

MEASURING RETURNS

WHAT WILL YOU LEARN?

- ▶ How do you compute the return on any asset?
- ▶ What is holding period return?
- ▶ What is the difference between an arithmetic mean and geometric mean?

CALCULATING RETURNS

- ▶ Suppose you invest in a stock index fund. The fund currently sells for \$100 per share.
- ▶ Suppose your investment horizon is one year.
- ▶ If the price per share at year's end \$110 and the cash dividends over the year are \$5, what is your holding period return?

ANNUAL RETURNS FOR A FIVE-YEAR PERIOD

	Return (r)
Year 1	-11.89%
Year 2	-22.10%
Year 3	28.69%
Year 4	10.88%
Year 5	4.91%

WHAT IS YOUR FIVE-YEAR HOLDING PERIOD RETURN?

	Return (r)	Gross Return = (1+r)	Cumulative Value of \$1 invested at t = 0
Year 1	-11.89%	0.8811	0.8811
Year 2	-22.10%	0.7760	0.6864
Year 3	28.69%	1.2869	0.8833
Year 4	10.88%	1.1088	0.9794
Year 5	4.91%	1.0491	1.0275

HOW ABOUT CALCULATING MEAN RETURNS?

- ▶ What was your average annual return over the five-year period?
- ▶ This is the geometric mean.

EXPECTED FUTURE ANNUAL RETURN

- If we could come up with likely scenarios for the economy and attach probabilities to them, we could calculate the expected return as the probability weighted average of the possible outcomes.

EXPECTED FUTURE ANNUAL RETURN

	Probability	Year-end price	Cash dividends	Return
Excellent	0.25	126.50	4.50	31%
Good	0.45	110.00	4.00	14%
Poor	0.25	89.75	3.50	-6.75%
Crash	0.05	46.00	2.00	-52%

ANNUAL RETURNS FOR A FIVE-YEAR PERIOD

	Return (r)
Year 1	-11.89%
Year 2	-22.10%
Year 3	28.69%
Year 4	10.88%
Year 5	4.91%

EXPECTED FUTURE RETURN

- Arithmetic average provides an unbiased estimate of the future expected return.