Problem Set 4 Solution
Econ 40357 Financial Econometrics
University of Notre Dame
Professor Nelson Mark
Fall 2022

Due Thursday 10 November 2022 before class, through Canvas. As usual, submit the pdf for your group and an appendix with everyone's computer work.

Use the Eviews workfile ps4.wf1. Both sheets contain the same raw data. They are monthly returns of 25 Dow-component firms, the S&P and the 3-month T-Bill rate. All returns are in annual percent. The returns are listed as r01,...,r25. For your information, the associated ticker symbols these firms are AAPL, AXP, BA, CAT, CVX, DD, DIS, GE, HD, IBM, INTC, JNJ, JPM, KO, MCD, MMM, MRK, MSFT, NKE, PFE, PG, TRV, UTX, VZ, XOM.

Problems 1-5 will use the time-series method to estimate and test the model

$$\bar{r}^e_{it} = \lambda\beta_i \tag{1}$$

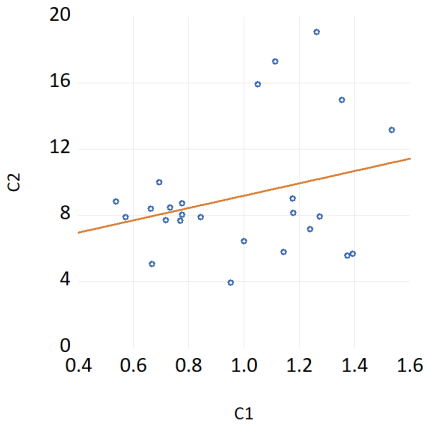
$$r^e_{it} = \alpha_i + \beta_i r^e_{mt} + \epsilon_{it} \tag{2}$$

where r^e_{it} is the excess return on asset i and r^e_{mt} is the excess return on the market. This is a single factor model where $f_t = r^e_{mt}$. Before starting, construct excess returns for each of the stocks.

1. Using the time-series method, estimate the factor (market) risk premium. Report your estimate of λ, the naive t-ratio and the Newey-West t-ratio.

$\hat{\lambda} = \bar{r}^e_m$	`Naive t-ratio`	`Newey-West t-ratio`
4.110140	`1.472897`	`1.417988`

2. Estimate the alphas and betas for each firm. Plot the betas against the average excess returns. Put the excess returns on the y axis.



3. Report the alphas and their t-ratios for the Dow-component stocks.

alpha	Newey-West t-ratio
9.388260466	1.165554277
-0.043047509	-0.013076495
2.326482226	0.525539446
2.698914985	0.569079904
5.454888203	2.000867209
1.076258271	0.352078775
3.300748083	1.003989872
2.056346146	0.81978796
12.71523331	2.934603851
0.031681157	0.0079891
6.831930889	1.233466502
7.160113666	2.653699862
-0.07127255	-0.01625722
5.670547999	1.902375177
5.542720746	1.583528345
4.844166544	1.907422134
4.772646033	1.278071179
13.89552038	2.768871
11.60916586	2.310189659
4.410654899	1.322888858
6.624897349	2.177606532
4.522834587	1.483746006
4.200140099	1.35746407
2.322678911	0.800940675
5.554121384	2.525515319

4. Test the hypothesis that the alphas are jointly zero. Report the test statistic and the p-value of the test.

   Chi-square 59.07674 25 0.0001

5. Would you say the CAPM works, or does not work for the Dow stocks?

   It sort of does, yes.

Okay, now we're going to redo the analysis with Fama-MacBeth. We have already computed the mean excess returns and the betas.

6. Run the single cross-sectional regression of the mean excess returns on the betas with constant. Report your results. Point out your point estimate for γ and λ.

Dependent Variable	MEAN_RE			
Method	Least Squares			
Date: 11/09/22	Time: 15:37			
Sample: 1 25				
Included observations	: 25			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.466961	2.752422	1.986236	0.0
BETA_S	3.715871	2.665352	1.394139	0.1766
R-squared	0.077921			

7. Report the Fama-Macbeth t-ratio on λ

   0.743012

8. Report the Fama-Macbeth t-ratio on γ

   1.410733