Tendency to Continue Education under the Policy of ‘School Consolidation’ from the Perspective of Modernising Education

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Abstract. Drawing upon interviews with policy-affected individuals, this paper delineates its research objective: to investigate the influence of a specific policy on the inclination towards continued education within a given region. Leveraging comprehensive data ranging from provincial population sample surveys spanning 2008 to 2021 and annual statistics from the China National Bureau of Statistics, we meticulously select appropriate proxy variables. By conducting a nuanced mechanism analysis focusing on students and their families, we establish a Difference-in-Differences (DID) model. The empirical findings, fortified by rigorous placebo tests and parallel trend assessments, conclusively demonstrate the positive impact of the "School Consolidation" policy on fostering an increased tendency towards further education. Furthermore, our analysis reveals that regions with a higher degree of urbanization exhibit a correspondingly stronger propensity for continued education. This study, which marries micro-level mechanism insights with macro-data-driven empirical conclusions, offers invaluable decision-making support for China’s basic education landscape by shedding light on the psychological dynamics ignited by the policy.

Keywords: School Consolidation policy, Modernising Education, Continue Education.

1 Introduction

The development of the policy of adjusting the layout of primary schools in New China over the past 70 years has passed through four stages: the orientation dominated by ‘political rights’, the orientation dominated by ‘giving priority to efficiency while maintaining fairness’, the orientation dominated by ‘economies of scale’, and the orientation dominated by ‘equity and quality’. At different stages of development, the values pursued, the driving factors and the policy focus of the policy of adjusting the layout of basic education schools have been different. Policy objectives have roughly followed the trajectory of ‘having schools to go to - running schools well - enjoying learning’. After the reform and opening up in 1978, the primary task of education in rural China was to popularize elementary education. Therefore, from 1995 to 2000, the Ministry of

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Education and the Ministry of Finance implemented the 'National Poverty-Stricken Areas Compulsory Education Project,' which promoted the spread of compulsory education and school construction in poverty-stricken areas. However, starting in the late 1990s, the widespread distribution of basic education and decentralized schooling in rural areas led to a series of problems, such as scattered school layouts and high pressure on educational investment. To optimize the allocation of rural educational resources and reduce the gap between urban and rural areas, China began adjusting the layout of rural schools nationwide from the late 1990s to 2012. Rural schools with small scale, weak faculty, and inadequate teaching facilities were merged or closed, a policy known as 'School Consolidation.' [1]

Yet, still, the 'School Consolidation' policy was not a one-size-fits-all solution. As the policy progressed, issues such as local governments reducing educational investment and affecting rural students' ability to attend nearby schools gained the attention of the central government. What makes the policy promotion more complicated is that the evaluation of the policy effect is still controversial. The lack of an effective scale makes it difficult for the government to obtain negative feedback from society, thus making the policy noise serious. A large number of studies have qualitatively discussed the policy's impacts. Liang (2017) supposes that, in rural China, the continuous decline in the number of school-aged children under the 'one school per village' model has further diluted already scarce rural educational resources, and demographic changes have increased the cost and difficulty of managing rural primary schools [2]. At the same time, Guo & Ye (2023) have examined its long-term effects on human capital, finding that 'School Consolidation' reduces average years of schooling by 0.74 years but does not significantly affect the probability of individuals receiving high school education. However, it decreases the probability of receiving education beyond the compulsory level by 18% [3].

The inclination to continue education, identified during the author's field research, is a valuable indicator of public sentiment regarding education and the general level of the population's desire to pursue further education in a region. Evaluating the policy's impact on this inclination provides a research foundation for discussing the psychological effects of policy implementation and contributes to the discourse on the future layout of China's basic education system [4]. Therefore, to analyze the inclination to pursue further education after the completion of compulsory education, it is essential not only to consider individual tendencies but also to take into account family influences. During the early stages of the policy's implementation, the risk of dropout for rural students in compulsory education decreased. Family background became a more critical factor in determining a child's likelihood of attending school after the policy was enacted. The 'School Consolidation' policy increased commuting costs, which in turn heightened the need for greater family involvement. At the same time, the policy provided better educational resources and learning environments. The former affects families, prompting them to consider further investment in their children's education from an economic perspective. The latter influences students by fostering a desire to continue their studies through the provision of better educational resources and environments. Together, these factors impact the general inclination toward further education in the affected regions [5].

2 Research Design

2.1 Data Source & Variables Identification

The data used in this study comes from the provincial population sample surveys (2008–2021), annual provincial data from the China National Bureau of Statistics, the National Statistical Yearbook, and statistical yearbooks and bulletins of each province. Missing data for the 2015 and 2020 population aged 6 and above, the population aged 6 and above with a high school edu-cation, and the population aged 6 and above with college and above education were supplemented using interpolation methods [6].

To study the tendency of the population in a certain region to continue their education, we must analyze the inclination of the population to pursue higher education after having received a certain level of basic education. Given that high school and higher education in China are non-compulsory and not publicly funded, the proportion of the population with a high school and above education out of the total population aged 6 and above can serve as an appropriate proxy for this inclination. The educational attainment index, Edu_{it}, is constructed as follows:

$$\mathrm{Edu}_{it} = \frac{N_1(i,t) + N_2(i,t)}{N_0(i,t)} * 100 \tag{1}$$

$N_0\ (i, t)$: The population aged 6 and above in region i during year t.

$N_1\ (i, t)$: The number of high school students aged 6 and above in region i during year t.

$N_2\ (i, t)$: The population aged 6 and above with a college education in region i during year t.

To estimate the effect of the policy, the most common method used in academic research is the DID (difference-in-differences) model. This model requires variations in two dimensions: one in time (before and after policy implementation), and another in region (whether the policy was significantly implemented in a given area). Given the heterogeneity among regions, the intensity of the policy's implementation varied across different areas. For the first key independent variable (time), unlike policies that yield immediate results, such as higher education enrollment expansion, the "School Consolidation" policy has a certain lag from its announcement to its execution. Additionally, education is inherently a long-term process, and any policy related to education takes time to manifest in group-level effects. Through the review of relevant data and consideration of the availability and accuracy of Chinese statistical data, 2012 is set as the identification time for the policy's implementation. In other words, the years from 2012 onward are considered affected by the policy.

For the second key independent variable (whether the policy was significantly implemented in a region), due to the difficulty in obtaining micro-level data, the intensity of the policy's implementation is quantified using the reduction rate of middle schools in a given region during the study period, defined as follows:

$$\mathrm{index} = \frac{\mathrm{N}(\textit{The number of middle schools in } 2008) - \mathrm{N}(\textit{The number of middle schools in } 2020)}{\mathrm{N}(\textit{The number of middle schools in } 2008)}$$

Using data from the National Bureau of Statistics, this index is calculated for each region. Shanghai and Tianjin were excluded due to their unique administrative structure. The average value across all regions was found to be 0.47, with the highest value in Heilongjiang (0.834) and the lowest in Tibet (0.065). The top eight regions with the highest values of this index are classified as the treatment group (regions where the policy was significantly implemented), while the bottom eight regions serve as the control group (regions where the policy was not significantly implemented) (Table 1).

Table 1. Policy Implementation Index by Province.

Province	Index Value	Province	Index Value
Heilongjiang	0.83419	Guangxi	0.45167
Shanxi	0.75487	Guangdong	0.44995
Qinghai	0.71434	Jiangxi	0.44150
Shaanxi	0.67500	Hubei	0.42098
Liaoning	0.64863	Henan	0.41460
Chongqing	0.63643	Beijing	0.40183
Jilin	0.61503	Fujian	0.40123
Gansu	0.60873	Yunnan	0.35509
Sichuan	0.59240	Hebei	0.29281
Inner Mongolia	0.54202	Shandong	0.28763
Anhui	0.53685	Zhejiang	0.25107
Hainan	0.49689	Jiangsu	0.20810
Hunan	0.47986	Xinjiang	0.12454
Ningxia	0.47820	Tibet	0.06553
Guizhou	0.47699		

2.2 Modelling & Variables Control

The time variable is a dummy variable indicating whether the policy was implemented (time = 1 if the policy was implemented, time = 0 if not). The treatment variable is another dummy variable indicating whether the policy was significantly implemented in the region (treat = 1 for regions where the policy was significantly implemented, treat = 0 for regions where it was not). To account for heterogeneity, control variables are added, and the econometric model is established as follows:

$$Edu_{it} = \alpha_1 + \beta_1 time + \beta_2 treat + \beta_3 \, time * treat + \gamma X_{it} + u_{it} \quad (2)$$

This basic econometric model is referred to as Model 1. Edu_{it} represents the educational attainment index, and the interaction term $did = time * treat$ captures the policy effect, with the coefficient β_3 reflecting the policy's impact. X_{it} includes control variables, and u_{it} represents the random error term.

For variables control, since this study examines the impact of the "School Consolidation" policy on the tendency to continue education, control variables are selected based on factors that may also influence the local population's educational aspirations.

These factors include economic, public infrastructure (transportation), healthcare, and urbanization level. The final control variables are (Table 2):

Regional GDP (gdp) in billions of yuan
Per capita urban road area (infrastructure) in square meters
Number of healthcare professionals per 10,000 people (health)
Urbanization rate of the resident population (constant_pop)

Table 2. Descriptive statistics for the variables in Model 1.

Variable	Obs	Mean	Std. Dev.	Min	Max
year	208	2014	3.751	2008	2020
id	208	39.875	17.843	13	65
index	208	0.467	0.237	0.066	0.834
edu	208	23.806	8.893	0.192	38.89
gdp	208	2.142	2.03	0.039	10.272
infrastructure	208	15.718	4.307	9.28	25.82
health	208	0.567	0.139	0.27	0.92
constant_pop	208	53.634	11.324	21.9	73.44
time	208	0.692	0.463	0	1
treat	208	0.5	0.501	0	1
did	208	0.346	0.477	0	1

3 Analysis

3.1 Evaluation & Optimisation

A regression analysis was conducted on Model 1, and the results are shown in the Table 3. The interaction term (did) is significant at the 10% confidence level, indi-cating that the policy effect is significant at the 10% confidence level. The model's goodness-of-fit (r2) approaches 0.8, suggesting that the model results are of reference value. Among the control variables, only the urbanization rate (constant pop) is significant, suggesting that other control variables do not significantly affect the policy's impact. Therefore, model optimization was considered.

By sequentially removing insignificant control variables, it was found that retaining only the urbanization rate (constant pop) resulted in the most significant interaction term coefficient. Thus, an optimized Model 2 was estab-lished, with regression results shown in the Table 3. From the regression results, the significance level of the interaction term coefficient increases to 5%, and the F value rises, making this model superior. The interaction term coefficient better reflects the policy effect.

Moreover, a parallel trend test was performed on Model 2. It is evident that the mean policy effect was close to zero be-fore policy implementation (current time point and earlier). However, after the policy was implemented, the policy effect rose significantly. The 95% confidence interval for the policy effect two periods after implementation does not include zero, and the mean values for the lag periods are all greater than zero. Therefore, it can be concluded that Model 2 passes the parallel trend test, and the policy produced a significant positive effect after implementation (will not be shown here).

Finally, to further verify the rationality of the design of Model 2, a placebo experiment was conducted by constructing Model 3. The policy implementation time was moved forward to 2011, creating new variables: time_test and did_test = time_test * treat. The regression results are shown in the table below. As can be seen, the significance of the interaction term coefficient decreases from the 5% confidence level to the 10% level. This indicates that 2012 is a more reasonable start time for the policy implementation (Table 3).

Table 3. Regression analysis results of Model 1, 2 & 3.

	Model 1	Model 2	Model 3
	edu	edu	edu
time	1.450	1.049	1.092
	(0.67)	-0.53	(0.55)
treat	0.000	0	0.000
	(.)	(.)	(.)
did	1.208*	1.220**	1.117*
	(2.15)	-2.15	(1.79)
gdp	0.002	0.517***	0.518***
	(0.01)	-4.51	(4.50)
infrastructure	-0.035	-6.113	-6.138
	(-0.34)	(-1.17)	(-1.17)
health	-1.904	208	208
	(-0.45)	0.793	0.791
constant_pop	0.551***	0.759	0.757
	(4.08)	48.592	48.114
_cons	-6.447	1.049	1.092
	(-1.18)	-0.53	(0.55)
N	208	0	0.000
r2	0.793	(.)	(.)
r2_a	0.755	1.220**	1.117*
F	39.417	-2.15	(1.79)

3.2 Further Analysis

Based on the regression results, the coefficient of the interaction term in Model 2 is 1.22, and it is significant at the 5% confidence level. This provides strong evidence that the implementation of the 'School Consolidation' policy had a positive effect on the inclination to continue education in the studied region. From the parallel trend test, it is evident that the policy produced significant positive effects within two years of its implementation, although the effect weakened slightly after two years, it remained significantly positive. Combining these facts, the empirical results of this paper demonstrate that the ‘School Consolidation’ policy has a positive effect on the tendency to continue education in the studied region [7].

From the aspect of the association with urbanization, given China’s specific situation where primary schools are typically located in villages, middle schools are found in towns, and high schools are county-based, the improvement in the urbanization rate is naturally expected to increase high school enrollment rates and thus the inclination to continue education as measured by this study. The regression results show that the coefficient for urbanization rate is approximately 0.5 and significant at the 1% confidence level. This confirms that the higher the degree of urbanization in a region, the stronger the inclination to continue education in that region.

4 Conclusion

The proxy variable devised in this study to quantify the inclination towards continued education fails to comprehensively encapsulate the genuine propensity within the population [8]. The scope of data collection is overly broad, lacking a robust micro-level theoretical underpinning, necessitating a compromise in the variable’s construction due to data constraints. Despite China’s household registration system not impacting interprovincial migration statistics, it significantly influences the actual propensity for further education. While the employment of panel data and the DID approach enhances provincial comparability, the analysis remains somewhat rudimentary and could benefit from further refinement. Furthermore, the impact of expanded higher education enrollment has not been sufficiently considered and necessitates additional validation [9]. Through observational and basic regional analysis, it becomes evident that the control group regions with the lowest policy implementation index can be attributed to two primary factors: either these regions possess a scarcity of schools eligible for closure (such as Tibet and Xinjiang), or they exhibit a high urbanization rate, resulting in fewer schools remaining for potential closure (e.g., Jiangsu and Zhejiang). The disparity between these two scenarios may be partially explained by the urbanization rate, yet other unaccounted variables may also play a role. This issue merits deeper exploration and analysis [10].

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