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 + ½ 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 + ½ 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 + ½ 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 + ½ 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%**