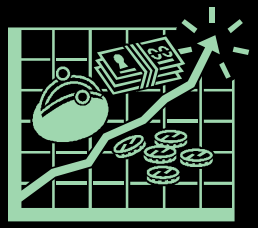


PW With Inflation

Two ways to account for inflation in PW calculations:

(1) Convert cash flow into constant-value dollars(CVD) and use regular i

Where: CVD = then-current dollars / $(1 + f)^n$

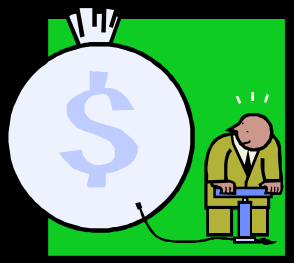
f = inflation rate

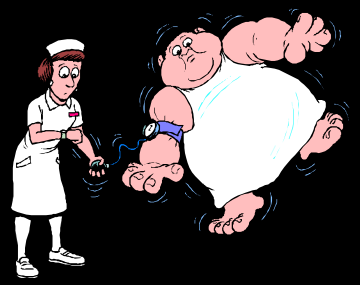
(Note: Calculations up to now have assumed constant-value dollars)

(2) Express cash flow in then-current dollars and use inflated interest rate

Where: $i_f = i + f + (i)(f)$

(Note: the inflated interest rate is the market interest rate)





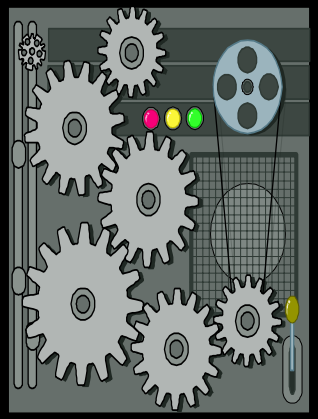
PW With Inflation Example

Example: **A certain machine will have a cost of $25,000 (then $) six years from now. Find the PW of the machine if the real interest rate is 10% per year and the inflation rate is 5% per year using (a) constant-value dollars, and (b) then-current dollars.**

Solution: (a) First find constant-value dollars and then use i in equations:

$$CVD = 25{,}000 / (1 + 0.05)^6 = \$18{,}655$$

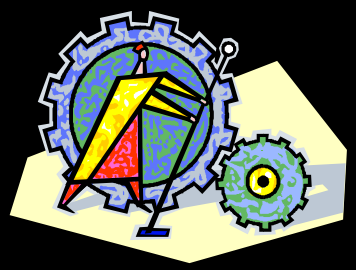
$$PW = 18{,}655(P/F,10\%,6)$$
$$= \$10{,}531$$



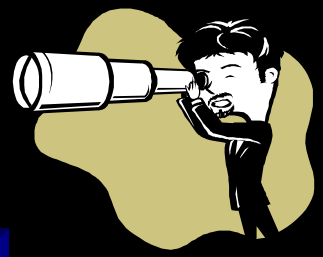
(b) Leave dollars as then-current and use i_f in equations:

$$i_f = 0.10 + 0.05 + (0.10)(0.05) = 15.5\%$$

$$PW = 25{,}000(P/F,15.5\%,6)$$
$$= \$10{,}530$$



FW with Inflation



FW values can be 3 different things:

(1) The actual amount of money accumulated (also represents the amount required to maintain the purchasing power of the present sum and earn a stated rate of return(i.e. a real interest rate). Market rate or MARR

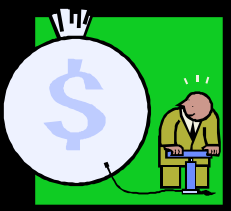
(use i_f in FW equations)

(2) The purchasing power(in terms of today's dollars) of the future amount

(use i_f in FW equations and divide by $(1+f)^n$ or use real i where $i = (i_f - f)/(1 + f)$

(3) The number of then-current dollars required to have the same purchasing power as a dollar today(no time-value considered)

(use f instead of i in F/P factor)



FW With Inflation Example

Example: An engineer invests $15,000 in a savings account that pays interest at a real 8% per year. If the inflation rate is 5% per year, determine (a) the amount of money that will be accumulated in 10 years, (b) the purchasing power of the accumulated amount(in terms of today's dollars), and (3) the number of then-current dollars that would have the same purchasing power as the $15,000 today.

Solution:

(a) $i_f = 0.08 + 0.05 + (0.08)(0.05) = 13.4\%$

FW = 15,000(F/P,13.4%,10)
= $52,750

(b) Purchasing power = 15,000(F/P,13.4%,10) / $(1 + 0.05)^{10}$
= $32,384

(c) Number of then-current dollars = 15,000(F/P,5%,10)
= $24,434

A/P and A/F With Inflation

The A/P and A/F factors require the use of i_f when inflation is considered

Example: **If a small company invests $150,000 in a new production-line machine, how much must it receive each year to recover the investment in 5 years if the real interest rate is 10% and the inflation rate is 4% per year?**

Solution:

$$i_f = 0.10 + 0.04 + (0.10)(0.04) = 14.4\%$$

$$A = 150{,}000(A/P,14.4\%,5)$$
$$= \$44{,}113$$