Curriculum and Teaching Methodology (2024)
Clausius Scientific Press, Canada

DOI: 10.23977/curtm.2024.070816
ISSN 2616-2261 Vol. 7 Num. 8

Exploration of the Ideological and Political Teaching Design of Econometrics in Application-oriented Universities

Shaowen Yang

School of Business, Lingnan Normal University, Zhanjiang, 524048, China

Keywords: Econometrics, Ideological and Political Education, Teaching Design

Abstract: Given the characteristics of the teaching of undergraduate specialties in application-oriented universities, this paper analyzes the current teaching status of Econometrics and the usefulness of students' ideological and political foundation to course learning. From the perspectives of philosophy and Chinese themes, this article explores how to effectively integrate ideological and political elements into the teaching of the specialty. Taking the multivariate linear regression model as an example, ideological and political elements are designed from the aspects of teaching objectives, teaching content, teaching reflection, and effect evaluation to achieve the purpose of internalizing ideological and political education in the mind and externalizing it in the behavior. It provides a practical approach for integrating professional knowledge with value guidance in ideological and political education, thus demonstrating that econometrics is both a professional knowledge course and a carrier of ideological and political education.

1. Introduction

In May 2020, the Ministry of Education of the People's Republic of China issued the "Guidelines for Ideological and Political Education in Higher Education Courses," which elevated the principle of "fostering virtue through education" to a strategic priority emphasizing "people-oriented" development. Since then, universities have initiated efforts to integrate ideological and political education into their curricula, and have conducted in-depth research on the concept, connotation, characteristics, implementation strategies and faculty development, etc.[1], and study on integrating ideological education into specific courses has emerged as a significant focus within broader reforms in higher education. Various professional courses should work in tandem with ideological and political theory courses to play a synergistic effect[2].

Application-oriented and research-oriented universities have distinct goals for talent cultivation, resulting in different approaches to integrating ideological and political elements into their curricula. This paper focuses on the econometrics course in undergraduate programs at application-oriented universities, exploring practical methods for integrating ideological education with specialized knowledge.

2. Current Status of Econometrics Course Teaching and Students' Ideological Foundations

2.1. Current Status of Course Teaching

Econometrics heavily relies on advanced mathematics, probability theory, and statistics, making it more challenging to teach compared to other economics courses, especially for students from liberal arts backgrounds who generally have weaker mathematical foundations [3]. Difficult to teach and difficult to learn are particularly prominent, manifesting in three specific ways. First, many universities adopt the original foreign textbooks to emphasize the original flavor, so their cases are not related to the Chinese context, which is not conducive to achieving the purpose of ideological and political education in the course. Second, econometrics involves extensive theoretical derivations, proofs, statistical test methods, and mathematical formulas, which makes it particularly difficult for students with limited mathematical backgrounds to fully understand the material. Third, students can only undertake the study of econometrics after completing calculus, linear algebra, macro and microeconomics, probability theory and mathematical statistics. Weaknesses in any of these prerequisite areas often become more apparent during econometrics courses [4]. These status quo problems not only add to the instructional burden on educators but also undermine students' confidence in mastering econometrics.

The core concept of teaching in application-oriented universities is to meet the needs of practical applications, focusing on training applied talent that combines practical skills with theoretical knowledge. In the teaching process, the talent training goals of application-oriented universities should closely align with the practical needs of front-line production, services, and management, with the core task being to solve real-world, challenging problems. In contrast, the talent training goals of research-oriented universities aim to cultivate students with highly developed abstract thinking and logical reasoning skills, focusing more on in-depth theoretical research and academic exploration, while providing superior research resources. Given the limited class time, many experts believe that the primary goal of teaching econometrics in undergraduate programs at application-oriented universities is to help students master the basic ideas and skill applications, rather than focusing on mathematical derivations. This is because, in real-world work situations, the key to problem-solving often lies in understanding the essence of the problem and the core approach. While the description of theoretical methods in econometrics requires mathematical reasoning, in the case of the limited time for theoretical teaching, students should focus on mastering the basic ideas rather than the detailed mathematical derivation process [3], enabling them to use econometric tools effectively to solve practical problems.

2.2. Ideological and Political Foundation for Students

Integrating ideological and political education into the teaching of econometric courses helps mitigate the challenges students face in mastering complex mathematical derivations, enabling them to grasp core concepts from a broader, more philosophical perspective. First of all, students, whether in high school or the ideological and political courses in colleges and universities, have received rigorous ideological and political education, thereby acquiring a solid foundation in these subjects. Econometrics, as a methodological framework within economics, serves as a discipline for understanding complex economic realities. The philosophy introduced in the first year offers a broad perspective, providing theoretical guidance for incorporating ideological and political elements into econometrics. If the philosophical content introduced in the first year is not integrated into subsequent courses, students may perceive it merely as an exam subject, with much of the knowledge quickly forgotten afterward. As a result, the critical thinking skills intended to be fostered by philosophical studies remain underutilized and unreinforced throughout further learning.

This leads to a phenomenon where ideological and political courses and professional courses have two separate effects on the development of students' comprehensive qualities. By extracting ideological and political material from econometrics from a philosophical perspective, students can become familiar with, apply, and revalidate the philosophical knowledge they previously learned within the context of a new course.

Therefore, teachers can integrate ideological and political education into the teaching of econometrics, design teaching according to the characteristics of the specialty, and organically integrate related ideological and political elements into the content. Econometrics involves many overly mathematical and abstract descriptions. For these difficult-to-teach parts, teachers can provide more tangible and positive interpretations of challenging concepts. This not only helps students understand the content better but also benefits them ideologically and politically [5].

3. Integration Points for Ideological and Political Elements in the Course

Econometrics bridges theory with reality, and is the result of the convergence of economics, mathematics, statistics, and related disciplines. It serves not only as a methodological tool in economics but also as an analytical framework for understanding real-world complexities. Consequently, theories such as worldview and methodology can be integrated into the teaching of this course. Philosophy, as a foundational study of worldviews and methodologies, provides a comprehensive framework for integrating ideological and political elements into econometrics. The practice of socialism with Chinese characteristics offers a rich repository of materials for the sinicization of philosophical thought.

3.1. Integration of Ideological and Political Elements with Philosophy

The integration of philosophical and political elements in econometrics is profound, with the principles of dialectical materialism deeply woven into its theoretical and practical aspects. These philosophical ideas can become ideological and political education materials for econometrics, and also provide a novel perspective to comprehend and employ the worldview and methodology of philosophy. The knowledge system of econometrics demonstrates the application of philosophical ideas such as dialectical materialism in specialized academic courses.

Firstly, the concepts, formulas, theorems, and methods of econometrics embody dialectical principles such as randomness and certainty, connection and development, part and whole, general and particular, opposition and unity, quantitative change and qualitative change, theory and practice. These principles are key components of dialectical materialism. For example, the random error term in econometrics reflects the uncertainty and randomness inherent in economic phenomena, while regression coefficients reflect the certainty and necessity between economic variables, illustrating the dialectical unity of randomness and certainty. Time series analysis and panel data analysis study the evolution of economic variables in the dimensions of time and space, revealing the developmental and relational laws of economic phenomena over time and space, which reflects the dialectical unity of connection and development.

Secondly, parameter estimation and hypothesis testing in econometrics illustrate the distinctions and connections between parts and the whole, as well as between theory and practice. By deriving a sample regression equation from a partial sample, we can infer the characteristics of the overall regression, illustrating the distinction and connection between parts and the whole. Hypothesis testing involves testing theoretical hypotheses based on sample information. These theoretical hypotheses typically concern the signs, magnitudes, and significance of regression coefficients. By empirically testing theoretical hypotheses, we can evaluate how well the theoretical model fits actual data, and also understand the applicability of the theoretical model. Furthermore, empirical

testing demonstrates the connection between theory and practice, indicating that theory should be grounded in practice, while empirical tests that reflect practice are the means of verifying the validity of the theory.

Thirdly, econometric research is based both on the observation and practice of the real world and on applying its research results to our practice. This iterative, spiraling process of understanding precisely embodies the core ideas of philosophical praxis and epistemology. Econometrics originated in the early 20th century with the econometric school, aiming to validate economic theories and solve practical economic problems. It uses tools from mathematics and statistics to build economic models, collect and analyze data, and draw conclusions and recommendations, providing a rigorous and effective research method for economics. The findings of econometrics, in turn, guide economic practice, for example, by helping to formulate reasonable economic policies, optimizing resource allocation, and promoting economic growth. Econometrics continually tests and refines itself in practice while constantly exploring and generating new knowledge in theory, forming a dynamic evolutionary process.

Lastly, econometrics aims to uncover the underlying laws and essence of economic phenomena through empirical analysis, rather than merely focusing on appearances. This reflects the dialectical unity between phenomena and essence in philosophy [6]. Phenomena are the forms that things present on the surface, while essence is the internal law that exists within things and determines their nature and development direction. Phenomena and essence are a dialectical unity that depends on, transforms, interacts with, and reflects each other. Econometrics follows this dialectical principle by deeply analyzing phenomena to uncover their underlying essence. For example, economists, through the observation and measurement of economic growth, reveal the driving forces and pathways of economic growth. This reflects the exploration process from phenomena to essence and is a concrete application of philosophy in econometrics.

3.2. Integration of Ideological and Political Elements with Chinese Themes

Econometrics is characterized by empirical analysis, and the practical undertakings in building a socialist market economy with Chinese characteristics provide rich case studies for enhancing econometrics instruction. Incorporating Chinese-themed case studies into the classroom can help students objectively understand China's economic development and gain a deeper comprehension of Sinicized philosophical concepts [7]. Examples include studies on the urban-rural income gap and common prosperity, analyses of household consumption expenditure in the pursuit of a better quality of life, and investigations into educational expenditure's impact on economic development. Classroom case studies use real data to analyze the current development of the Chinese economy, enabling students to not only recognize China's achievements but also identify existing challenges, which makes this teaching approach more convincing.

Using the Chinese case facilitates a scientific evaluation of the effectiveness of Chinese government policies. In the construction of socialism with Chinese characteristics and the process of realizing Chinese-style modernization, the government has introduced many specific policies for socio-economic development. The effectiveness and impact of these policies can be analyzed through specific econometric case studies. For instance, when teaching policy evaluation, the achievements of China's poverty alleviation can be used as an example. Similarly, when teaching forecasting, the economic miracle of China can be cited to help students better understand the effectiveness and impact of policies[8]. Empirical cases that tell the story of China, summarize the Chinese experience, and encapsulate Chinese propositions help students naturally internalize ideological and political elements during their study and research[9]. Combining real Chinese cases with professional knowledge in teaching allows students to better understand and grasp China's

development path, thereby enhancing their trust and support for the government.

4. Integration Points for Ideological and Political Elements in the Course

Each chapter on econometrics can incorporate ideological and political elements, with the chapter on multiple regression models serving as the most representative example. The multiple regression model occupies a central role in the undergraduate econometrics curriculum, encompassing core theories and methodologies, while laying the foundation for advanced econometric studies and applications. Moreover, the integration of ideological and political elements into the multiple regression model chapter provides a reference framework and exemplar for other chapters. The following is an example demonstrating how ideological and political elements can be effectively incorporated into classroom instruction of the multiple regression model.

4.1. Teaching Objectives

The multiple linear regression model is a foundational component of econometrics, encompassing the three core functions of the discipline: structural analysis (verifying and developing economic theories), economic forecasting, and policy evaluation. Although specific content may vary by textbook, the initial lecture typically introduces the fundamental concepts and functions of the model, laying the groundwork for subsequent theoretical derivations.

Classroom teaching should adopt a student-centered approach, with iterative adjustments to fulfill course objectives, focusing specifically on knowledge, skills, and quality. The knowledge objective is to comprehend the philosophical basis underpinning the multiple linear regression model, master its matrix representation, and understand the foundational theories and methodologies involved. The skill objective involves constructing suitable multiple regression models for specific problems, as well as understanding the role of empirical models in theory verification and policy evaluation. The quality objective is to recognize the role of philosophical concepts in econometrics and critically evaluate the scientific basis and rationality of national policies from an econometric perspective.

4.2. Teaching Content

When teaching the formulation, variable classification, functions, and coefficient interpretation of the multiple linear regression model, instructors can integrate ideological and political elements into lesson content, instructional methods, and expected ideological outcomes. This approach helps students understand and apply the multiple linear regression model through philosophical, political, and economic lenses.

In teaching the formulation of a multiple regression model, teachers primarily employ the lecture method to explain the concept of one effect with multiple causes, where the effect serves as the dependent variable and the causes are represented by independent variables. The regression model is, at its core, a causal mechanism model. This enables students to understand the underlying philosophical logic of model construction, specifically the concept of causality in philosophy.

In teaching variable classification within the multiple regression model, teachers explain that the dependent variable represents the central subject of study and reflects the outcome of dynamic contradictions that drive the development of phenomena. Development is driven by primary and secondary contradictions, where independent variables reflect factors related to the primary contradiction. Core variables are those under direct investigation, while control variables represent factors that are not the main focus of the current model. The disturbance term captures the influence of secondary contradictions, aiding students in understanding the philosophical basis for variable

selection in the model, especially the interplay between primary and secondary contradictions.

Teachers can introduce the functions of the multiple regression model by starting with the concept that "practice is the sole criterion for testing truth," emphasizing that regression analysis represents one of several methods for empirical testing, albeit an incomplete verification approach. Through this approach, students come to understand that model validation is essentially a process of testing truth through practice, reflecting the relationship between absolute and relative truths, as well as the interplay between epistemology and agnosticism within the theory of praxis.

When explaining the meaning of coefficients in the multiple regression model, teachers can employ discussion and demonstration techniques to guide students in analyzing the economic significance of independent variable coefficients, and to further explore their broader political implications. For example, instructors can use a video to elucidate the No. 1 Central Document concerning the increase in farmers' income, and employ econometric software to empirically analyze the impact of income growth in urban and rural areas on consumption, thereby highlighting the economic and political significance of boosting farmers' income as part of achieving common prosperity. In this way, students can understand central government policies from an econometric perspective.

Through the above teaching content design, the expected ideological and political outcomes of classroom teaching include: enhancing students' philosophical thinking ability and political awareness, improving their professional competence and practical skills, and fostering patriotism and a sense of social responsibility.

4.3. Teaching Reflection

Teaching reflection entails a systematic analysis of the teaching process and outcomes, to continuously enhance instructional effectiveness and pedagogical skills. The process can be divided into four stages: description, analysis, evaluation, and improvement, with specific reflective content differing based on the teacher and the instructional content.

A description of the teaching experience for the first lesson on the multiple regression model should include objectives, content, methods, and classroom activities. The teaching objectives should be specified and effectively communicated to students. The delivery of teaching content should include highlighting the integration points of ideological and political elements. Furthermore, the reflection should explain how to use instructional methods such as lecturing, examples, discussion, and exercises, and design relevant questions and cases for classroom activities.

An analysis of the teaching effectiveness of the multiple regression model class should consider outcomes, challenges, and personal reflections. The primary teaching outcome aims to assess whether integrating ideological and political elements into the multiple linear regression lesson effectively stimulates students' interest and motivation. The central challenge involves balancing the depth of multiple linear regression content with the integration of ideological and political elements, while also managing time effectively. Reflections on teaching include satisfaction with the content and methods, as well as confidence in their implementation.

The evaluation of teaching performance for the multiple regression model lesson should focus on strengths, weaknesses, and underlying causes. The reflection should highlight strengths such as the effective explanation of complex concepts in multiple linear regression through clear language and diagrams, ensuring that the integration of ideological and political elements was seamless and natural. Conversely, it should identify limitations, such as the inability to effectively utilize multimedia and online resources due to time constraints, which could have further enriched the teaching experience. This limitation may be attributed to insufficient teaching experience with the multiple linear regression model and inadequate depth in incorporating ideological elements.

To improve future teaching of multiple linear regression, it is essential to establish clear goals, strategies, and actionable measures. The primary improvement goal aims to enhance both the quality and effectiveness of integrating ideological elements into the teaching of multiple linear regression. The improvement strategy involves adopting teaching methods and activities specifically tailored to address the characteristics and challenges inherent in teaching multiple linear regression. Key improvement measures include the incorporation of multimedia and online resources, such as videos, software, and websites, to enrich both the content and delivery of multiple linear regression lessons, thus enhancing student interest and engagement.

5. Evaluation of the Effectiveness of Ideological and Political Integration in Teaching Design

The effectiveness of integrating ideological and political elements into econometrics should be assessed in two stages: internalization (embedding the concepts internally) and externalization (translating these concepts into tangible actions). This process can be evaluated through both in-class and after-class assessments, which should collectively contribute to the overall course evaluation. The primary focus is on in-class ideological and political education, while after-class activities are designed to consolidate and reinforce the in-class learning [10].

5.1. In-Class Ideological and Political Assessment

In classroom instruction, emphasis is placed on interactive engagement with students while explaining theories and methods, with process assessments focusing on content that incorporates ideological and political elements. The student-centered approach is designed to facilitate the internalization of knowledge by students. At the beginning of the lesson, teachers can assess students' preparedness, evaluate their understanding of the course content, and identify specific areas that require targeted explanations. During instruction, digital tools can be employed to rapidly generate questions and facilitate real-time assessment of student learning outcomes.

For example, after presenting the general form of the multiple regression model, instructors can prompt students with multiple-choice questions, such as: What philosophical relationship exists between the independent and dependent variables? How does the random error term relate to the dependent variable? This approach allows students to understand and retain knowledge while also deepening their comprehension and mastery of ideological and political content. In specific empirical cases involving multiple regression, effectively utilizing Chinese themes can help continually present discussion topics, guiding students to interpret the economic significance of coefficients and address their implied political significance. This enables students to better understand and master the knowledge, as well as develop a deeper understanding of social phenomena and issues.

5.2. After-Class Ideological and Political Assessment

After-class ideological and political assessment serves as a further examination and evaluation of students' in-class learning outcomes, representing the externalization of internalized concepts. Students' comprehension can be evaluated through reflective questions and assigned short essays. To prevent rote task completion, specific case analyses should be incorporated to facilitate the internalization of knowledge and its practical application. During their responses, students are guided to externalize the positive insights gained from in-class ideological and political education.

In specific fields of research, students are encouraged to actively collect relevant data, conduct in-depth analysis, select research problems, collect data, construct and analyze models, and finally draw conclusions and summarize their findings. Each step tests and trains students' practical

abilities, effectively achieving the goal of applying ideological education in practice [10]. Since the entire process emphasizes student independence, it not only evaluates learning outcomes but also stimulates students' desire for knowledge and self-motivation, fostering their practical abilities and innovative thinking, thereby better achieving the goals of ideological and political education.

5.3. Course Ideological and Political Assessment

Both in-class and after-class, ideological and political assessments must be integrated into the overall course evaluation to ensure consistent and effective implementation. These assessments should be embedded within the objectives, rationale, content, formats, and standards of the course evaluation to ensure comprehensive integration. Specifically, course evaluation objectives must explicitly incorporate ideological and political components. Beyond evaluating students' knowledge proficiency, the assessment should prioritize fostering political awareness, scientific literacy, innovative thinking, and a sense of social responsibility.

The basis for course evaluation is the syllabus for the econometrics course. Therefore, the syllabus must first integrate ideological and political elements to align with the overall course objectives. The content of the course assessment should encompass both professional knowledge points and skills related to ideological and political elements, ensuring their integration within the academic framework. The course evaluation format should include a combination of regular assignments and a final examination. For regular assessments, a stipulated number of tasks, such as assignments, case studies, and lab reports, must incorporate ideological and political elements. Regarding the final examination, if a written exam is utilized, a specific portion of the questions must reflect these elements; alternatively, if a course paper is required, its content must integrate ideological and political components. The standards for course evaluation should be based on students' performance in regular assignments and the final examination, emphasizing mastery of knowledge, problem-solving abilities, innovative thinking, and sensitivity to ideological and political dimensions.

6. Conclusion

As an essential medium for ideological and political education, econometrics not only imparts professional knowledge but also serves as a guide for value formation, aiding students in determining their life direction and achieving holistic personal development. This paper examines the ideological and political educational elements embedded within econometrics, viewed through the lens of philosophical insights and the practice of socialism with Chinese characteristics. The multiple regression model serves as a case study to specifically illustrate how ideological elements can be effectively integrated into professional education, thus achieving a cohesive unity between knowledge transmission and value orientation within the teaching process. By integrating professional knowledge with ideological and political elements, this approach subtly imparts correct worldviews, values, and life perspectives, thereby encouraging students to actively contribute to societal progress.

Acknowledgements

Lingnan Normal University 2022 school-level ideological and political demonstration class "Econometrics Chapter 4 Multivariate Linear Regression Model Estimation" (Lingnan Normal University Teaching Affairs [2022] No. 155)

References

[1] Jie LU. (2017). Ideological and Political Education in China's Higher Education. East Asian Policy, 9(2), 78-91.
[2] Liu, Xu, Zhao Xiantong, and Hugh Starkey. (2021). Ideological and Political Education in Chinese Universities: Structures and Practices. Asia Pacific Journal of Education, 43(2):586–598.
[3] SHI Rong. (2019). A Structural Equation Modeling: A Questionnaire of the Factors Influencing Conometric Teaching in Guangxi Private Colleges and Universities. Education Modernization, 6(10):179-181+189.
[4] Mi Guofang. (2022). Teaching Reform and Exploration of Ideological Political Education in Econometrics Curriculum. Heilongjiang Education, (07):53-55.
[5] Han Xianzhou. (2023). Professional ideology and politics: the logic of deepening program ideology and practical requirements. China Higher Education, 707(05):39-42.
[6] Chen Hang. (2020). Exploration and practice of ideological and political education in mathematics courses. Chinese University Teaching, 363(11): 46-51.
[7] Tian Feng. (2023). Case Study and Practice of Ideological and Political Education in the Course. Advances in Educational Technology and Psychology, 13 (7): 64-71.
[8] Zhao Ming. (2021). Case selection for ideological and political education in econometrics courses. Modern Commerce and Industry, 42(13): 154-155.
[9] Feng Ping, Chen Xia, Fan Chen. (2022). Research on the Implementation Path of Curriculum Ideology and Politics under the Concept of Ecological Education: Take "Econometrics" as an example. The Guide of Science & Education, (24):108-110.
[10] Haiming Wu. (2023). Research on the Paths and Strategies of the Integration and Development of College English Instruction and Ideological and Political Education. Adult and Higher Education, 5: 88-93.