**Problem Set 5**
**Econ 40357 Financial Econometrics**
**University of Notre Dame**
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This problem set is an application of the Fama-MacBeth method to the CAPM (a one-factor model). We will investigate

$$E(r_i^e) = \lambda\beta_i + \gamma \tag{1}$$

for $i = 1, ..., 25$, where

$$r_{t,i}^e = \alpha_i + \beta_i f_t + \epsilon_{t,i}, \tag{2}$$

$f_t = r_{t,m}^e = mkt\_rf$ is the market excess return, and $r_{t,i}^e$ $i = 1, ..., 25$ is the excess return on 25 of the Dow components.

Don't just work through this problem set to be getting through it. Think about what each step is accomplishing.

Load the Eviews workfile called **ps5.wf1**. Sheet1 contains the data. $r01, ..., r25$ are the security returns $rm$ is the market return, and $rf$ is the risk-free rate. These are monthly data from 1966m07-2016m09.

1. Construct excess returns for each of the 25 securities and for the market. Let's call the security excess returns $y$, and the market excess return $x$. That is,

   Hint: Try this little program.

   ```
   for !j=1 to 9
      series y{!j}=r0{!j}-rf
   next
   for !j = 10 to 25
      series y{!j}=r{!j}-rf
   next
   series x = rm-rf
   ```

2. Compute the average excess returns for the securities and store in the first column of a matrix called AAMAT

   Hint: Try this.

   ```
   matrix(25,2) AAMAT
   for !j = 1 to 25
      AAMAT(!j,1) = @mean(y!j)
   next
   ```

3. Run 25 time-series regressions of each excess return on the market excess return. Store the estimated betas in the second column of the matrix AAMAT

   Hint: try this

```
for !j = 1 to 25
   equation eq0.ls(n) y!j c x
   AAMAT(!j,2) = @coefs(2)
next
```

4. Write the betas and average returns to an excel file called CS1.xlsx

   Hint: Try this

```
AAMAT.write(t=xls) CS1.xls
```

5. Create a new page. Call it CS1 and import the data in CS1.xls

   Hint: Try issuing these two lines in the command window.

```
pagecreate(page=CS1) u 1 25
import CS1.xls @smpl @all
```

   On this page, look at what you've imported. Quite possibly, Series01 is blank, Series02 contains the mean excess returns, and Series03 contains the betas. If that is the case, let's rename the series. Try this:

```
rename series02 rebar
rename series03 beta
```

6. On the CS1 page, run the cross-sectional regression

$$\bar{r}_i^e = \gamma + \lambda\beta_i + u_i$$

   Show me the regression output.

7. Isolate the excess returns data, write them to an excel file called TEMP.XLS, then read the transposed data back into Eviews.

   Hint: try this

```
pagecreate(page=temp) m 1986M07 2016M09
for !j = 1 to 25
   copy Sheet1\y{!j}
next
wfsave(type=excel) temp
```

   Go into the Excel file TEMP.xls, delete the column 1 and rows 1 and 2. Save the edited Excel file.

   Now we're going to load the TRANSPOSED excess returns data.

   In Eviews,

Click File → Open → Foreign Data as Workfile

Select temp.xls. A new window opens up. Towards the bottom, check the box that says Read series by row (transpose incoming data).

Then rename the series

```
for !j = 1 to 9
   series re!j = series0!j
next
for !j = 10 to 362
   series re!j = series!j
next
```

8. Copy the betas from CS1.xls to the Temp.wf1 workfile. That is, highlight the cells with the betas in them, copy and paste into Temp.wf1, name the series BETA.

9. Run the $T$ cross-sectional regressions,

$$r^e_{t,i} = \gamma_t + \lambda_t \beta_i + u_{t,i}$$

Save the lambdas in a matrix called LAMBDA.

```
matrix(362,1) LAMBDA
for !j = 1 to 362
   equation tmpeq.ls re!j c beta
   LAMBDA(!j,1) = @coefs(2)
next
```

10. Convert the $\lambda$'s back to time-series. We'll create a new sheet called TEMP2 and work there.

```
pagecreate(page=temp2) u 1 362
```

Drag and drop LAMBDA from sheet TEMP to sheet TEMP2.

In sheet TEMP2: Issue these commands

```
mtos(LAMBDA,LAMBDA2) ' CONVERTS MATRIX TO SERIES LAMBDA2
equation csreg.ls(n) lambda2 c
show csreg
```

Report the regression output.