14) **INFLATION**

The value of money generally decreases over time — inflation.

\[
\text{Dollars in period } t_1 = \frac{\text{Dollars in period } t_2}{\text{inflation rate between } t_1 + t_2}
\]

**EQ 14.2**

\[
\text{Today's Dollars} = \frac{\text{Future Dollars}}{(1 + f)^n}
\]

**EQ 14.3**

\[
\text{Future Dollars} = \text{Today's Dollars} \times (1 + f)^n
\]

**EX** If inflation has average 3% over time since your parents were your age now, approx 25 yrs ago, what was $20 worth to them.

\[
20 = \frac{\text{Future } \$}{(1.03)^{25}}
\]

Future $ = 20 \times (1.03)^{25} = $41.87

**EX** 50 yrs for GRANDPARENTS $87.68

**EX** YOUR KIDS 20 yrs (1.03)^{25} = $9.55

GRANDKIDS (1.03)^{25} = $4.56
It is said that $1 today was worth $2.50 ten yrs ago. What was the average annual inflation rate?

$$\frac{\$2.50}{(1+f)^{10}} = 1$$

\[ f = 9.6\% \]

EQ 14.6

\[ \hat{i} = i + f + if \]

\( f \), inflation rate

\( i \) = Real or inflation-free rate
- the rate at which interest is earned when the effects of inflation are removed
- assumed \( \Rightarrow \) previous chapters

\( \hat{i} \) = Market Interest Rate
- Combination of real + inflated rates
- You can argue this is the rate we used in previous chapter

EX

\[ i = 10\% \quad f = 3\% \]

\[ \hat{i} = i + .03 + .1(0.03) = 13.3\% \]
\[ P = \frac{A}{i} \]
\[ i + f = 0.14 + 0.02 + 0.14(0.02) = 16.28\% \]
\[ P = CC \]
\[ CC_C = \frac{8.5m}{8.5m} - 8.5m \left( \frac{A}{P, 16.28, 5} \right) - 8K + 5K \left( A/F, 16.28, 5 \right) \]
\[ = -16,094,975 \]

\[ CC_D = -20m - \frac{7K}{16.28} + 2K \left( P/F, 16.28, \infty \right) \]
\[ = -20,042,998 \]
Which financing option is superior, with and without inflation? Real rate = 12%, inflation rate = 2.5%.

\[ \dot{r} = 12\% \quad f = 2.5\% \]

A) Pay cash today for $47,500

B) Pay $10K/yr for 8 yrs

\text{without inflation} \Rightarrow \dot{r} = 12\%

\[ P = 10K \left( \frac{P/A}{\dot{r},8} \right) = \$49,676 \quad \text{\tiny \textcircled{A}} \]

\text{with inflation} \Rightarrow \dot{r_f} = 0.12 + 0.025 + 0.12(0.025) = 14.8\%

\[ P = 10K \left( \frac{P/A}{\dot{r_f},8} \right) = \$45,170 \quad \text{\tiny \textcircled{B}} \]