Analysis on the Promotion Effect of New Finance and Economics Education Reform on the Quality of Undergraduate Education: Quasi-Natural Experimental Evidence from On-Campus Students

Yuanyuan Wang[1], Kun Zhang[2]*, Shuyu Wang[2]*, Wenyue Li[2]
[1]Accounting School, Hebei University of Economics and Business, Shijiazhuang, China
[2]Business School, Hebei University of Economics and Business, Shijiazhuang, China
**Corresponding Author.*

Abstract

In recent years, the "new finance and economics" education reform program for finance and economics majors has been launched in many universities in China. In this paper, the difference-in-difference method is used to evaluate the effect of the reform of new finance and economics education on the quality of undergraduate education by using the principle of quasi-natural experiment, based on the data collected from the students in the experimental and non-experimental classes of new finance and economics in Hebei University of Economics and Business. The research shows that the experimental class of the university is in good teaching condition, with the students' professional knowledge level improved obviously, and the quality of undergraduate education improved significantly. In addition, the effect of educational reform is heterogeneous, that is, it has a more significant effect on improving female students and rural students. Therefore, the construction plan of the experimental class of New Finance and Economics needs to meet the conditions of teaching students in accordance with their aptitude, pay attention to students' interests and characteristics, and develop a diversified education system.

Keywords*: New finance and economics education reform, difference-in-difference method, quasi-natural experimental data*

I. Introduction

In China, the economy is facing a new situation from high-speed development to high-quality development, in which information technologies such as artificial intelligence, big data, cloud computing and Internet of Things are developing at a high speed, while emerging industries such as "internet plus" are in a vigorous state, and the speed of advancement in the 5G era is gradually accelerating. In the new era, new requirements and challenges are put forward for the education and training of talents, which is based on the undergraduate education [1][2]. Therefore, in order to improve the teaching quality of undergraduate education, the "four news" construction strategic plan of comprehensively developing new engineering, new medicine, new agricultural science and new liberal arts has become the development direction of higher education reform in China since 2018. The construction of "four news" aims to improve the educational model of colleges and universities, explore new ways of discipline development, cultivate compound high-quality talents and form a world-class undergraduate professional cluster with Chinese characteristics [3].

Based on the revitalization goal of "four news" construction, the educational reform of "new finance and economics" emerged in response to the proper time and conditions. At present, some colleges and universities in China have launched the "new finance and economics" education reform plan for finance and economics majors, as a pioneering exploration of the "new finance and economics" reform and construction, including setting up the experimental class, promoting cross-study of literature, science, business and industry, and actively integrating information technology knowledge, etc., with the aim of cultivating compound finance and economics talents with structural knowledge system and adapting to social needs.

Some universities, such as Hebei University of Economics and Business, Southwest University of Finance and Economics, Anhui University of Finance and Economics and Shanghai University of Finance and Economics, have taken the lead in entering the stage of testing and popularizing the new finance and economics education reform. Among them, Hebei University of Economics and Business has the earliest time, the most complete student data and the most innovative reform methods, and has successively opened digital accounting experimental class, artificial intelligence law experimental class, digital economy experimental class, intelligent business experimental class, financial science and technology experimental class and intelligent logistics management experimental class. Moreover, the university specially provides the experimental class with a curriculum system that combines structural professional knowledge with integrated multidisciplinary knowledge, pays attention to the cross-training of literature, science, business and industry, and connects with the development of intelligent, digital, information-based and networked industries, aiming to deliver to the society finance and economics talents who integrate various knowledge and have compound abilities and adapt to global competition. Hebei University of Economics and Business has set up a new financial education reform experimental site in the form of a new financial experimental class, which is worth paying attention to as the educational effect of the key innovation model of finance and economics majors.

In this paper, the training effects of students in experimental and non-experimental classes were mainly compared based on a case study of the reform of new finance and economics major in Hebei University of Economics and Business. First of all, the first-hand data of the students in school were collected through the combination of online questionnaire and offline interview. Then, the influence on the quality of undergraduate education was studied by taking whether the students are in the experimental class of new finance and economics, whether the reform of new finance and economics education has begun as virtual variables, and the gender of the students and the source region as explaining variables respectively. Finally, the role of the new finance and economics education reform in improving the education quality of undergraduate students was discussed by collecting the quasi-natural experimental data of Hebei University of Economics and Business using the Difference in Difference (hereinafter referred to as "DID").

In this paper, according to the analysis results of new finance and economics education reform examples, the future undergraduate education system of finance and economics majors is explored, which not only clarifies the advantages of the inherent mode of breaking discipline barriers, but also explores the top-level design of new finance and economics education reform, and at the same time provides direction guidance for the sustainable development of education reform.

II. Research Design

2.1 Modeling

In this paper, 320 questionnaires from experimental and non-experimental classes of Hebei University of Economics and Business from 2017 to 2020 are taken as research samples. From 2019 to 2020, Hebei University of Economics and Business successively established six experimental classes in different colleges. Such education model of batch establishment and acceptance made the experimental class have the nature of "quasi-natural experiment". Therefore, in this paper, the difference in difference method is used to investigate the effect of the new finance and economics education reform on improving the quality of undergraduate education. Since the new finance and economics education reform only affects the intervention group but not the control group, the difference can be made based on the difference before and after the education reform in each group. The obtained average treatment effects on the treated (ATT) of the intervention group has removed the endogenous caused by individual characteristics, and can measure the net impact of the new finance and economics education reform on the intervention group. Besides, the control groups selected here must follow the common trend assumption in order to ensure a smooth second difference. In this paper, referring to experimental model determination criteria, other students with the same major who did not participate in the New Finance and Economics Experimental Class were selected as the control group[4][5]. All the

students in intervention group and control group had the same level of knowledge base before receiving undergraduate education.

In terms of measurement processing, two virtual variables, event dimension and time dimension, were set in the DID method, and the cross item of the two virtual variables was set as one of the independent variables. The significant positive coefficient indicates that the new finance and economics education reform has a significant positive impact on the improvement of undergraduate education quality.

Where, the virtual variable D_s was defined as 1 for students in the experimental class of new finance and economics and 0 for students in the non-experimental class of new finance and economics. Before and after the new finance and economics education reform (i.e., before and after the corresponding undergraduate education was carried out), the data should be collected from the students, so that another virtual variable D_t was defined as 1 after the reform and 0 before the reform, as shown in Table 1.

Table 1 Virtual variables and their meanings

	$D_t = 1$	$D_t = 0$
$D_s = 1$	After the experimental class students accepted the new financial education reform	Before the experimental class students accepted the new financial education reform
$D_s = 0$	After the non-experimental class students accepted the undergraduate education	Before the non-experimental class students accepted the undergraduate education

The difference in difference model was established based on the above two virtual variables, as shown in (1):

$$Y = \beta_0 + \beta_1 D_s + \beta_2 D_t + \beta_3 D_s D_t + \delta X_{ist} + \varepsilon_{ist} \quad (1)$$

Where,

i=the individual;

s= whether or not it is a student in the New Finance and Economics Experimental Class;

t= the implementation time of the new finance and economics education reform (that is, whether to implement the new finance and economics education reform);

Y are the explained variables, which are measured by various methods, including students' mastery of professional knowledge (MA), scientific research ability (SI), understanding of contemporary Chinese economic thoughts (SL), clarity of future life planning (SUX), satisfaction with subject integration (CR), evaluation of teaching innovation mode (FE), and effect of reform (EOR). The first six aspects were the first-hand data obtained by collecting and arranging the abnormal results through questionnaires and offline interviews, which were finally reflected in the form of scores, and the seventh aspect, EOR (Effect of Reform), was the summation result of the scores of the first six aspects and an indicator to measure the improvement of undergraduate education quality from a comprehensive perspective. The explaining variable X includes gender and source of students (hereinafter referred to as "region").

2.2 Descriptive statistics

As shown in Table 2, the total number of samples in this study was N=320, and the average EOR was 117.54, the median was 109.23, the minimum value was 30.15, the maximum value was 220.5, and the standard deviation was

67.42. Obviously, the EOR descriptive variable has a large deviation from the mean value. The mean values of the two virtual variables D_t and D_s are 0.621875 and 0.38125, respectively, the medians are 1 and 0, the maximum and minimum values are 0 and 1, respectively, and the standard deviation is 0.485 and 0.486, respectively. It is easy to draw a conclusion that the deviation degree of D_t and D_s descriptive variables from the mean value is small, and the mean value of explanatory variable X is close to 1.5. Comprehensive results show that the explaining variable X is relatively stable, and the deviation from the mean value is also small.

Table 2 Descriptive statistics

Variable	N	Mean	SD	Min	Max
EOR	320	117.54	67.42	30.15	220.5
D_t	320	0.6218	0.485	0	1
D_s	320	0.3812	0.486	0	1
Gender	320	0.5562	0.4976	0	1
City	320	0.4906	0.5006	0	1

III. Empirical Analysis

3.1 Benchmark regression model

The following table shows the results of benchmark regression in empirical analysis.

According to the benchmark regression results in Table 3, the implementation of new finance and economics education reform and the establishment of new finance and economics experimental classes have significantly improved students' comprehensive knowledge level. However, the Dt*Ds coefficients in columns (2), (3), (4) and (6) are not significant, indicating that the current new finance and economics education reform policy may not improve students' scientific research ability, understanding of contemporary Chinese economic thoughts, life planning and innovative modes of education and teaching. In addition, column (5) of the results shows that the Dt*Ds coefficient is significantly negative, which proves that the new finance and economics education reform policy has a negative effect on discipline integration. In summary, the areas where the new finance and economics education reform fails to significantly affect or has a negative effect will be the direction for future policy improvement.

Table 3 Benchmark regression

	Dependent Varaible					
	MA	SI	SL	SUX	CR	FE
	（1）	（2）	（3）	（4）	（5）	（6）
Dt	.6759241*** (12.29)	1.027122*** (28.24)	1.206312*** (30.17)	1.116975*** (21.27)	1.468135*** (30.80)	1.600719*** （23.72）
Ds	.7858687*** (4.14)	1..340236*** (10.68)	1.210982*** (8.77)	1.283634*** (7.08)	1.694912*** (10.30)	1.155368*** （4.96）
Dt*Ds	.9685162*** (4.89)	.0548731 (0.42)	.2151809 (1.50)	.1855833 (0.98)	-.5668167*** (-3.30)	-.1519452 （-0.63）
Gender	-.042432 (-1.00)	.0359738 (1.28)	.011201 (0.36)	-.0176487 (-0.43)	-.0135157 (-0.37)	-.0.820209 （-1.57）
Region	-.0121761 (-0.29)	-.0204558 (-0.74)	-.0489422 (-1.60)	-.0318389 (-0.79)	.008391 (0.23)	.0677148 （1.31）

Constant	2.053607 (21.21)	1.847379 (28.85)	1.830594 (26.00)	1.82955 (19.79)	1.755752 (20.92)	1.738525 （14.64）
N	320	320	320	320	320	320
R^2	0.8936	0.9484	0.9470	0.9090	0.9242	0.8595

3.2 Heterogeneity analysis

Because the effect of the new finance and economics education reform may be significantly influenced by gender and region, the effect of the reform is heterogeneous among different groups of students. In the heterogeneity analysis of this paper, EOR will be used as the explained variable to examine the effect of the new finance and economics education reform from the perspective of full sample, gender and region. In addition, the sample data will be classified into male and female students according to gender and urban and rural students according to region for regression analysis, as shown in Table 4.

Table 4 Heterogeneity analysis

	Dependent Variable=EOR				
	All sample	Male sample	Femle sample	Urban sample	Rural sample
	(1)	(2)	(3)	(4)	(5)
Dt	65.23324*** (36.10)	66.84355*** (33.08)	64.17811*** (25.11)	67.1287*** (26.72)	63.03323*** (28.34)
Ds	74.75749*** (11.99)	145.5384*** (16.47)	50.88451*** (6.55)	99.22295*** (13.32)	3.560352 (0.35)
Dt*Ds	14.27896** (2.19)	-59.12274*** (-6.49)	39.65545*** (4.87)	-11.31966 (-1.44)	86.9744*** (8.36)
Gender	.1164895 (0.08)	-	-	-1.156885 (-0.57)	2.13992 (1.31)
Region	-.8031995 (-0.58)	-.5638455 (-0.38)	-.3614335 (-0.18)	-	-
Constent	44.23765 (13.91)	43.52542 (16.91)	44.3574 (12.53)	44.12852 (3.416513)	40.66981 (15.33)
N	320	142	178	163	157
R^2	0.9678	0.9845	0.9613	0.9642	0.9799

The regression results in Table 4 show a significant level of Dt*Ds as a whole, which can prove that the new finance and economics education reform has a positive effect on the cultivation of students. The specific analysis is as follows:

The data in column (1) shows that the Dt*Ds coefficient is significantly positive, indicating that the new finance and economics education reform policy has a significant improvement effect on the comprehensive quality of undergraduate education.

The data in columns (2)(3) show that the Dt*Ds coefficients of both females and males are significant, but in the opposite direction (the coefficients of males are negative and those of females are positive), indicating that the new finance and economics education reform may have a negative effect on the cultivation effect of male students. According to the actual situation, it is found that since the reform policy of new financial education is in the early

stage, the experimental classes have more difficult courses and more strict management. Female students can adapt better because they are more self-disciplined and easier to comply with the rules, while male students are more likely to have rebellious attitude when dealing with the sudden increase in academic pressure, which leads to a short-term decline in the role.

The data in columns (4) and (5) show that urban students are not significant, but rural students are significant. Comparing the results of the regional regression, it is found that the effect of the new finance and economics education reform may be more significant to the rural students, perhaps because the reform is more inclined to improve the overall quality education of the students, while the rural students have a limited basic quality education due to the gap in educational resources, and the urban students have a better basic quality education owing to the sufficient educational resources. Therefore, the implementation of the new finance and economics education reform may be more significant for students from rural areas.

In summary, gender differences and regional differences also have an impact on the development of students themselves to some extent.

IV. Research Conclusions

In this paper, the students with the same knowledge base are studied with the case study of the new finance and economics education reform in Hebei University of Economics and Business, and the future undergraduate education system of finance and economics majors is explored based on the difference between the two teaching modes of the new finance and economics experimental class and the non-experimental class, which has important theoretical value and practical significance.

The results show that the new finance and economics education reform policy can promote the improvement of undergraduate education quality. New finance and economics education focuses on the construction of professional knowledge, and has reform plans in the fields of scientific research ability, economic thought, life planning, subject integration and innovative teaching. According to the results of regression analysis, although some coefficients are not significant, they have an important impact on the improvement of comprehensive quality of education.
Secondly, the construction of new finance and economics experimental class can effectively improve the level of professional knowledge of students (MA), whose Dt*Ds coefficient is significantly better in the regression analysis results, indicating that the undergraduate knowledge education system construction in the university is reasonable, with further development and reference value.

Finally, because the construction effect of the new finance and economics education policy varies significantly according to the students' gender and the source area, so in order to stabilize the effect of education reform, the construction scheme of the new finance and economics experimental class needs to meet the conditions of teaching students in accordance with their aptitude, that is, according to the characteristics of students to carry out a diversified education system.

According to the analysis results of the new finance and economics education reform of Hebei University of Economics and Business, the overall reform design of the university has great breakthrough and innovation, not only breaking the inherent mode of discipline barriers, but also implementing the sustainable development of undergraduate education. The reform experience of the university has laid an important theoretical and practical foundation for the future undergraduate education system of finance and economics majors, and is of milestone significance for forming a world-class undergraduate professional cluster with Chinese characteristics.

Acknowledgements

This research was supported by New Finance and Economic Education Reform Project of Hebei University of

Economics and Business (Grant No. 2020XCJ06), Hebei Research Grant for Graduates returning from oversea (Grant No. C201869), and Research Grant of Hebei Social Sciences Development (Grant No.2019030202026).

References

[1] G. Chai, K. Zhang, X. Cui, “An analysis of the effect of the Ministry of Education's auditing and evaluation on the quality of undergraduate education - natural experimental evidence from school students' academic performance,” Research in Educational Development, vol. 39, no. 7, pp. 42-52, 2019.

[2] X. Ma, H. Tan, “Building First-class Business Studies: AACSB Certification and New Finance and Economics Education in China,” China University Teaching, no. 04, pp. 58-66, 2019.

[3] Y. Zhou, Z. Li, “Principles and Design of New Liberal Arts Construction,” China University Teaching, no.06, pp. 52-59, 2019.

[4] J.V. Victor, “Instituting a Monetary Economy in a Semester-Long Macroeconomics Course,” The Journal of Economic Education, vol. 44, no. 02, pp. 129-141, 2013.

[5] T. Emerson, and B. A. Taylor, “Comparing Student Achievement Across Experimental and Lecture-Oriented Sections of a Principles of Microeconomics Course,” Southern Economic Journal, vol. 70, pp. 672-93, 2004.