

# Reform and Practice of Hybrid Teaching Mode in Econometrics Course Based on OBE+SPOC

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**Abstract.** This paper presents a study of the hybrid teaching mode for the Econometrics course based on Outcomes Based Education (OBE) and Small Private Online Courses (SPOC). Firstly, the paper by analyzed the issues present in Econometrics teaching. It focuses on the problem of limited course hours and incomplete understanding by beginners in the teaching process of Econometrics; Students lack a solid foundation in mathematics and statistics; Students will operate the software, but the results of the econometric model will not be explained; Insufficient autonomy of students in learning; The lack of up-to-date cases and data has been analyzed. Secondly, the paper proposes a hybrid teaching mode based on OBE+SPOC. Different from traditional MOOC, SPOC is not a "loose management of free range", but a hybrid teaching mode based on OBE+SPOC, which is formed on the MOOC platform and revolves around key links such as "course objectives, course content, classroom implementation, and course evaluation". Thirdly, the practice of the hybrid teaching mode of Econometrics course based on OBE+SPOC is presented. The hybrid teaching mode of Econometrics based on OBE+SPOC provides an effective way to solve the problems in traditional Econometrics teaching. Through the combination of online and offline learning, students can obtain a more flexible and personalized learning experience. Finally, the study concludes with insights into the effectiveness of this model.

## 1. Introduction

Econometrics is one of the eight core courses in economics as defined by the Chinese Ministry of Education. In Western countries, Microeconomics, Macroeconomics, and Econometrics are essential subjects for economics majors. Econometrics holds a crucial position in the curriculum of economics-related majors.

OBE (Outcomes Based Education) emphasizes student-centered, proactive learning, driven by continuous feedback from students, emphasizing learning outcomes, and sustainable improvement of teaching and learning processes. [1-3]

In 2013, Professor Amando Fox from the University of California, Berkeley, proposed the Small Private Online Course (SPOC) teaching mode, which combines MOOC with traditional teaching methods. The goal is to allow students to read course materials from online platforms before class, then ask, discuss, and communicate with teachers in class to solve problems, and ultimately conduct comprehensive evaluations both online and offline. [4-7]

Y. Zhang, C. Pei, B. Dai, N.Wang(2022) explored how Hybrid learning methods are applied in the process of Financial Econometrics based on questionnaire survey data and Logit model. The conclusions are as follows: Firstly, insufficient knowledge of financial and statistical theory as well as computer programming skills is a

common problem among students in this course. In this case, Hybrid learning can significantly improve teaching effectiveness. Secondly, this course involves a large number of mathematical models, and Hybrid learning can effectively improve students' learning effectiveness on the mode. Therefore, Hybrid learning methods should be promoted in the teaching process of financial courses with mathematical requirements.[8]

In a sense, OBE and SPOC are both designed to promote student engagement, build a solid knowledge foundation, and offer more flexible and personalized learning experiences. Based on the OBE+SPOC hybrid teaching mode, students can benefit from a versatile and individualized learning experience, emphasizing practical applications and outcome-oriented education.

## 2. Issues in Econometrics Teaching

### 2.1 Insufficient Course Hours for Superficial Understanding

The typical duration for an Econometrics course aimed at economics majors is 48 class hours. However, for beginners, mastering the entire content of Econometrics within this time-frame is highly challenging.

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## 2.2 Weak Mathematical and Statistical Foundations of Students

Economics majors often include a significant proportion of liberal arts students who may have weak mathematical and statistical foundations. Econometrics is a discipline that combines mathematics, statistics, and economics, requiring students to have a solid grounding in mathematics and statistics, including calculus, linear algebra, probability theory, and statistics. Therefore, students with weak mathematical and statistical backgrounds may face obstacles in learning Econometrics, often accompanied by a fear of the subject.

## 2.3 Competence in Software Operation but Inability to Interpret Econometric Results

With the widespread availability of the internet and information technology, students can easily find online tutorials for operating econometric software and perform calculations. However, they often struggle with interpreting the results and understanding the economic implications. This deficiency can be traced back to their inadequate understanding of the theoretical foundations of Econometrics.

## 2.4 Lack of Self-Directed Learning

Given the complexity of Econometrics, students may encounter difficulties in their studies. Without adequate preparation before class and follow-up review after class, they may fall behind and lose motivation over time, resulting in diminishing self-directed learning capabilities.

## 2.5 Limited Access to Up-to-Date Cases and Data

Econometrics course materials often rely on textbook cases, which may contain outdated or even decades-old data. Hot issues either do not have data, or the data results do not support conclusions, which requires a lot of time for teachers, and may still not be able to find suitable cases.

## 3. The Hybrid Teaching Mode of Econometrics Course Based on OBE+SPOC

The hybrid teaching mode of Econometrics course based on OBE+SPOC includes course objectives, course content design (online and offline), classroom implementation (Before class, During Class, and After Class), and course evaluation. Fig. 1. is the hybrid teaching mode of Econometrics course based on OBE+SPOC.

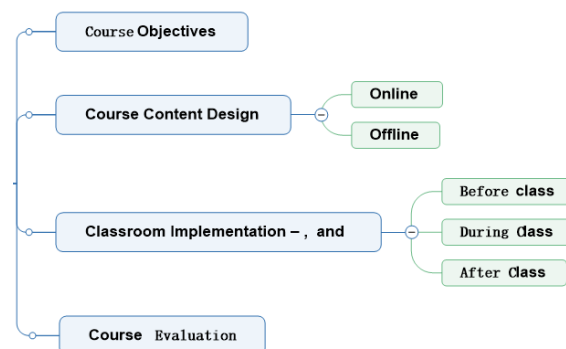


Fig. 1. The Hybrid Teaching Mode of Econometrics Course Based on OBE+SPOC.

### 3.1 Course Objectives

The undergraduate Econometrics course based on OBE+SPOC should aim to enable students to master the fundamental methods of econometric research and apply these methods to real economic issues. The teaching of Econometrics courses should focus on the theoretical and methodological system, neglect the cultivation of abilities and practical applications, and shift to emphasizing ideas, methods, and applications.

### 3.2 Course Content Design (Online + Offline)

On the basis of MOOC, the offline Econometrics teaching team of our school has screened the online MOOC content to form SPOC courses suitable for our students' learning. SPOC in the hybrid learning mode typically includes online videos, exercises, and discussions, which can be fully utilized to promote students' learning, including designing interactive links to increase student engagement.

The textbook "Econometrics" which is wrote by Professor H. Pang from Southwest University of Finance and Economics, combined with the online course "Econometrics" of Southwest University of Finance and Economics, has formed a course content system based on a combination of online and offline. The online course of Econometrics includes online testing, online Q&A, and a scoring system that can also serve as feedback on students' learning situation. Table 1. is the design of teaching content for Econometrics course based on OBE+SPOC.

Table 1. Design of Teaching Content for Econometrics Course Based on OBE+SPOC.

Course Content		Online	Offline
1 Introdu ction	Chapter 1 Introduction	Chapter 1 Introduction	Classroom discussion+ Q&A+case teaching+af ter class leak detection and filling+expa nsion practice+Ec onometrics paper
2 Classic Econo metrics	Chapter 2 Simple Linear Regression Model	Chapter 2 Classic Linear Regression Model	
	Chapter 3 Multiple Linear Regression Model	Chapter 4 Multicollinearity Chapter 5 Heteroscedasticity Chapter 6 Autocorrelation	

3 Special Topics in Econo metrics	Chapter 4 Virtual Variables (Virtual Explanatory Variable Model, Virtual Explanatory Variable Model)	Chapter 3 Virtual Variable Regression
	Chapter 5 Stationary Time Series (ARMA Model, ARCH, GARCH Model)	Chapter 7 Unit Root Test Chapter 8 Stationary Time Series Model
	Chapter 6 Non-stationary Time Series (Unit Root, Cointegration, Vector Autoregressive Model)	Chapter 9 Non-stationary Time Series Model
	Chapter 7 Panel Data Model (Panel Unit Root, Panel Cointegration)	Supplement: Panel Data Model
	Chapter 8 Spatial Econometric Model	Elective Course: Spatial Econometric Model
	Chapter 9 Machine Learning	Elective Course: Machine Learning
	Chapter 10 Text Mining and Financial Big Data Econometrics	Elective Course: Text Mining and Financial Big Data Econometrics

### 3.3 Classroom Implementation – Before Class, During Class, and After Class

**Before Class:** Students preview the course content through online course videos before class and record any questions they do not understand.

**During Class:** In the classroom, teachers answer questions and discuss the preview content, and refine the teaching content through case analysis.

**After Class:** After class, students will conduct knowledge checking and filling, complete extracurricular expansion exercises, and complete a course paper on Econometrics at the end of the semester to consolidate their knowledge and apply what they have learned.

### 3.4 Course Evaluation

Based on the hybrid teaching mode of OBE+SPOC, the undergraduate teaching goal of Econometrics course is to "prioritize ideas, methods, and applications". Therefore, this course requires students to learn the operation of econometric software Eviews or STATA and apply the learned methods for econometric analysis.

The evaluation of the Econometrics course at our school is as follows:

overall score=30% of usual grades (including attendance of 5%, classroom performance of 5%, and homework of 20%)+35% of classroom tests+35% of course paper grades. Among the 20% homework, 10% are based on online learning, and 10% are based on completion of homework after class. Classroom testing mainly involves operational testing of econometric software, accounting for 35%. The course paper trains students' ability to apply what they have learned, by selecting research subjects, searching for data and

materials, establishing econometric models, data integration into software calculations, and finally explaining research questions, accounting for 35% of the total.

## 4. Practice of Hybrid Teaching in Econometrics Course Based on OBE+SPOC

Based on the OBE+SPOC hybrid teaching mode of Econometrics course, practical teaching was conducted in the Econometrics classroom of our school's business school from 2022 to 2023. At the end of the semester, a questionnaire survey was conducted among students. 67 valid questionnaires were collected from this survey. Table 2 is the questionnaire survey.

**Table 2.** Questionnaire Survey.

Number	Questions	Options
(1)	Are you satisfied with this course?	A. Very satisfied (43.28%) B. Very satisfied (41.79%) C. Basically satisfied (14.93%) D. Not satisfied (0%) E. Very dissatisfied (0%)
(2)	Do you think you have mastered all the course knowledge?	A. 120% Mastery (1.49%) B. 100% Mastery (10.45%) C. 80% Mastery (62.69%) D. 60% Mastery (25.37%) E. 40% Mastery (0%) F. 20% Mastery (0%) G. No Mastery (0%)
(3)	Have you watched the teaching and operation videos of the Superstar Learning System?	A. Yes (94.03%) B. No (5.97%)
(4)	Do you think the Super Star Learning System video is helpful for your learning?	A. Yes (92.54%) B. No (7.46%)
(5)	Are you satisfied with the reference materials for this course?	A. Yes (94.03%) B. No (5.97%)
(6)	Do you think the introduction of course paper writing methods in this course would be helpful to you?	A. Yes (92.54%) B. No (7.46%)
(7)	Have you seriously studied the online course of Econometrics at Southwest University of Finance and Economics?	A. Yes (92.54%) B. No (7.46%)
(8)	Is the online course 'Econometrics' helpful for you to learn Econometrics?	A. Yes (86.57%) B. No (13.43%)

(9)	Is the online course 'Econometrics' too difficult for you?	A.Yes (71.64%) B. No (28.36%)
(10)	Do you recommend the next class of students to take the online course of Econometrics?	A.Yes (94.03%) B. No (5.97%)

From the results of the questionnaire survey, it can be seen that 85.07% of students are very satisfied with this course; 74.63% of students have mastered over 80% of course knowledge; 94.03% of students have watched the teaching and operation videos of the Econometrics team teachers' self built Superstar Learning System, and 92.54% of students believe that videos of Superstar Learning System are helpful for their learning; 94.03% of students are satisfied with the learning materials provided in the course; 94.03% of students believe that the introduction of course paper writing methods in this course is helpful; 92.54% of students have studied the online course "Econometrics" at Southwest University of Finance and Economics, 86.57% of students believe it is helpful for learning Econometrics, 71.64% of students believe that the online course is more difficult, but 94.03% of students are willing to recommend it to the next class of students. In response to students' learning situation, we chose the relatively simple and easy to understand online course "Econometrics" at Southwest University of Finance and Economics. However, despite this, students still struggle to learn. Compared to online courses, self built courses may be more helpful for students' learning.

## 5 Conclusion

This article focuses on the problem of limited course hours and incomplete understanding by beginners in the teaching process of Econometrics; Students lack a solid foundation in mathematics and statistics; Students will operate the software, but the results of the econometric model will not be explained; Insufficient autonomy of students in learning; The lack of up-to-date cases and data has been analyzed, and a hybrid teaching mode of Econometrics based on OBE+SPOC has been proposed. Different from traditional MOOC, SPOC is not a "loose management of free range", but a hybrid teaching mode based on OBE+SPOC, which is formed on the MOOC platform and revolves around key links such as "course objectives, course content, classroom implementation, and course evaluation". Based on the OBE+SPOC hybrid teaching mode of Econometrics course, practical teaching was conducted in the Econometrics classroom of our school's business school from 2022 to 2023. At the end of the semester, a questionnaire survey was conducted among students.

The hybrid teaching mode of Econometrics based on OBE+SPOC provides an effective way to solve the problems in traditional Econometrics teaching. Through the organic combination of online and offline learning,

students can obtain a more flexible and personalized learning experience. However, this mode requires high pre class preview and post class review requirements, and the learning effect of students also depends on their learning willingness and self-discipline. Therefore, it needs to be continuously improved through continuous practice and improvement to improve the quality of teaching.

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