

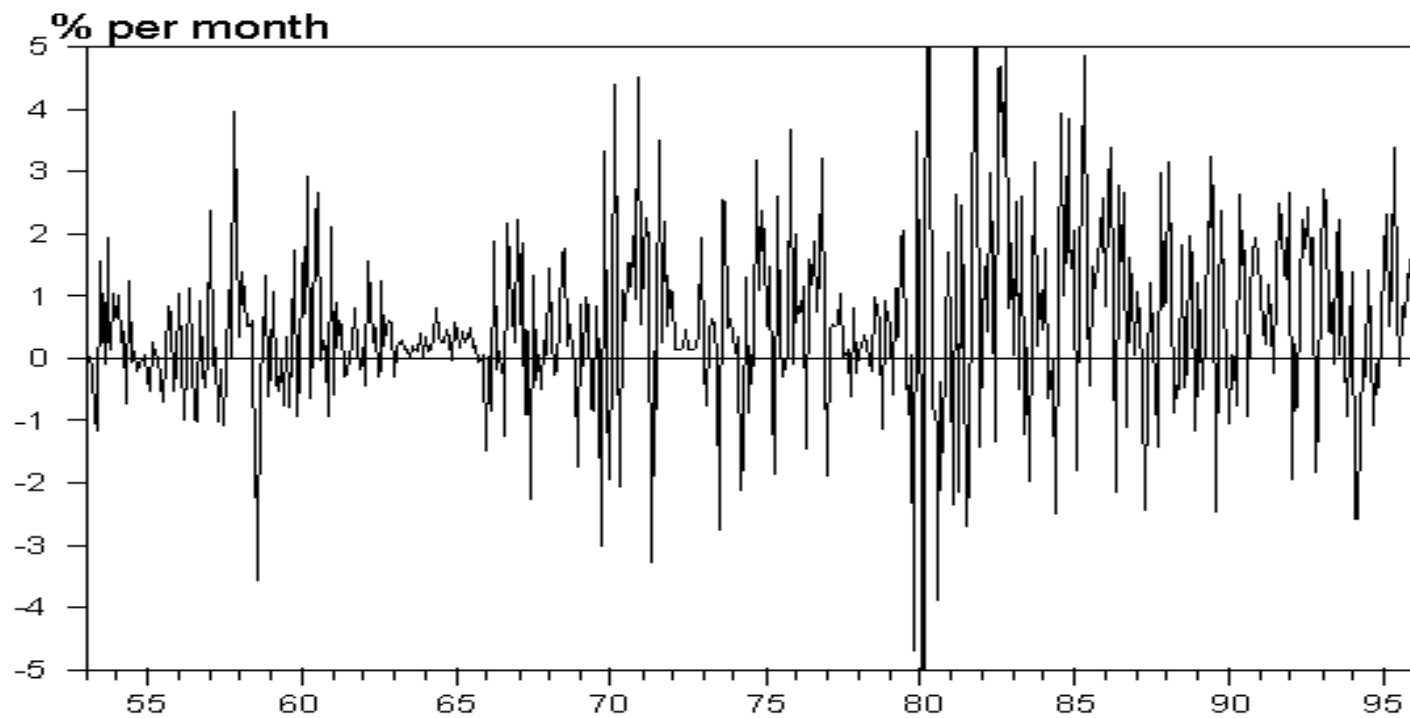
Value at Risk (VAR)

- *VAR is the maximum loss over a target horizon within a confidence interval (or, under normal market conditions)*
- In other words, if none of the “extreme events” (i.e., low-probability events) occurs, what is my maximum loss over a given time period?

VAR: Example

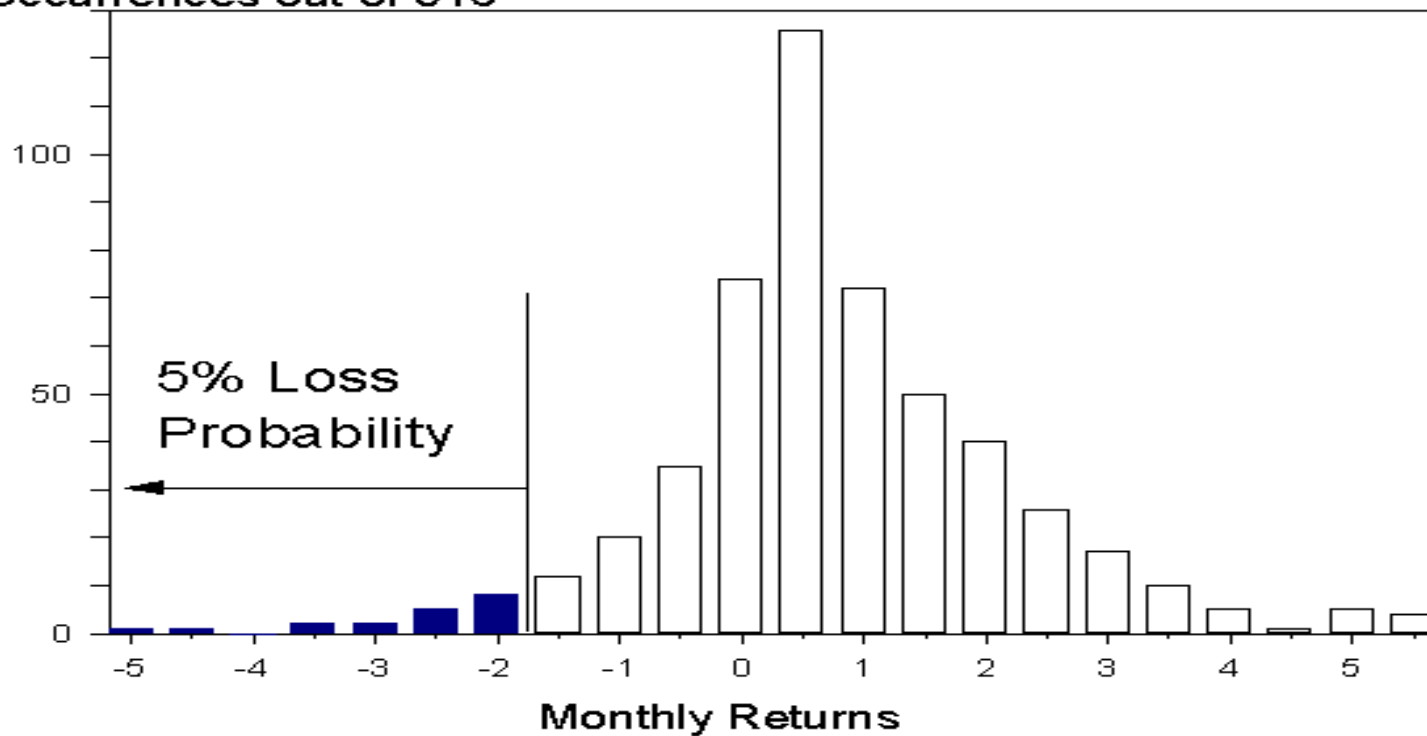
- Consider a \$100 million portfolio of medium-term bonds. Suppose my confidence interval is 95% (i.e., 95% of possible market events is defined as “normal”.) Then, what is the maximum monthly loss under normal markets over any month?
- To answer this question, let’s look at the monthly medium-term bond returns from 1953 to 1995:
- *Lowest: -6.5%* vs. *Highest: 12%*

History of Medium Bond Returns



Distribution of Medium Bond Returns

Occurrences out of 516



Calculating VAR at 95% Confidence

- At the 95% confidence interval, the lowest monthly return is -1.7% . (*I.e., there is a 5% chance that the monthly medium bond return is lower than -1.7%*)
- *That is, there are 26 months out of the 516 for which the monthly returns were lower than -1.7% .*
- **VAR = 100 million X 1.7% = \$1.7 million**
(95% of the time, the portfolio's loss will be no more than \$1.7 million!)

Issues to Ponder

- What horizon is appropriate?

A day, a month, or a year?

- What confidence level to consider?

** Are you risk averse?*

The more risk averse => (1) the higher confidence level necessary & (2) the lower VAR desired.