Research and Practice on Introducing Programmed Trading Into Investment Courses

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Abstract. At present, the forefront of the securities and futures investment industry is quantitative trading and procedural trading, and procedural trading is the "key capability". With the aid of simulation software, a brand-new professional environment has been built. By quantifying, visualizing and programming the trading system, programming, back testing, optimization, operation, etc. have been realized, and commercial strategy development has been achieved. The results prove the effectiveness of this method and provide reference for the cultivation of key abilities in higher vocational colleges under the background of modern apprenticeship system.

1 Introduction

In May 2019, after several years of pilot work, the general office of the Ministry of Education issued a notice on comprehensively promoting the work of modern apprenticeship [1], informing the relevant work objectives and requirements of "summing up the pilot experience of modern apprenticeship and comprehensively promoting modern apprenticeship". Its goal is to take Xi Jinping's new era of socialism with Chinese characteristics as a guide, fully implement the party's education policy, implement the fundamental task of cultivating people through moral education, deepen the integration of industry and education, school-enterprise cooperation, improve the education mechanism of combining morality with technology, combining work with study, and the quality evaluation mechanism of multi-party participation, further promote the reform of teachers, teaching materials and teaching methods, summarize the successful experiences and typical cases of modern apprenticeship pilot projects, and comprehensively promote the modern apprenticeship system with Chinese characteristics with government guidance, industry participation, social support, enterprise and vocational school education in major national strategies and regional pillar industries and other related specialties. One of its key tasks is to "absorb in time and form a teaching resource system that is jointly built and shared." Facing the brand-new professional environment and key abilities, how to effectively realize the field expansion from "in school" to "in profession" and how to transform "professional skills" teaching into "key abilities" training play an important role in promoting the modern apprenticeship system in an all-round way. It is the key and difficult point for higher vocational colleges to quickly find out the new professional environment and key abilities, construct a complete professional environment and efficiently cultivate key abilities. Different majors have different situations, but the basic thinking is the same. We take investment majors as an example, and other majors can learn from it.

The first position of investment major is the securities and futures industry and the corresponding investment companies. Through investigation and analysis, the forefront of the current securities and futures investment industry is quantitative trading and procedural trading, and procedural trading is the "key capability". Programmed trading refers to investors using computer technology to automatically find trading opportunities and complete trading behavior through specific model strategies. Programmed trading is one of the important symbols of capital market modernization and has become a new growth point for capital market innovation and development [2]. The procedural trading in full swing is the industry's "new technologies, new processes, new specifications and typical production cases". As the latest cutting-edge technology in the industry [3], it plays an increasingly important role in investment practice. With the aid of simulation
software, a brand-new professional environment is constructed, and the development of business strategies is achieved through quantifying, visualizing and programming the trading system, realizing programming, back testing, optimization, operation, etc. This is the path to realize the programmed teaching of investment courses. The results prove the effectiveness of this method, which provides a reference for the introduction of the latest procedural technology into higher vocational courses under the background of modern apprenticeship system to achieve key ability training.

2 Research and Practice on Introducing Programmed Trading into Investment Courses

The Key Steps of Introducing Programmed Transaction. The key steps of introducing procedural trading into investment courses, just like in actual industry practice, include platform selection, quantification of trading systems, graphics and procedures, and commercial development of procedural strategies. There are many programmed platforms. How to choose the appropriate platform according to actual combat and teaching characteristics will get twice the result with half the effort. Quantification of trading system, including construction of trading system and quantification of trading system, will complete the first step of transformation from traditional investment mode to modern investment mode. Graphical solution is to show the direction of the judgment trend of the trading system and the logic of the buying and selling points in the market graph, which is convenient to observe and analyze the market and trading system, to carry out manual back testing of the trading system and to optimize the trading system. Programmed will be the graphical trading system manual test back after optimization, through programming, by the computer automatically complete the test back, optimization, and then through the simulation account operation. The commercial development of programmed strategy is to appropriately optimize the classic strategy to form a strategy combination suitable for market conditions and account characteristics, and enter the firm account for trial operation and commercial operation upon satisfaction. The detailed process and key contents of each step are as follows.

Platform selection. To achieve good teaching results, we must have a suitable platform, so we first determine the selection principle of the platform. There are many platforms on the market. According to the practical tests we have used for many years, programmed trading platforms must at least meet the following principles: first, they are widely used; Second, the performance is stable. Third, the interface is friendly. Fourth, the programming language is concise; Fifth, the visualization effect is good; Sixth, the cost is as low as possible and so on. Programmed first appeared in the external market, represented by MT4, which is a software for receiving and trading market quotations. The software was released by MetaQuotes Software Corp with Chinese and English interfaces. As many server access addresses are provided by various trading companies, MT4 can view the prices of gold, silver, foreign exchange, stocks, futures, etc. at the same time, it can carry out firm offer trading and simulated trading. It is extremely powerful and is one of the most widely used foreign exchange futures quotation software at present. More than 90% of global retail transactions are transacted through MT4 platform. The software has not been popularized in China, and the MQL4 language used in its programming language is simple but not concise. Ten or even dozens of lines of codes may be solved one line in WH8, and the software is not used in domestic securities and futures, so it is not selected. There are several procedural trading platforms for domestic futures, which can be roughly divided into two categories, namely, free and fee-based ones. The free one is directly connected to CTP interface, which has the advantages of saving platform cost and keeping good confidentiality, but requires Mtlab or c++ or python programming. It is a professional direction for the future, but the technical threshold is high and it is not suitable for teaching at the initial stage. The other category is fee-based and belongs to third-party platforms, such as Mandarin, Pioneers, Pyramids, etc. Among them, WH8 of Wenhua Finance and Economics is widely used and can be used by various futures companies. The interface is relatively friendly. Especially, the building-block wheat language is the simplest of all programming languages, almost the same as the index language, easy to use and good in visualization effect. Of course, after all, it is
a third party. There are common problems of the third party, including the authorization to charge for purchase and use, and the price is acceptable. The confidentiality of the program may be seen by Mandarin. Sometimes the line breaks, so you have to turn on the cloud server several times a week to prevent the cloud or mandarin from breaking. As a springboard for programmed trading, it is still appropriate to learn at the beginning.

Building a trading system. Trading system is the materialization of systematic trading thinking. Systematic trading thinking is an idea, mainly including basis for opening positions, basis for closing positions, position control, etc. It is reflected in the overall observation of price movements and continuous observation in time in the market judgment analysis, and in the overall reflection of the three major elements of trading objects, trading capital and trading investors in the decision-making. Trading system is the basis of quantitative trading, but also an essential prerequisite for procedural trading. The construction of trading system includes the following main links: selection of trading system types, components of trading system, selection of signal complexity of trading system, construction and graphics of trading system, etc. Intelligent trading or programmed trading will gradually replace manual trading, which is the general trend. The key to profitability is still strategy. Artificial intelligence has been used to build strategies, such as neural networks and robots. Selection of transaction system type. There are many types of trading systems, the common ones are: high frequency trading, medium and low frequency trading systems; Short-term, mid-line and long-term trading systems; Strike the blocking and homeopathic trading system; Unilateral and hedging trading systems; Single and compound trading systems, etc. For teaching, or actual combat, the trend trading system is the easiest to succeed, so the teaching training starts with the trend trading system. The establishment of a trading system conforms to the law of human understanding, from simple to complex and back to simple. The simplest trend trading system is the EMA trend tracking system. Take the 10-day EMA trend tracking trading system as an example: MA10:MA(C,10); Ten-cycle closing price moving average (The following contents are comments, without calculation, the same below). C>=MA10,BPK; The closing price is greater than or equal to MA10. Buy more than one order and more than one order. C<MA10,SPK; closing price is less than MA10, short selling is more than flat selling. The above three lines are actually the entire contents of the programming code of the simplest moving average trend tracking system. The meaning is to identify the trend by taking the closing price of the 10th issue as the moving average. When the closing price crosses the moving average upward, it will make more orders than it is empty. When the closing price crosses the moving average downward, open an empty order and trade more than one. This is almost the simplest trading system, which can be commercialized by appropriate improvement. Therefore, teaching suggestions should start with this system. On this basis, an all-round model integration idea of "multiple varieties, multiple periods, multiple models and multiple parameters" is gradually realized, and the transaction is carried out by constructing a special transaction module [4].

Graphical trading system. Whether the trading system conforms to the market characteristics and the psychological characteristics of traders are the two keys to the success of the transaction. Therefore, whether the established trading system is feasible or not must first be visually inspected, that is, the trading system should be graphically displayed. On the market chart, the trading area of the trading system should be clearly displayed with icons and various colors, so as to visually inspect whether the trading system conforms to the market characteristics and psychological characteristics on various varieties and cycles. In the trading system, the closing price crosses the moving average and keeps above the moving average all the time, the moving average color is set to red, and B(buy) or other icons are displayed at the position of the first k-line after the crossing is successful; On the contrary, the closing price will cross the EMA and remain below the EMA all the time. The EMA color is set to blue, and S(sell) or other icons will be displayed at the position of the first K-line after the crossing is successful. Thus, the moving average system is patterned. Visual inspection of the trading system on various futures varieties and periods can easily find that the closing price of a single K-line often jumps up and down around the EMA, causing unnecessary
frequent operations, while continuous multiple K-lines crossing the EMA are relatively stable, so the trading system can be immediately improved to four continuous K-lines crossing the EMA.

Procedure of Trading System. On the basis of the image trading system, the program design can be entered after manually checking the trading signal areas of various varieties in various periods and preliminarily optimizing and screening the trading system. Due to the advantages of mandarin wheat language, it is simple, building blocks and common with index language, so it is easy to program. The programming of the trading system mainly includes the following steps: starting the programming platform environment, programming the trading system, loading the program, testing the program back, optimizing the program, simulating the operation, and making a firm offer. The improved trading system is programmed as follows: MA10:MA(C,10); EVERY(C>=MA10,4),BPK; EVERY(C<MA10,4),SPK; AUTOFILEER; One Open One Flat Filter Model As a result, programs are loaded on the platform, programs are retested, and programs are optimized. By looking at retest reports, capital curves, etc., students can observe and analyze various performance parameters of the trading system. In the training room with one person and one machine, special teaching software is adopted, and the operation on the teacher's machine can be displayed on all students' computers at the same time, so that the demonstration operation of the teacher can be clearly and timely watched, and the students can imitate the operation accordingly, thus the teaching and training process is smoother and more efficient.

Commercialization of Programmed Strategies. After completing the programmed platform selection, trading system establishment and quantification, graphics and programming, the trainees have basically mastered the basic methods of programming. The following work is the commercialization of programming strategies that are of great investment value and challenging. They will program their own developed strategies or strategies provided by customers or classic strategies, including programming, optimization and so on, and make corresponding optimization especially for customer account conditions and trading varieties, with special attention paid to avoiding the trap of over-optimization! Classic strategies are the most important sources of strategies, such as EMA trend tracking system, adaptive EMA system, Brin channel, adaptive Tangjian channel, ATR breakthrough trend system, oscillator strategy, Dual Thrust trading strategy, intraday interval breakthrough strategy, volume-bin EMA model, based on normal distribution strategy, MACD combined with weighted moving EMA strategy, ATR plus-bin and floating-win plus-bin models, parabolic time price trading system, Kinkentner trading system, thermostat system and Gu Bi EMA system. In addition, every year, the world's top 10 trading systems are published on the Internet, which can be used as a strategy update. At the same time, guide and encourage students to develop and create new trading strategies based on the inspiration of classic strategies and indicators, and test them with procedures. The purpose of commercialization of trading strategies is to select a number of properly optimized and effective strategy combinations from the classic strategies according to the characteristics of each trading variety and its different periods, which are the strategy combinations with positive returns, so as to realize the ideal profit goal of the account. Mastering the commercial development of trading strategies is the core of procedural teaching.

3 Conclusion

The modern apprenticeship system that the Ministry of Education is promoting in an all-round way has effectively promoted and will promote vocational education and training in a more all-round way to absorb new technologies, new processes, new norms and typical production cases in a timely manner. At present, the forefront of the securities and futures investment industry is quantitative trading and procedural trading. Quantitative trading and procedural trading have also become the professional environment and key capabilities of the current investment industry. In the face of a brand-new professional environment and key capabilities, with the aid of simulation software, Wenhua Finance WH8, a brand-new professional environment is built, one person, one machine, and efficient guidance and training are conducted, effectively realizing the field expansion
from "in school" education and training of traditional education to "in profession", and transforming "professional skills" teaching into "key capabilities" of programmed trading. By quantifying, graphing and programming the trading system, programming, back testing, optimization, operation, etc. are realized. Reaching business strategy development, placing students in the forefront of the professional environment, and cultivating the key ability of procedural trading play a decisive role in the comprehensive promotion of modern apprenticeship system for investment majors. Combined with simulated trading, the participants felt challenging and fulfilling. The practical results of teaching and training have proved the effectiveness of this method, which provides a reference for the introduction of the latest procedural technology into investment courses under the background of modern apprenticeship system.

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