

Effect Evaluation of Financial Support Policy for Private Colleges in Guangdong Province under the Background of Big Data

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Abstract: *Effect evaluation is important for public policy revision and improvement. This study adopted big data technology to integrate the panel data of private colleges in Guangdong Province from 2015 to 2020 and evaluated the effect of the policy on three dimensions by DID measurement method: Education quality, Team construction, and Social benefits. The DID measurement method overcame the endogeneity of the experiment through a series of analyses. It showed that the implementation of financial support policy for private colleges in Guangdong Province has positive effects, but how to balance educational resources between public and private colleges needs to be addressed by the government. It also provides a reference for other provinces to carry out this work.*

Keywords: *Private college, Financial support, Effect evaluation, Big Data*

1. Introduction

After 40 years of reform and opening up, private higher education in China developed rapidly. In 2017, the Law of the People's Republic of China on the Promotion of Private Education stipulated that private colleges must be given classified financial support. In response to the policy, Guangdong set up a special fund for education development and invested public finance in the construction of private higher education. This study aimed to provide a positive reference for this public policy revision in China by evaluating the impact of the financial support policy for private colleges in Guangdong Province.

Bowie and Wang considered that the system design of the financial support policy was not refined enough and did not reflect a clear target direction [1]. They also pointed out that the policy has not been effective in reducing the burden of tuition by using the Propensity Score Matching. Zhang considered that the existing merit-based support model is unreasonable and leads to the deterioration of the situation [2]. Wang pointed out that the policy effect had periodicity and lag by establishing a linear regression model [3].

Therefore, we used DID (Differences-in-Differences) method to calculate the difference between the experimental group and the control group under the policy intervention. The method can reduce the influence of selection bias and other external factors on variables to a certain extent and avoid the endogeneity problem, which is suitable and feasible for this study.

2. Analysis of Effect Evaluation of Financial Support Policy for Private Colleges Based on DID

The use of DID method needs to meet two conditions. One is the policy impact, and the other is existing the panel data of at least one year before and after the implementation of the policy. The financial support policy for private colleges in Guangdong Province has been implemented for nearly five years with relatively stable data support. Therefore, the preconditions of this method need to be met for further analysis. For the 2017 policy implementation, we divided private colleges into treatment and control groups according to whether they received funds continuously from 2015–2020 to explore the net effect of the policy by comparing the differences between the two groups.

2.1. Research Hypothesis

At present, the academic community has not put forward a unified definition and measurement

method for the financial support policy for private colleges. We comprehensively considered the assessment indicators mentioned in the "Implementation Regulations of the Law of the People's Republic of China on the Promotion of Private Education" and "Interim Measures for the Management of Special Funds for Private Education in Guangdong Province". The effect of the financial support policy is evaluated on three dimensions: Education quality, Team construction, and Social benefits. Therefore, we put forward the following research hypotheses: Financial support policy can improve the Education quality, team construction, and social benefits of private colleges.

2.2. DID model and Variable Selection

In order to minimize the differences between the treatment group and the control group, 12 private colleges in Guangdong Province were selected including 3 private undergraduate colleges and 3 private vocational colleges respectively. The treatment group has continuously received special support funds since 2017, while the control group has never received special support funds. There is no significant difference between the two groups before the policy impact and their rate of development is similar. Education quality (Tp), Team construction (Ts), and Social benefits (Ws) were used to measure the effectiveness of the policy. Students scale(Cs), non-special support funds(Nsf), private investment(Pi), teacher salaries of regional public colleges(Pts), regional demand for higher education(He), and adequacy of financial funds for regional higher education(FF) were selected as control variables. The above indicators were adjusted to per capita indicators. The data were from the corresponding university information disclosure website.

The model was expressed as

$$Y_{it} = \alpha + \beta \text{Treat_Post} + \sum \text{Controls}_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (1)$$

where *Treat* stands for a grouping dummy variable and the variable value of the treatment group is 1 while the control group is 0, *Post* stands for a period dummy variable and the value of *Post* in the year after the policy was implemented is 1, otherwise, the value is 0, *Treat_post* stands for the interaction term, β stands for the effect of policy implementation, μ_i stands for an individual fixed effect to control for the impact of shocks among universities that do not change over time, δ_t stands for the time fixed effect, *Controls_{it}* stands for the other control variables, and ε_{it} stands for the error term and α stands for the constant term. In order to avoid the possible influence of individual heterogeneity and time variability in the operation of each university, individual and year fixed effect is controlled. We focus on the regression results of β . If $\beta > 0$, it indicates that the financial support policy promotes the development of private colleges. Otherwise, it inhibits the development of private colleges.

3. Empirical results and tests

3.1. Descriptive statistics

We used stata14 statistical software to analyze data change trends. There were a total of 72 sample observations as shown in Table 1. However, further group regression analysis is needed to explore whether the effect of financial support policy in Guangdong Province will vary with the differences among colleges.

Table 1: Descriptive statistics of variables

variables	N	Mean	Sd	Min	Max
Tp	72	0.231	0.0999	0.0740	0.418
Ts	72	0.821	0.0735	0.707	0.972
Ws	72	0.922	0.0330	0.832	0.993
did	72	0.333	0.475	0	1
Cs	72	16.22	7.007	7.289	28.33
Nsf	72	17.67	1.796	14.23	20.89
Pi	72	2.245	0.543	1.112	2.870
Pts	72	113.6	3.220	101.0	117.4
He	72	31.13	4.504	2.122	33.96
FF	72	11.45	0.0212	11.42	11.49

3.2. Correlation analysis

Table 2 shows that education quality were significantly correlated with policy effectiveness. In same way, Table 3 and Table 4 show that team construction, and social benefits were significantly correlated with policy effectiveness. In other words, financial support policy can promote the development of the variables. The variables settings in this study were reasonable and relevant.

Table 2: Correlation analysis of Education quality

Tp	1	did	Cs	Nsf	Pi	Pts	He	FF
did	0.391***	1						
Cs	0.815***	0.225*	1					
Nsf	-0.141	0.103	-0.465***	1				
Pi	-0.524***	-0.0140	-0.638***	0.0800	1			
Pts	-0.0810	0.148	-0.111	0.259**	0.300**	1		
He	0.0190	0.155	0.153	-0.238**	0.0570	-0.0120	1	
FF	0.523***	0.573***	0.351***	-0.0220	-0.127	0.189	0.147	1

Table 3: Correlation analysis of Team construction

Ts	1	did	Cs	Nsf	Pi	Pts	He	FF
did	0.700***	1						
Cs	0.381***	0.225*	1					
Nsf	0.294**	0.103	-0.465***	1				
Pi	-0.235**	-0.0140	-0.638***	0.0800	1			
Pts	0.246**	0.148	-0.111	0.259**	0.300**	1		
He	0.135	0.155	0.153	-0.238**	0.0570	-0.0120	1	
FF	0.543***	0.573***	0.351***	-0.0220	-0.127	0.189	0.147	1

Table 4: Correlation analysis of Social benefits

Ws	1	did	Cs	Nsf	Pi	Pts	He	FF
did	0.221*	1						
Cs	0.267**	0.229*	1					
Nsf	0.185	0.107	-0.457***	1				
Pi	-0.0780	-0.0200	-0.619***	0.0960	1			
Pts	0.246	0.124	-0.427	0.259**	0.578***	1		
He	-0.159	0.157	0.157	-0.231*	0.0510	-0.0170	1	
FF	0.243**	0.575***	0.369***	0.00600	-0.131	0.193	0.145	1

Note: *, ** and *** indicate significance at 10%, 5% and 1% levels

3.3. Baseline regression analysis

In order to verify the hypothesis, we used the model of Eq. (1) to perform the benchmark regression. In the regression with the addition of various control variables, the coefficient of the reward policy variable DID was significantly positive, showing that financial investment improved by 2.92% with education quality. The coefficient of non-special funds was 0.0236 and improved Education quality by 2.36%. The coefficient of the adequacy of regional educational financial funds was 0.0173 and improved education quality by 1.73%. Therefore, hypothesis 1 was confirmed.

The DID coefficient of team construction was 0.463, indicating that financial funds had a promoting effect on team construction by 4.6%. The coefficient of non-special funds was 0.0043, which improved team construction by 2.36%. The coefficient of district public teacher salaries was 0.0043, which improved the team construction by 0.43%. Thus, hypothesis 2 was confirmed.

The DID coefficient of social benefits was 0.016, indicating that financial funds had a promoting effect on Social benefits by 1.6%. The coefficient of non-special funds was 0.0168 and improved the social benefits by 1.68%. The coefficient of private investment was 0.0583, which improved the social benefits by 5.83%. Therefore, hypothesis 3 was confirmed (see Table 5).

Table 5: Benchmark regression results

VARIABLES	Education quality	Team construction	Social benefits
did	0.0292* (1.79)	0.0463** (2.55)	0.0160** (2.13)
Nsf	0.0236*** (3.51)	0.0128* (1.70)	0.0168*** (2.89)
Pi	0.0314 (1.18)	-0.0503* (-1.69)	0.0583*** (2.76)
Pts	-0.0049** (-2.26)	0.0043* (1.81)	-0.0058 (-1.05)
He	0.0011 (0.65)	0.0006 (0.29)	0.0756 (1.34)
FF	0.0173*** (4.76)	0.7673* (1.89)	-0.4872 (-0.078)
Observations	72	72	72
Number of code	12	12	12
R-squared	0.592	0.605	0.724
r2_a	0.464	0.481	0.672
F	13.06	13.79	18.61

Note: *, ** and *** indicate significance at 10%, 5% and 1% levels

3.4. Placebo test

Table 6 shows that if the time of financial support is advanced one year, the efficiency coefficient of education quality and team construction, as well as social benefits were no longer significant. The assumed financial support time did not have a positive effect on private colleges. The counterfactual test showed that the financial support policy effectively promoted the development of private colleges to a certain extent.

Table 6: Placebo test

VARIABLES	Education quality	Team construction	Social benefits
did	0.0155 (0.59)	0.0149 (0.66)	0.0135 (1.19)
Nsf	0.0159* (1.77)	0.0157** (2.04)	0.0078*** (4.13)
Pi	-0.0093 (-0.31)	-0.0444* (-1.75)	0.0070** (2.46)
Pts	0.0021 (0.69)	0.0046* (1.79)	-0.0122 (-1.46)
He	0.0022 (0.91)	0.0005 (0.25)	0.0009 (1.35)
FF	2.8596*** (6.43)	1.1655*** (3.07)	-0.7703 (-0.08)
Observations	72	72	72
Number of code	12	12	12
R-squared	0.670	0.566	0.772
r2_a	0.566	0.429	0.743
F	18.24	11.72	42.40

Note: *, ** and *** indicate significance at 10%, 5% and 1% levels

3.5. Parallel trend plot test

Figures 1–3 present that the indexes trend of education quality, team construction, and social benefits in the treatment and control groups were the same before 2017. After the policy was implemented, the trend changed. This also showed that the indicators met the parallel trend test.

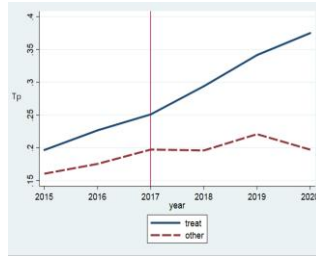


Figure 1: Indexes trend of Education quality.

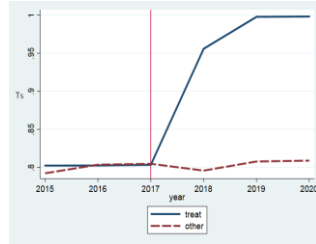


Figure 2: Indexes trend of Team construction.

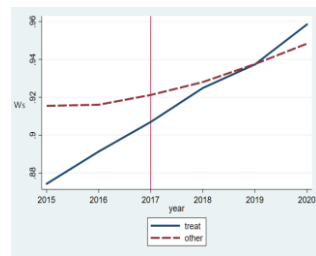


Figure 3: Indexes trend of Social benefits.

4. Conclusion

First, according to the above analysis, the implementation of the financial support policy has positive effects in education quality, team construction, and social benefits of private colleges in Guangdong Province.

Second, the improvement of local public teacher resources has a negative correlation with the education quality of private colleges. Although the policy of the new Law emphasizes the same status of public universities and private colleges, the resource gap between them in the early stage is not conducive to the improvement of the scientific research level of private colleges [4]. In the short term, the financial support policy cannot essentially solve the shortage of education quality and team constructions in private colleges. Thus, the implementation of financial support policy for private colleges in Guangdong Province needs more attention.

Last, under the current policy background, the preferential policy of financial support for private colleges in Guangdong Province has not been clear and implemented such as taxes and land allocation. The complex relationship between financial support and private higher education is hard to be defined. Therefore, the policy evaluated in this study is mainly for the special support fund policy, which is the periodic evaluation and discussion. This study will be continued for further discussion and a combination of indirect policies, which provides a reference for optimizing the effective operation mechanism of private education financial support policy.

Acknowledgment

The research of this paper was funded by the "public management" construction project of characteristic key discipline from Guangdong province, China in 2016

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