

Innovative and Active Approach to Teaching Finance

In Chapter 7, I discussed the teaching methods and educational philosophy and in Chapter 8, I explained how I trained Ph.D. students in finance and accounting. In this chapter, I will discuss and present my experiences using an innovative and active approach to teaching finance. This experience comes not only from my teaching in the classroom, but also from writing and editing textbooks, editing journals, consulting, and organizing conferences. I believe finance is based upon the knowledge of accounting, mathematics, economics, statistics, and computer technology. Therefore, I use this kind of view to teach not only undergraduate and master's students, but also to teach Ph.D. students in finance, accounting, and economics. The goals of training Ph.D. students in finance are to command the capacity and ability to do meaningful research, to learn how to effectively teach undergraduate, master's, and Ph.D. students, and to learn the knowledge that can make them capable and effective individuals in the finance industry.

If we review the history of business schools in the United States, the first Department of Finance was started at the University of Illinois at Urbana-Champaign in 1964. I was hired there in 1976 to improve the

quality of research, teaching, and services. I was assigned to complete the following:

1. Move finance education from a qualitative approach to a quantitative approach.
2. Start a master's program in finance and improve the quality of the Ph.D. program.
3. Propose an interdisciplinary approach to the Ph.D. program (i.e. integrate finance with economics or accounting).

During my time at UIUC, I was able to achieve these goals, and I was later hired by Rutgers University at New Brunswick to set up a new Department of Finance to mimic the UIUC program.

In August 1988, I came to Rutgers University with the help of Professor Oded Palmon and others. We set up the Department of Finance based on three principles: a quantitative approach, a project approach, and an internship approach. Since Rutgers University is adjacent to the global center of finance, students have a higher chance of obtaining internships than at UIUC, which is located in a remote area. To my best knowledge, when UIUC set up their land-grant university, they tried to find a location at the center of the state, surrounded by farmland to allow students to focus and study.

Both the University of Georgia and UIUC are flagship universities. The students at these universities have an outstanding high school background, and their mathematical knowledge is better than the average high school students. Since the education level of New Jersey high schools is just as good as Illinois and Georgia, a state university like Rutgers University therefore has an advantage, as far as location is concerned. I believe we should fully utilize and glorify their quantitative background. A person's IQ is partially born with them; it also known that IQs can be improved by exposed training. I believe quantitative training can improve a student's IQ. Without analytical training, students cannot perform well in their jobs. In addition, applying

computer programming to student projects can also enhance students' IQs and make them more marketable in the job market.

When I was in Illinois, I started to use a project approach to teach my undergraduate and MBA students. During that time, students used to go to the library, copy accounting and stock price data information from financial data publications, keypunch it into cards, and run statistical analyses on main frames. After they analyzed the data, they would write a term project and present it in class.

It is often said that the best way to learn is by doing. Understanding how textbook concepts and theories can be applied to real world situations is essential. Making this connection is what sets one job candidate apart from another. After students complete their projects, they are almost ready to understand the foundations of how companies work. I incorporated a project approach in all my courses, where students have to perform case scenarios of various financial topics to specific companies, and ultimately analyze components and statistics of the company.

During the last 43 years, I have taught the following courses: Investment Analysis, Futures and Options, Asset Pricing and Portfolio Analysis, and Corporate Finance. In each course, students are required to work on a term project comparing the various financial topics of either two or three companies. The following is a discussion on the investment analysis course based upon the syllabus in Appendix 9A.¹ This syllabus is divided into four parts: Part I states both required and reference textbooks used for the course, Part II reviews the grading policy, Part III goes over the topics which are covered in the course, and Part IV is the table of contents for the course project.

From the projects' tables of contents and the syllabi presented in this autobiography's website (<http://www.worldscientific.com/worldscibooks/10.1142/10182>), we can see how these three courses are interrelated. For example, there is a 30 percent overlap between Investment Analysis and Futures and Options and a 25 percent overlap

¹ In the website for this autobiography (<http://www.worldscientific.com/worldscibooks/10.1142/10182>), we will discuss not only investment analysis, but also futures and options, asset pricing and corporate finance courses.

between Investment Analysis and Asset Pricing and Portfolio Analysis. There is certainly a relative overlap between all three courses. I believe Futures and Options is the most important course for finance majors. This course teaches students new concepts, theories, and methodologies. The topics covered in Futures and Options applies to other financial courses. In other words, Futures and Options is just like soy sauce, which is used to cook many Chinese dishes.

In 2013, I published a book, *Security Analysis, Portfolio Management, and Financial Derivatives*, with my son, daughter, Professor Finnerty, and Professor Wort. This book was designed for three different courses — Investment Analysis, Portfolio Management, and Futures and Options with some supplemental materials.

In addition to the book mentioned above, I wrote some supplemental chapters to support our textbook. Books, such as the *Encyclopedia of Finance*, which I edited with my daughter, Alice C. Lee, and a statistics book, which I wrote with both my son and daughter, are also used to supplement the classes. This kind of innovative and active teaching approach is not only beneficial to students, but it also helps me improve my own knowledge about company analyses.

Using the required textbook and supplement materials, I lecture about the above-mentioned courses as follows.

1. Use extensive and complete PowerPoint presentations in lectures on the material.
2. Ask students to review the PowerPoint presentations and read the textbook.
3. Assign homework based on the textbook.
4. Bring students to computer labs and show them how to collect accounting and financial data, and to use Excel programs to do their projects.
5. Make students write the term project in accordance with the project outlines mentioned above and those presented in Appendix 9A.

Every semester I give two exams. Each exam includes a take home test, which is worth 25 percent and a class test, which is worth 75 percent. The take home test portion contains one or two essay questions and one derivation question, which asks students to apply calculus to derive some equations. The take home portion allows students to work with each other as well as my assistant and myself.

I also frequently teach Corporate Finance. I have written three books related to corporate finance; they are *Essentials of Financial Management*, *Corporate Finance*, and *Financial Analysis Planning and Forecasting: Theory and Application*.

In my experience, these four courses are interrelated. The Investment Analysis course is a prerequisite course for both Futures and Options and Asset Pricing and Portfolio Analysis. In the investment course, we need to teach students about the financial instruments and markets. Then we need to review students' accounting knowledge and their knowledge of finance theories and methods, which they learned from the financial management course. It is important to ask students to collect data on stock prices and the market index in order to calculate stock rates of returns. Then based upon their statistical knowledge and Excel program techniques, students need to calculate the average return, standard deviation, and skewness, and then they need to perform a risk return trade off analysis.

I use 12 chapters to cover all of the topics students need to know to have an understanding of investment analysis. A more detailed look at the content I cover in Investment Analysis can be found in Appendix 9A. In Chapter 1, we cover financial markets and financial instruments, which students are required to know. In Chapter 2, we review four financial statements for a company and show students how regression analysis can be applied to analyze this financial data. In Chapter 3, we use stock price and stock index to show how rate of return and market rate of return can be calculated. In addition, the growth rate of a company is also discussed. Finally, I show students how standard deviation can be calculated and show how risk return trade off can be demonstrated. In Chapter 4, we discuss alternative finance theories, such as classical theory, neoclassical theory, CAPM, APT, and options

and futures. In Chapter 5, we first discuss alternative corporate bond, which has been issued by a company, then we use alternative methods to evaluate corporate bonds. In Chapter 6, we show students how alternative market indexes such as Dow Jones Index and the S&P 500 index can be compiled. In addition, we also show how these market indexes can be used to calculate market rate of return and be applied to financial analysis.

In Chapter 7, I discuss how sources of risk can be defined and analyzed. First, I classify the corporate risk into business risk and financial risk, and then I show how total risk can be also classified into systematic risk and nonsystematic risk. The application of these risk classifications will be explicitly used in the next chapter. In Chapter 8, we discuss the concept of risk-aversion, capital asset allocation, and the Markowitz model. We first discuss the definition of risk-aversion, and then we discuss how capital asset can be allocated in a portfolio. Finally, we show how the Markowitz model can be used to calculate an optimal portfolio. In Chapter 9, we discuss how capital asset pricing model can be derived and applied in financial analysis. In addition, we show how beta coefficient can be estimated and forecasted in terms of two alternative methods. In Chapter 10, the definition of option is carefully defined. In addition, we also show how seven alternative option strategies can be formulated. In Chapter 11, we discuss option pricing theory and how they can be used to determine firm valuation. In this chapter we explicitly show how Black–Scholes option pricing model can be derived, then we show how the option instrument can be evaluated in terms of Black–Scholes model. Finally, in Chapter 12, we show students how technical, fundamental, and contrarian method can be used to analyze the value of securities. Then we discuss alternative mutual funds and finally we show how mutual fund performance can be analyzed and determined.

In this class, we not only require students to do homework, we also require students to write a term paper. This term paper includes six sections. Section A is an introduction describing the company and project framework. Section B is an analysis of the company's financial statement and a ratio analysis. Section C discusses rate of return, market

models, and CAPM. In Section D, students perform a portfolio analysis and evaluation of the company they chose. Section E is dedicated to option strategy and valuation, and Section F is a summary and includes any concluding remarks. Finally, students should have a reference section to describe the references they used for their term paper. In this term paper students should use Excel to do their empirical results related to Section C, Section D, and Section E.

From my experience and subjective opinion, students can start to learn some financial data analysis right from their beginning statistics course. Since I believe this to be true, I wrote a book entitled *Statistics for Business and Financial Economics*, which was published in 1993, 2002, and again in 2013. To my best knowledge, this business statistics book is the only book using finance, accounting, and economic data throughout the whole book. From the table of contents in this book, which is presented in Appendix II, I suggest a project approach to teaching a statistics course. Overall I use this type of approach to teach investment analysis, asset pricing and portfolio analysis, futures and options, and corporate finance. From my personal experience, it is best to use a project approach instead of Harvard's case approach to teach finance courses because the project approach is more innovative and active for training students.

In general, there are two alternative methods for teaching finance: traditional method and case method. By using traditional method, teachers only lecture on the material from the textbook and assign homework. In addition, they require students to take two or three exams. For the case method, teachers present different cases and let student discuss all of the cases with supplement text materials. It also requires students to take some tests. It is clear that in the traditional method students don't have a chance to relate to the real world. However, the case method guides students to understand real world issues. Unfortunately, materials used for the case method are generally out of date. The innovative and active approach I mentioned in this chapter try to strike a balance between the traditional method and case method.

Now we will go one step further and discuss the advantages of my innovative and active approach to teaching finance. As previously

mentioned, I ask students to complete some homework. In addition, I also require students to do a project to analyze two companies' accounting information, stock price information, and option and futures information. This project involves a 30- to 50-page term paper and must be written by a team of two students.

For example, in one of my classes, two students used Delta Air Lines and American Airlines, two well-known airlines in the U.S., as the companies for their project.

Based on data from 2013, the students used these two companies to make a comparison for financial analysis. In Section B, they calculated the financial ratios for each of the two companies and made a comparison. For example, the current ratio is calculated as the current asset divided by current liabilities. Delta Air Lines has a current ratio of 0.62 and American Airlines has a current ratio of 0.58. The current ratio is one of the liquidity ratios that are calculated from the information on the balance sheet and measure the relative strength of a firm's financial position. That is the liquidity is higher for Delta Air Lines than for American Airlines. For the leverage ratio, which is defined as debt to equity ratio, Delta Air Lines is 21.9 and American Airlines is 0.57. That means Delta uses more debt financing and bears a higher financial risk. In Section C, they estimated the beta coefficient by regressing the past monthly returns for each of these two companies on the S&P 500 index. The beta estimated for Delta is 0.76 and for American, 2.02. Thus, the systematic risk for American Airlines is higher than that of Delta Air Lines. Then by using the estimated beta, risk-free rate and market risk premium, they estimated the expected return by using CAPM for these two companies. The expected return for Delta Air Lines was 0.0158 and American Airlines was 0.0253. In Section D, they did the portfolio analysis that consists of Delta Air Lines and American Airlines by minimum variance approach, Markowitz Approach, and Sharpe Performance Measure Approach. In Section E, they constructed seven option strategies and evaluated the call and put options values for each of the two companies. The seven option strategies include: long/short straddle, spread (Bullish and Bearish by using Call and Put options), protective put, cover call, and collar. They evaluated the call and put

options values by using the Black–Scholes Option Pricing Model and put-call parity. The call option value for Delta was 9.4 and American was 8.9. The put option value for Delta was 8.65 and American was 1.78. The hedge ratio was calculated by using the estimated call and put option values. The hedge ratio for Delta was 0.49 and American Airlines was 1.0. By definition, the hedge ratio is the number of shares of stock needed to buy for each call option sold. For Delta, 0.43 shares of the stock should be bought for each call option sold and for American Airlines, one share of stock should be bought for each call option sold. In conclusion, they found that while Delta Air Lines is doing better than American Airlines in that it has less debt, it still lacks in the total asset utilization area.

From the project discussed above students can actively learn the following knowledge. First, students learn how to collect data needed to analyze the companies, which are related to the course lecture materials. Second, students learn how to apply accounting and market information, such as stocks price and options price. The byproduct of the project for students is that they learn how to use statistics and Microsoft Excel, a program that is necessary to understand in order for students to find a job in the industry, to analyze the data. Finally, students write a complete project, from which they learn how to write and present the report. In Chapter 12 entitled, “Editing Journal and Writing Books,” I will discuss how and why I wrote textbooks and reference books to be used for innovative and active teaching in finance.

Appendix 9A

Syllabus for Investment Analysis

I. Textbooks:

A. Required books:

1. *Security Analysis, Portfolio Management, and Financial Derivatives*

by Cheng-Few Lee, Joseph Finnerty, John C. Lee, Alice C. Lee, and Donald Wort

World Scientific Publishing, 2013

2. Supplement Chapter 1 Financial Markets and Financial Instruments
3. Supplement Chapter 2 Raising Equity Capital and Security Trading

B. Reference textbooks:

1. *Statistics for Business and Financial Economics*

by Cheng-Few Lee, John C. Lee, and Alice C. Lee

Springer, Third Edition, 2013

2. *Encyclopedia of Finance*

by Cheng-Few Lee and Alice C. Lee

Springer, Second Edition, 2013

II. Grading Policy

1 st Exam.....	20%
Term Project.....	30%
2 nd Exam.....	30%
Class Performance	10%
Homework assignments.....	10%

III. Topics to be covered:

1. Introduction: Financial Markets and Financial Instruments
Lee *et al.*, Chapter 1 and Supplement Chapter 1
 - 1.1. Introduction of the Course
 - 1.2. Financial Markets
 - 1.3. Financial Instruments
 - 1.4. Money Markets
2. Accounting Information and Regression Analysis
Lee *et al.*, Chapter 2
Encyclopedia of Finance, Chapter 72
3. Common Stock: Return, Growth, and Risk
Lee *et al.*, Chapter 3 and Supplement Chapter 2
Encyclopedia of Finance, Chapter 64
 - 3.1. Raising Equity Capital
 - 3.2. Security Trading
 - 3.3. Return
 - 3.4. Growth Rate
 - 3.5. Risk
4. Introduction to Valuation Theories
Lee *et al.*, Chapter 4
Encyclopedia of Finance, Appendix A (Derivation of Dividend Discount Model)

5. Bond Valuation and Analysis
Lee *et al.*, Chapter 5 and Supplement Chapter 1
6. The Uses and Calculation of Market Indexes
Lee *et al.*, Chapter 6 and Supplement Chapter 1
7. Sources of Risks and Their Determination
Lee *et al.*, Chapter 7
Encyclopedia of Finance, Appendix E (Derivation of Minimum-Variance Portfolio)
Encyclopedia of Finance, Appendix F (Derivation of an Optimal Weight Portfolio Using the Sharpe Performance Measure)
8. Risk-Aversion, Capital Asset Allocation, and Markowitz Model
Lee *et al.*, Chapter 8
9. Capital Asset Pricing Model and Beta Forecasting
Lee *et al.*, Chapter 9
Encyclopedia of Finance, Appendix I (Derivation of Capital Market Line (CML))
Encyclopedia of Finance, Appendix J (Derivation of Security Market Line (SML))
10. Options and Option Strategies
Lee *et al.*, Chapter 16
Statistics for Business and Financial Economics, Chapters 7 and 13
11. Option Pricing Theory and Firm Valuation
Lee *et al.*, Chapter 17
12. Security Analysis and Mutual Fund Performance
Lee *et al.*, Chapter 21

IV. Table of Contents for Investment Analysis Project

Title: Investment Analysis for Companies A and B

Section A: Introduction

1. Company Description
2. Project Framework

Section B: Financial Statement Analysis and Ratio Analysis

1. Procedure for Comparing Cash Flow Statement
2. Ratio Analysis
3. Ratio Analysis Interpretation

Section C: Rate of Return, Market Models, and CAPM

Section D: Portfolio Analysis and Evaluation

1. Equal Weights Method
2. Optimal Weights by Minimal Variance Approach
3. Optimal Weights by Markowitz Model

Section E: Option Strategy and Valuation

Section F: Summary and Concluding Remarks

References