Rutgers Business School--Newark & New Brunswick
MQF 22:839:571:31, Financial Modeling I
Spring 2020

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Academic Integrity
All students are expected to know, understand and live up to the standards of academic integrity explained at http://academicintegrity.rutgers.edu/integrity.shtml. The minimum penalty for any cheating in an exam is the immediate failure of the course. The minimum penalty for any plagiarism in an assignment is a zero point for the assignment.

Policy on Electronic Devices in the Classroom
Students are not allowed to use the computer or other electronic devices to chat, email or surf the internet in class. Unauthorized use of the computer or other electronic devices during an exam will be considered cheating and will result in the immediate failure of the course.

Course Description
This is a quantitatively-oriented financial economics course for the Master of Quantitative Finance (MQF) students. The course covers the basic concepts and analytical techniques of modern portfolio theory and asset pricing. Topics include Fisher separation, risk analysis using expected utility theory, mean-variance analysis, capital asset pricing model, arbitrage pricing theory, state preference theory, consumption-based asset pricing, market efficiency, empirical tests of asset pricing models, and market anomalies.

Main Text
Pennacchi, George, 2008, Theory of Asset Pricing, Pearson Addison-Wesley, ISBN 13-978-0-321-127720-4.

Other References
1. Francis, Jack Clark and Dongcheol Kim, 2013, Modern Portfolio Theory, Wiley, 978-1-118-37052-0.
2. Huang, Chi-fu and Robert Litzenberger, 1988, *Foundations for Financial Economics*, Prentice-Hall, ISBN 0-13-500653-8.
3. Back, Kerry, 2017, *Asset Pricing and Portfolio Choice Theory*, 2nd ed., Oxford University Press, ISBN 978-0-19-024114-8.
4. Ang, Andrew, 2014, *Asset Management*, Oxford University Press, ISBN 978-0-19-995932-7.
5. Copeland, Thomas E. and J. Fred Weston, 2005, *Financial Theory and Corporate Policy*, 4th ed., Addison-Wesley Publishing Company, ISBN 0-321-12721-8.
6. Cochrane, John, 2005, *Asset Pricing*, second edition, Princeton University Press, ISBN 978-0-691-12137-6.
7. Campbell, John Y., Andrew W. Lo and A. Craig MacKinlay, 1997, *The Econometrics of Financial Markets*, Princeton University Press, ISBN 0-691-04301-9.

Grading Policy
1. Exam I, Wed, 3/4/20, 30%
2. Exam II, Wed, 4/29/20, 30%
3. Problem sets, 20%
4. Group project, 15%, due 5/6/20
5. Class participation, 5%

Active class participation is extremely important and can affect your grade.

Exams are close-book, close-note. Homework must be submitted in hardcopy.

Group Project
The class will be divided into groups, each of which consists of no more than 5 students. Each group is required to do a simple portfolio investment project. A notional $1 million is provided for your investment. Trading is restricted to the 30 stocks in the DJIA and the 1-month T-bill. Short sale and margin trading are both allowed. Assume a one-way transaction cost of 20 basis points for trading stocks. Securities are bought/sold once a week (every Friday) for 15 weeks (1/25-5/1). You must report to me your transactions every Friday after trading by e-mail, or I will assume that you do not trade in that week. Each purchase/sale should be justified on the basis of current market conditions and finance principles. Each group will write a report and do a presentation in class. Your report must explain the rationale of your trading, report the weekly profit and loss of your portfolio and provide key summary statistics of the portfolio performance over the trading period. In particular, the summary statistics must include the following: portfolio mean return, standard deviation, t-ratio of mean return (and statistical significance), excess return over the T-bill (and statistical significance), excess return over the DJIA return (and statistical significance), Sharpe ratio, market beta, market alpha (and statistical significance), Fama-French betas, Fama-French alpha (and statistical significance), Treynor measure ($(\bar{r}_p - \bar{r}_f)/\beta_p$), M^2 measure (portfolio outperformance relative to the market), appraisal ratio ($\alpha_p / \sigma_{\varepsilon_p}$), best weekly return, worst weekly return, number of winning weeks, number of losing weeks, and maximum consecutive losing weeks. You should do the analysis on a before-cost basis and on an after-cost basis. The final report is due on 5/6/20. You are graded on the performance of your portfolio as well as the quality of your analysis.

Topics Covered (tentative, subject to change)

I. Review of Expected Utility Theory and Risk Aversion
Pennacchi, 1; Copeland-Weston, 3; Huang-Litzernberger, 1, 2; Francis-Kim, 4

II. The Mean-Variance Analysis
Pennacchi, 2; Copeland-Weston, 5; Huang-Litzernberger, 3; Francis-Kim, 5, 6, 7

III. Market Equilibrium, CAPM and Factor Models
Pennacchi, 3; Copeland-Weston, 6; Huang-Litzernberger, 4; Francis-Kim, 12, 13

IV. State Preference Theory and Equilibrium under Complete Markets
Pennacchi, 4; Copeland-Weston, 4; Huang-Litzernberger, 5

V. Market Efficiency and Test of Asset Pricing Models
Copeland-Weston, 6; Campbell, et al, 5, 6; Cochrane, 12, 15; Francis-Kim, 14

VI. Market Anomalies and Active Investment Strategies
Notes to be distributed

VII. Multi-period Portfolio Choice and Asset Pricing (if time allows)
Pennacchi, 5, 6

Appendix

30 Companies in the DJIA Index			
Company	Exchange	Symbol	Industry
3M	NYSE	NYSE: MMM	Conglomerate
American Express	NYSE	NYSE: AXP	Financial services
Apple Inc.	NASDAQ	AAPL	Information technology
Boeing	NYSE	NYSE: BA	Aerospace manufacturer and Arms industry
Caterpillar Inc.	NYSE	NYSE: CAT	Construction and Mining
Chevron Corporation	NYSE	NYSE: CVX	Petroleum industry
Cisco Systems	NASDAQ	CSCO	Information technology
Dow Inc.	NYSE	NYSE: DOW	Chemical industry
ExxonMobil	NYSE	NYSE: XOM	Petroleum industry
Goldman Sachs	NYSE	NYSE: GS	Financial services
IBM	NYSE	NYSE: IBM	Information technology
Intel	NASDAQ	INTC	Information technology
Johnson & Johnson	NYSE	NYSE: JNJ	Pharmaceutical industry
JPMorgan Chase	NYSE	NYSE: JPM	Financial services
McDonald's	NYSE	NYSE: MCD	Food industry
Merck & Co.	NYSE	NYSE: MRK	Pharmaceutical industry
Microsoft	NASDAQ	MSFT	Information technology
Nike	NYSE	NYSE: NKE	Apparel
Pfizer	NYSE	NYSE: PFE	Pharmaceutical industry
Procter & Gamble	NYSE	NYSE: PG	Fast moving consumer goods
The Coca-Cola Company	NYSE	NYSE: KO	Food industry
The Home Depot	NYSE	NYSE: HD	Retailing
The Travelers Companies	NYSE	NYSE: TRV	Financial services
The Walt Disney Company	NYSE	NYSE: DIS	Broadcasting and entertainment
United Technologies	NYSE	NYSE: UTX	Conglomerate
UnitedHealth Group	NYSE	NYSE: UNH	Managed health care
Verizon	NYSE	NYSE: VZ	Telecommunication
Visa Inc.	NYSE	NYSE: V	Financial services
Walgreens Boots Alliance	NASDAQ	WBA	Retailing
Walmart	NYSE	NYSE: WMT	Retailing