

BUS 423, RAM Fund II

CAPM, Beta, Vasicek Beta Assignment, Generic Version

Dr. Gordon H. Dash, Jr.

GHDash@uri.edu

Learning Objectives: By completing this homework assignment you will learn how to: a) download capital market data into an Excel spreadsheet; b) manipulate raw financial data to construct a “research” dataset; c) compute period returns; d) solve a regression analysis using Excel Data Analysis function; and e) compute descriptive statistics and f) compute the Vasicek adjusted beta coefficient.

Concepts: This homework is designed to support a student’s recognition of how beta coefficients are computed and why behavioral finance recognizes time-variability in stock beta. Additionally, it should become more immediately observable how a stock beta can differ simply by using a different index (independent variable). Finally, it is to help all students understand how to overcome one important weakness of raw (unadjusted) beta coefficients – their tendency over time to shift towards one (1.0).

Support Spreadsheet: [Vasicek](#)

Assignment

From the sample Ram Fund portfolio choose 3 stocks and one market index to follow. Remember, shortly you will begin the process of designing and managing an equity hedge fund. For each stock fill in the following table (feel free to copy the table to another document for reporting purposes):

	Symbol	Market Cap	P/E Ratio	Published Beta	Computed Beta	Sig. (*)	Vasicek Beta
Market							
1							
2							
3							

* - significant at the 99% confidence level (p-value of 0.01, or smaller)

** - significant at the 95% confidence level (p-value of 0.05, or smaller)

*** - - significant at the 99% confidence level (p-value of 0.10, or smaller)

Download **monthly** historical prices to an Excel spreadsheet for each security and the index. Choose a Start Date year of 2011.

After all data is downloaded, use Edit / Copy (or your favorite Excel keystrokes) to create an Excel Book that contains the *adjusted close* for each one of the six (6) data series in six consecutive columns. No other data should be in this spreadsheet book. Also, be sure to place the symbol of each security at the top of the data range (see lecture notes).

Create monthly period returns from the Adjusted Close

Compute the beta for each stock using the market index in your data series (these are monthly beta coefficients). Operationally, this is accomplished by executing 3 separate Excel regressions. In each case the **dependent** variable will be the (single) data range (column) that holds the rate of return of the security. In all regressions, the **independent** variable will be the data range of the market's rate of return. Enter the Beta (regression coefficient) into the table (see above). Also, indicate the level of significance by attaching the appropriate asterisk (if the coefficient is NOT significant you will not attach anything). For example, a Beta that is significant at the 90% confidence level would be entered as: 1.52*** .

Compute the Correlation Matrix

Use the Excel Data Analysis function to compute the correlation matrix. Fill-in the north-east (NE) quadrant. Why is the south-west (SW) quadrant greyed out?

	Market	Sec: 1	Sec: 2	Sec: 3
Market	1.0			
Sec: 1		1.0		
Sec: 2			1.0	
Sec: 3				1.0

Compute the Covariance Matrix

Use the Excel Data Analysis function to compute the covariance matrix. Fill-in the north-east (NE) quadrant. Why is the south-west (SW) quadrant greyed out? Why are the diagonal

	Market	Sec: 1	Sec: 2	Sec: 3
Market				
Sec: 1				
Sec: 2				
Sec: 3				

Use the Excel Data Analysis function to compute the covariance matrix. Fill-in the north-east (NE) quadrant. Why is the south-west (SW) quadrant greyed out? What statistical metric is entered along the diagonal?

Compute the Vasicek Adjusted Beta for each security

First, compute the average return for the market. Also, compute the variance of mean return for this same index (see sample spreadsheet for guidance).

The Vasicek beta for each individual security is comprised of two parts.

a) A weight for the individual security:

$$W_1 = \frac{\sigma_{\beta_M}^2}{\sigma_{\beta_M}^2 + \sigma_{\beta_i}^2}, \text{ and}$$

b) A weight for the market index:

$$W_2 = \frac{\sigma_{\beta_i}^2}{\sigma_{\beta_M}^2 + \sigma_{\beta_i}^2}.$$

The final estimate of the Vasicek adjusted beta is computed by:

$$\beta_i^V = (W_1 \times \beta_i) + (W_2 \times \bar{\beta}_M)$$

- $\beta_i = 1.282$;
- Regression coefficient (sampling) error: 0.0494 (numerator W_2)
- Average Beta for 3 securities (see sample spreadsheet): 1.0383
- Variance for Beta coefficients in sample: 0.0496 (numerator W_1)

Weight 1: 0.5014

Weight 2: 0.4986

Vasicek Adjusted Beta: $\beta_i^V = 1.161$