Coefficient of Variation

The **standard deviation** is an appropriate measure of total risk when the investments being compared are **approximately equal** in expected returns (\( \approx \bar{k} \)) and the returns are estimated to have symmetrical probability distributions.

**When is it better to use the Coefficient of Variation to compare the riskiness of investments?**

Because the standard deviation is an **absolute** measure of risk, it generally is **not** suitable for comparing investments with different expected returns. In these cases the **Coefficient of Variation** provides a **better** measure of risk.

It is defined as the ratio of the standard deviation to the expected return:

\[
CV = \frac{\sigma}{\bar{x}}
\]

Therefore the CV measures risk per unit of return.

Let’s take a look at an example: We would like to compare the following to investments in terms of risk:

<table>
<thead>
<tr>
<th></th>
<th>Project A</th>
<th>Project B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Return ( \bar{x} )</td>
<td>60 %</td>
<td>8 %</td>
</tr>
<tr>
<td>Standard Deviation ( \sigma )</td>
<td>15</td>
<td>3</td>
</tr>
</tbody>
</table>

\[
CV_A = \frac{15}{60} = \frac{1}{4} = 0.25
\]

\[
CV_B = \frac{3}{8} = 0.375
\]

Although investment A has a higher standard deviation (\( = \) absolute risk), intuition tells us that investment A is less risky, because its **relative** variation is smaller.