	4603

For the first-stage regression, as we explore the effect of the 9-year compulsory education law on the schooling years of household head by 2002, the regression result shown by Table 3 indicates that there is a significantly positive effect of policy treatment on the years of schooling of household head, where the coefficient 0.663 of policy treatment dummy shows that treatment of the policy raised about 0.663 years of schooling years of the household head. While the sex of the household head do not have great importance on the years of schooling, the place of Hukou (province) and factor of living in urban/rural areas do significantly influence the years of education attainment. The table 3 suggests that the group of people holding urban Hukou have about 2.4 more years of education than those who hold rural Hukou. As the discontinuous regression design further help visualize the effect of education policy on the schooling years, we are informed that the gap at the threshold shown on graph 1 suggests the cohort who was not affected by the compulsory policy receives about 1.57 percent less schooling years than the one who was affected by the compulsory education policy.

Table 4: Second Stage-Regression of household APC on schooling years of household head with four 3 group of controls variables

	(1) HHAPC	(2) HHAPC	(3) HHAPC
Fitted values	0.0393*** (0.00804)	0.0372*** (0.00818)	0.0800*** (0.0173)
HHinc_inv	5720.0*** (151.5)	7172.9*** (179.2)	7370.2*** (184.9)
ln_HHassets		0.0614*** (0.00607)	0.0593*** (0.00609)
Age			0.00999 (0.00515)
age2			-0.0000571 (0.0000491)
Never married			0 (.)
With spouse			0.0127 (0.0755)
Divorced			0.00836 (0.0945)
Widow or widower			0.0558 (0.0868)
Urban			-0.190 (0.0766)
Household Size			0.0433*** (0.00969)
Female			0.0569*** (0.0153)
Constant	0.0866 (0.0884)	-0.579*** (0.107)	-1.347*** (0.259)
Observations	4595	4289	4289

For the second-stage regression, as we explore the effect of the predicted schooling years on corresponding households' consumption behaviors in 2002, the regression results shown by Table 4 indicate that there is a significantly positive effect of policy treatment of the years of schooling of household head on the corresponding households' APC, where the coefficient 0.08 shown in the column 3 of the predicted schooling years shows that One additional year of

schooling led to 8% increase of consumption rate of the household. While the age, marital statuses of the household head do not have great importance on the APC of households, the sex, urban/rural areas of the household head, and the household size do significantly influence the APC of the household head. The table 4 shows that urban area individuals' household have 19% lower consumption rate compared with the one of rural individuals. In addition, if female is the household head, the corresponding household will have 5.6% higher consumption rate compared to on with male household head.

To sum up the results from previous two-stage least squares regression, household head who was affected by the Chinese 9- year compulsory education policy have 0.663 years more of schooling years, and one additional schooling year led the household have around 8% more expenditure. Therefore, we concluded that overall effect of Chinese 9- year compulsory education policy on the APC of the household is 5.304% ( $=0.663*8\%$ ). That is, if the household head was affected by the education policy around 1986, then his/her household has 5.304% higher consumption rate in 2002 compared to the one who was not affected by the policy.

### **Robustness check**

In this section of checking robustness, we focus on the second stage of two-stage analysis and vary some control variables from the empirical model to observe the variation of the coefficient of the schooling years. On table 4, the first column includes the control variable  $1/(\text{Household Income})$  and the coefficient of schooling years is 0.393, which is significantly

positive. The second column contains control variables:  $1/(\text{Household Income})$  and  $\ln(\text{Household assets})$ , and the coefficient of schooling years is 0.372, which is significantly positive, but decreasing slightly by including the variable  $\ln(\text{Household assets})$ . This result makes sense since the household asset play a significant role on the consumption behaviors. The third column contains control variables  $\ln(\text{Household assets})$ ,  $\ln(\text{Household assets})$ , age,  $\text{age}^2$ , marriage status, household size, the coefficient of schooling years is significantly positive in this case as we discussed in the results section. From the table 4, we could tell that the province dummy variables play an role in increasing the importance of income and decreasing the importance of household asset, schooling years, though these two factors are both significant to the household APC.

### **Conclusion**

This paper examines the effect of the Chinese 9-year compulsory education policy on the consumption behavior of the household. According to the data extracted from “Chinese Household Income Project 2002”, we found that this compulsory education policy being effective on 1986 led to around 5.304% increase of APC in 2002, for the affected households. From the first-stage regression results, we concluded that people who were affected by the policy have 0.663 years more of education or 1.57 percent more education (derived from discontinuous regression design) from the first-stage regression; From the second-stage regression results, excluding the exogenous factor to investigate the effect of schooling years, which is affected directly by compulsory education policy, on the APC of household, we concluded that one additional schooling year led to 8% increase of consumption rate (APC) of the household. The

results suggest that this Chinese 9- year compulsory education law, by raising people's education attainment, encouraged people to consume a little bit more (5.304%) out of their income.

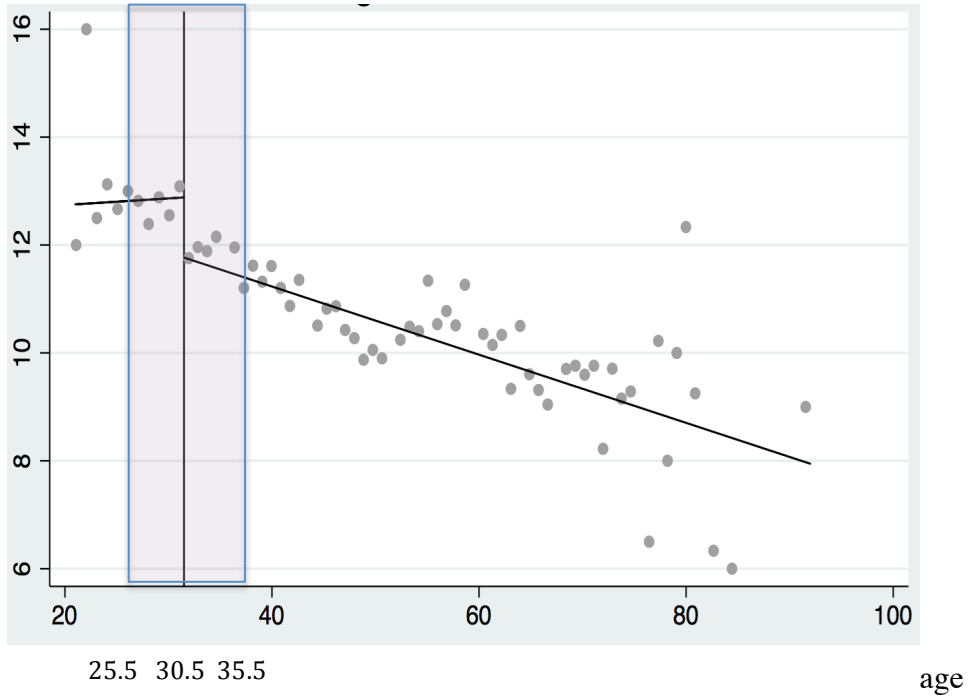
As for the implication of the potential Chinese 12-year compulsory education policy, we need more confirmations and researches on the consumption behaviors of larger populations and longer period of time. In addition, the research on the effect of the 12-year education policy conducted in Zhuhai city (first city implemented the Chinese 12-year compulsory education policy in 2007) is desired. Furthermore, we cannot determine with this paper's analysis whether the compulsory education is the only force behind the increased APC, while there are many unobservable explanatory factors. Exploring these issues more directly through innovative field experiment or by gathering data of extra survey years may shed further light on understanding the schooling attainments and consumption behavior, or more generally, the power of education.

## **Inference**

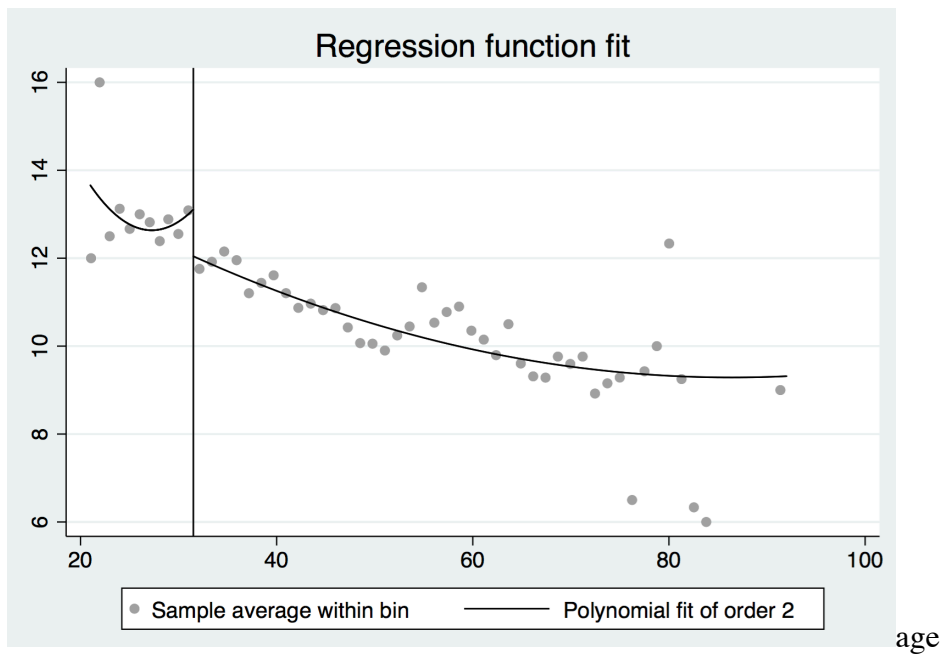
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## Appendix

**Graph: Local linear regression for the discontinuity regression design (Power of 1)**  
Schooling Years



**Graph: Local linear regression for the discontinuity regression design (Power of 2)**  
schooling years



**Table: Local linear regression for the discontinuity regression design (Power of 1)**

```
regress educ comp_educ age interaction if abs(age-30.5)< 5
```

Source	SS	df	MS	Number of obs	=	492
Model	39.3135196	3	13.1045065	F(3, 488)	=	1.59
Residual	4031.27794	488	8.26081546	Prob > F	=	0.1918
				R-squared	=	0.0097
				Adj R-squared	=	0.0036
Total	4070.59146	491	8.29041031	Root MSE	=	2.8742

educ	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
comp_educ	-1.568966	7.993054	-0.20	0.844	-17.27401 14.13608
age	-.1642397	.1032267	-1.59	0.112	-.3670634 .038584
interaction	.0451753	.2721917	0.17	0.868	-.4896371 .5799876
_cons	17.58724	3.433922	5.12	0.000	10.84014 24.33433

Note: In the discontinuity regression design, to visualize the general treatment effect of compulsory education policy on the entire country, we use the year 1986 as the policy effective of the whole country. The upper graph is regressed by the power of one of the independent variable and the lower one is regressed by the power of 2 instead. The coefficient of the policy in the right hand side Table that reflects the difference at the threshold and it examines the direct effect of treatment variable on the schooling years. The cohort who was not affected by the compulsory policy receives about 1.57 percent less schooling years than the one who was affected by the compulsory education policy.