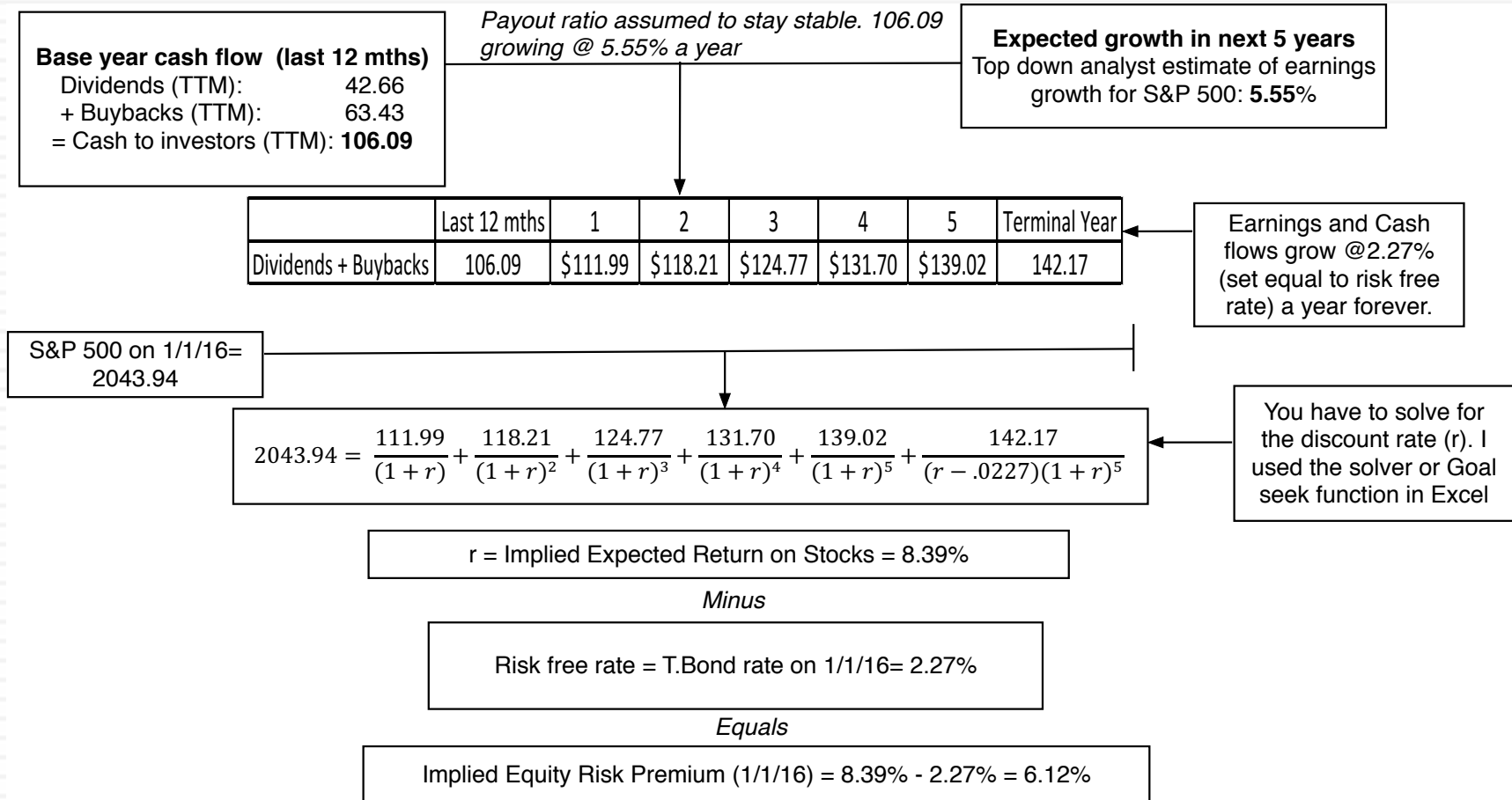
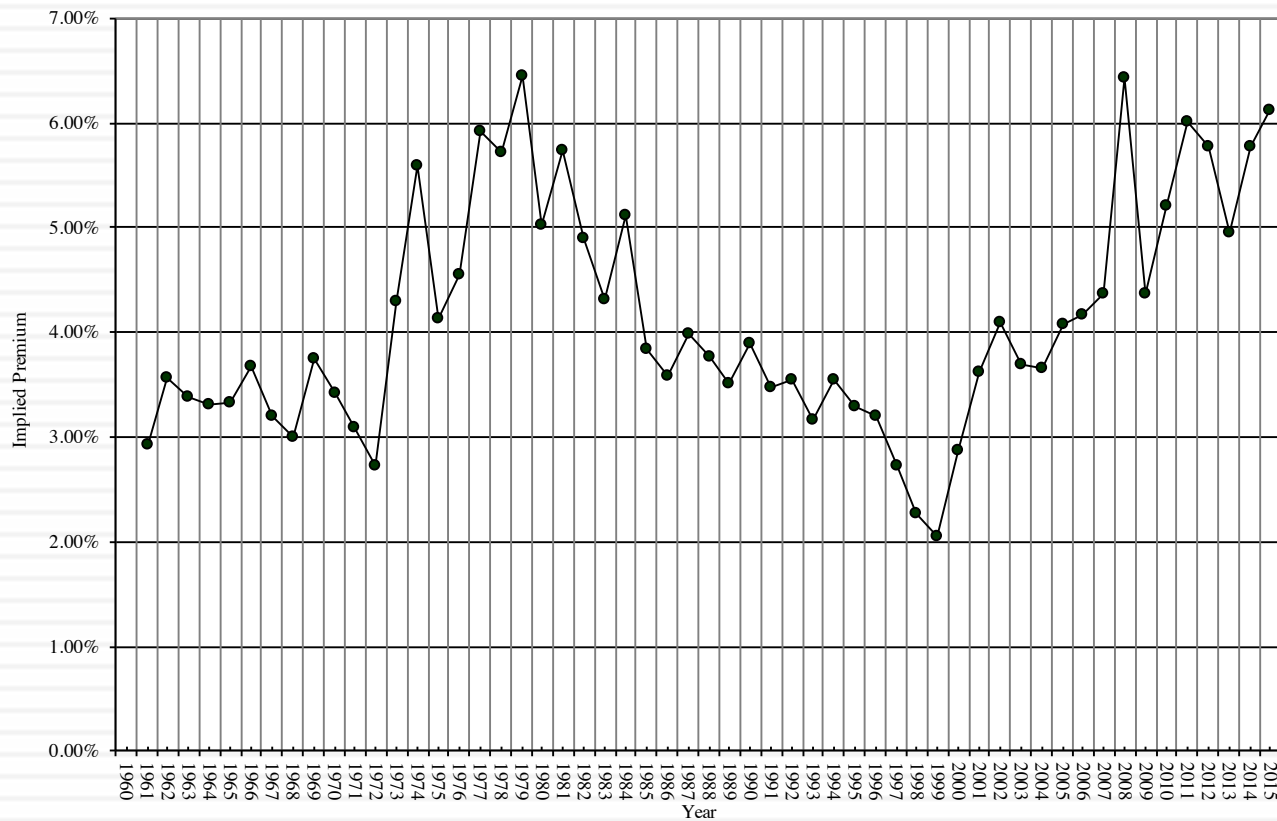


# An Implied ERP



# Implied Premiums in the US: 1960-2015

*Implied Premium for US Equity Market: 1960-2015*



# ERP : Jan 2016

Andorra	9.28%	3.28%	Jersey (States of)	6.59%	0.59%
Austria	6.00%	0.00%	Liechtenstein	6.00%	0.00%
Belgium	6.90%	0.90%	Luxembourg	6.00%	0.00%
Cyprus	12.71%	6.71%	Malta	7.79%	1.79%
Denmark	6.00%	0.00%	Netherlands	6.00%	0.00%
Finland	6.00%	0.00%	Norway	6.00%	0.00%
France	6.74%	0.74%	Portugal	9.72%	3.72%
Germany	6.00%	0.00%	Spain	8.84%	2.84%
Greece	20.90%	14.90%	Sweden	6.00%	0.00%
Guernsey	6.59%	0.59%	Switzerland	6.00%	0.00%
Iceland	8.84%	2.84%	Turkey	9.28%	3.28%
Ireland	8.38%	2.38%	United Kingdom	6.59%	0.59%
Isle of Man	6.59%	0.59%	<b>Western Europe</b>	<b>7.16%</b>	<b>1.16%</b>
Italy	8.84%	2.84%			

Albania	12.71%	6.71%
Armenia	11.37%	5.37%
Azerbaijan	9.28%	3.28%
Belarus	17.17%	11.17%
Bosnia	15.70%	9.70%
Bulgaria	8.84%	2.84%
Croatia	9.72%	3.72%
Czech Republic	7.05%	1.05%
Estonia	7.05%	1.05%
Georgia	11.37%	5.37%
Hungary	9.72%	3.72%
Kazakhstan	8.84%	2.84%
Latvia	7.79%	1.79%
Lithuania	7.79%	1.79%
Macedonia	11.37%	5.37%
Moldova	15.70%	9.70%
Montenegro	11.37%	5.37%
Poland	7.26%	1.26%
Romania	9.28%	3.28%
Russia	9.72%	3.72%
Serbia	12.71%	6.71%
Slovakia	7.26%	1.26%
Slovenia	9.28%	3.28%
Ukraine	20.90%	14.90%
<b>Eastern Europe &amp; Russia</b>	<b>9.65%</b>	<b>3.65%</b>

Frontier Markets (not rated)							
Algeria	63.0	12.71%	6.71%	Malawi	57.0	17.17%	11.17%
Brunei	72.8	8.84%	2.84%	Mali	62.5	12.71%	6.71%
Gambia	62.0	14.20%	8.20%	Myanmar	63.3	12.71%	6.71%
Guinea	53.8	17.17%	11.17%	Niger	51.0	17.17%	11.17%
Guinea-Bissau	62.3	12.71%	6.71%	Sierra Leone	56.5	17.17%	11.17%
Guyana	63.5	12.71%	6.71%	Somalia	42.5	20.90%	14.90%
Haiti	57.0	17.17%	11.17%	Sudan	48.3	20.90%	14.90%
Iran	67.8	10.48%	4.48%	Syria	35.8	25.00%	19.00%
Iraq	56.0	17.17%	11.17%	Tanzania	63.0	12.71%	6.71%
Korea, D.P.R.	56.0	17.17%	11.17%	Togo	63.8	12.71%	6.71%
Liberia	50.5	17.17%	11.17%	Yemen, Republic	50.3	17.17%	11.17%
Libya	52.8	17.17%	11.17%	Zimbabwe	54.5	17.17%	11.17%
Madagascar	61.3	14.20%	8.20%				

Canada	6.00%	0.00%
US	6.00%	0.00%
<b>North America</b>	<b>6.00%</b>	<b>0.00%</b>
<b>Caribbean</b>	<b>14.61%</b>	<b>8.61%</b>
Argentina	17.17%	11.17%
Belize	19.42%	13.42%
Bolivia	11.37%	5.37%
Brazil	9.28%	3.28%
Chile	6.90%	0.90%
Colombia	8.84%	2.84%
Costa Rica	9.72%	3.72%
Ecuador	15.70%	9.70%
El Salvador	11.37%	5.37%
Guatemala	9.72%	3.72%
Honduras	15.70%	9.70%
Mexico	7.79%	1.79%
Nicaragua	14.20%	8.20%
Panama	8.84%	2.84%
Paraguay	9.72%	3.72%
Peru	7.79%	1.79%
Suriname	11.37%	5.37%
Uruguay	8.84%	2.84%
Venezuela	20.90%	14.90%
<b>Latin America</b>	<b>10.42%</b>	<b>4.42%</b>

Country	ERP	CRP
Angola	10.48%	4.48%
Botswana	7.26%	1.26%
Burkina Faso	15.70%	9.70%
Cameroon	14.20%	8.20%
Cape Verde	14.20%	8.20%
Congo (DR)	15.70%	9.70%
Congo (Republic)	11.37%	5.37%
Côte d'Ivoire	11.37%	5.37%
Egypt	15.70%	9.70%
Ethiopia	12.71%	6.71%
Gabon	11.37%	5.37%
Ghana	15.70%	9.70%
Kenya	12.71%	6.71%
Morocco	9.72%	3.72%
Mozambique	14.20%	8.20%
Namibia	9.28%	3.28%
Nigeria	11.37%	5.37%
Rwanda	12.71%	6.71%
Senegal	12.71%	6.71%
South Africa	8.84%	2.84%
Tunisia	11.37%	5.37%
Uganda	12.71%	6.71%
Zambia	14.20%	8.20%
<b>Africa</b>	<b>11.76%</b>	<b>5.76%</b>

Abu Dhabi	6.74%	0.74%
Bahrain	9.28%	3.28%
Israel	7.05%	1.05%
Jordan	12.71%	6.71%
Kuwait	6.74%	0.74%
Lebanon	14.20%	8.20%
Oman	7.05%	1.05%
Qatar	6.74%	0.74%
Ras Al Khaimah	7.26%	1.26%
Saudi Arabia	6.90%	0.90%
Sharjah	7.79%	1.79%
United Arab Emirates	6.74%	0.74%
<b>Middle East</b>	<b>7.11%</b>	<b>1.11%</b>

Bangladesh	11.37%	5.37%
Cambodia	14.20%	8.20%
China	6.90%	0.90%
Fiji	12.71%	6.71%
Hong Kong	6.59%	0.59%
India	9.28%	3.28%
Indonesia	9.28%	3.28%
Japan	7.05%	1.05%
Korea	6.74%	0.74%
Macao	6.74%	0.74%
Malaysia	7.79%	1.79%
Mauritius	8.38%	2.38%
Mongolia	14.20%	8.20%
Pakistan	15.70%	9.70%
Papua New Guinea	12.71%	6.71%
Philippines	8.84%	2.84%
Singapore	6.00%	0.00%
Sri Lanka	12.71%	6.71%
Taiwan	6.90%	0.90%
Thailand	8.38%	2.38%
Vietnam	12.71%	6.71%
<b>Asia</b>	<b>7.49%</b>	<b>1.49%</b>
Australia	6.00%	0.00%
Cook Islands	12.71%	6.71%
New Zealand	6.00%	0.00%
<b>Australia &amp; NZ</b>	<b>6.00%</b>	<b>0.00%</b>

Black #: Total ERP  
 Red #: Country risk premium  
 AVG: GDP weighted average



# Estimating Beta

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- The standard procedure for estimating betas is to regress stock returns ( $R_j$ ) against market returns ( $R_m$ ):

$$R_j = a + b R_m$$

where  $a$  is the intercept and  $b$  is the slope of the regression.

- The slope of the regression corresponds to the beta of the stock, and measures the riskiness of the stock.
- The R squared ( $R^2$ ) of the regression provides an estimate of the proportion of the risk (variance) of a firm that can be attributed to market risk. The balance ( $1 - R^2$ ) can be attributed to firm specific risk.

# Estimating Performance

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- The intercept of the regression provides a simple measure of performance during the period of the regression, relative to the capital asset pricing model.

$$\begin{aligned} R_j &= R_f + b (R_m - R_f) \\ &= R_f (1-b) + b R_m \end{aligned} \quad \text{..... Capital Asset Pricing Model}$$

$$R_j = a + b R_m \quad \text{..... Regression Equation}$$

- If

$a > R_f (1-b)$  .... Stock did better than expected during regression period

$a = R_f (1-b)$  .... Stock did as well as expected during regression period

$a < R_f (1-b)$  .... Stock did worse than expected during regression period

- The difference between the intercept and  $R_f (1-b)$  is Jensen's alpha. If it is positive, your stock did perform better than expected during the period of the regression.

# Setting up for the Estimation

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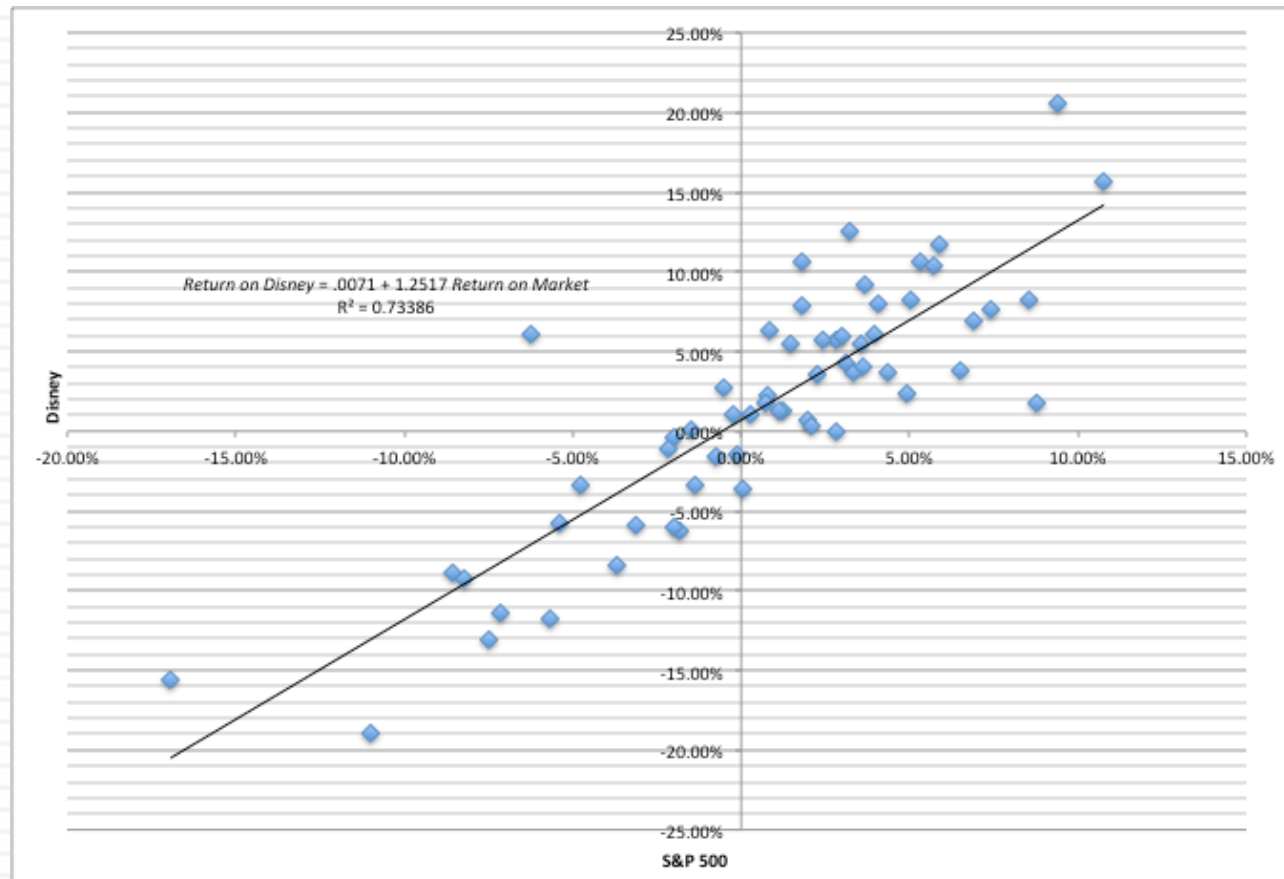
- Decide on an estimation period
  - ▣ Services use periods ranging from 2 to 5 years for the regression
  - ▣ Longer estimation period provides more data, but firms change.
  - ▣ Shorter periods can be affected more easily by significant firm-specific event that occurred during the period
- ▣ Decide on a return interval - daily, weekly, monthly
  - ▣ Shorter intervals yield more observations, but suffer from more noise.
  - ▣ Noise is created by stocks not trading and biases all betas towards one.
- Estimate returns (including dividends) on stock
  - ▣  $\text{Return} = (\text{Price}_{\text{End}} - \text{Price}_{\text{Beginning}} + \text{Dividends}_{\text{Period}}) / \text{Price}_{\text{Beginning}}$
  - ▣ Included dividends only in ex-dividend month
- Choose a market index, and estimate returns (inclusive of dividends) on the index for each interval for the period.

# Choosing the Parameters: Disney

- Period used: 5 years
- Return Interval = Monthly
- Market Index: S&P 500 Index.
- For instance, to calculate returns on Disney in December 2009,
  - ▣ Price for Disney at end of November 2009 = \$ 30.22
  - ▣ Price for Disney at end of December 2009 = \$ 32.25
  - ▣ Dividends during month = \$0.35 (It was an ex-dividend month)
  - ▣ Return =  $(\$32.25 - \$30.22 + \$ 0.35) / \$30.22 = 7.88\%$
- To estimate returns on the index in the same month
  - ▣ Index level at end of November 2009 = 1095.63
  - ▣ Index level at end of December 2009 = 1115.10
  - ▣ Dividends on index in December 2009 = 1.683
  - ▣ Return =  $(1115.1 - 1095.63 + 1.683) / 1095.63 = 1.78\%$



# Disney's Historical Beta



$$\text{Return on Disney} = .0071 + 1.2517 \text{ Return on Market} \\ (0.10)$$

$$R^2 = 0.73386$$

# Analyzing Disney's Performance

- Intercept = 0.712%
  - This is an intercept based on monthly returns. Thus, it has to be compared to a monthly riskfree rate.
  - Between 2008 and 2013
    - Average Annualized T.Bill rate = 0.50%
    - Monthly Riskfree Rate =  $0.5\%/12 = 0.042\%$
    - Riskfree Rate (1-Beta) =  $0.042\% (1-1.252) = -0.0105\%$
- The Comparison is then between
  - Intercept versus Riskfree Rate (1 - Beta)
  - 0.712% versus 0.0105%
  - Jensen's Alpha =  $0.712\% - (-0.0105)\% = 0.723\%$
- Disney did 0.723% better than expected, per month, between October 2008 and September 2013
  - Annualized, Disney's annual excess return =  $(1.00723)^{12} - 1 = 9.02\%$

# More on Jensen's Alpha

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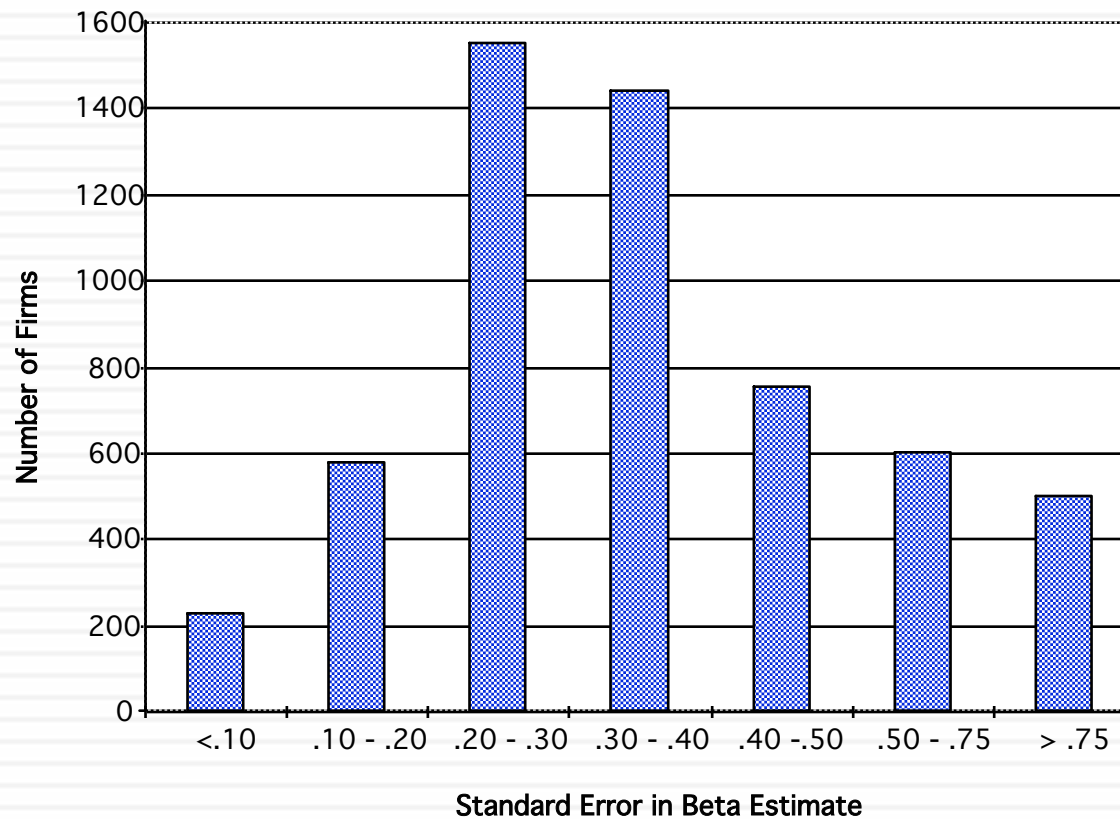
- If you did this analysis on every stock listed on an exchange, what would the average Jensen's alpha be across all stocks?
  - a. Depend upon whether the market went up or down during the period
  - b. Should be zero
  - c. Should be greater than zero, because stocks tend to go up more often than down.
- Disney has a positive Jensen's alpha of 9.02% a year between 2008 and 2013. This can be viewed as a sign that management in the firm did a good job, managing the firm during the period.
  - a. True
  - b. False
- Disney has had a positive Jensen's alpha between 2008 and 2013. If you were an investor in early 2014, looking at the stock, you would view this as a sign that the stock will be a:
  - a. Good investment for the future
  - b. Bad investment for the future
  - c. No information about the future

# Estimating Disney's Beta

- Slope of the Regression of 1.25 is the beta
- Regression parameters are always estimated with error. The error is captured in the standard error of the beta estimate, which in the case of Disney is 0.10.
- Assume that I asked you what Disney's true beta is, after this regression.
  - ▣ What is your best point estimate?
  - ▣ What range would you give me, with 67% confidence?
  - ▣ What range would you give me, with 95% confidence?

# The Dirty Secret of “Standard Error”

Distribution of Standard Errors: Beta Estimates for U.S. stocks



# Breaking down Disney's Risk

- R Squared = 73%
- This implies that
  - ▣ 73% of the risk at Disney comes from market sources
  - ▣ 27%, therefore, comes from firm-specific sources
- The firm-specific risk is diversifiable and will not be rewarded.
- The R-squared for companies, globally, has increased significantly since 2008. Why might this be happening?
  
- What are the implications for investors?

# The Relevance of R Squared

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- You are a diversified investor trying to decide whether you should invest in Disney or Amgen. They both have betas of 1.25, but Disney has an R Squared of 73% while Amgen's R squared is only 25%. Which one would you invest in?
  - ▣ Amgen, because it has the lower R squared
  - ▣ Disney, because it has the higher R squared
  - ▣ You would be indifferent
- Would your answer be different if you were an undiversified investor?

# Beta Estimation: Using a Service (Bloomberg)

