

\*\*\* This syllabus is tentative and subject to change as needed.

# Quantitative Analysis in Finance

Period V Spring 2018

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**Office:** G2.10 (Office hours: by appointment)

**Times:** Tuesday, 15:00 - 16:30 and Thursday, 13:00 - 14:30

**Location:** Subject to dates, specified below

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## Course Description

This course covers basic quantitative skills for analyzing financial data. This course reviews academic papers related to empirical asset pricing topics, such as behaviors of securities prices relative to the benchmark asset pricing models. This course also introduce some applications to quantitative analysis, such as the factor-based investing. By the end of the course students, students will be familiar with academic findings on the empirical asset pricing; be familiar with basic quantitative methods for analyzing financial data; be able to implement those skills in the context of developing investment strategies.

## Course Material

The main reference for this course will be the class slides, which will be posted on MyCourses. The readings and other materials will be also provided through MyCourses.

## Prerequisites

Investment Management (28C00300) and Econometrics for Finance (28C00200), or equivalent courses. **Basic skills to manage financial data and conduct statistical analyses are required.**

## Grading Policy

The final grade (0 – 5 scale) is based on total points (max 100 points); combining assignments (50 %) and exam (50 %) points. To pass the course, you have to get at least 40% of exam points, i.e. 20 points. Conditional on that, your final grade is based on the following scale:

$90 \leq x \leq 100$ :	Final grade = 5
$80 \leq x < 90$ :	Final grade = 4
$70 \leq x < 80$ :	Final grade = 3
$60 \leq x < 70$ :	Final grade = 2
$50 \leq x < 60$ :	Final grade = 1
$0 \leq x < 50$ :	Final grade = 0, Fail

In this course, cheating and/or plagiarism (such as copying assignments and/or case studies used in other course and/or from other students) will result in a score of zero on the assignments. For example, if two or more individuals (or groups) assignments are almost identical, BOTH will get a zero score on the assignment. **Any types of cheating activities during the exams will result in, at a minimum, a grade of “0”.**

For a late submission of an assignment, 50% of score for the assignment will be deducted.

## Individual Assignments (20%)

There will be two individual assignments (10% per each). The assignments will contain exercises to apply quantitative skills to the financial data and replicate academic studies. It requires programming skills and basic understanding of econometrics in addition to academic knowledges covered by the lecture. For all individual assignments, it is strictly forbidden to refer other's works. Both results (or answers) and codes to generate the results should be submitted. Detailed instructions will be announced later through MyCourses.

## Group Works (30%)

There will be one group work; developing a quantitative investing strategy involving factor investing. A group can have four or less members. A group of four members is recommended. (The maximum number of members can be adjusted according to number of students enrolled in the class) Each member of a group is expected to motivate others to participate equally.

A final report of maximum 15 pages (15%) and a final presentation of 20-30 mins (15%) will be required. The report should include various quantitative analyses on the developed strategy, such as back-testing, robustness checks, and risk analyses. It does not have to be a completely new strategy or factor. Showing capability of quantitative skills and developing logics for the strategy will be main criteria for the evaluation. Finding a new factor will be a huge plus if it is convincingly robust. Consider yourself as a quant and this report as a proposal to adopt or sell new quantitative investment strategy. Detailed instructions will be announced later through MyCourses.

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## Schedule and Contents

Note: Contents are tentative and are subject to change.

Tuesday, 15:00 - 16:30 and Thursday, 13:00 - 14:30

### #1. Course Orientation and Introduction.

10.4, Tue, G-111 (Chydenia)

### #2. Evaluating asset returns: Time-Series vs. Cross-sectional tests.

12.4, Thu, A-304 (Main)

- Fama, E. F., and French, K. R. 1992. The cross-section of expected stock returns. the Journal of Finance, 47(2), 427-465.
- Fama, E. F., and MacBeth, J. D. 1973. Risk, return, and equilibrium: Empirical tests. Journal of Political Economy, 81(3), 607-636.
- Gibbons, M. R., Ross, S. A., and Shanken, J., 1989, A test of the efficiency of a given portfolio. Econometrica, 1121-1152.
- Fama, E. F., and French, K. R., 1993, "Common Risk Factors in the Returns on Stocks and Bonds," Journal of Financial Economics, 33, 3-56.

### #3. Value Investing.

17.4, Tue, E-127 FINNAIR (Arkadia)

- Lakonishok, J., Shleifer, A., and Vishny, R. W., 1994, Contrarian investment, extrapolation, and risk. *Journal of Finance*, 49(5), 1541-1578.
- Fama, E. F., and French, K. R., 1996, Multifactor explanations of asset pricing anomalies. *Journal of Finance*, 51(1), 55-84.
- Daniel, K., and Titman, S., 1997, Evidence on the characteristics of cross sectional variation in stock returns. *Journal of Finance*, 52(1), 1-33.
- Asness, C. S., Frazzini, A., Israel, R., and Moskowitz, T. J., 2015, Fact, fiction, and value investing.
- **Individual Assignment 1**

### #4. Momentum Investing.

19.4, Thu, E-127 FINNAIR (Arkadia)

- Jegadeesh, Narasimhan and Sheridan Titman, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," 1993, *Journal of Finance*, 48, 65-91.
- Moskowitz, Tobias and Mark Grinblatt, "Do Industries Explain Momentum?," 1999, *Journal of Finance*, 54, 1249-1290.
- Cooper, M. J., Gutierrez, R. C., and Hameed, A., 2004, Market states and momentum. *The Journal of Finance*, 59(3), 1345-1365.
- Hvidkjaer, Soeren, "A Trade-Based Analysis of Momentum," 2006, *Review of Financial Studies*.
- George, T. J., and Hwang, C. Y., 2004, The 52-week high and momentum investing. *The Journal of Finance*, 59(5), 2145-2176.
- Daniel, K., and Moskowitz, T. J., 2016, Momentum crashes. *Journal of Financial Economics*, 122(2), 221-247.
- Asness, C. S., Frazzini, A., Israel, R., and Moskowitz, T. J., 2014, Fact, fiction and momentum investing.
- Goyal, A., & Jegadeesh, N., 2017, Cross-Sectional and Time-Series Tests of Return Predictability: What Is the Difference?, *The Review of Financial Studies*

### #5. Quality Investing, Betting against Beta, and Q-factor Model

24.4, Tue, G-111 (Chydenia)

- Novy-Marx, Robert, 2013, "The Other Side of Value: The Gross Profitability Premium," *Journal of Financial Economics*.
- Asness, C. S., Frazzini, A., and Pedersen, L. H., 2014, Quality minus junk.
- Frazzini, A., and Pedersen, L. H., 2014, Betting against beta. *Journal of Financial Economics*, 111(1), 1-25.
- Frazzini, A., Kabiller, D., & Pedersen, L. H., 2013, Buffett's alpha. *National Bureau of Economic Research*.
- Cederburg, S., and O'Doherty, M. S., 2016, Does it pay to bet against beta? on the conditional performance of the beta anomaly. *Journal of finance*, 71(2), 737-774.
- Hou, K., Xue, C., & Zhang, L. (2015). Digesting anomalies: An investment approach. *The Review of Financial Studies*, 28(3), 650-705.

## #6. Factor Investing: is it robust?

### 26.4, Thu, E-127 FINNAIR (Arkadia)

- Harvey, C. R., Liu, Y., and Zhu, H., 2016, ... and the cross-section of expected returns. *The Review of Financial Studies*, 29(1), 5-68.
- McLean, R. D., and Pontiff, J., 2016. Does academic research destroy stock return predictability?. *Journal of Finance*, 71(1), 5-32.
- Jacobs, H., and Müller, S., 2017, Anomalies across the globe: Once public, no longer existent?.
- Israel, Ronen and Tobias Moskowitz, 2013, The Role of Shorting, Size, and Time on Market Anomalies, *Journal of Financial Economics*, 108, 275-301.
- Hou, K., Xue, C., and Zhang, L., 2017. Replicating anomalies. National Bureau of Economic Research.
- Asness, C. S., Frazzini, A., Israel, R., Moskowitz, T. J., and Pedersen, L. H. (2017). Size matters, if you control your junk.
- **Individual Assignment 2**

## #7. Other Asset Market: Corporate Bonds

### 3.5, Thu, G-111 (Chydenia)

- Merton, R. C., 1974, On the pricing of corporate debt: The risk structure of interest rates. *Journal of finance*, 29(2), 449-470.
- Asness, C. S., Moskowitz, T. J., and Pedersen, L. H., 2013, Value and momentum everywhere. *Journal of Finance*, 68(3), 929-985.
- Eom, Y. H., Helwege, J., & Huang, J. Z. (2004). Structural models of corporate bond pricing: An empirical analysis. *The Review of Financial Studies*, 17(2), 499-544.
- Gebhardt, W. R., Hvidkjaer, S., and Swaminathan, B., 2005, Stock and bond market interaction: Does momentum spill over?. *Journal of Financial Economics*, 75(3), 651-690.
- Jostova, G., Nikolova, S., Philipov, A., and Stahel, C. W., 2013, Momentum in corporate bond returns. *The Review of Financial Studies*, 26(7), 1649-1693.
- Houweling, P., & Van Zundert, J., 2017. Factor investing in the corporate bond market. *Financial Analysts Journal*, 73(2), 100-115.
- Chordia, T., Goyal, A., Nozawa, Y., Subrahmanyam, A., and Tong, Q. (2017). Are capital market anomalies common to equity and corporate bond markets? An empirical investigation. *Journal of Financial and Quantitative Analysis*, 52(4), 1301-1342.
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## #8. Big Data and Machine Learning

### 8.5, Thu, G-109 KPMG (Chydenia)

- Mullainathan, S., and Spiess, J., 2017. Machine learning: an applied econometric approach. *Journal of Economic Perspectives*, 31(2), 87-106.
- Choi, H., and Varian, H., 2012. Predicting the present with Google Trends. *Economic Record*, 88(s1), 2-9.
- Kogan, S., Levin, D., Routledge, B. R., Sagi, J. S., and Smith, N. A. ,2009,. Predicting risk from financial reports with regression. In *Proceedings of Human Language Technologies: The 2009 Annual Conference of the North American Chapter of the Association for Computational Linguistics* (pp. 272-280). Association for Computational Linguistics.
- Abe, M., and Nakayama, H., 2018. Deep Learning for Forecasting Stock Returns in the Cross-Section. arXiv preprint arXiv:1801.01777.
- McLean, R. D., and Pontiff, J., 2016. Does academic research destroy stock return

- predictability?. *Journal of Finance*, 71(1), 5-32.
- Hoberg, G., and Phillips, G., 2010. Product market synergies and competition in mergers and acquisitions: A text-based analysis. *The Review of Financial Studies*, 23(10), 3773-3811.
  - Moritz, B., and Zimmermann, T., 2016, Tree-based conditional portfolio sorts: The relation between past and future stock returns.

### **#9. Group Presentation 1**

15.5, Tue, G-109 KPMG (Chydenia)

### **#10. Group Presentation 2**

17.5, Thu, G-111 (Chydenia)

\*\*\* There will be no lecture on public holidays. (May 1<sup>st</sup> and 10<sup>th</sup>) An individual assignment (i.e., the second individual assignment) will be provided to cover.

\*\*\* The reading list is tentative. The exam will cover all materials and papers that are appeared in the lecture notes.