

Teaching Model of *Fixed Income Securities* Based on BOPPPS

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Abstract: As a core course in finance majors, *Fixed Income Securities* integrates profound theoretical knowledge with practical application-oriented features. Traditional lecture-based teaching methods face prominent challenges, such as the disconnection between theory and practice and low student engagement. The BOPPPS teaching model, which follows a closed-loop logic of “Bridge-in, Objective, Pre-assessment, Participatory learning, Post-assessment, and Summary”, aligns well with the learning rules of financial courses characterized by “cognition, comprehension, application, and migration”. Combining the characteristics of the *Fixed Income Securities* course, this paper analyzes the predicaments of traditional teaching, constructs a two-level teaching closed loop at both the course and single-class levels based on the BOPPPS philosophy, and proposes implementation guarantee strategies. The research aims to improve the quality of course teaching and cultivate applied financial talents who meet the needs of the industry.

Keywords: BOPPPS Teaching Model; Fixed Income Securities; Teaching Reform; Applied Talent Training

1. Introduction

With the steady expansion of the scale of China's bond market, innovative products such as credit derivatives and Asset-Backed Securities (ABS) have emerged one after another. The financial industry has an increasingly urgent demand for professional talents equipped with the capabilities of fixed income securities pricing, risk analysis, and investment management. As a core course connecting financial theory with market practice, *Fixed Income Securities* undertakes the crucial mission of cultivating students' professional literacy and practical operation capabilities in the bond market. However, the current course teaching generally suffers from three major pain points. First, the abstractness of theory is disconnected from students' cognition. Core concepts such as bond pricing models, duration and convexity, and yield curves are highly formulaic, making it difficult for students to establish an intuitive understanding. Second, the teaching model is simplistic, dominated by teacher-centered lectures, where students passively receive knowledge without opportunities to actively participate in knowledge construction. Third, the practical teaching link is weak. The course is isolated from the actual operation scenarios of the financial market, resulting in students' inability to transform theoretical knowledge into the ability to solve practical problems.

Originating from the teaching practice of universities in North America, the BOPPPS teaching model is a student-centered closed-loop teaching framework consisting of six core stages: Bridge-in, Objective, Pre-assessment, Participatory learning, Post-assessment, and Summary. Through the process design of “goal orientation, learning situation diagnosis, interactive construction, effect evaluation, and knowledge sublimation”, this model effectively addresses the drawbacks of the one-way knowledge transmission in traditional teaching. Integrating the BOPPPS philosophy into the teaching of *Fixed Income Securities* is not only a practical need to optimize the quality of course teaching but also an inevitable path to cultivate applied financial talents.

2. Connotation of the BOPPPS Teaching Philosophy and Its Adaptability to the Course

2.1 Core Connotation of the BOPPPS Teaching Philosophy

The essence of the BOPPPS teaching model lies in constructing an integrated closed-loop system

of “teaching, learning, and evaluation”, with its six stages closely linked and progressing step by step. The Bridge-in stage aims to attract students’ attention and establish a connection between the course content and real-world scenarios. The Objective stage clarifies the learning direction, enabling students to clearly understand “what to learn” and “to what extent to learn”. The Pre-assessment stage diagnoses students’ existing knowledge base, providing a basis for differentiated teaching. The Participatory learning stage is the core of the model, guiding students to actively participate in knowledge construction through the design of interactive tasks. The Post-assessment stage evaluates learning outcomes and promptly identifies teaching problems. The Summary stage sorts out the knowledge system to realize the systematization and transfer of knowledge.

The core advantage of this model is its student-centered orientation. Abandoning the traditional “teacher talks, students listen” model, it emphasizes students’ active participation and timely feedback, which is highly consistent with the core tenets of the constructivist learning theory in modern educational philosophy. That is, knowledge is not acquired through teacher instruction but constructed by learners through active exploration and interactive collaboration in specific situations.

2.2 Adaptability Between BOPPPS and the *Fixed Income Securities* Course

The *Fixed Income Securities* course features the integration of theory and practice, and the close connection between the knowledge system and industry practice. Its adaptability to the BOPPPS model is mainly reflected in three aspects. First, goal adaptability. The course’s knowledge objectives (mastering pricing models and risk indicators), ability objectives (Excel modeling and investment analysis), and literacy objectives (risk awareness and compliance thinking) can be hierarchically quantified through the Objective stage of BOPPPS, ensuring the precise implementation of teaching goals. Second, content adaptability. Core modules of the course, such as bond pricing, duration management, and credit risk assessment, can be designed into participatory learning tasks, such as Excel practical operations, case analysis, and simulated trading, which align with the core requirement of BOPPPS for “interactive construction”. Third, effect adaptability. The practical nature of the course requires that teaching effectiveness be evaluated by “solving practical problems”. The Pre-assessment–Post-assessment closed loop of BOPPPS enables dynamic evaluation of students’ knowledge mastery and practical operation capabilities, facilitating timely adjustment of teaching strategies.

3. Construction of the *Fixed Income Securities* Teaching Model Based on BOPPPS

Combined with the 48-class-hour teaching arrangement of the course, this paper constructs a two-level teaching model of macro closed loop at the course level + micro closed loop at the single-class level, realizing the full-process integration of the BOPPPS philosophy.

3.1 Design of the Macro BOPPPS Closed Loop at the Course Level

The macro closed loop at the course level focuses on the construction of the entire course knowledge system and ability training, running through the entire semester.

3.1.1 Bridge-in: Anchoring Industry Scenarios to Stimulate Learning Motivation

At the beginning of the course, starting with hot events in the bond market and industry career demands, a connection bridge between “reality and theory” is built. On the one hand, hot market topics such as “the impact of the inversion of the 2024 treasury bond yield curve on bank wealth management products” and “case review of a corporate bond default” are selected. Through case discussions, students can perceive the practical value of the course. On the other hand, lectures are delivered by practitioners from the fixed income departments of financial institutions to interpret the competency requirements for positions such as bond traders and credit rating analysts. A *Fixed Income Securities* Cognition Questionnaire is distributed to collect students’ initial understanding of bond products and pricing logic, clarifying the focus of teaching.

3.1.2 Objective: Hierarchical Quantification to Anchor the Teaching Direction

According to the talent training program for finance majors and industry demands, the course objectives are divided into three dimensions: knowledge, ability, and literacy, to achieve measurable and verifiable goals.

Knowledge Objectives: Master the product classification, cash flow characteristics, and pricing models (discount rate method, spot rate method) of *fixed income securities*; understand the calculation logic of duration and convexity, the credit rating system, and the structure of ABS products.

Ability Objectives: Be able to use Excel to complete bond pricing and duration measurement, write bond investment analysis reports, and extract market data based on the Wind database for risk assessment.

Literacy Objectives: Cultivate financial risk awareness, data sensitivity, and compliance thinking, and establish the investment philosophy of “matching risks with returns”.

3.1.3 Pre-assessment: Diagnosing Learning Situations to Implement Differentiated Teaching

A pre-assessment is conducted in the second class hour of the course, covering prerequisite knowledge such as the calculation of the time value of money, basic concepts of the financial market, and basic bond elements. The form of “online answering + group mutual evaluation” is adopted to quickly complete the diagnosis of students’ learning situations. Based on the test results, students are divided into three levels: basic level, improvement level, and expansion level. Differentiated learning tasks are designed for students at different levels. For example, the basic level focuses on formula application and basic calculations, while the expansion level focuses on the pricing and strategy analysis of complex bonds (including callable bonds and convertible bonds).

3.1.4 Participatory Learning: Modular Task Design to Realize the Integration of Theory and Practice

This is the core link of course teaching. The course content is decomposed into four core modules, and interactive and practical learning tasks are designed for each module to guide students to actively construct knowledge. The specific design is shown in Table 1.

Table 1 Design of Participatory Learning Modules for *Fixed Income Securities*

Module Number	Core Content of the Module	Participatory Task Design	Teaching Implementation Form
1	Fundamentals of Fixed Income Securities and Market Structure	1. Group research: Collect the issuance documents of three types of products (treasury bonds, corporate bonds, ABS) and compare their element differences; 2. Classroom debate: “Which is more important, the debt nature or equity nature of convertible bonds?”	Offline group re-search + classroom presentation + debate
2	Bond Pricing and Yield Curve	1. Excel practical operation: Calculate the theoretical prices of zero-coupon bonds and coupon-bearing bonds, and analyze the impact of interest rate changes on prices; 2. Case analysis: Draw the 10-year treasury bond yield curve and interpret market interest rate expectations	Online practical operation + offline group discussion + teacher comments

3	Interest Rate Risk and Credit Risk Management	1. Simulated trading: Group members act as “bond investors” and adjust the duration of bond portfolios according to market interest rate changes; 2. Risk assessment: Conduct a credit risk retrospective analysis of a defaulted corporate bond and write an assessment report	Simulated trading platform operation + risk report writing
4	Innovation of Fixed Income Products and Investment Strategies	1. Product design: Groups design a mortgage-backed MBS product and draw a transaction structure flow chart; 2. Strategy review: Analyze the position structure and income sources of a bond fund and put forward optimization suggestions	Group collaborative design + scheme defense

3.1.5 Post-assessment: Multi-dimensional Evaluation to Test Teaching Effectiveness

A three-in-one evaluation system of process assessment, summative assessment, and industry practical assessment is constructed to comprehensively evaluate students' knowledge mastery and practical operation capabilities.

Process Assessment (60%): Includes module tests, group task results, and classroom interaction performance, focusing on evaluating students' participation and the process of knowledge construction.

Summative Assessment (30%): Adopts the form of “comprehensive case analysis”. Given real market data, students are required to complete bond portfolio pricing, risk measurement, and investment proposal writing, assessing their ability to comprehensively apply knowledge.

Industry Practical Assessment (10%): Practitioners from financial institutions are invited to comment on students' bond investment analysis reports and score them in accordance with industry practical standards, achieving accurate alignment between teaching and industry demands.

3.1.6 Summary: Knowledge Sublimation to Connect with Professional Practice

At the end of the course, the systematization and transfer of knowledge are realized through “knowledge sorting + industry extension”. On the one hand, students are guided to draw a knowledge mind map of “product-pricing-risk-strategy” to sort out the core logical chain of the course. On the other hand, students are organized to participate in bond market simulation competitions, and outstanding students are recommended to intern in the fixed income departments of financial institutions, achieving seamless connection between course teaching and professional practice.

3.2 Design of the Micro BOPPPS Closed Loop for a Single Class – Taking “Bond Pricing Model” as an Example

The micro closed loop for a single class focuses on the teaching of specific knowledge points. Taking the 4-class-hour “Bond Pricing Model” as an example, the specific implementation process of the six BOPPPS stages is demonstrated.

3.2.1 Bridge-in (15 minutes): Problem-driven to Stimulate Inquiry Desire

Practical questions are raised: “Why does the market price of a 10-year treasury bond with a 5% coupon rate sometimes fall below its par value?” “What is the pricing logic behind a corporate bond with an issuance interest rate 2 percentage points higher than that of treasury bonds?” Meanwhile, a 1-minute video clip of the pricing interface of bond trading software is played, allowing students to intuitively perceive the real scenario of bond pricing and quickly focus on the core content of the class.

3.2.2 Objective (10 minutes): Clarifying Key and Difficult Points to Anchor the Learning Direction

The learning objectives of this class are clarified: master the core principle of bond pricing (cash flow discounting); be able to calculate the prices of zero-coupon bonds and coupon-bearing bonds using the discount rate method; understand the inverse relationship between market interest rates and bond prices. The key point is marked as the application of the coupon-bearing bond pricing formula, and the difficult point is the selection logic of the discount rate.

3.2.3 Pre-assessment (15 minutes): Diagnosing Basic Knowledge to Fill in Gaps

A small quiz is conducted: calculate the compound future value of a principal of 1,000 yuan with an annual interest rate of 3% for a term of 2 years; briefly describe the composition of bond cash flows. The papers are corrected and feedback is provided quickly. For students with weak compound interest calculation skills, instant micro-courses are provided for supplementary learning to ensure that students have the foundation to learn new knowledge.

3.2.4 Participatory Learning (120 minutes): Practical Operation and Drill to Construct Knowledge

The form of theoretical decomposition + group practical operation + interactive discussion is adopted to guide students to actively construct knowledge. First, the bond cash flow is analogized to “housing loan repayment” to simplify the abstract logic of the pricing model. Then, groups are given parameters of three types of products: zero-coupon bonds, annual coupon-bearing bonds, and semi-annual coupon-bearing bonds. Students are asked to calculate theoretical prices using Excel and compare the impact of different coupon frequencies on pricing. Finally, an interactive discussion is organized: “When market interest rates rise by 1 percentage point, which type of bond will experience the largest price decline?” This guides students to initially perceive the concept of duration, laying the groundwork for subsequent courses.

3.2.5 Post-assessment (20 minutes): Practical Testing with Instant Feedback

A practical question is designed: given the par value (1,000 yuan), coupon rate (4%), remaining term (5 years), and market discount rate (5%) of a corporate bond, students are required to calculate its theoretical price and analyze the price change range if the discount rate drops by 0.5%. The form of group cross-correction is adopted, and the teacher focuses on explaining common mistakes (such as the adjustment of interest rates and terms for semi-annual coupon payments) to promptly correct cognitive deviations.

3.2.6 Summary (10 minutes): Sorting out Logic and Assigning Extended Tasks

The core logic of this class is sorted out: “cash flow decomposition → discount rate determination → price calculation → interest rate sensitivity analysis”. An extended after-class task is assigned: find the public data of a listed bond on the Shanghai and Shenzhen Stock Exchanges, calculate the difference between its theoretical price and market price, and analyze the reasons, realizing the transfer and application of knowledge.

4. Guarantee Strategies for the Implementation of the Teaching Model

4.1 Tool Support: Improving the Construction of Teaching Resources and Platforms

Financial practical operation tools and platforms are introduced to lower the threshold for students' practical operations. On the one hand, an online course teaching platform is built to upload learning resources such as micro-course videos, case materials, and Excel pricing templates, supporting students' autonomous learning. On the other hand, industry software such as the Wind Financial Terminal and the Tonghuashun Bond Simulation Trading Platform are introduced, enabling students to carry out practical training in a real market data environment and improving the authenticity and effectiveness of teaching.

4.2 Differentiated Teaching: Meeting the Needs of Students at Different Levels

According to the students divided into basic level, improvement level, and expansion level in the pre-assessment, differentiated learning tasks and assessment criteria are designed. For students at the basic level, formula derivation processes and basic exercise sets are provided to strengthen the understanding and application of knowledge. For students at the expansion level, challenging tasks such as “complex bond pricing” and “credit risk premium measurement” are set to cultivate innovative thinking and research capabilities.

4.3 Feedback Mechanism: Constructing a Closed Loop for Continuous Improvement of Teaching Quality

A multi-dimensional feedback mechanism of student feedback + peer review + industry evaluation is established. After the teaching of each module, an anonymous questionnaire is distributed to collect students' opinions on teaching content and interactive forms. Peers in the field of financial education are invited to review the teaching process and put forward improvement suggestions. Industry practitioners are regularly invited to participate in teaching evaluation to ensure that the teaching content is updated in synchronization with industry demands.

4.4 Teacher Team Construction: Improving Teachers' “Dual-qualification” Literacy

Efforts are made to strengthen the cultivation of teachers' “dual-qualification” capabilities. Teachers are encouraged to take temporary positions in the fixed income departments of financial institutions, participate in bond market research projects, and accumulate industry practical experience. Industry experts are invited to serve as part-time course teachers to participate in case design, practical operation guidance, and assessment evaluation, realizing the complementary advantages of university teachers and industry resources.

5. Conclusion and Prospect

Integrating the BOPPPS teaching philosophy into the teaching of Fixed Income Securities and constructing a two-level closed-loop teaching model at both the course and single-class levels can effectively address the pain points of traditional teaching, such as the disconnection between theory and practice and low student engagement. Through goal-oriented teaching design, interactive learning tasks, and multi-dimensional effect evaluation, this model realizes the transformation to student-centered teaching. It not only helps improve students' professional knowledge and practical operation capabilities but also cultivates their financial literacy that meets industry demands.

In the future, further exploration can be made on the integration path of the BOPPPS model and online-offline hybrid teaching. Virtual Reality (VR) technology can be introduced to construct a simulated teaching scenario of the bond market, enhancing the immersion and interactivity of teaching. Meanwhile, cooperation with financial institutions should be deepened to build practical teaching bases, promote the in-depth integration of course teaching and industry practice, and cultivate more high-quality applied financial talents.

References:

- [1] Yu L .Research on Teaching Reform and Practice of Management Psychology Course Based on BOPPPS Teaching Model[J].Frontiers in Educational Research, 2023 ,6(24).
- [2] Qu N ,Wang Q.BOPPPS Instructional Model Applied to a Basic Economics Course in Higher Education: Design and Assessment[J].International Journal of Management Science Research, 2023 ,6(5).
- [3] Wang Q .Design and Application of Personalized Teaching Model Based on Learning Styles and BOPPPS[J].International Journal of Learning and Teaching, 2023 ,9(4).

[4] Xingming M ,Xuewei M ,Ling L , et al.Effect of blended learning with BOPPPS model on Chinese student outcomes and perceptions in an introduction course of health services management.[J].Advances in physiology education,2021 ,45(2):409-417.