

Research on the Impact of Certification-Related Reforms on Students' Abilities Based on the Regression Discontinuity Design

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Abstract: Based on the survey data of international economics and trade majors in Guangzhou City University of Technology, this paper uses regression discontinuity design (RDD) to select indicators such as teamwork, business knowledge, analysis and technology to conduct a comprehensive survey on IACBE certification and a series of teaching reforms. According to the research, professional certification and a series of teaching reforms have a significant impact on the effect of students' practice. In the future, attention should be paid to teaching team building, students' teamwork ability and the application of new technology to make higher education better adapt to the changing business needs.

Keywords: Education reform; Satisfaction; Breakpoint regression design; Professional certification

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1. Research background

Accreditation is a hot topic, and reflecting on the nature of accreditation and its outside impact on the work of academia is an important activity. Professional accreditation has its recognized benefits. Hayward (2006) discusses the issue of accreditation in quality assurance in higher education. He argues that accreditation is a process of self-assessment and external review used to review quality assurance and improvement in higher education institutions and their programs ^[1]. Chedrawi *et al.* (2019) mention that accreditation for Lebanese business schools gives it a competitive advantage ^[2]. The websites of some large accreditation bodies show that accreditation not only confirms the school's current adherence to quality standards, but also demonstrates the school's commitment to continuous improvement ^[3-5]. Accreditation is considered a system to help schools improve ^[6], and school self-assessment in particular is considered key to this process ^[7]. International accreditation is a symbol of a school's increased international competitiveness ^[8] as well as a commitment to quality and continuous improvement ^[9].

The International Council for Accreditation of Business School Education (IACBE) was established in 1997 and is accredited by the Council for Higher Education Accreditation (CHEA). IACBE is a mission-driven,

results-based accreditation organization for business school education serving student-centered universities and other institutions of higher education worldwide. With hundreds of member institutions around the world, IACBE has accredited more than 1,500 business and related professional programs in the United States, Europe, Asia, the Middle East, Central and South America. Guangzhou City Institute of Technology (GCUT) has been an educational member of IACBE since November 2013, and is the first IACBE member institution in China. In 2015–2016, GCUT completed the Outcomes Assessment Program and the candidate qualification site visit was completed in September 2016. In December 2016, four business majors (International Economics and Trade, Business Administration, Accounting and Marketing) were successfully eligible for candidacy. Since 2017, the International Economics and Trade program has used assessment tools to measure student learning outcomes and the state of business schools. Through self-assessment, schools not only assess all aspects of the school, but also identify areas for improvement and generate evidence before the accreditation team arrives. After the certification, the school carried out a series of reforms, and under the advocacy of the digital economy era and new business education concepts, flexibly adopted the “flipped classroom” model, encouraging students to preview the materials provided by teachers before class, and discuss and solve problems in class, so as to realize the reversal of “teaching” and “learning.” Through the use of information technology and personalized development model, emphasis is placed on project-based training in the “second classroom,” such as POCIB and cross-border e-commerce, to fully stimulate students’ innovation and entrepreneurial ability in the field of digital trade. At the same time, the “Third classroom” is actively promoted and students are encouraged to participate in practical innovation projects, “Internet Plus” innovation and entrepreneurship competitions, as well as academic competitions, such as the “National Business Elite Challenge International Trade Competition,” to constantly enhance students’ innovation ability. In this way, students are encouraged to take the initiative to explore new fields, seek new discoveries and create new knowledge, aiming to stimulate students’ enthusiasm for the subject and improve their comprehensive ability.

Accreditation is seen as a tool to embed this measurement process in schools, as accreditors are seen to encourage the implementation of data-driven decision making, professional development and strategic planning ^[10,11]. Fertig (2007) argues that the accreditation process has a certain constraining effect, with schools forced to adapt to particular organizational patterns ^[12]. Oldham (2018) interviewed an accreditor who, while visiting a school, observed students dozing off in class, but the school was still accredited ^[13]. Accreditation was found to restrict the way schools are managed, narrow the school’s philosophy of learning, and dictate the practices that take place within the classroom. Teachers are limited in their creativity in designing learning activities, provided that these activities are aligned with prescribed curriculum standards ^[14]. This effect of certification requires further research attention, which is the research motivation of this paper.

2. Methods

The rest of this paper is structured as follows: The second part is the research method; The third part is theoretical hypothesis and demonstration; The fourth part is the analysis and discussion of the empirical results. This paper focuses on the internship enterprise satisfaction, which can reflect students’ learning effect and teaching reform and other factors. Since IACBE provides 7 indicators, this paper sends questionnaires to corporate employers or internship supervisors to investigate the contents of three indicators. A regression discontinuous design (RDD) was used to identify the causal effect of professional certification on internship satisfaction, so as to quantitatively assess the impact of certification on student internship outcomes.

(1) Theoretical hypothesis: Professional certification in colleges and universities can affect teamwork, business

knowledge, analytical and technical ability, and thus affect the satisfaction of internship enterprises.

- (2) Empirical methods: The International Economics and Trade major gained IACBE membership in 2018, which led to changes in teaching conditions and provided a quasi-natural experiment for us to study the impact of professional certification on student internships using the regression discontinuity method.

The basic idea is that without professional accreditation, student learning outcomes should be smooth, and once learning outcomes change significantly before and after accreditation, it can be assumed that this change is mainly caused by exogenous professional accreditation activities. The processing probability of the processed object at the point of discontinuity jumps from 0 to 1, which conforms to the characteristics of regression discontinuity design (Sharp RDD).

The dependent variable is employer satisfaction, and the measures are teamwork, business knowledge, and analytical and technical competence. The driving variable was time T; and the processing variable (D) indicates whether the internship outcome is affected by certification. If D is greater than 0, it means that certification has a positive effect on student internship outcomes; otherwise, it means that certification has a negative impact on student internship results. The covariates include the situation of the teacher's teaching reform (including the number of teaching reform papers, projects and awards), which may have a positive impact on the student's learning. The time span of the study was 5 years, and the sample size of the analysis was 962.

3. Results

3.1. Statistical analysis

Measure students' analytical and technical abilities by asking "Does university professional study contribute to applying decision support tools to business decisions?" To measure students' ability to work in a team by asking "Does corporate internship help to work effectively with diverse colleagues," This measures students' ability to apply knowledge by asking "whether students can apply the business concepts and expertise they have learned to corporate activities and achieve integration of expertise." A four-point scale is used: If the answer is yes, 4 points are scored; If the answer is generally acceptable, score 3; If not sure, 2 points; If not at all, get 1 point.

Use the SPSSAU analytics platform for data processing. From the descriptive statistics of the main variables of the full sample, the average value of business knowledge is 3.78, the average value of analytical and technical ability is 3.61, and the average value of teamwork is 3.83.

3.2. Empirical analysis

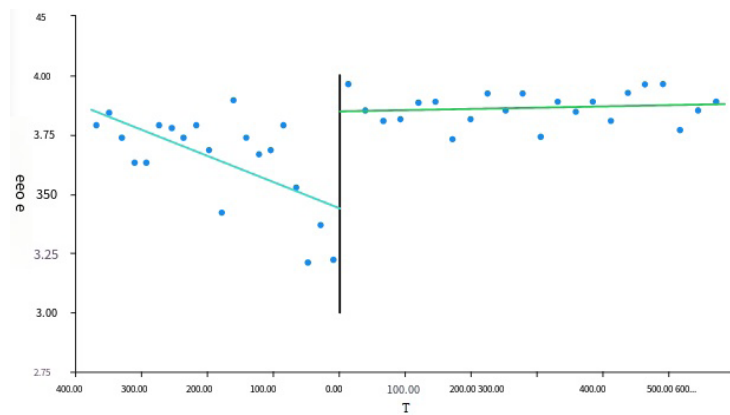
Table 1. Results of basic regression test

	Coef.	Std. Err.	z	p	95% CI
Business knowledge	0.752	0.139	5.396	0	0.479–1.025
Analytical and technical skills	0.688	0.23	2.994	0.003	0.238–1.139
Teamwork	0.359	0.169	2.118	0.034	0.027–0.691

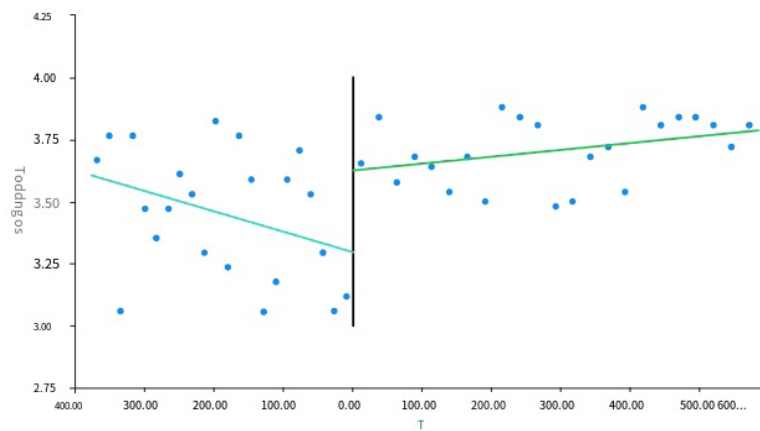
If the 95% confidence interval (CI) contains 0, it means the result is not significant. Conversely, if the confidence interval contains no 0, it means the result is significant. **Table 1** shows that the implementation of professional certification has a significant positive effect on students' practical training, thus supporting the hypothesis.

The fitting plot visually shows the relationship between variables, and the breakpoint values can be clearly

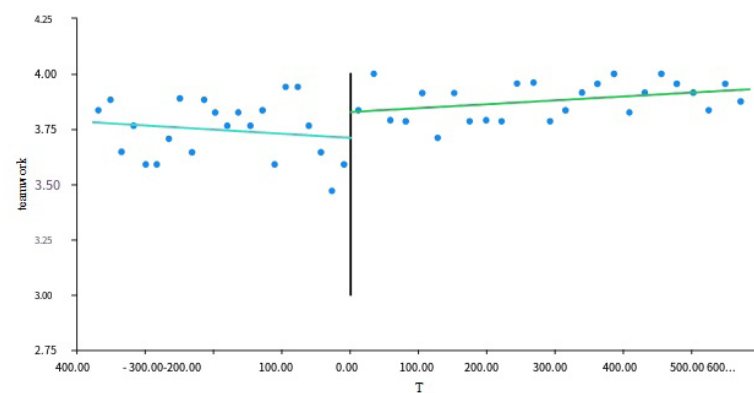
observed through the graph. The optimal model order is first order. The horizontal coordinate in the figure is the time after centralized processing, and 0 represents the time node of authentication implementation.



(a) Business knowledge



(b) Analysis and technology



(c) Teamwork

Figure 1. Fitting curves before and after certification. Figure 1. Fitting curves before and after certification.

3.3. Robustness test

In regressive discontinuity design (RDD) studies, robust identification strategies first require that sample individuals or driving variables cannot be artificially controlled. In this study, period number is the driving variable, which cannot be artificially controlled, so other robustness tests will be carried out next. These tests include: changing the bandwidth, changing the breakpoint (placebo test), and adding covariates.

3.3.1. Tests for adding covariates

Table 2. Results of regression estimation after adding covariates

	Coef.	Std. Err.	<i>z</i>	<i>p</i>	95% CI
Business knowledge	0.924	0.153	6.044	0	0.624–1.223
Analysis and technology	1.505	0.222	6.772	0	1.069–1.940
Teamwork	0.78	0.19	4.111	0	0.408–1.152

3.3.2. Bandwidth sensitivity

The robustness of an RDD result is greatly affected by bandwidth. To verify the robustness of the baseline regression results, we performed regression analyses at 0.5, 1, 1.5, 2, and 2.5 bandwidths successively.

Table 3. Regression results at different multiples of bandwidth

	Bandwidth	Coef.	Std. Err.	<i>z</i>	<i>p</i>	95% CI
Business knowledge	33.059 (0.25 times)	0.66	0.288	2.292	0.022	0.095–1.224
	66.119 (0.5 times)	0.724	0.192	3.768	0	0.347–1.100
	99.178 (0.75 times)	0.759	0.155	4.9	0	0.456–1.063
	132.237 times (1)	0.752	0.139	5.396	0	0.479–1.025
	165.297 (1.25 times)	0.708	0.128	5.514	0	0.456–0.960 times
	198.356 (1.5 times)	0.672	0.12	5.622	0	0.438–0.906 times
	231.415 (1.75 times)	0.633	0.112	5.641	0	0.413–0.853 times
	264.475 (2 times)	0.596	0.106	5.648	0	0.389–0.803
Analysis and Technology	30.306 (0.25 times)	0.681	0.557	1.222	0.222	-0.411–1.772 times
	60.612 (0.5 times)	0.633	0.355	1.783	0.075	-0.063–1.328
	90.918 (0.75 times)	0.734	0.272	2.699	0.007	0.201–1.267
	121.223 times (1)	0.688	0.23	2.994	0.003	0.238–1.139
	151.529 (1.25 times)	0.604	0.203	2.982	0.003	0.207–1.001 times
	181.835 (1.5 times)	0.583	0.181	3.213	0.001	0.227–0.938 times
	212.141 (1.75 times)	0.561	0.165	3.403	0.001	0.238–0.885 times
	242.447 (2 times)	0.523	0.152	3.444	0.001	0.225–0.820
Teamwork	38.802 (0.25 times)	0.256	0.406	0.63	0.529	-0.540–1.052
	77.604 (0.5 times)	0.368	0.251	1.466	0.143	-0.124–0.859 times
	116.405 (0.75 times)	0.409	0.198	2.06	0.039	0.020–0.798 times
	155.207 times (1)	0.359	0.169	2.118	0.034	0.027–0.691
	194.009 (1.25 times)	0.317	0.148	2.137	0.033	0.026–0.608 times
	232.811 (1.5 times)	0.297	0.133	2.24	0.025	0.037–0.557 times
	271.613 (1.75 times)	0.265	0.12	2.213	0.027	0.030–0.500
	310.414 (2 times)	0.225	0.11	2.057	0.04	0.011–0.440

If the 95% confidence interval (CI) value includes 0, the result is not significant. Conversely, if 0 is not included, the result is significant. If the significance is basically the same across different bandwidths, then the results are well robust. The results show that certification significantly improves students' teamwork ability, knowledge application ability, and ability to analyze and use technology, supporting the conclusions of this paper. Clearly, the conclusion from the benchmark analysis that certification has a positive impact on students' internship outcomes is robust.

3.3.3. Placebo test

The placebo test was conducted in this study by changing the certification implementation time. In light of this, the study delayed the implementation of professional certification and a series of instructional reforms until 2021, with the estimated results as follows.

Table 4. Placebo test

	Coef.	Std. Err.	<i>z</i>	<i>p</i>	95% CI
Teamwork	-0.04	0.1	-0.398	0.691	-0.235–0.156
Business knowledge	0.079	0.116	0.681	0.496	-0.149–0.307
Analysis and technology	-0.239	0.148	-1.616	0.106	-0.530–0.051

If the 95% confidence interval (CI) value includes 0, the result is not significant. As can be seen from the estimates in **Table 4**, the study chose a pseudo-breakpoint and selected trigonometric kernel estimates by default, and the results show no significance. The results of the pseudo-breakpoint test further verify that the RDD model does not confuse the influence of other unobserved factors, and the pseudo-breakpoint test passes.

4. Conclusion

This paper empirically tests the impact of professional certification on students' internship results by using the breakpoint regression design (RDD) method, and analyzes the reasons. The study used data from the student internship satisfaction questionnaire of 962 business executives between 2018 and 2023. The results show that professional certification and a series of educational reforms significantly improve student practice outcomes, and this improvement is long-term, and it takes time to fully show the effects of reforms. Based on the empirical results of this paper, the following policy recommendations are put forward the following.

The empirical results show that the effect of teaching reform takes some time to appear. Therefore, teachers should actively promote teaching reform and share reform experience. As educators often stress, the process is as important as the result ^[15]. There are significant benefits to bringing teams of teachers together to work on curriculum, teaching methods and student outcomes. For example, the digital economy is at the forefront of social development and is a growing part of international trade. International Trade Practice is a compulsory course for international economics and trade majors in colleges and universities. With the vigorous development of "digital trade," some problems in teaching are gradually exposed, including the preference for the explanation of traditional theoretical knowledge of trade practice, while the neglect of the training of students' practical operation of trade digitalization. Teachers do not adapt to "digital technology," and the teaching content and methods are still monotonous. The teaching content cannot keep up with the cutting-edge information, technology

and policies of the “digital trade” industry. In view of the above problems, teaching should actively keep pace with the ways and methods of international trade, and require appropriate innovation in the comprehensive quality training system of international economic and trade professionals to meet the new requirements of the market on the ability of international economic and trade professionals. In 2022, in line with the development trend of digital trade, the Teaching and Research Section of International Economics and Trade has compiled four digital trade-related textbooks, *Introduction to Digital Trade*, *Application of Cloud Computing in Digital Trade*, *Application of Big Data in Digital Trade*, and *Application of Blockchain in Digital Trade*. The first two textbooks have been put into use and received good feedback from students.

In the teaching process, practical teaching should be actively promoted and students should be encouraged to use data analysis tools, especially by increasing the proportion of experiential learning opportunities. Practice has proved that students will use relevant analytical tools in their work after graduation. On the basis of the existing “POCIB International Trade Professional Skills Comprehensive Practical Training Software” and “SimAMZ Cross-border E-commerce Integrated Teaching Platform,” the “SEG Digital International Trade Comprehensive Skills Practical Training Platform Software” is introduced to strengthen students’ foreign trade comprehensive business skills and cross-border e-commerce comprehensive skills. The digital platform integrates the on-the-job training of enterprises and the practical teaching of talents in relevant colleges and universities, introduces scientific, effective and pragmatic teaching methods and training methods for the training of economic and trade talents, and evaluates the ability level of students. Strengthen simulated practical training teaching and make good use of the “second classroom.” Economic and trade students can integrate their theoretical knowledge in the digital simulation training platform, and set project themes together with the training platform. For example, from the aspects of cross-border e-commerce platform selection, product selection, marketing mode selection, trademark design, profit and loss calculation, students can independently design and write preliminary plans, and then teachers will analyze the students’ design plans. In addition, the knowledge learned from the theoretical courses can be matched to fully stimulate the students’ innovation and entrepreneurship ability in the field of digital trade. Through negotiations with representatives of real foreign trade enterprises, students will apply their theoretical knowledge (the first class) and practical training experience (the second class) to the competition (the third class), so that students can personally understand the latest international business practices of foreign trade enterprises. The winning experience in the competition process will also guide the teaching of the “first and second class.”

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Disclosure statement

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