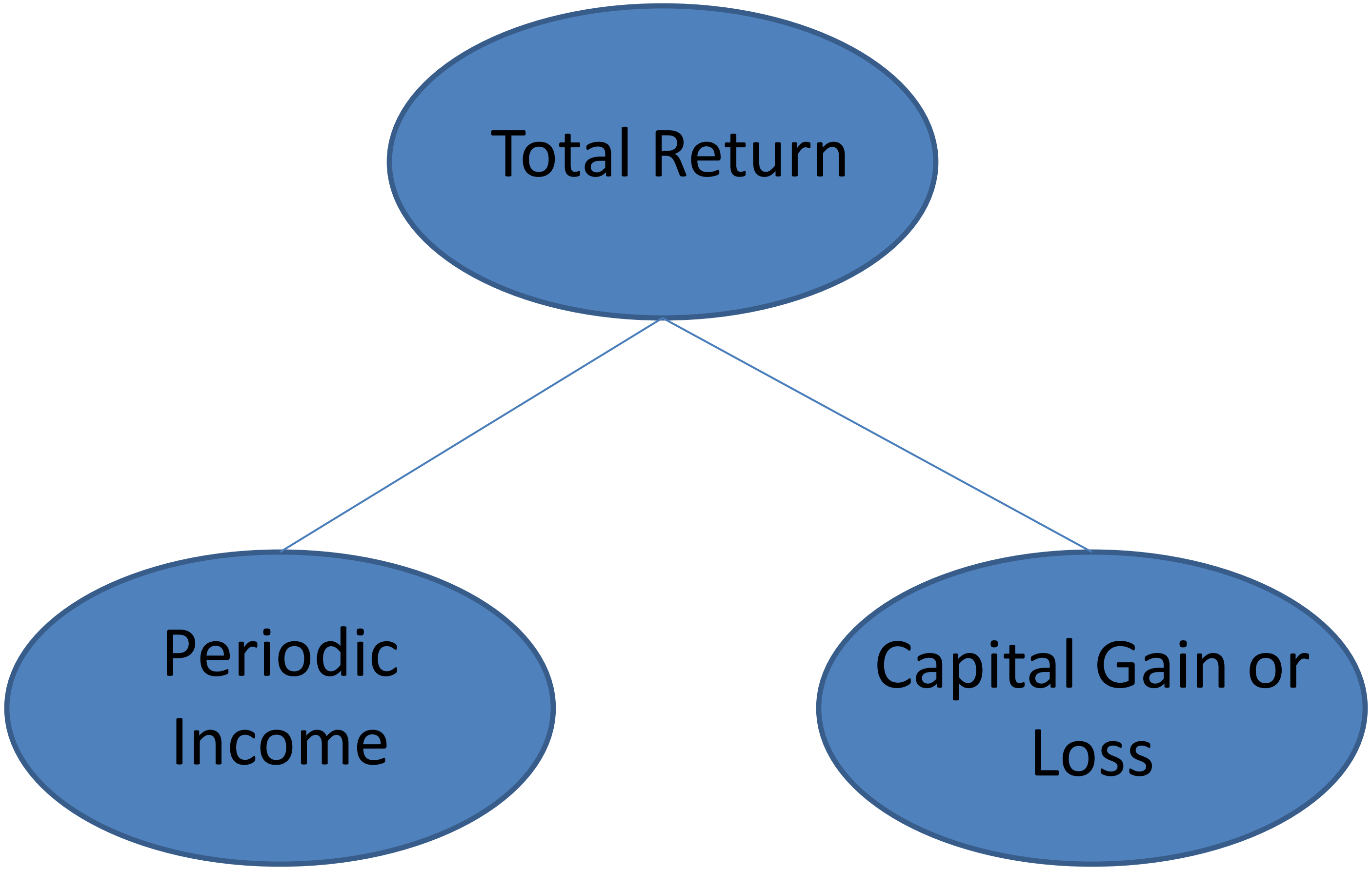
Return measures

Return on Financial Assets



Holding Period Return

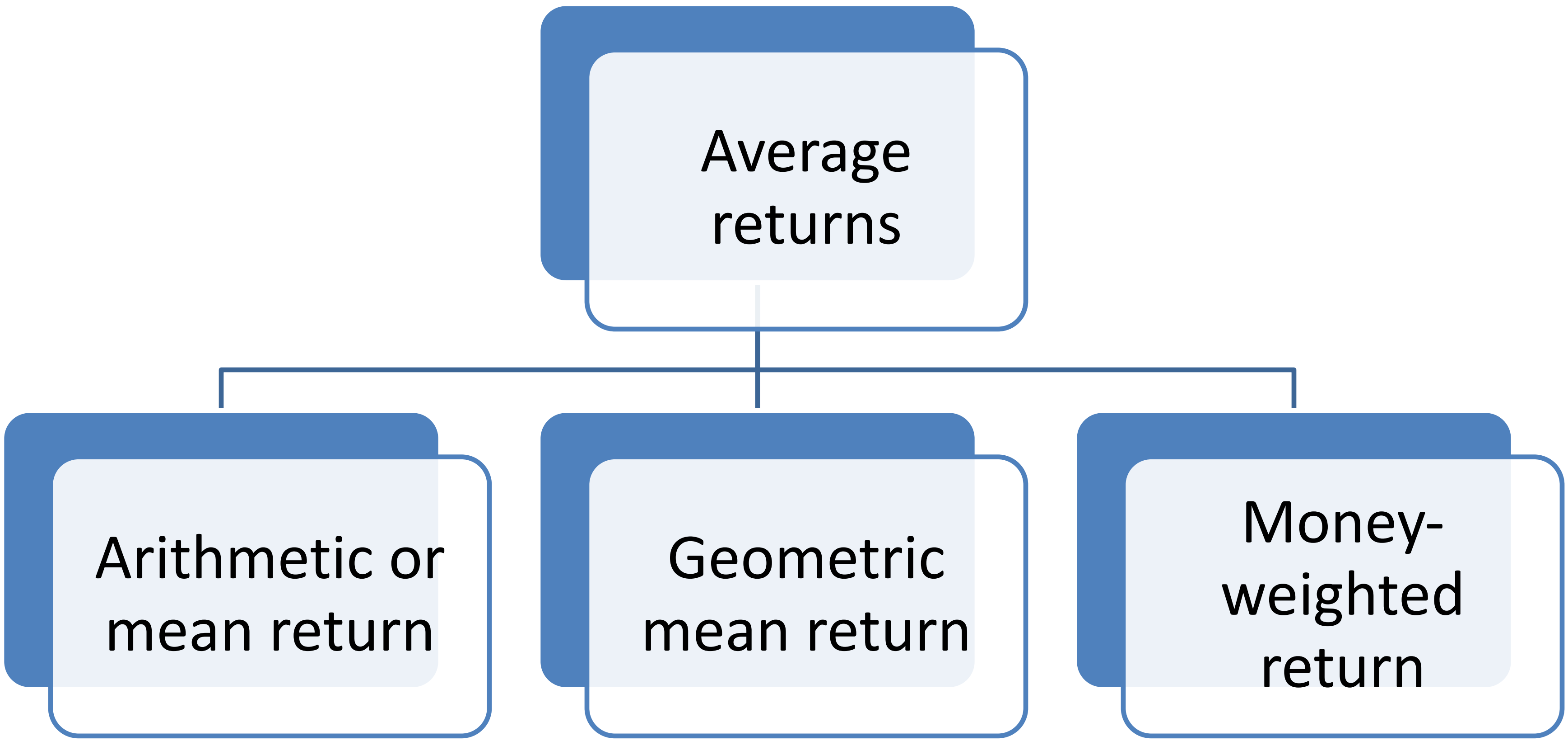
A *holding period return* is the return from holding an asset for a single specified period of time.

$$R = \frac{P_t - P_{t-1} + D_t}{P_{t-1}} = \frac{P_t - P_{t-1}}{P_{t-1}} + \frac{D_t}{P_{t-1}}$$

$$= \text{Capital gain} + \text{Dividend yield}$$

$$R = \frac{105 - 100}{100} + \frac{2}{100} = 5\% + 2\% = 7\%$$

Average Returns



Arithmetic or Mean Return

The *arithmetic* or *mean return* is the simple average of all holding period returns.

$$\overline{R}_i = \frac{R_{i1} + R_{i2} + \cdots + R_{iT-1} + R_{iT}}{T} = \frac{1}{T}\sum_{t=1}^{T} R_{it}$$

$$\overline{R}_i = \frac{-50\% + 35\% + 27\%}{3} = 4\%$$

Geometric Mean Return

The *geometric mean return* accounts for the compounding of returns.

$$\overline{R}_{Gi} = \sqrt[T]{\left(1+R_{i1}\right)\times\left(1+R_{i2}\right)\times\cdots\times\left(1+R_{iT-1}\right)\times\left(1+R_{iT}\right)}-1$$

$$= \sqrt[T]{\prod_{t=1}^{T}\left(1+R_{it}\right)}-1$$

$$R_{Gi} = \sqrt[3]{(1-.50)\times(1+.35)\times(1+.27)}-1 \approx -5.0\%$$

Weighted return

	Value	% of Total	Required Return (After Tax)	Weighted Rate*
Current Assets	$ 400,000	4.0	4.2 %	0.2 %
Other Assets	1,000,000	10.0	4.0	0.4
Intangible Assets	3,000,000	30.0	13.0	3.9
WFIP	500,000	5.0	13.0	0.7
Goodwill	5,350,000	53.5	15.0	8.0
ST Liabilities	(250,000)	-2.5	4.0	-0.1
Total	**$10,000,000**			**13.0%**

Annualized Return

$$r_{annual} = \left(1 + r_{period}\right)^{c} - 1$$

$$c : \text{number of periods in a year}$$

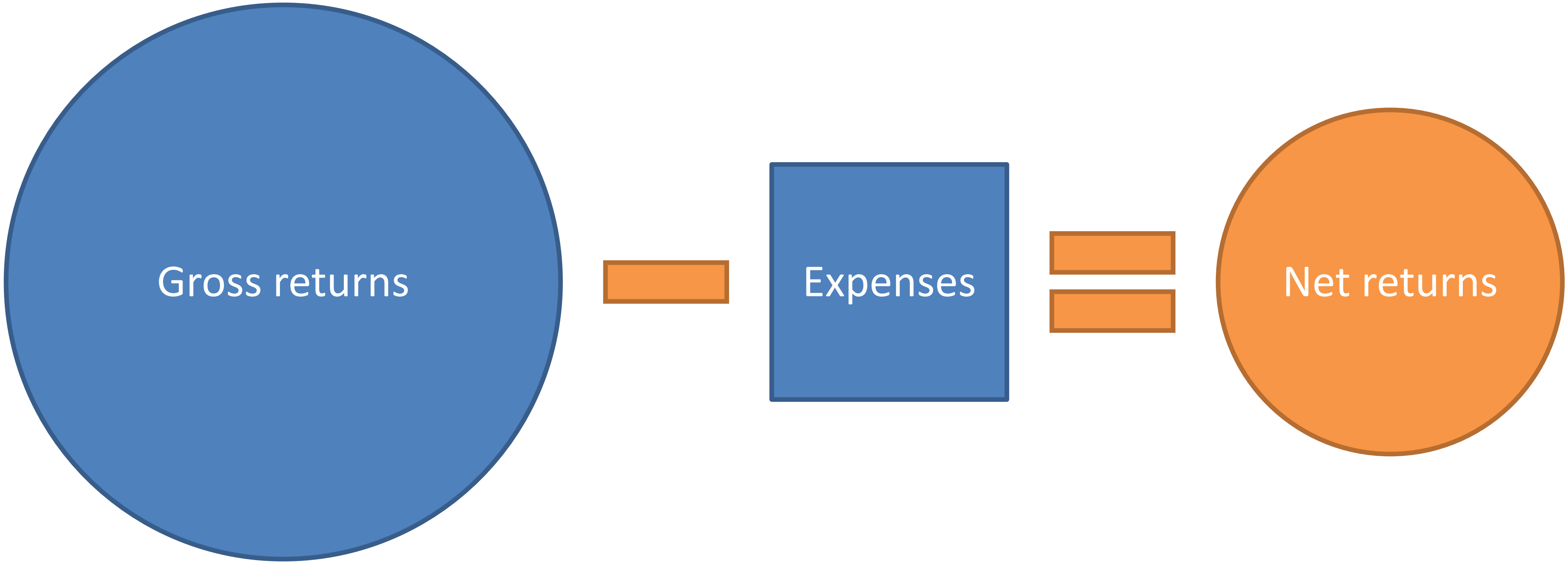
Weekly return of 0.20%:

$$r_{annual} = (1 + 0.002)^{52} - 1 = .1095 = 10.95\%$$

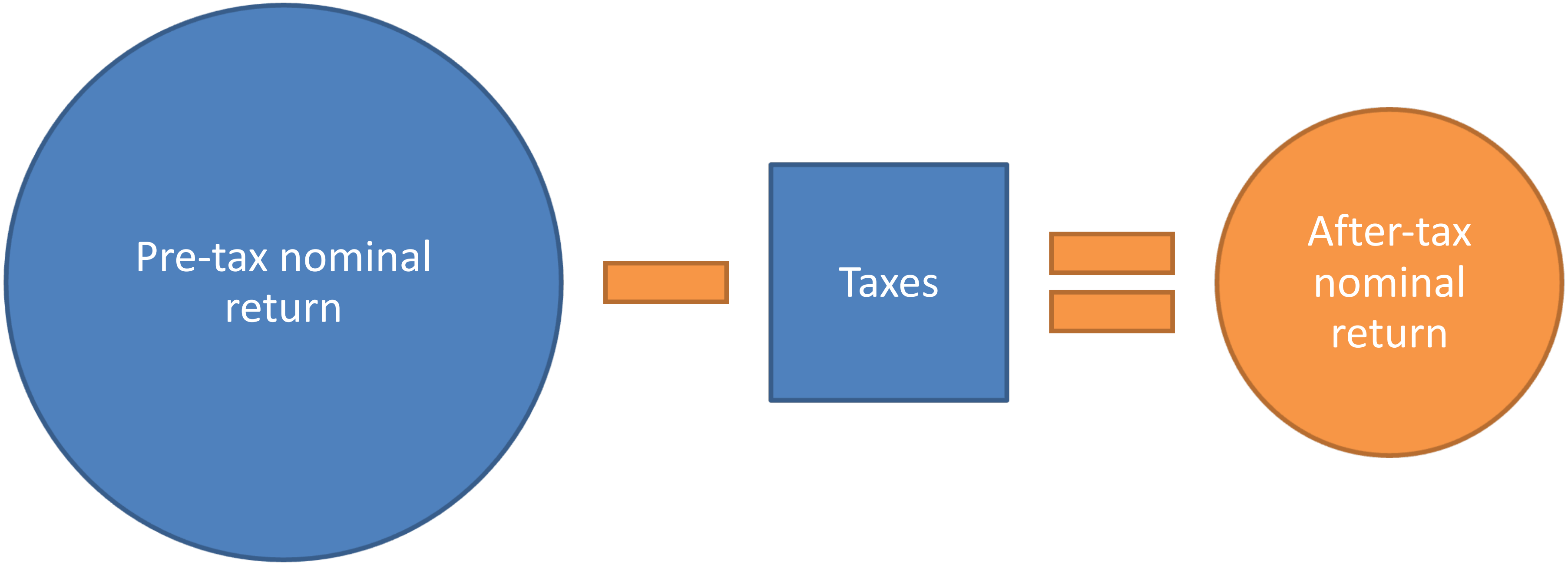
18-month return of 20%:

$$r_{annual} = (1 + 0.20)^{2/3} - 1 = 0.1292 = 12.92\%$$

Gross and Net Returns



Pre-Tax and After-Tax Nominal Return



Nominal Returns and Real Returns

$$(1+r)=\left(1+r_{rF}\right)\times(1+\pi)\times(1+RP)=(1+0.03)\times(1+0.02)\times(1+0.05)$$

$$r=10.313\%$$

$$\left(1+r_{real}\right)=\left(1+r_{rF}\right)\times(1+RP)=(1+0.03)\times(1+0.05)$$

$$r_{real}=8.15\%$$

$$\left(1+r_{real}\right)=(1+r)\div(1+\pi)=(1+0.10313)\div(1+0.02)$$

$$r_{real}=8.15\%$$