



MBA 792B - Syllabus

Capital Markets and Allocation: *Quantitative Analysis*

Module III - Spring 2023

Administrative Information

Instructor: Dr. Gill Segal, Assistant Professor of Finance

Email: Gill_Segal@kenan-flagler.unc.edu

Office: McColl 4113

Phone: (919) 962-3854

Office Hours: Tuesdays 12:30-1:30PM

Exam/Final Project: ~Between March 2–5; TBD

Class Sessions

Capital Markets Lab (McColl 2550); Tuesdays and Thursdays; 11:00AM-12:20PM

Prerequisites

Students must be comfortable with fundamentals of statistics, regression analysis, and calculus. No prior programming knowledge is required other than basic usage of Excel.

Overview

The class covers quantitative and systematic approaches for allocating capital across financial instruments. Specifically, the focus of the class is on factor investing, and its implementation in equity capital markets. This investment strategy is widely employed in the industry by hedge funds and mutual funds. Following the introduction of new investment products, it is also used by a growing number of retail investors. The goal of the class is to: (1) introduce the analytical building blocks required for quantitative investors, (2) familiarize databases that are key for quantitative investment, and (3) implement the methods in excel.

The basic take-away from introductory finance classes is that individual stock holding is not efficient: it is always possible to find a well-diversified portfolio that yields the same reward as the individual stock, but with lower risk. Investor should not allocate all of their capital to a specific security – rather, they should engage in portfolio selection. But which portfolios are better? Factor investing provides an answer. Think of factors as representing hard times for investors. Assets that are more sensitive to fluctuations in these risk factors are rewarded with long term premium. The goal is to optimally harvest factor risk premium using well-diversified portfolios.

In the long-term, investors that are exposed to risk factors are able to earn high returns. Yet, there are no “free lunches”. While factor investing typically results in more stable portfolios (compared to individual stock holdings), there is substantial risk. On average, there are high returns to factors because during downturns they can substantially underperform. Factor risk premia also stem from systematic events that are not arbitrated away. Consequently, understanding and managing the underlying macro risks is another core topic of the class.

The class is constructed around five key questions. While each question is always relevant, the execution involves the most recent data and news items. Students taking the class will be expected to be able to provide their own (potentially subjective) answer to each of the following questions:

What is my expectation for the return on the S&P500 for 2023?

- Overview of capital markets and instruments in 2021: fixed-income, equities, and derivative instruments; fundamentals of trading
- Parametric distribution of returns: computation of mean, variance, skewness, kurtosis and VaR in excel
- Obtaining data on leading predictors from FRED, SPF, and Bloomberg (P/D, P/E, CAY, VRP, G/P)
- Predictive regression analysis and model selection in excel

How should I allocate my portfolio of bonds and stocks in 2023?

- Analytical capital allocation between one risky and one risk-free asset
- Properties of covariance and correlations
- Analytical capital allocation between two and three risky assets
- Solving for capital allocation between many risky assets using maximization programs in excel (unconstrained, short-selling constraints)

Should I bet on or against market risk in 2023?

- Review of CAPM: Capital market line, security market line, model assumptions
- Beta computation: precision of estimates and mean-reversion

- Evidence and methodology of Fama & French 1992
- Evidence and methodology of Fama & Macbeth 1973
- Betting against beta strategy in excel

How would I use factor investment to beat the market in 2023?

- Principles of factor investment: value, size, momentum, liquidity, investment, profitability
- Interpreting factors: risk of mispricing?
- Key ideas of investment-based asset pricing
- Long-short portfolios for hedging market risk
- Fundamental of systematic portfolio sort in excel

Which stocks do I think are potentially mispriced now?

- Market efficiency: evidence using event studies
- The factor model of AQR
- The Q-factor model
- Seeking for alpha in the cross-section of equities in excel

Course Materials

There is no required textbook. Prior to each class I will upload the lecture notes in PDF format to Canvas. Part of the lecture notes are common to MBA792A (Capital Markets and Allocation), and part are specifically designed for the empirical quantitative analysis. The lecture notes, along with the discussions in class, encompass all needed materials. Recommended textbooks for additional reference:

1. Investments, by Zvi Bodie, Alex Kane, and Alan Marcus (McGraw-Hill, 8/9/10/11/12/13th Edition; henceforth BKM). Specifically, the relevant chapters for this Module are 1-3, 5-11, and 13.
2. Asset Management: A Systematic Approach to Factor Investing, by Andrew Ang
3. Suggested Readings:
(ordered by publication year – I will refer to these studies in class)
 - Grossman, S. J., & Stiglitz, J. E. (1980). On the impossibility of informationally efficient markets. *The American economic review*, 70(3), 393-408.
 - Chen, N. F., Roll, R., & Ross, S. A. (1986). Economic forces and the stock market. *Journal of business*, 383-403.
 - Bernard, V. L., & Thomas, J. K. (1989). Post-earnings-announcement drift: delayed price response or risk premium?. *Journal of Accounting research*, 27, 1-36.
 - Fama, E. & French, K. (1992). The cross-section of expected stock returns. *Journal of Finance*, 47(2), 427-465.
 - Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of finance*, 48(1), 65-91.

- Sloan, R. G. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings?. *Accounting review*, 289-315.
- Pástor, L., & Stambaugh, R. F. (2003). Liquidity risk and expected stock returns. *Journal of Political economy*, 111(3), 642-685.
- Petkova, R., & Zhang, L. (2005). Is value riskier than growth?. *Journal of Financial Economics*, 78(1), 187-202.
- Zhang, L. (2005). The value premium. *The Journal of Finance*, 60(1), 67-103.
- Welch, I., & Goyal, A. (2008). A comprehensive look at the empirical performance of equity premium prediction. *The Review of Financial Studies*, 21(4), 1455-1508.
- Ang, A., Hodrick, R. J., Xing, Y., & Zhang, X. (2009). High idiosyncratic volatility and low returns: International and further US evidence. *Journal of Financial Economics*, 91(1), 1-23.
- Kogan, L., & Papanikolaou, D. (2012). Economic activity of firms and asset prices. *Annu. Rev. Financ. Econ.*, 4(1), 361-384.
- Frazzini, A., & Pedersen, L. H. (2014). Betting against beta. *Journal of Financial Economics*, 111(1), 1-25.
- Fama, E. & French, K. (2015). A five-factor asset pricing model. *Journal of financial economics*, 116(1), 1-22.
- Lucca, D. O., & Moench, E. (2015). The pre-FOMC announcement drift. *The Journal of finance*, 70(1), 329-371.
- Cieslak, A., Morse, A., & Vissing-Jorgensen, A. (2019). Stock returns over the FOMC cycle. *The Journal of Finance*, 74(5), 2201-2248.
- Huang, D., & Kilic, M. (2019). Gold, platinum, and expected stock returns. *Journal of Financial Economics*, 132(3), 50-75.
- Ball, R., Gerakos, J., Linnainmaa, J. T., & Nikolaev, V. (2020). Earnings, retained earnings, and book-to-market in the cross section of expected returns. *Journal of Financial Economics*, 135(1), 231-254.
- Feng, G., Giglio, S., & Xiu, D. (2020). Taming the factor zoo: A test of new factors. *The Journal of Finance*, 75(3), 1327-1370.
- Gofman, M., Segal, G., & Wu, Y. (2020). Production networks and stock returns: The role of vertical creative destruction. *The Review of Financial Studies*, 33(12), 5856-5905.
- Hendershott, T., Livdan, D., & Rösch, D. (2020). Asset pricing: A tale of night and day. *Journal of Financial Economics*, 138(3), 635-662.
- Hou, K., Mo, H., Xue, C., & Zhang, L. (2021). An augmented q-factor model with expected growth. *Review of Finance*, 25(1), 1-41
- Penman, S. H., & Zhang, X. J. (2021). Accounting for asset pricing factors. Available at SSRN 3881177.

Homeworks

There are five homeworks, one for each question above. The homeworks require downloading recent data, and executing the methods demonstrated in class. The actual due dates will be announced in class. Late submissions are not accepted. You may choose to submit only four out of the five homeworks, but in that case, all four submissions will count. I strongly encourage you to submit all five homeworks. Each homework should be submitted in a group of 3-4 students. If you chose to work in a group, please state the names of all students clearly, and submit only one copy per-group. Each group's composition can change between homeworks at the

discretion of the student(s). After the due date of each homework, I may ask specific students of different groups to discuss their group's analysis and conclusion in class, to spread different perspectives on the questions of interest.

Final Project

The final project of this class substitutes the traditional pen-and-paper exam. The work on the project is at home, with an open-book format. It will resemble a data-driven project in the spirit of the homeworks. The work on the final project should be done individually.

Attendance

Attendance is mandatory. If you miss a class for a reason related to an illness, family emergency, religious observance, or civic obligation, please inform me no later than a week from the date of absence. Active participation in class is strongly encouraged.

Grading

The final grade is aggregated as follows:

Homeworks	40% (10% each; best 4 out of 5)
Final project	50%
Class participation	10%

Guidance

1. Office hours: Tuesdays 12:30-1:30PM, McColl 4113
2. I will do my best to answer questions sent by email:
Gill_Segal@kenan-flagler.unc.edu.

Tentative Schedule

Class	Date	Topic	Reference	Due Dates
1	1/10	Introduction; Financial Markets – Part I	BKM 1, 2, 3	
2	1/12	Financial Markets – Part II	BKM 1, 2, 3	
3	1/17	Financial Markets – Part III + What is my expectation for the return on the S&P500– Part I	BKM 5	
4	1/19	What is my expectation for the return on the S&P500– Part II	BKM 5	
5	1/24	How should I allocate my portfolio? – Part I	BKM 6-7	Submit HW 1
6	1/26	How should I allocate my portfolio? – Part II	BKM 6-7	
7	1/31	Should I bet on or against market risk? – Part I	BKM 8, 9	Submit HW 2
8	2/2	Should I bet on or against market risk? – Part II	BKM 9, 13.1	
9	2/7	How should I use factor investment? – Part I	BKM 10, 13.1, 13.2, 13.3, 13.4	Submit HW 3
10	2/9	How should I use factor investment? – Part II	BKM 10, 13.1, 13.2, 13.3, 13.4	
	2/14	No class – Well-being day		
11	2/16	How should I use factor investment? – Part III	BKM 10, 13.1, 13.2, 13.3, 13.4	
12	2/21	Which stocks do I think are potentially mispriced?	BKM 11	Submit HW 4
13	2/23	Miscellaneous Topics on Smart Beta	BKM 11	
14	2/28	Review		Submit HW 5