Financial Services Laboratory #2

Topic: Regression analysis model building

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Learning objective: Create a model to explain (and then be able to predict) the return on a stock, using Excel to perform regression analyses using financial independent variables. The single equation regression model may explain the company return and allow us to decide whether the stock would be good to buy (due to its "excess return").

Description:
Students will model excess returns data for 2 different companies (dependent variables) and 3 potential explanatory factors (independent variables).

For this exercise you must first download the Excel data file from the Eco 145 Blackboard web site. While we created this data set to speed up the demo, you could also find other company returns or explanatory (independent) variables on Thomson One or CRSP and Morningstar Encorr data sets (see previous lab instructions). The Excel spread sheet (**FSL#2 regression data**) contains data on the current period for each variable:

- Dependent variables: Returns for two stocks, Microsoft and Yahoo, adjusted for (net of) the risk-free return (30 day Tbills rate) = $R_i - R_f$
- Independent variables:
  - "Market" excess return (SP 500 return – Tbills rate) = Rm-Rf ;
  - "Capital size" factor (Russell 2000 return - Russell 1000 return);
  - "Value of the company" factor (Russell 1000 Value return – Russell 1000 Growth return).

In order to create the Capital Asset Pricing Model from which the slope coefficient is the financial beta factor, first do the simple regression, Ri-Rf on Rm-Rf, and check the results (t-ratios or p-values; R-bar squared). Then add the other two factors for a multiple regression to account for current market factors, which is the Fama-French Model

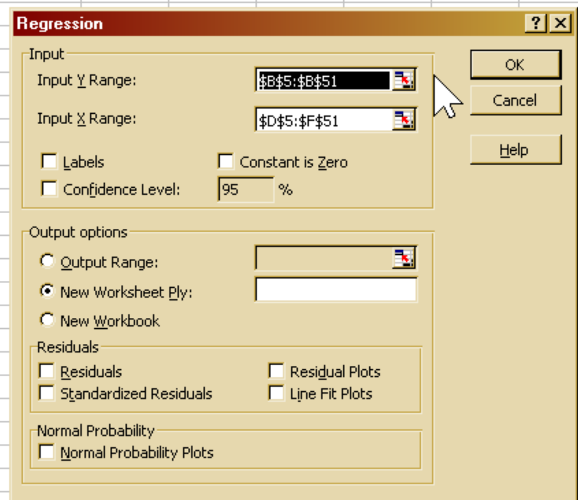
Step 1: Data on Blackboard

- Go the Eco 145 Blackboard >> Course Documents >> **FSL regression lab;** click on the file name to download and open the regression data set into Excel. Check to make sure DATA >> Data Analysis is working.

Step 2: Excel Regression

- Open Data >> Data Analysis >> Regression
  - The **Microsoft** stock excess return, Ri-Rf, is the dependent (Y) variable. Click on the Input Y- Range box; highlight the Microsoft column of data (no headings).
  - Market Factor, Rm-Rf, is the independent (X1) variable. Click on the Input X-variable box and highlight the X1 column of returns (no headings).
  - Make sure the "Constant is Zero" box is NOT checked. **This will estimate an intercept term, which will measure excess return, alpha (α)**.
  - Click Output Range and list the cell next to the original data where the output will appear.
  - Click OK.

	A	B	C	D	E	F
5	Aug-04	-4.006	(7.545)	0.29	-1	1.91
6	Jul-04	-0.345	(15.485)	-3.41	-3.22	4.24
7	Jun-04	8.803	18.641	1.86	2.41	1.11
8	May-04	0.323	21.294	1.31	0.15	-0.84
9	Apr-04	4.733	4.170	-1.65	-3.29	-1.28
10	Mar-04	-6.121	9.224	-1.6	2.29	0.98
11	Feb-04	-4.111	(5.679)	1.33	-0.48	1.5
12	Jan-04	0.953	4.260	1.77	2.44	-0.28
13	Dec-03	6.377	4.665	5.16	-2.76	2.7
14	Nov-03	-1.715	(1.717)	0.81	2.35	0.31
15	Oct-03	-5.466	23.439	5.59	2.54	0.5
16	Sep-03	4.747	5.910	-1.14	-0.83	0.09
17	Aug-03	0.347	7.190	1.88	2.55	-0.93
18	Jul-03	2.933	(4.871)	1.69	4.27	-1
19	Jun-03	4.085	9.484	1.18	0.49	-0.13
20	May-03	-3.807	20.378	5.18	5.03	1.47
21	Apr-03	5.476	3.022	8.14	1.41	1.41
22	Mar-03	2.052	15.104	0.87	0.25	-1.69
23	Feb-03	0.121	14.470	-1.59	-1.47	-2.21
24	Jan-03	-8.301	11.215	-2.72	-0.35	0.01
25	Dec-02	-10.478	(10.619)	-5.99	0.09	2.57
26	Nov-02	7.754	22.333	5.77	3.07	0.87
27	Oct-02	22.105	55.764	8.66	-5.1	-1.76



- Examine the results and analyze them (note output above is for 2002-2004).
  - What is the intercept sign and magnitude (size of estimate)?
  - What is the slope coefficient sign and size for X1?
  - Are the slope and intercept statistically significant (H_0: pop slope = 0)?
  - What is the adjusted R-sq?

Step 3: Re-estimate the regression model with all 3 independent variables

- When you choose the Input X – Range, highlight all 3 columns (no headings).
- Choose the Output Range option and list an open cell that will not interfere with either the original data or the first, single equation output.
- Examine the results and analyze them for each of the slope coefficients.

	A	B	C	D	E	F	G	H	I
1	SUMMARY OUTPUT								
2									
3	*Regression Statistics*								
4	Multiple R	0.67							
5	R Square	0.45							
6	Adjusted R Sq	0.41							
7	Standard Error	8.62							
8	Observations	47.00							
9									
10	ANOVA								
11		*df*	*SS*	*MS*	*F*	*Significance F*			
12	Regression	3	2568.04	856.01	11.51	0.00			
13	Residual	43	3198.55	74.38					
14	Total	46	5766.59						
15									
16		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
17	Intercept	2.15	1.35	1.59	0.12	-0.57	4.87	-0.57	4.87
18	X Variable 1	0.96	0.31	3.16	0.00	0.35	1.58	0.35	1.58
19	X Variable 2	-0.23	0.40	-0.58	0.56	-1.04	0.57	-1.04	0.57
20	X Variable 3	-0.96	0.37	-2.63	0.01	-1.70	-0.23	-1.70	-0.23
21									

Step 4: Choose the model which best explains the company's return.

- Compare R-bar-sq; signs of coefficients; significance of coefficients.
- Is there any significant excess return for Microsoft? Do you see any further analyses you could try?
- Repeat the process for Yahoo and then Starbucks. Save your Excel files to your own H: space or disk (floppy or flash). Print 2 copies of all of your regression results and bring to the next class.