MEASURING PORTFOLIO RISK

WHAT WILL YOU LEARN?

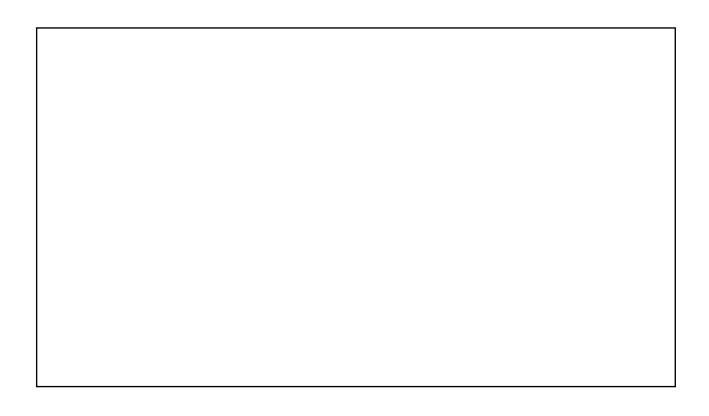
► How do you measure portfolio risk?

REVIEW: MEASURING RISK

- ► We use the dispersion as measured by the standard deviation of a distribution to measure risk.
- ► The variance is the probability weighted average of the squared deviations from the mean.

RISK: VARIANCE AND STANDARD DEVIATION

State of the economy	Prob.	Toyota	Walmart	Pfizer
Expansion	0.10	6.0%	4.5%	2.5%
Normal	0.40	7.5	5.5	-0.5
Recession	0.30	2.0	4.0	1.0
Depression	0.20	-3.0	-1.0	13.0
Expected return E(R)		3.60%	3.65%	2.95%
Standard deviation σ				



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Standard deviation σ		4.02%	2.41%	5.11%

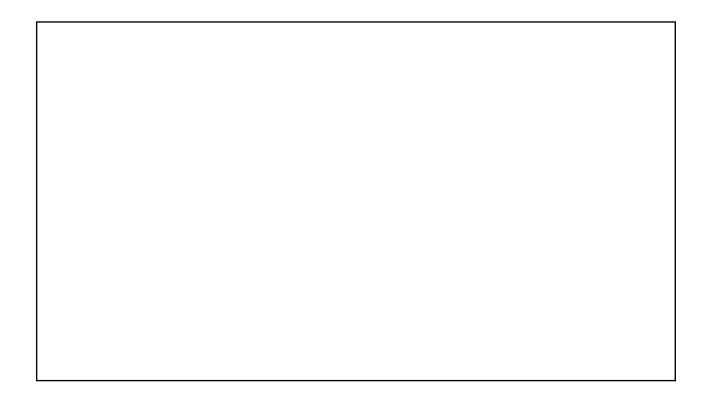
MEASURING PORTFOLIO RISK

PORTFOLIO RISK

► Find the volatility of a portfolio that consists of 50% Toyota and 50% Pfizer.

PORTFOLIO RISK:1/2 TOYOTA + 1/2 PFIZER

State of the economy	Prob.	Toyota	Pfizer	½ Toyota + ½ Pfizer
Expansion	0.10	6.0%	2.5%	4.25%
Normal	0.40	7.5	-0.5	3.5
Recession	0.30	2.0	1.0	1.5
Depression	0.20	-3.0	13.0	5.0
Expected return E(R)		3.60%	2.95%	3.275%
Standard deviation σ		4.02%	5.11%	



PORTFOLIO RISK:1/2 TOYOTA + 1/2 PFIZER

State of the economy	Prob.	Toyota	Pfizer	½ Toyota + ½ Pfizer
Expansion	0.10	6.0%	2.5%	4.25%
Normal	0.40	7.5	-0.5	3.5
Recession	0.30	2.0	1.0	1.5
Depression	0.20	-3.0	13.0	5.0
Expected return E(R)		3.60%	2.95%	3.275%
Standard deviation σ		4.02%	5.11%	1.29%

PORTFOLIO RISK

- ► The variance of a portfolio is not a weighted average of the individual variances.
- ▶ The same is true for the standard deviation.

MEASURING PORTFOLIO RISK

PORTFOLIO RISK

► Let's now find the volatility of another portfolio that consists of 50% Toyota and 50% Walmart.

PORTFOLIO RISK:1/2 TOYOTA + 1/2 WALMART

State of the economy	Prob.	Toyota	Walmart	½ Toyota + ½ Walmart
Expansion	0.10	6.0%	4.5%	5.25%
Normal	0.40	7.5	5.5	6.5
Recession	0.30	2.0	4.0	3.0
Depression	0.20	-3.0	-1.0	-2.0
Expected return E(R)		3.60%	3.65%	3.625%
Standard deviation σ		4.02%	2.41%	

PORTFOLIO RISK:1/2 TOYOTA + 1/2 WALMART

State of the economy	Prob.	Toyota	Walmart	½ Toyota + ½ Walmart
Expansion	0.10	6.0%	4.5%	5.25%
Normal	0.40	7.5	5.5	6.5
Recession	0.30	2.0	4.0	3.0
Depression	0.20	-3.0	-1.0	-2.0
Expected return E(R)		3.60%	3.65%	3.625%
Standard deviation σ		4.02%	2.41%	3.16%