THE CAPITAL ASSET PRICING MODEL

$$R_i = R_f + \beta_i (R_m - R_f)$$

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

$$R_i = R_f + \beta_i(R_m - R_f)$$

$$R_i - R_f = \beta_i(R_m - R_f)$$

IF WE REARRANGE THIS EQUATION

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

$$R_i - R_f = \beta_i (R_m - R_f)$$

DEPENDENT VARIABLE

THIS LOOKS VERY MUCH
LIKE A LINEAR REGRESSION

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

$$R_i - R_f = \beta_i (R_m - R_f)$$

INDEPENDENT VARIABLE

THIS LOOKS VERY MUCH LIKE A LINEAR REGRESSION

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

$$R_i - R_f = \beta_i (R_m - R_f)$$

SLOPE OF THE REGRESSION LINE

THIS LOOKS VERY MUCH
LIKE A LINEAR REGRESSION

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

$$R_i - R_f = \beta_i (R_m - R_f)$$

RETURNS OF GOOGLE
- RISK FREE RATE

WE WANT TO FIND
THE BETA FOR GOOGLE

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

$$R_i - R_f = \beta_i (R_m - R_f)$$

RETURNS OF AN INDEX THAT REPRESENTS THE MARKET -

RISK FREE RATE

NASDAQ

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

LET'S GO THROUGH THE STEPS WE'LL NEED TO DO

STEP 1: DOWNLOAD THE HISTORICAL PRICES FOR GOOGLE AND NASDAQ FROM A FINANCIAL SITE (YAHOO FINANCE)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 1: DOWNLOAD THE HISTORICAL PRICES FOR GOOGLE AND NASDAQ FROM A FINANCIAL SITE (YAHOO FINANCE)

STEP 2: CONVERT THE PRICES TO RETURNS

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EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 1: DOWNLOAD THE HISTORICAL PRICES FOR GOOGLE AND NASDAQ FROM A FINANCIAL SITE (YAHOO FINANCE)

YAHOO FINANCE HAS HISTORICAL PRICES FOR STOCKS AND SECURITIES

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

Alphabet Inc. (GOOG) - NasdaqGS

697.77 ↓7.30 (1.04%) 2:30a

Historical Prices

Set Date Range

Start Date: Jan 1 2010 Eg.

End Date: Feb 1 2016

NASDAQ Composite (^IXIC) - Nasdaq GIDS

4,557.95 ↓32.52 (0.71%) 3:45am

Historical Prices Get Historica

Set Date Range

Start Date: Jan 1 2010 Eg. Jan 1, 2010

End Date: Feb 1 2016

- Daily
- Weekly
- (•) Monthly
- Dividends Only

Get Prices

FOR 6 YEARS (JAN 1, 2010 - FEB 1, 2016)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 1: DOWNLOAD THE HISTORICAL PRICES FOR GOOGLE AND NASDAQ FROM A FINANCIAL SITE (YAHOO FINANCE)

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EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 2: CONVERT THE PRICES TO RETURNS

THE FILES FROM THE PREVIOUS STEP LOOK LIKE THIS

Date	Open	High	Low	Close	Volume	Adj Close
2/1/2016	750.46	757.86	743.27	752	10278400	752
1/4/2016	743	752	673.26	742.95	2632600	742.95
12/1/2015	747.11	779.98	724.17	758.88	2026100	758.88
11/2/2015	711.06	762.708	705.85	742.6	1801600	742.6
10/1/2015	608.37	730	599.85	710.81	2333600	710.81
9/1/2015	602.36	650.9	589.38	608.42	2398400	608.42
8/3/2015	625.34	674.9	565.05	618.25	2661500	618.25
7/1/2015	524.73	678.64	515.18	625.61	2955500	625.61
6/1/2015	536.79	543.74	520.5	520.51	1660600	520.51
5/1/2015	538.43	544.19	521.085	532.11	1723100	532.11

WE TAKE THE ADJUSTED CLOSING PRICE ON EACH DAY TO CALCUATE THE RETURNS

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 2: CONVERT THE PRICES TO RETURNS

	GOOG	NASDAQ
Date	Adj Close	Adj Close
2/1/2016	752	4620.37
1/4/2016	742.95	4613.95
12/1/2015	758.88	5007.41
11/2/2015	742.6	5108.67
10/1/2015	710.81	5053.75
9/1/2015	608.42	4620.16
8/3/2015	618.25	4776.51
7/1/2015	625.61	5128.28
6/1/2015	520.51	4986.87
5/1/2015	532.11	5070.03

WE CAN CALCULATE THE MONTHLY RETURNS FROM PRICES

$$\text{RETURN} = \frac{(\text{NEW PRICE} - \text{OLD PRICE})}{\text{OLD PRICE}}$$

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 2: CONVERT THE PRICES TO RETURNS

	GOOG	NASDAQ
Date	Returns	Returns
2/1/2016	1%	0%
1/4/2016	-2%	-8%
12/1/2015	2%	-2%
11/2/2015	4%	1%
10/1/2015	17%	9%
9/1/2015	-2%	-3%
8/3/2015	-1%	-7%
7/1/2015	20%	3%
6/1/2015	-2%	-2%
5/1/2015	-1%	3%

WE CAN CALCULATE THE MONTHLY RETURNS FROM PRICES

$$\text{RETURN} = \frac{(\text{NEW PRICE} - \text{OLD PRICE})}{\text{OLD PRICE}}$$

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 1: DOWNLOAD THE HISTORICAL PRICES FOR GOOGLE AND NASDAQ FROM A FINANCIAL SITE (YAHOO FINANCE)

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STEP 4: SUBTRACT THE YIELDS FROM GOOGLE AND NASDAQ RETURNS

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 3: DOWNLOAD THE HISTORICAL YIELDS FOR A 5 YR TREASURY BOND (RISK FREE RATE)

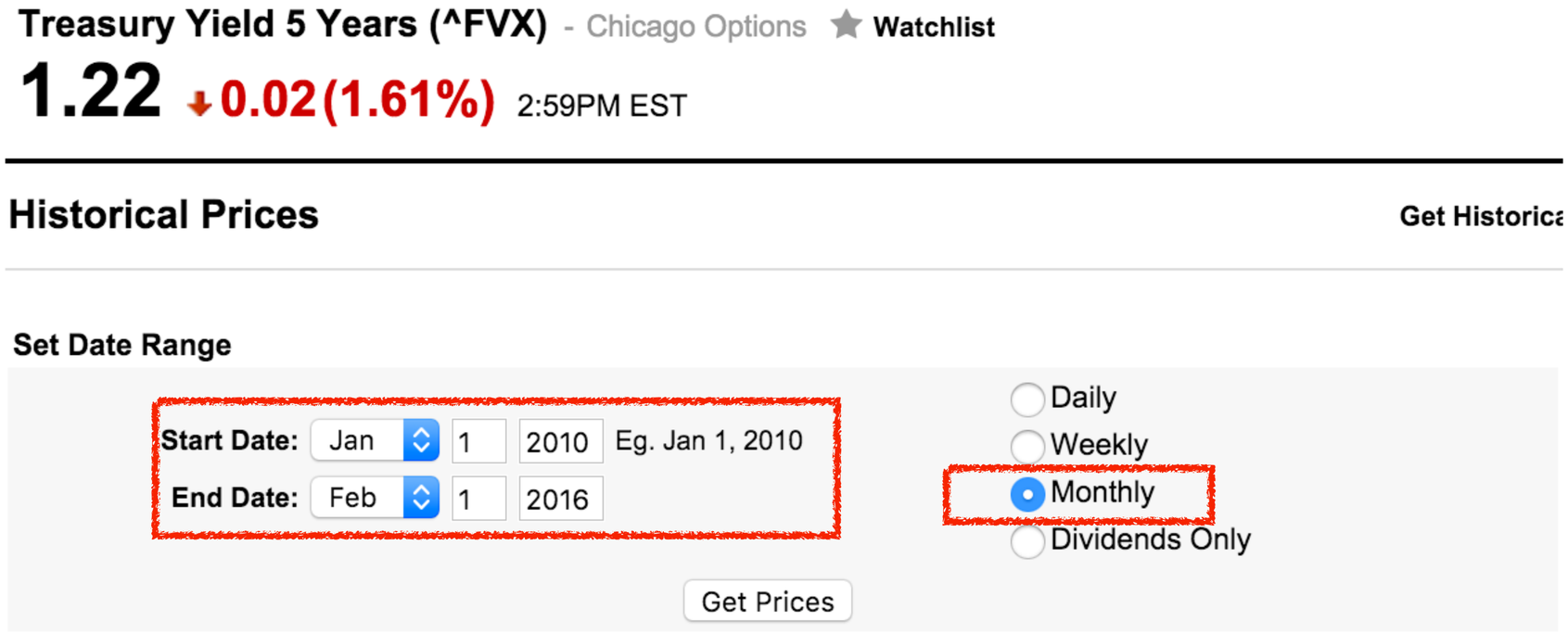
^FVX IS THE SYMBOL FOR 5 YEAR TREASURY BONDS

SEARCH AND DOWNLOAD THE YIELDS FOR THIS BOND FROM YAHOO FINANCE

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 3: DOWNLOAD THE HISTORICAL YIELDS FOR A 5 YR TREASURY BOND (RISK FREE RATE)

^FVX IS THE SYMBOL FOR 5 YEAR TREASURY BONDS



EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 3: DOWNLOAD THE HISTORICAL YIELDS FOR A 5 YR TREASURY BOND (RISK FREE RATE)

Tbond		Tbond
Adj Close	→	Yield
1.383		1%
1.335		1%
1.758		2%
1.654		2%
1.528		2%
1.375		1%
1.541		2%
1.548		2%
1.628		2%
1.467		1%

THE ADJ. CLOSE COLUMN IN THIS FILE REPRESENTS THE YIELD %

DIVIDE BY 100 BEFORE STEP 4 (SUBTRACTING FROM THE RETURNS)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 1: DOWNLOAD THE HISTORICAL PRICES FOR GOOGLE AND NASDAQ FROM A FINANCIAL SITE (YAHOO FINANCE)

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EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 4: SUBTRACT THE YIELDS FROM GOOGLE AND NASDAQ RETURNS

	GOOG	NASDAQ
Date	Returns	Returns
2/1/2016	1%	0%
1/4/2016	-2%	-8%
12/1/2015	2%	-2%
11/2/2015	4%	1%
10/1/2015	17%	9%
9/1/2015	-2%	-3%
8/3/2015	-1%	-7%
7/1/2015	20%	3%
6/1/2015	-2%	-2%
5/1/2015	-1%	3%

-

Tbond
Yield
1%
1%
2%
2%
2%
1%
2%
2%
2%
1%

=

GOOG	Nasdaq
r-rf	rm-rf
0%	-1%
-3%	-9%
0%	-4%
3%	-1%
15%	8%
-3%	-5%
-3%	-8%
19%	1%
-4%	-3%
-2%	1%

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

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EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

GOOG	Nasdaq
r-rf	rm-rf
0%	-1%
-3%	-9%
0%	-4%
3%	-1%
15%	8%
-3%	-5%
-3%	-8%
19%	1%
-4%	-3%
-2%	1%

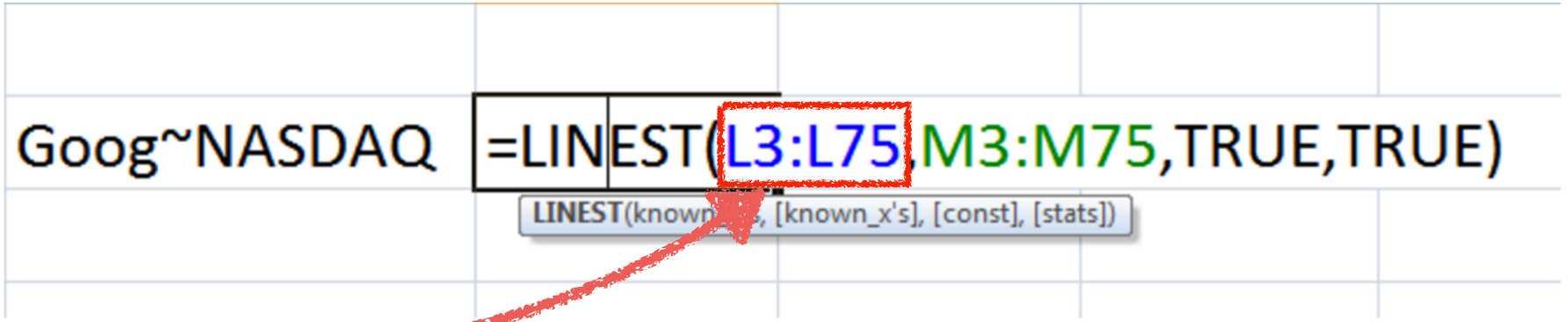
THE LINEST() FUNCTION IN EXCEL CAN BE USED FOR LINEAR REGRESSION

THIS FUNCTION USES THE ORDINARY LEAST SQUARES METHOD

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

GOOG	Nasdaq
r-rf	rm-rf
0%	-1%
-3%	-9%
0%	-4%
3%	-1%
15%	8%
-3%	-5%
-3%	-8%
-3%	-8%
19%	1%
-4%	-3%
-2%	1%

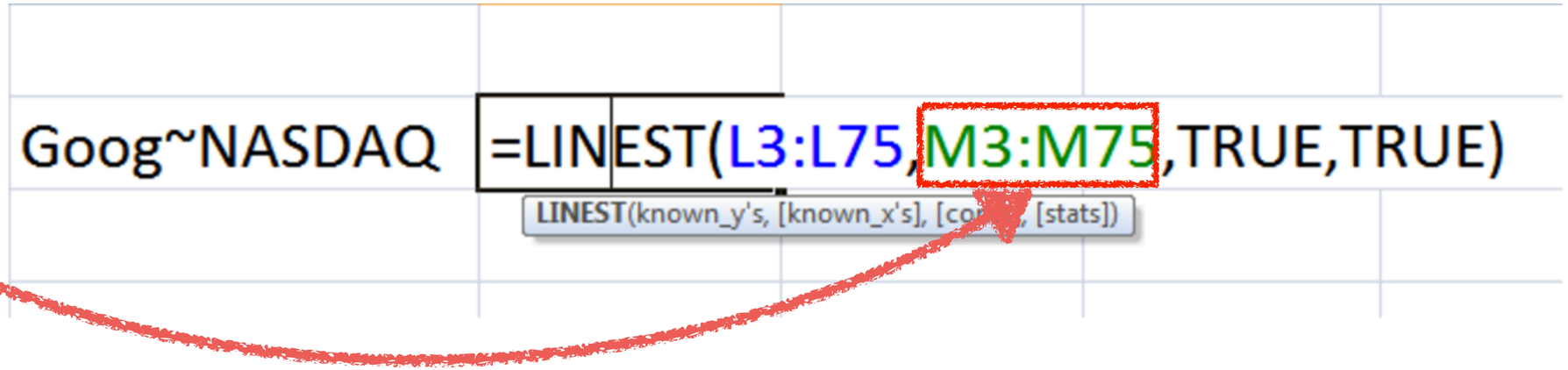


THE DEPENDENT VARIABLE

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

GOOG	Nasdaq
r-rf	rm-rf
0%	-1%
-3%	-9%
0%	-4%
3%	-1%
15%	8%
-3%	-5%
-3%	-8%
19%	1%
-4%	-3%
-2%	1%

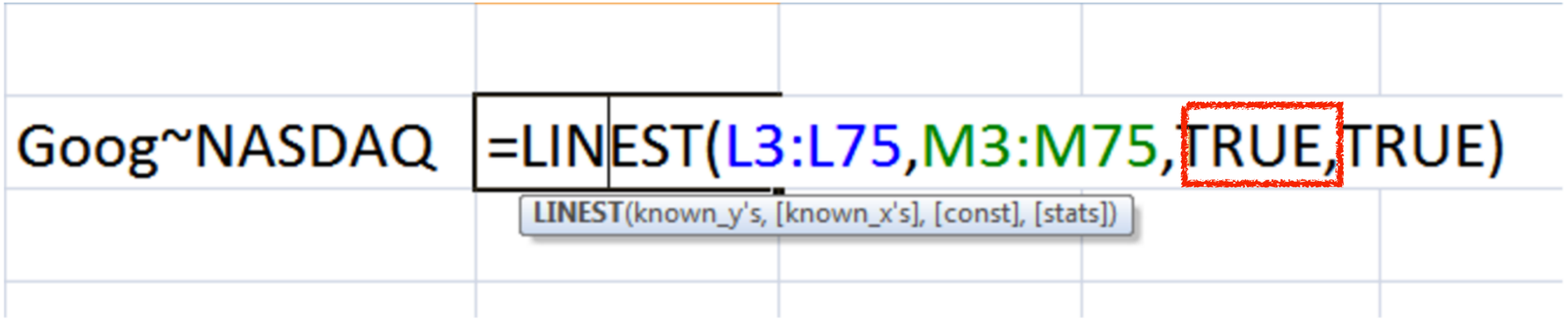


THE INDEPENDENT VARIABLE(S)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

GOOG	Nasdaq
r-rf	rm-rf
0%	-1%
-3%	-9%
0%	-4%
3%	-1%
15%	8%
-3%	-5%
-3%	-8%
19%	1%
-4%	-3%
-2%	1%

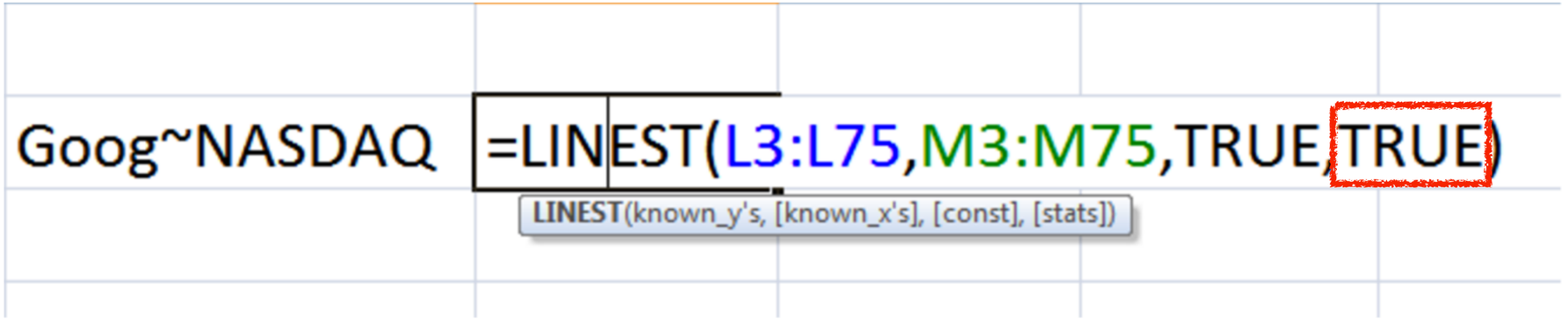


SHOULD THERE BE AN INTERCEPT

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

GOOG	Nasdaq
r-rf	rm-rf
0%	-1%
-3%	-9%
0%	-4%
3%	-1%
15%	8%
-3%	-5%
-3%	-8%
19%	1%
-4%	-3%
-2%	1%



WHETHER IT SHOULD CALCULATE SOME OF THE RELEVANT STATISTICS (LIKE R-SQUARE)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

GOOG	Nasdaq
r-rf	rm-rf
0%	-1%
-3%	-9%
0%	-4%
3%	-1%
15%	8%
-3%	-5%
-3%	-8%
19%	1%
-4%	-3%
-2%	1%

Goog~NASDAQ	0.95886

THE RESULT OF LINEST() IS THE SLOPE

THIS IS THE BETA WE WANT TO FIND

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

LINEST() IS MORE OFTEN USED AS AN ARRAY FORMULA

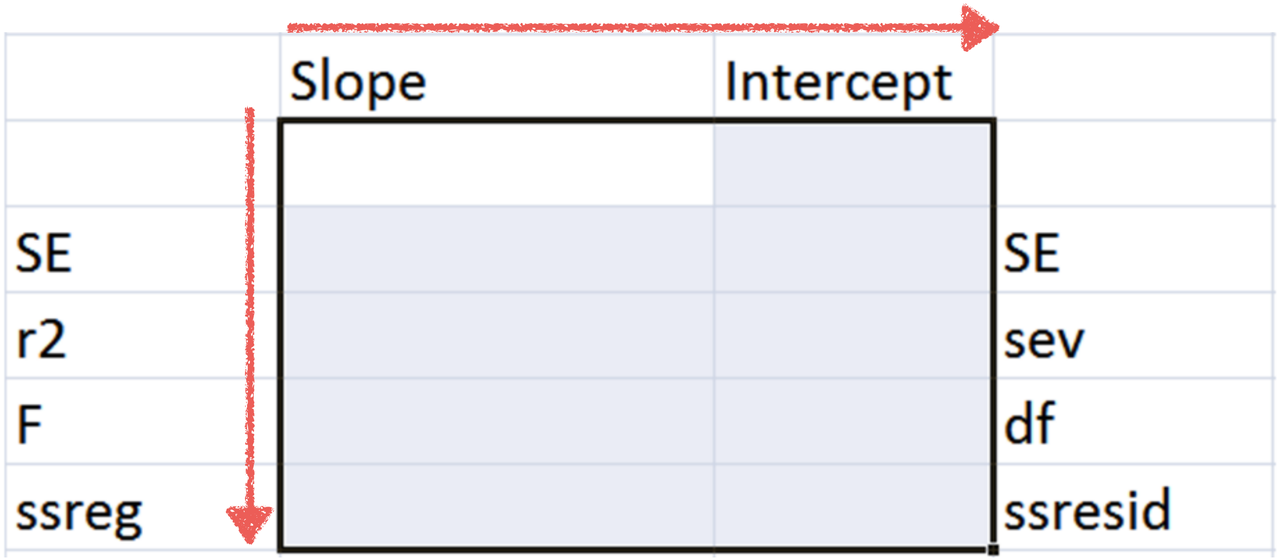
1) TO GET THE CO-EFFICIENTS FOR MULTIPLE INDEPENDENT VARIABLES

2) TO GET THE RELEVANT REGRESSION STATISTICS LIKE R-SQUARED

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

LINEST() IS MORE OFTEN USED AS AN ARRAY FORMULA



THE ARRAY RESULT HAS 5 ROWS

COLUMNS = # INDEPENDENT VARIABLES + 1

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

LINEST() IS MORE OFTEN USED AS AN ARRAY FORMULA

	Slope	Intercept	
SE			SE
r2			sev
F			df
ssreg			ssresid

SELECT AN AREA OF THE REQUIRED SIZE (5 ROWS, 2 COLS)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

LINEST() IS MORE OFTEN USED AS AN ARRAY FORMULA

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

ENTER THE FORMULA

HIT CTRL +SHIFT+ENTER

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

LINEST() IS MORE OFTEN USED AS AN ARRAY FORMULA

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

LET'S PARSE THIS RESULT

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

BETA FOR GOOGLE

THE SLOPE OF THE REGRESSION LINE

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

THE INTERCEPT OF THE REGRESSION LINE

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

THE SECOND ROW IS THE STANDARD ERROR FOR THE CORRESPONDING CO-EFFICIENT

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

STANDARD ERROR

THIS TELLS US THE MAGNITUDE THE CO-EFFICIENT MIGHT BE OFF BY

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

STANDARD ERROR

STANDARD ERROR CAN BE USED TO CALCULATE A TEST STATISTIC (T-STATISTIC)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

STANDARD ERROR → T-STATISTIC

THE IDEA IS TO VERIFY WHETHER THE RELATIONSHIP BETWEEN THIS VARIABLE AND DEPENDENT VARIABLE

IS 1) A FLUKE (DUE TO SOME CHANCE VARIATION IN THE DATA)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

STANDARD ERROR → T-STATISTIC

THE IDEA IS TO VERIFY WHETHER THE RELATIONSHIP BETWEEN THIS VARIABLE AND GOOGLE RETURNS IS 1) A FLUKE (DUE TO SOME CHANCE VARIATION IN THE DATA)

OR 2) A REAL RELATIONSHIP (STATISTICALLY SIGNIFICANT)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

STANDARD ERROR

THIS AND OTHER STATISTICS THAT LINEST() PROVIDES HELP YOU FIND OUT HOW WELL (ACCURATELY) THE REGRESSION LINE EXPLAINS THE HISTORICAL DATA

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

R-SQUARED

WHAT % OF THE VARIATION IN THE DEPENDENT VARIABLE HAS BEEN EXPLAINED

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

SUM OF SQUARES OF REGRESSION

NUMERATOR IN R-SQUARED

$$R^2 = \frac{SSR}{SST} = \frac{\sum (\hat{y}_i - \bar{y})^2}{\sum (y_i - \bar{y})^2}$$

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

SUM OF SQUARES OF REGRESSION

THE AMOUNT OF VARIATION IN Y THAT'S EXPLAINED

$$R^2 = \frac{SSR}{SST} = \frac{\sum (\hat{y}_i - \bar{y})^2}{\sum (y_i - \bar{y})^2}$$

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

SUM OF SQUARES OF RESIDUALS

THE AMOUNT OF VARIATION IN Y THAT HAS NOT BEEN EXPLAINED

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

	Slope	Intercept	
	0.958859788	0.005303	
SE	0.160220029	0.007086	SE
r2	0.335305325	6%	sev
F	35.81596028	71	df
ssreg	0.130901804	0.259494	ssresid

THE F-STATISTIC

THIS IS A TEST STATISTIC THAT WE CAN USE TO TELL IF THE TRUE VALUE OF R-SQUARED IS 33% OR NOT

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS IN A REGRESSION

THE F-STATISTIC

TELLS US IF THE ENTIRE MODEL IS STATISTICALLY SIGNIFICANT

VS

THE T-STATISTIC

TELLS US IF THE EACH CO-EFFICIENT IS STATISTICALLY SIGNIFICANT

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

IN A REGRESSION

THE F-STATISTIC VS THE T-STATISTIC

TELLS US HOW GOOD THE OVERALL MODEL IS

TELLS US HOW IMPORTANT THE INCLUSION OF EACH VARIABLE IN THE MODEL IS

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

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DEGREES OF FREEDOM

NUMBER OF DATA POINTS - NUMBER OF VARIABLES - 1

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DEGREES OF FREEDOM

USEFUL TO CALCULATE THE F-STATISTIC

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STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

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STANDARD ERROR OF Y

IF YOU USE THIS REGRESSION TO PREDICT THE GOOGLE RETURNS, IT COULD BE OFF BY ~6% PTS

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

STANDARD ERROR OF Y

$$\sigma_{est} = \sqrt{\frac{\sum (Y - Y')^2}{N}}$$

SQRT(AVERAGE OF SQUARED ERROR)

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

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EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

THE LINEST() FUNCTION IN EXCEL IS PRETTY COOL, BUT FOR SEVERAL REASONS IT MAKES SENSE TO USE A PROGRAMMING LANGUAGE LIKE R TO DO REGRESSION

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

THE LINEST() FUNCTION IN EXCEL IS PRETTY COOL, BUT FOR SEVERAL REASONS IT MAKES SENSE TO USE A PROGRAMMING LANGUAGE LIKE R TO DO REGRESSION

1) YOU CAN EASILY AUTOMATE A NUMBER OF THE MANUAL STEPS PRE-REGRESSION

2) REGRESSION IN R IS MUCH MORE POWERFUL

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

2) REGRESSION IN R IS MUCH MORE POWERFUL

ONE SIMPLE EXAMPLE IS THAT IF THERE ARE MISSING VALUES IN THE DATA, LINEST WILL THROW AN ERROR

GOOG	Nasdaq			
r-rf	rm-rf		Goog~NASDAQ	#VALUE!
0%	-1%		Goog~NASDAQ	
-3%			Slope	Intercept
0%	-4%		#VALUE!	#VALUE!
3%		SE	#VALUE!	#VALUE!
15%		r2	#VALUE!	#VALUE!
-3%	-5%	F	#VALUE!	#VALUE!
-3%	-8%	ssreg	#VALUE!	#VALUE!
19%	1%			
-4%	-3%			
-2%	1%			

R ENABLES YOU TO HANDLE THESE ISSUES

EXAMPLE 1: FIND THE BETA OF GOOGLE (IN EXCEL)

STEP 5: REGRESS THE ADJUSTED GOOGLE RETURNS AGAINST NASDAQ RETURNS

2) REGRESSION IN R IS MUCH MORE POWERFUL

LINEST() ENABLES YOU TO CALCULATE THE TEST STATISTICS

R DOES

BUT DOES NOT DIRECTLY GIVE YOU THE STATISTICAL SIGNIFICANCE OF THE MODEL OR CO-EFFICIENTS