Business Economics 365

Portfolio Theory and Analysis

Fall 2018

Instructor: Professor Gang Wang

Lectures: MWF 11-11:50am, Morgan 201

Office: Morgan 201

Office Hours: MWF 9-10:00am, or by appointment

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Text: Investments, 11th edition, by Bodie, Kane and Marcus. You might want to buy 10th edition which is very similar. However, earlier editions are significantly different.

Overview:

The objective of the course is to study the theory and empirical evidence relevant for investing, particularly in the context of portfolio management. The course may be of interest to those who wish to make economically sensible investments either for themselves or as part of their career, perhaps as portfolio analyst or a manager of a pension or investment fund. We will discuss the evaluation of different assets including bonds, equities, and derivatives, but the focus is on the construction and evaluation of portfolios through the portfolio theory. The major topics include:

- security markets and the investment industry
- risk-return analysis and portfolio theory
- arbitrage pricing theory (APT) and multifactor models
- portfolio performance evaluation
- evaluation of assets including bonds, stocks, options, futures

Prerequisites:

Econ 110, basic finance/accounting courses are recommended

Attendance:

Attendance is required. You will earn the full 5% if you attend all the classes (excused absence needs my approval). Frequent absences will reduce your final grade.

Moodle:

We will be using the Moodle course management system in this course. All assignments, handouts and links to websites and data sets will be posted on Moodle. It is your responsibility to check it on a regular basis.

Project:

A guide for the portfolio project is provided at the end of the syllabus.

Homework:

Homework will be assigned several times during the semester. Homework is due at the due date specified on each assignment and late submission will not be accepted.

Class Participation:

During class times students will have an opportunity to earn extra-credit points for class participation. Some class sections will begin with a short quiz based on the material discussed in the last class. During the class sections, I will give you some problems for you to work on in class. You can earn points when you provide appropriate answers for those questions and problems.

Tokens will be handed out to students who ask relevant questions or make substantive comments during class. The instructor will be the sole judge of the appropriateness of comments. Students can earn **up to two tokens per class session**. Students are free to participate after they have earned the maximum number of tokens for that class. Tokens must be turned in at the end of class. Each token worth 0.05 points.

Each point worth 1% of the final grade. If the total points you earn for the whole semester are over 5 (5% of the final grade), the extra points will be treated as bonuses.

Midterms:

There will be **two midterm exams** offered during the semester. No make-up midterm exams will be given. If you have to miss an exam, you need to provide a documented serious reason in advance, which will be subject to my approval. If approved, the weight

of the exam you missed will be distributed evenly across the remaining exam(s). Without prior communication or approval, you get a score of zero on the exam you miss.

Grades:

Exam 1 (20%), Exam 2 (20%), Final Exam (20%), Project (20%), Homework Assignments (10%), Attendance (5%), and Class Participation (5%)

Letter Grade Distribution:

>=93.00	A	[77.00, 79.99]	C+
[90.00, 92.99]	A-	[73.00, 76.99]	C
[87.00, 89.99]	B+	[70.00, 72.99]	C-
[83.00, 86.99]	B	[60.00, 69.99]	D
[80.00, 82.99]	B-	<=59.99	F

APEX:

Students should inform me of documented, special accommodation needs with regards to taking exams, as early in the semester as possible. All discussions will remain confidential. Contact the Learning Center to arrange exam accommodations and to enquire about other student resources.

Ethics:

Violations of the College's code of ethics (e.g. plagiarism or cheating) will be reported to the Dean of the Faculty and have the potential of serious punishment.

Tentative Course Line:

The following is a tentative outline of the topics covered in the course. All topics are subject to change and additional readings may be added. Check frequently the Moodle course page for revisions.

Date	Chapter #	Short Description
Aug 22, 24	1	Syllabus, introduction
Aug 27, 29, 31	1, 4	Financial crisis, Investment funds
Sep 3, 5, 7	5	Risk and return of assets
Sep 10, 12, 14	6	Optimal portfolio of one risky asset and a risk-free asset, CAL, CML

Sep 17, 19, 21	7	Optimal portfolio with two risky assets, Mean-variance analysis
Sep 24, 26	7	Markowitz portfolio optimization model
Exam 1 on Friday, Sep 28		
Oct 1, 3, 5	9, 10	CAPM, APT, Fama-French model, multifactor model
Fall Break		
Oct 15, 17, 19	13	Evidence on security returns
Oct 22, 24, 26	24	Portfolio performance evaluation
Oct 29, 31, 2	14	Bond evaluation
Nov 5, 7, 9	15	Term structure of interest rates
Exam 2 on Monday, Nov 12		
Nov 14, 16	18	Equity evaluation (DDM, FCF, Price multiples)
Nov 19	18	Equity evaluation continued
Thanksgiving		
Nov 26, 28, 30	20, 21	Options
Dec 3, 5, 7	22	Futures
Project due on Wednesday, December 5		
Final Exam on Monday, December 10 at 9:00am in Morgan 201		

Project Guide

Introduction:

This project is an opportunity for you to test our classroom theories empirically and behave like a "portfolio manager". **It should begin this week (the first week of semester)**. You are to construct a hypothetical portfolio, keep track of its value for the semester, and evaluate its performance. How your portfolio actually performs is irrelevant to your grade, but how you evaluate it counts 20%. Papers are due in class on Wednesday December 5, 2018 and are to be typewritten (word processed) and double spaced. Projects submitted late will receive a grade of zero. You are expected to do this project independently without outside help from others.

Instructions:

1. Choose a portfolio of any dollar amount containing ten different securities consisting of at least two common stocks from each of the large-cap (>$6 Billion), mid-cap (less than large, but > $2 Billion), and small-cap (smaller than mid-cap) categories along with two corporate bonds. Make round-lot purchases only.

2. Use Excel to record the price of each security at Friday's closing prices (use YahooFinance for equities and The FINRA Database for bonds and the Barrons Data Center for Treasury Securities) for this and the next fourteen weeks. You will also construct a benchmark (market) index based on Friday's prices and compare its performance to that of your portfolio. On a weekly basis, compute the total value of the portfolio and the rate of return on both the portfolio and the market index. You will have fifteen values and fourteen rates of return for each. You may buy and sell securities, but the proportions listed above must be maintained. The market value of new securities purchased cannot exceed the proceeds from the securities sold. Any cash balances are assumed to earn the T-bill rate of interest for bills maturing December 6, 2018 (*as of the start of the project*). Note: this rate is an "opportunity cost" and doesn't change during the course of the project.

A **sample** of Excel spreadsheet showing these calculation is named "**Project worksheet sample**" on **Moodle**.

3. When your data are complete, compute:

1) The mean rate of return on your portfolio and the policy (market) index established at the beginning of the semester.
2) The standard deviation of the weekly rate of return on your portfolio and on the market index.
3) The covariance between your portfolio's rate of return and the index rate of return.

4) The alpha and beta for your portfolio. Also draw the characteristic line for your portfolio on graph paper along with a scatter plot of the points you used in your calculations. You may use Excel or Stata to create the scatter plot and characteristic line.
5) The Sharpe ratio, Treynor ratio, Sortino ratio, Jensen's alpha, upside beta, downside beta and Information ratio of your portfolio's performance. (The risk-free rate is the Treasury Bill yield as quoted the first week of class for Bills maturing the week of December 6, 2018.)

A **spreadsheet** showing various calculation of these measures is named "**Performance measures example**" on **Moodle**.

4. Briefly answer the following questions:

1) What procedure did you follow in selecting the securities in your portfolio?
2) Was your portfolio well diversified? How do you know?
3) Did your portfolio do well for the risk that you assumed? Explain using any of your calculated results that are helpful
4) What role did your asset allocation and stock selections play in your results, i.e, were you a good "active manager"?
5) How big a difference would transactions costs make to your portfolio's performance?
6) What would you do differently in selecting a portfolio now? Why?

Format of the project:

The text should be typewritten and double spaced. Calculations and spreadsheet working papers sufficient to support your conclusions must be included in an organized and comprehensible form, but need not be typed.

Your project should include these parts as follows:

1. First Few Pages:

Ledger: List the names of the securities included in your portfolio at the present time, the exchanges on which they can be found, and the number of shares held of each. After these, list the names of any securities that you previously held, the number of shares, and the date they were sold.

Summary Statistics: Show the results you found in "Instructions, part 3", for example, the mean weekly return, the standard deviation of these returns, alpha, beta, Sharpe, Treynor, and so on. (Remember the risk-free rate (Treasury bill rate) is quoted as an annual rate, you need to divide it by 52 to get the weekly rate which is consistent with the frequency of your data.)

2. Analysis Pages:

The analysis of your portfolio follows the cover page. This would include, but is not limited to, answering the questions from Part 4 of the portfolio project description distributed at the beginning of the course. Be sure to include here a graph of your portfolio's characteristic line.

3. Supporting Documents:

Computations and the spreadsheet reports necessary to support your statistics and analysis should be included at the end of the paper. These should be legible and arranged in an orderly fashion.

Note: Number the pages for a better reading experience.