

# What is Risk?

## Lesson Summary

*What is Risk?* provides students with an understanding that there is some level of risk in all investments.

## Mathematical Strands

### Thinking Algebraically

Students use differences in the percentage change of the market and the percentage change of a stock to explore what Beta numbers mean

### Interpreting Statistics

Students calculate Beta numbers, and then match those stocks to the profiles of different investors.

### Communicating Quantitative Information

Students investigate the connection between volatility (as represented on a graph) and beta numbers.

### Tackling Complex Problems

NA



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## Thinking Algebraically

A stock's beta number is one of many measures of how volatile its price is compared to the market. Market analysts use sophisticated statistical tools to calculate the beta numbers for each stock, but you can get an idea of what Beta measures by comparing the change in the market to the change in price of a stock.

To better understand beta numbers, calculate the monthly percentage change in each stock and in the S&P 500 in each table, using the following formula:

$$\text{Percentage change from month a to month b} = \frac{(\text{price\_in\_month\_b}) - (\text{price\_in\_month\_a})}{\text{price\_in\_month\_a}} \cdot 100\%$$

Example:

$$\text{Expedia Percentage change from November to December} = \frac{20.98 - 18.16}{18.16} \cdot 100\% = 15.53\%$$

	<b>Expedia, Inc. (EXPE)</b>		<b>S &amp; P 500</b>	
	<b>price</b>	<b>% change</b>	<b>value</b>	<b>% change</b>
<b>November 2006</b>	\$18.16	15.53%	\$1,400.63	
<b>December 2006</b>	\$20.98		\$1,418.30	
<b>February 2007</b>	\$21.26		\$1,406.82	
<b>March 2007</b>	\$23.18		\$1,420.86	

	<b>Edison International (EIX)</b>		<b>S &amp; P 500</b>	
	<b>price</b>	<b>% change</b>	<b>Value</b>	<b>% change</b>
<b>November 2006</b>	\$45.98		\$1,400.63	
<b>December 2006</b>	\$45.48		\$1,418.30	
<b>January 2007</b>	\$44.98		\$1,438.24	



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<b>February 2007</b>	\$47.00		\$1,406.82	
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	<b>Eastman Kodak Company (EK)</b>		<b>S &amp; P 500</b>	
	<b>price</b>	<b>% change</b>	<b>Value</b>	<b>% change</b>
<b>December 2006</b>	\$25.80		\$1,418.30	
<b>January 2007</b>	\$25.86		\$1,438.24	
<b>February 2007</b>	\$23.87		\$1,406.82	
<b>March 2007</b>	\$22.56		\$1,420.86	

Which of the stocks above had percentage changes that were very different from the market? What do you think this means about its Beta number?



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1. What is the overall change from the stock's high and low prices?

Assume the chart below is graph of the Dow Jones Industrial Average over the same period.

2. How does the chart help explain why the dramatic change occurred, but the stock has a Beta of 1.01?

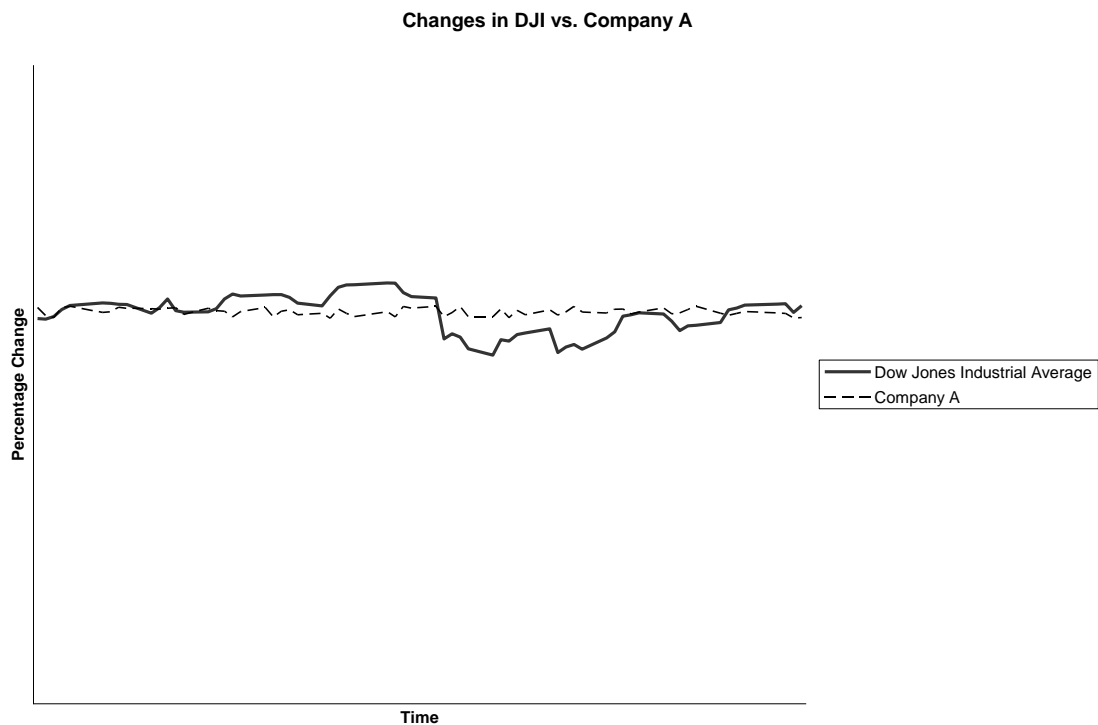
3. Use your knowledge of Beta to explain to your client what may have been going on in the stock market during this same time, and why this fluctuation may not be that "wild" after all.



## Communicating Quantitative Information

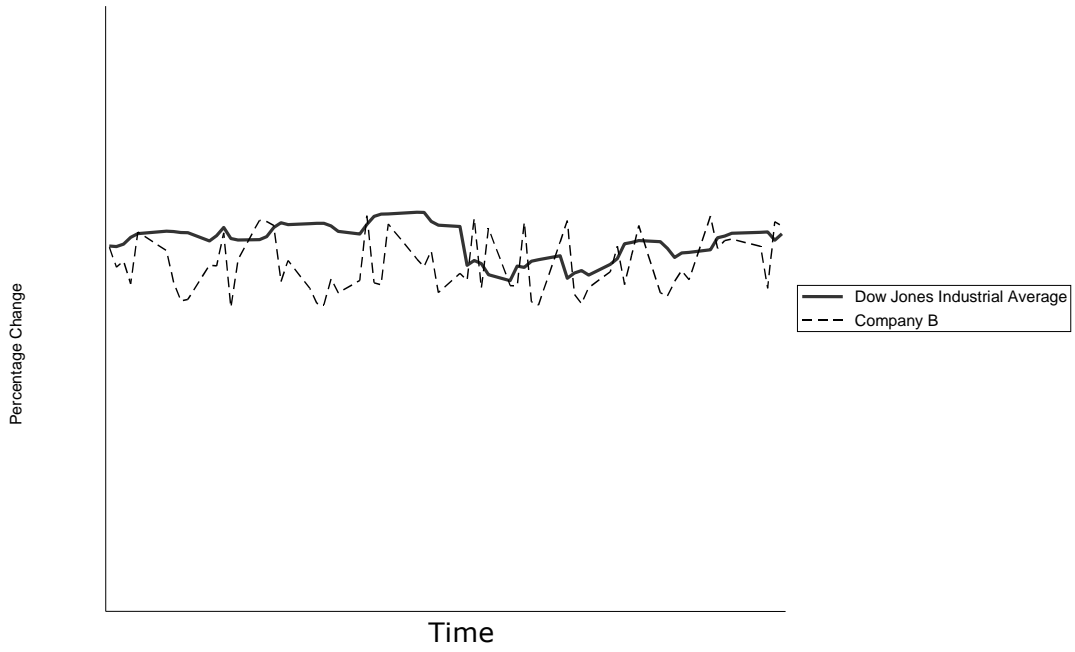
The following graphs illustrate how the relative performance of stocks with different Beta numbers would perform against the market as a whole.

Company A has a Beta of 1.02.



Company B has a Beta of 2.3

Changes in DJI vs. Company B



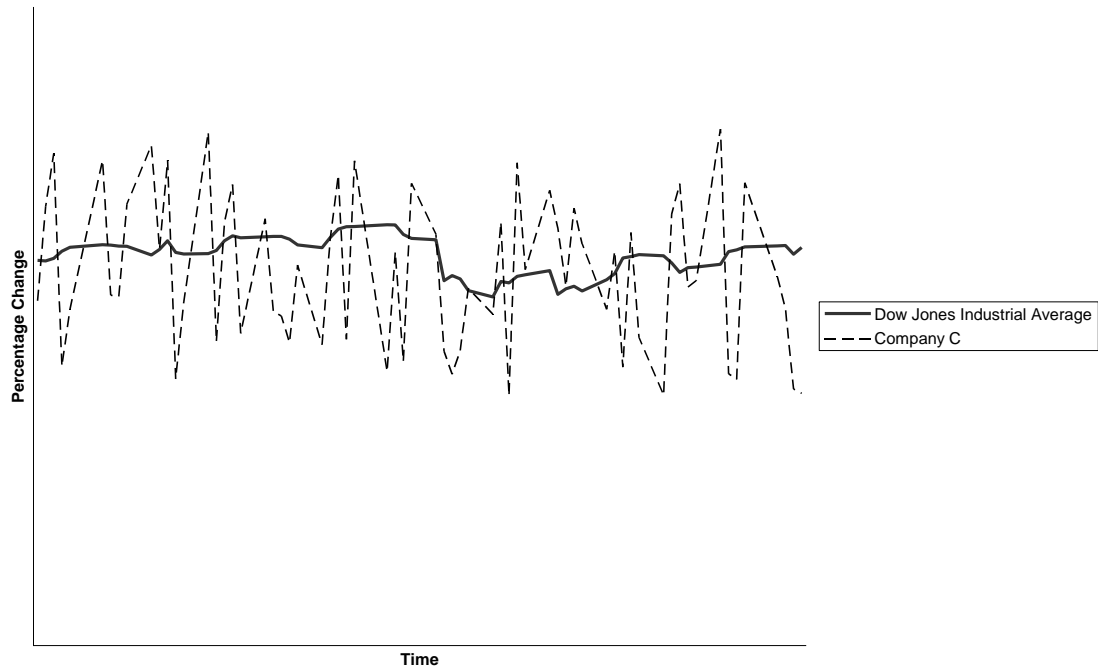
Company C has a Beta of 5.8

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Changes in DJI vs. Company C



1. Which of the graphs shows a stock whose performance most closely resembles the trend of the Dow Jones Industrial Average?
2. Which of the graphs shows a stock whose performance showed more dramatic changes than the Dow Jones Industrial Average?
3. What is different about the graph of a stock's relative performance when it has a Beta close to 1 compared when a stock has a Beta close to 5?

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