

Video lecture

https://youtu.be/K4Sy_HzB6c4

Preliminary points

Dare: Would you jump from second floor for \$1,000? Risk lovers will jump even if there is no payment. Risk haters will not jump and no amount of money can make them jump. **Risk averse** will jump given the correct amount.

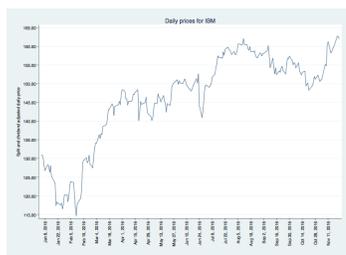
Dare: Would you jump from **third floor** for \$1,000? Would you ask for **more money** compared to jumping from the second floor? Would you ask for **less money** compared to jumping from the second floor? **Rational choice:** Ask for more money for more risk.

Price or return

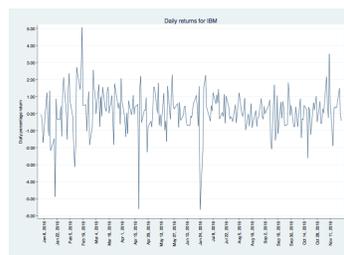
Return is earnings. Returns can be stated in dollar terms or in percentage terms: I earned \$10 or I earned 10%. However, the dollar term can be misleading: I earned \$10 on \$100K investment or I earned 10% on \$100K investment.

Our discussion is almost always about percentage returns. We rarely talk about prices. Prices would have trend. Returns should not have any trends. In fact, daily returns of stocks should be random and non-predictable.

The following charts show the daily prices and daily returns for IBM for the year 2016.



(a) Daily prices



(b) Daily return

Notice the trend in prices and deviations around the mean for the returns.

Price, return and risk: Statistics

	mean	sd	sum
	.0009406	.0128716	.2125833

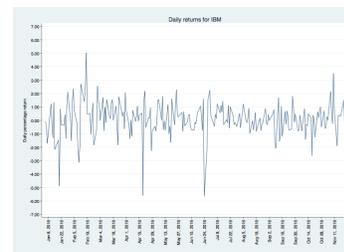
Mean refers to average daily return. Investor, on average, earned a positive return on a daily basis.

Sum refers to total return for the 2016. If IBM was purchased Jan. 1, 2016 and held until now: an investor would have earned 21.26%.

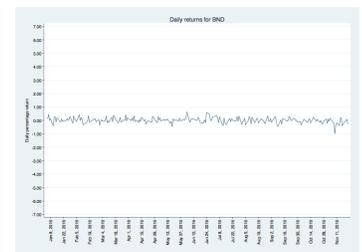
sd refers to standard deviation of daily returns. Average height of each daily return. In other words, average daily deviation from its mean daily return.

Risk: Comparative

Let's compare the risk for IBM and for BND. IBM is an equity and considered to be relatively higher risk. BND is an ETF that contains bonds and considered to be relatively lower risk.



(a) IBM



(b) BND

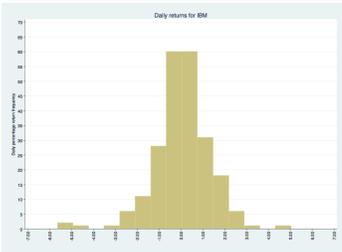
variable	mean	sd	sum
ln_IBM	.0009406	.0128716	.2125833
ln_BND	.0000891	.0020479	.0201434

mean: IBM's daily returns are higher than those of BND. **sd (risk):** IBM's standard deviation is higher than BND's. **sum:** Total return for IBM is higher than BND's.

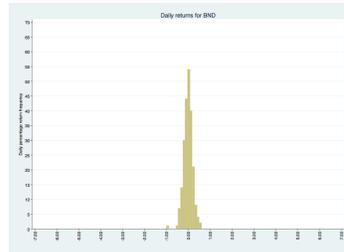


Risk and return

What is the likelihood of 5% return. How many days, out of all the trading days, would IBM return be 5% or more? Let's count...



(a) IBM



(b) BND

Notice the (a) number of bins (higher distribution) for IBM. Notice the (b) compactness of distribution for BND. Which security has a higher likelihood of having a 5% return in any given day?

Risk and return: Comparative

