Measuring the Gap

The Coefficient of Variation

By

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AUSTRALIAN INDEX OF CONSUMER SENTIMENT

2 MONTHS PROGRESSIVE TO MARCH 2013

Year commencing June

Recession Level

Happy 65% of last 40 years
73% of last 20 years

Source: Westpac - Melbourne Institute (IAESR), IBIS estimates 13/03/13
At 100 we'd all be happy. Zero inflation, no unemployment, and a zero bank mortgage loan rate. So, to judge the happiness of the masses, deduct the inflation rate, the unemployment rate, and the cost of a housing loan, from 100. The above chart is just this, done monthly from July 1970.

It doesn't get much better than this!

The lines indicate dates of previous recessions, 1974, 1983, and 1991. We weren't feeling too good about them either.
Australia, bliss index, to January 2012.
Australia, bliss index, to January 2012.

Bliss Index

Year commencing June
VOLUME
SHARES ARE GETTING LIGHTER?

Rising Prices on Decreasing Volume
Rising Prices on Decreasing Volume

Accumulation?
Accumulation?
SUCK EGGS
I know you know it, but I need to revise it.
The coefficient of variation is a measure of relative variability. It is used to measure the changes that have taken place in a population over time, or to compare the variability of two (or more) populations that are expressed in different units of measurement (like 1929, 1987 and 2008). It is expressed as a percentage rather than in terms of the units of the particular data.

The formula for the coefficient of variation, denoted by $V$, is

$$V = 100\left(\frac{s}{\bar{x}}\right)\%$$

Where $\bar{x}$ is the mean of the sample

$s$=the standard deviation of the sample
Nadia sells mainframe computers, hers sales averaged $256,000 per month with a standard deviation of $42,000.

\[ V = 100 \left( \frac{42,000}{256,000} \right) \% \]

16.4%

Bob sells personal computers, his sales averaged $36,000 per month with a standard deviation of $9,500.

\[ V = 100 \left( \frac{9,500}{36,000} \right) \% \]

26.4%
Thus, the relative variation of Bob’s sales is larger than that of Nadia’s, although the standard deviation of Bob’s sales is smaller than that of Nadia’s.

Bob’s $V=26.4\%$

Nadia’s $V=16.4\%$

The coefficient of variation indicates that, relative to their mean, the monthly sales of Bob are more variable than those of Nadia.

Note that the coefficient of variation is usually only appropriate for data in which all values are positive. Examples of such data include sales, height, weight and volume. If some of the values can be negative (e.g. profit, loss measurements of change), the coefficient of variation should not be used.

The coefficient of variation is equal to the standard deviation divided by the mean, multiplied by 100%.

For the sample of 10 times “to get ready”, since $\bar{x}$ the sample average is 39.6 and $S$ the sample standard deviation is 6.769… the coefficient of variation is $6.769/39.6 \times 100\% = 17.09\%$

For the times “to get ready”, the standard deviation is 17.1% of the mean.

The formula for the coefficient of variation, denoted by CV, is

$$CV = \frac{s}{\bar{x}} \times 100\%$$

Where $\bar{x}$ is the mean of the sample

$s$ = the standard deviation of the sample. 6.769 39.6
The formula for the coefficient of variation, denoted by CV, is

\[ CV = \left( \frac{s}{\bar{x}} \right) \times 100\% \]

Where \( \bar{x} \) is the mean of the sample
s=the standard deviation of the sample. 6.769 39.6
Standard Deviation is 17.09% of the Average.
<table>
<thead>
<tr>
<th></th>
<th>EXAMPLE 1</th>
<th>EXAMPLE 2</th>
<th>EXAMPLE 3</th>
<th>EXAMPLE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>LOW</td>
<td>8</td>
<td>23</td>
<td>48</td>
<td>98</td>
</tr>
<tr>
<td>RANG</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td>STANDARD DEVIATION</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>9</td>
<td>24</td>
<td>49</td>
<td>99</td>
</tr>
<tr>
<td>CV</td>
<td>11%</td>
<td>4%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Date</td>
<td>High</td>
<td>Low</td>
<td>STD</td>
<td>Average</td>
</tr>
<tr>
<td>--------</td>
<td>-------</td>
<td>-------</td>
<td>------</td>
<td>---------</td>
</tr>
<tr>
<td>19/10/19</td>
<td>87</td>
<td>1,738.74</td>
<td>254.325</td>
<td>1993.065</td>
</tr>
<tr>
<td>20/10/19</td>
<td>87</td>
<td>2,067.47</td>
<td>225.63</td>
<td>1841.84</td>
</tr>
<tr>
<td>29/10/19</td>
<td>29</td>
<td>212.3</td>
<td>20.05</td>
<td>232.35</td>
</tr>
<tr>
<td>21/07/19</td>
<td>33</td>
<td>84.5</td>
<td>7.1</td>
<td>91.6</td>
</tr>
<tr>
<td>28/10/19</td>
<td>29</td>
<td>256.8</td>
<td>19.2</td>
<td>276</td>
</tr>
<tr>
<td>24/10/19</td>
<td>29</td>
<td>272.3</td>
<td>20.25</td>
<td>292.55</td>
</tr>
<tr>
<td>6/10/193</td>
<td>1</td>
<td>87.5</td>
<td>6.5</td>
<td>94</td>
</tr>
<tr>
<td>30/10/19</td>
<td>29</td>
<td>230.9</td>
<td>15</td>
<td>245.9</td>
</tr>
</tbody>
</table>
Oct 19 1987
High 2,247.39
Low 1,738.74
average 1,993.065
standard deviation of 254.325

\[ V = 100 \left( \frac{254.325}{1993.065} \right) \% \]
13%
THE COEFFICIENT OF VARIATION EXAMPLE

High=10
Low=5
SD=2.5
Average=7.5
V=33%
THE COEFFICIENT OF VARIATION DOW JONES INDEX

V
Open
High
Low
Close
THE COEFFICIENT OF VARIATION DOW JONES INDEX
THE COEFFICIENT OF VARIATION DOW JONES INDEX
(YEARLY DATA)
THE COEFFICIENT OF VARIATION DOW JONES INDEX (YEARLY DATA)
<table>
<thead>
<tr>
<th>Year</th>
<th>V</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 0</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Year 1</td>
<td>12%</td>
<td>-12%</td>
</tr>
<tr>
<td>Year 2</td>
<td>7%</td>
<td>-7%</td>
</tr>
<tr>
<td>Year 3</td>
<td>23%</td>
<td>-23%</td>
</tr>
<tr>
<td>Year 4</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>Year 5</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>Year 6</td>
<td>9%</td>
<td>-9%</td>
</tr>
<tr>
<td>Year 7</td>
<td>29%</td>
<td>-29%</td>
</tr>
<tr>
<td>Year 8</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Year 9</td>
<td>11%</td>
<td>11%</td>
</tr>
</tbody>
</table>
THE COEFFICIENT OF VARIATION DOW JONES INDEX
1900-1909 (WITH DUPLICATION)
THE COEFFICIENT OF VARIATION DOW JONES INDEX 1900-1909 (WITH DUPLICATION)
THE COEFFICIENT OF VARIATION DOW JONES INDEX
1900-1909 (WITHOUT DUPLICATION)
THE COEFFICIENT OF VARIATION DOW JONES INDEX 1900-1909 (UP AND DOWN)
THE COEFFICIENT OF VARIATION DOW JONES INDEX
1900-1909
THE COEFFICIENT OF VARIATION DOW JONES INDEX
(STRONGEST V OR VOLATILITY ON NEGATIVE YEARS)
THE COEFFICIENT OF VARIATION DOW JONES INDEX  
(STRONGEST V OR VOLATILITY ON NEGATIVE YEARS)

-60%
-50%
-40%
-30%
-20%
-10%
0%
10%
20%
30%
40%
50%
60%

-17% 42 V 13% 72

Dates:
- 2/01/1900
- 1/01/1903
- 1/01/1906
- 1/01/1909
- 1/01/1912
- 1/01/1915
- 1/01/1918
- 1/01/1921
- 1/01/1924
- 1/01/1927
- 1/01/1930
- 1/01/1933
- 1/01/1936
- 1/01/1939
- 1/01/1942
- 1/01/1945
- 1/01/1948
- 1/01/1951
- 1/01/1954
- 1/01/1957
- 1/01/1960
- 1/01/1963
- 1/01/1966
- 1/01/1969
- 1/01/1972
- 1/01/1975
- 1/01/1978
- 1/01/1981
- 1/01/1984
- 1/01/1987
- 1/01/1990
- 1/01/1993
- 1/01/1996
- 1/01/1999
- 1/01/2002
- 1/01/2005
- 1/01/2008
- 1/01/2011
THE COEFFICIENT OF VARIATION DOW JONES INDEX (POSITIVE ONLY)
THE COEFFICIENT OF VARIATION DOW JONES INDEX (NEGATIVE ONLY)

V -

Linear (V -)
THE COEFFICIENT OF VARIATION DOW JONES INDEX (POSITIVE AND NEGATIVE OVER TEN YEAR REPEATS)
THE COEFFICIENT OF VARIATION DOW JONES INDEX (POSITIVE AND NEGATIVE OVER TEN YEAR REPEATS)

Repeat Cycles of V

Year 0 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9
THE COEFFICIENT OF VARIATION DOW JONES INDEX
(YEAR SUMMARIES)
(DID THEY SUFFER MORE AFTER 1929 THAN US 2008?)
THE COEFFICIENT OF VARIATION DOW JONES INDEX
(QUARTER SUMMARIES)

V Quarters
THE COEFFICIENT OF VARIATION DOW JONES INDEX (MONTH SUMMARIES)

V Month

0% 5% 10% 15% 20% 25% 30%

THE COEFFICIENT OF VARIATION DOW JONES INDEX (DAY SUMMARIES) SOME LACK OF DATA UNTIL OCT. 1928

v Daily
THE COEFFICIENT OF VARIATION DOW JONES INDEX (DAY SUMMARIES) WORKING ON CLOSE TO CLOSE (1914?)

V Daily Close
THE COEFFICIENT OF VARIATION DOW JONES INDEX (DAY SUMMARIES) NO TRADING AUG. TO DEC. 1914
THE COEFFICIENT OF VARIATION DOW JONES INDEX (DAY SUMMARIES) WHO HAD THE BIGGEST MOVE 1929 OR 1987?
THE COEFFICIENT OF VARIATION DOW JONES INDEX (DAY SUMMARIES) WHO HAD THE BIGGEST MOVE 1929 OR 1987?
V 85 Top Movers Show October Big Time Probability (1 in 1083)
Kal's Emotional Index
Kal's Emotional Index

The graph shows Kal's emotional index from January to December, with fluctuations throughout the year.
WHAT OTHER GAPS CAN WE MEASURE?
MOVING AVERAGES OSCILLATORS
WHAT OTHER GAPS CAN WE MEASURE? CANDLE TOPS TO BOTTOMS AND CANDLE BODIES
WHAT OTHER GAPS CAN WE MEASURE? MONTH’S SUMMARY

When is a Doji a Doji?
WHAT OTHER GAPS CAN WE MEASURE? TOPS TO BOTTOMS
WHAT OTHER GAPS CAN WE MEASURE? OPEN TO CLOSE FOR THE CANDLE BODIES
WHAT OTHER GAPS CAN WE MEASURE? ARE THESE RELATIVELY BIG OR SMALL WAVES?
WHAT OTHER GAPS CAN WE MEASURE? PULSE PRESSURE DURING EXERCISE THE GAP IS INCREASED
WHAT OTHER GAPS CAN WE MEASURE? TWO SMALLER GAPS CAN KILL YOU AND SO CAN TWO BIGGER GAPS
WHAT OTHER GAPS CAN WE MEASURE? TRADING CHAOS
MEASURING CAPS BETWEEN THE TRADERS AND INVESTORS
Gap between 5 and 13 day moving averages
V2 Average .05%
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Cycles Research
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Member of ATAA
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Coefficient of Variation (CV) is a measure of the dispersion of points/prices around the mean (Dispersion of a probability distribution).

In statistics, the coefficient of variation is also called variation coefficient, unitized risk or relative standard deviation (%RSD). Because its value is normalized and it is a dimensionless number, it is very helpful in analyzing and comparing volatility of different stocks.

CV is expressed in percentage and its value is always positive. It is calculated by taking the standard deviation of N-past prices and then dividing them by the absolute value of the mean (of these N-past prices).

One the main advantage of using the coefficient of variation over the standard deviation to measure volatility is the fact that CV is normalized and can be used to directly compare different asset's volatility. The standard deviation must be used in the context of the mean of the data. The main disadvantage is that the coefficient becomes very sensitive to small variation of the mean when the latter is close to zero. This means that this trading indicator is not suited to measure the volatility of penny stocks.

As with the standard deviation, the coefficient of variation function has two arguments. The first one gets a time-series (Example: Close price) and the second one gets a lookback period (Number of past bars to use when calculating the mean and the standard deviation).


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Chapter: 7
Understanding Risk
Section: 1
What is Risk?
Sub Section: 1

Coefficient of Variation

What if the two stocks offered different returns and different standard deviations?

In this way, one measure could be the risk per unit of return i.e. standard deviation of returns divided by expected return. This measure is called coefficient of variation.

<table>
<thead>
<tr>
<th></th>
<th>Stock C</th>
<th>Stock D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expected Return</strong></td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>5%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Coefficient of Variation</strong></td>
<td>5% / 10% = 0.50%</td>
<td>10% / 15% = 0.67%</td>
</tr>
</tbody>
</table>

Hence, even though stock D offers a higher expected return, it is a poor investment in relation to its risk.
Few Questions about coefficient of variation and high risk returns?

Stock A has an expected return of 10% and a standard deviation of 15%. Stock B has an expected return of 12% and a standard deviation of 17%. According to the coefficient of variation, which of the following stocks is riskier?

Rank the following types of securities from high risk/return to low risk/return based on their historical averages: large company stocks, long term corporate bonds, small company stocks, and U.S. Treasury bills.

Should a diversified investor be more concerned with systematic risk or unsystematic risk? Explain.

5 years ago   Report Abuse

Best Answer - Chosen by Asker

Coefficient of Variation = Standard Deviation / Expected Return
The lower the ratio the better

Stock A = 15% / 10% = 1.5
Stock B = 17% / 12% = 1.42
Therefore, Stock A is the riskier

From low risk to high risk:
1. US Treasury Bill
2. Long Term Corporate Bonds
3. Large Company Stocks
4. Small Company Stocks

A bondholder is a creditor of the company while a stockholder is a part owner. By law, creditors are paid first before the owners in time of liquidation.

A diversified investor is more concerned with systematic risk. He holds wide range of well diversified portfolio where the returns on such well diversified portfolio will vary due to the effects of market-wide or economy wide factors, thereby eliminating the unsystematic risk.
Definition of 'Coefficient Of Variation - CV'

A statistical measure of the dispersion of data points in a data series around the mean. It is calculated as follows:

\[
\text{Coefficient of Variation} = \frac{\text{Standard Deviation}}{\text{Expected Return}}
\]

The coefficient of variation represents the ratio of the standard deviation to the mean, and it is a useful statistic for comparing the degree of variation from one data series to another, even if the means are drastically different from each other.

Investopedia explains 'Coefficient Of Variation - CV'

In the investing world, the coefficient of variation allows you to determine how much volatility (risk) you are assuming in comparison to the amount of return you can expect from your investment. In simple language, the lower the ratio of standard deviation to mean return, the better your risk-return tradeoff.

Note that if the expected return in the denominator of the calculation is negative or zero, the ratio will not make sense.
US THE THREE FOES

[Graph showing trends for 35% C of V Mortgage Rate, 70% C of V Inflation Rate, and 24% C of V Unemployment Rate from 1971 to 2012]
US TOTAL AGGRO

30% C of V of Total Aggro Rate
30% C of V of Total Aggravation Rate
Bliss Index

Recession

Recession

Recession
USA INDEX OF CONSUMER SENTIMENT
2 MONTHS PROGRESSIVE TO MARCH 2013

Recession Level

Happy 42% of last 33 years