**Group Projects for Asset Pricing**

These projects are meant to test the ability of the students to estimate and test asset pricing models, and demonstrate understanding of theoretical concepts acquired during the course. The main focus is on cross-sectional tests for CAPM model and its extensions. The projects will be evaluated based on students’ ability to perform the test, understand and interpret its results from the economic and asset pricing point of view. Quality of implementation of statistical methods will be of secondary importance. All results provided in the report should be fully explained and justified. The group works are structured as follows:

1. **Testing Fama-French Factors in the Cross-Section of Global Stock Returns**

Download monthly portfolios for Global stocks sorted on size and book-to-market (<http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/ftp/Global_6_Portfolios_ME_Prior_12_2.zip>). Now use the characteristics-based Global factors constructed as originally proposed in Fama and French (1993, *Journal of Financial Economics*), (download data from <http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/ftp/Global_Factors.zip>).

Perform the exercises a) and b) using only the in-sample period from the beginning of the sample until August 2008 (just before the bankruptcy of Lehman Brothers).

1. Perform the test of the CAPM by running a two-steps Fama-MacBeth regression. Fully interpret the results and comment upon the validity of the model and its ability to explain the cross-section of the portfolio returns.
2. Add the additional factors’ betas and test the extended model. Fully interpret the results and comment upon the validity of the model and its ability to explain the cross-section of the portfolio returns. How do the results differ from the previous ones? Provide economic justification of the difference between performances of the models.
3. Re-estimate the model out-of-sample (using the period from September 2008 until the most recent observation). Compare the performances of the models (both the CAPM and the extended factor model) in both samples. Comment upon the obtained results.

Some Reference Literature which might be useful:

Ferson, W., and C. Harvey. 1991. “The Variation of Economic Risk Premiums”. Journal of Political Economy 99:385–415.

Fama, E., and J. MacBeth. 1973. “Risk, Return and Equilibrium”. Journal of Political Economy pp. 607–636.

Cochrane, J. 2001. “Asset Pricing”. Princeton, NJ: Princeton University Press.

Jeffrey M. Wooldridge, “Introductory Econometrics A Modern Approach”, 4th edition, South Western College, 2008.

1. **Testing the leverage of broker-dealer in the Cross-Section of US Stock Returns**

Download monthly portfolios for US stocks sorted by size and momentum (download data from <http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/ftp/25_Portfolios_ME_Prior_12_2.zip>). Now use the financial intermediaries factor proposed in Adrian et al. (*Journal of Finance, Forthcoming)*, (you can download the data from

<https://sites.google.com/site/tylersmuir/home/data-and-code>).

This project is handled in two separate groups which are given different questions.

Perform the exercises a) and b) using only the in-sample period from the beginning of the sample until August 2008 (just before the bankruptcy of Lehman Brothers).

1. Perform the cross-sectional test of the CAPM. Fully interpret the results and comment upon the validity of the model and its ability to explain the cross-section of the portfolio returns.
2. Add the additional factors’ betas and test the extended model. Fully interpret the results and comment upon the validity of the model and its ability to explain the cross-section of the portfolio returns. How do the results differ from the previous ones? Provide economic justification of the difference between performances of the models.
3. Using the estimates of the risk premia from the in-sample data, test the performance of the model out-of-sample (test for significance of the pricing errors). Consider the period from September 2008 until the most recent observation as out-of-sample. Comment upon the models (both the CAPM and the extended factor model) performances.

Some Reference Literature which might be useful:

Cochrane, J. 2001. “Asset Pricing”. Princeton, NJ: Princeton University Press

Adrian, T, Etula, E, and Muir, T. “Financial Intermediaries and the Cross-Section of Asset Returns”, Journal of Finance, forthcoming

Jeffrey M. Wooldridge, “Introductory Econometrics a Modern Approach”, 4th edition, South Western College, 2008.

1. **Testing the Liquidity Factor for the Cross-Section of Stock Returns**

Download monthly portfolios for US stocks sorted by size and momentum (download data from <http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/ftp/25_Portfolios_ME_Prior_12_2.zip>). Now use the Liquidity factor as in Pastor and Stambaugh (2003, *Journal of Political Economy*). (the data are here

<http://faculty.chicagobooth.edu/lubos.pastor/research/liq_data_1962_2013.txt>).

Perform the exercises a) and b) using only the in-sample period from the beginning of the sample until August 2008 (just before the bankruptcy of Lehman Brothers).

1. Perform the test of the CAPM by running a two-steps Fama-MacBeth regression. Fully interpret the results and comment upon the validity of the model and its ability to explain the cross-section of the portfolio returns.
2. Add the additional factors’ betas and test the extended model. Fully interpret the results and comment upon the validity of the model and its ability to explain the cross-section of the portfolio returns. How do the results differ from the previous ones? Provide economic justification of the difference between performances of the models.
3. Re-estimate the model out-of-sample (using the period from September 2008 until the most recent observation). Compare the performances of the models (both the CAPM and the extended factor model) in both samples. Comment upon the obtained results.

Some Reference Literature which might be useful:

Cochrane, J. 2001. “Asset Pricing”. Princeton, NJ: Princeton University Press

Pastor, L, and R. Stambaugh, “Liquidity Risk and Expected Stock Returns”, Journal of Political Economy, 111, 642-685.

Fama, E., and J. MacBeth. 1973. “Risk, Return and Equilibrium”. Journal of Political Economy pp. 607–636.

Jeffrey M. Wooldridge, “Introductory Econometrics a Modern Approach”, 4th edition, South Western College, 2008.

1. **Testing Macroeconomic Factors for Industry Portfolios**

Download monthly portfolios for US stocks sorted by Industries (can be downloaded from <http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/ftp/49_Industry_Portfolios.zip>). Now use some of the macroeconomic risk factors as originally proposed in Ferson and Harvey (1991, *Journal of Political Economy*). Specifically you need to consider the Default premium, the Term premium, the return on the Market Portfolio and the real 1-month T-Bill return.

Perform the exercises a) and b) using only the in-sample period from the beginning of the sample until August 2008 (just before the bankruptcy of Lehman Brothers).

1. Perform the test of the CAPM by running a two-steps Fama-MacBeth regression. Fully interpret the results and comment upon the validity of the model and its ability to explain the cross-section of the portfolio returns.
2. Add the additional factors’ betas and test the extended model. Fully interpret the results and comment upon the validity of the model and its ability to explain the cross-section of the portfolio returns. How do the results differ from the previous ones? Provide economic justification of the difference between performances of the models.
3. Re-estimate the model out-of-sample (using the period from September 2008 until the most recent observation). Compare the performances of the models (both the CAPM and the extended factor model) in both samples. Comment upon the obtained results.

Some Reference Literature which might be useful:

Ferson, W., and C. Harvey. 1991. “The Variation of Economic Risk Premiums”. Journal of Political Economy 99:385–415.

Fama, E., and J. MacBeth. 1973. “Risk, Return and Equilibrium”. Journal of Political Economy pp. 607–636.

Cochrane, J. 2001. “Asset Pricing”. Princeton, NJ: Princeton University Press.

Jeffrey M. Wooldridge, “Introductory Econometrics A Modern Approach”, 4th edition, South Western College, 2008.

1. **Testing Fama-French Factors in the Cross-Section of Asia Pacific Stock Returns**

Download monthly portfolios for Asia pacific ex Japan stocks sorted on size and book-to-market (<http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/ftp/Asia_Pacific_ex_Japan_25_Portfolios_ME_BE-ME.zip>). Now use the Fama-French factors specific for Asia Pacific, ex Japan, constructed as in Fama and French (1993), (data can be downloaded <http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/ftp/Asia_Pacific_ex_Japan_Factors.zip>).

Perform the exercises a) and b) using only the in-sample period from the beginning of the sample until August 2008 (just before the bankruptcy of Lehman Brothers).

1. Perform the cross-sectional test of the CAPM. Fully interpret the results and comment upon the validity of the model and its ability to explain the cross-section of the portfolio returns.
2. Add the additional factors’ betas and test the extended model. Fully interpret the results and comment upon the validity of the model and its ability to explain the cross-section of the portfolio returns. How do the results differ from the previous ones? Provide economic justification of the difference between performances of the models.
3. Using the estimates of the risk premia from the in-sample data, test the performance of the model out-of-sample (test for significance of the pricing errors). Consider the period from September 2008 until the most recent observation as out-of-sample. Comment upon the models (both the CAPM and the extended factor model) performances.

Some Reference Literature which might be useful:

Fama, E., and K. French. 1993. Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics* 33:3–56.

Cochrane, J. 2001. “Asset Pricing”. Princeton, NJ: Princeton University Press.

Jeffrey M. Wooldridge, “Introductory Econometrics a Modern Approach”, 4th edition, South Western College, 2008.

**Writing Your Project**

1. Title
2. Abstract
3. Introduction
4. Clear description of the problem/ research question
5. How this issue/question is going to be resolved/answered in the current project
6. Which other alternative approaches are done in the literature
7. What is your methodology – briefly
8. What is the main result – briefly
9. Literature Review (not necessarily a separate section; can be done in Introduction)
10. Methodology – detailed description of methods and calculations performed in the project
11. Data and Empirical Results
12. Detailed data description – which market, time, frequency, source, descriptive statistics where appropriate
13. Any caveats or limitations of your study.
14. All results should be clearly explained in the text
15. Every table and figure should contain an INFORMATIVE caption – it should be self-explanatory!
16. Conclusions of your study

**General information**

**Important:**

Note that your mark does not depend on finding specific results. For example you may find that Fama-French factors do not explain the cross-section of stock returns. That is perfectly fine.

Your mark will depend on the soundness of (a) your understanding about the problem, (b) the correctness of the tests conducted, (c) your interpretation/discussion about of the results and (d) clarity/presentation. Also please make sure to not exceed the word limit of 4,000.

**Free riding:**

This is a group project and everyone is expected to be a punctual and contributing member to the process. If a person is attempting to free ride the remaining group members should come and talk to us about it.

**Support:**

Feel free to use the office hours to ask questions about the process and stuff you are unclear about. However, please send the email your specific questions one day in advance so there is a chance to examine how to deal with them.

**Marking details**

The group project is meant to test the ability to test the asset pricing models by using the tools acquired during the course. The focus is on cross-sectional tests for the CAPM and factor models. Evaluation criteria:

1. The clarity of the overall exposure
2. The understanding of the nature of asset pricing models and performing their tests
3. The ability to correctly interpret the estimated models and the results of the test
4. The clarity and coherence in reporting and commenting the results in the light of the knowledge acquired during the course.
5. Awareness of the relevant theoretical and empirical literature and the ability to relate the obtained results to it.