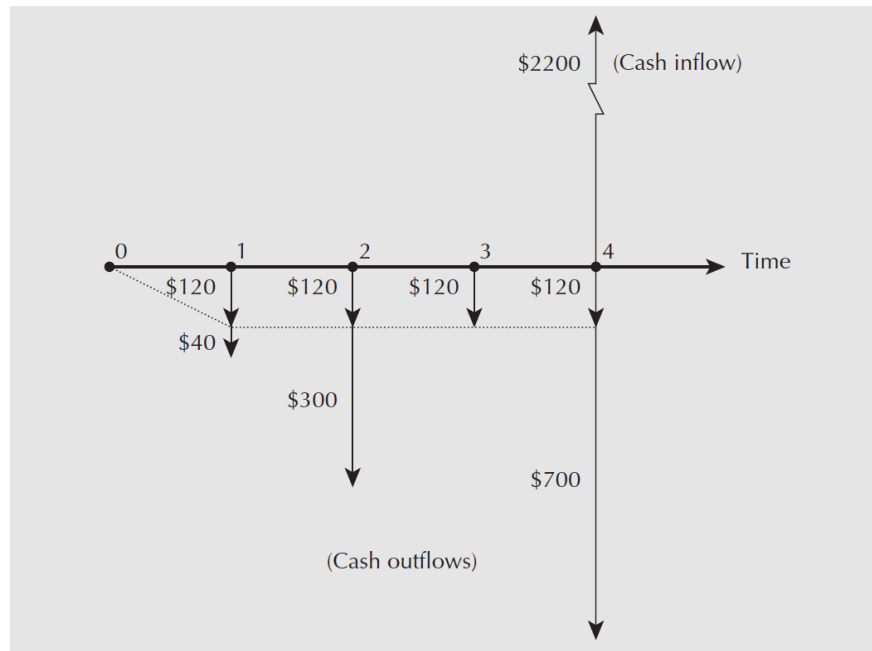


MSCI 261 Midterm Review (Chpt. 2-5)

Cash Flow Diagrams



- Cash inflows and outflows are represented by arrows
- Each “year” point represents the beginning of that year

Interest

- **Compound interest:** $F = P(1 + i)^N$
 - F = future value (value at the end of year N)
 - P = present value
 - i = interest rate (per period)
 - N = number of periods
- **Simple interest:** $F = PN(1 + i)$
- **Nominal interest rate:** i_s
 - “Normal” way of stating interest rate
 - If annual nominal rate = 12%/year, then monthly nominal rate = 1%/month
- **Effective interest rate:** i_e
 - “Actual” interest rate
 - Suppose i_s is stated over a “small” period

- Then i_e over a “large” period, which consists of m small periods, is

$$i_e = (1 + i_s)^m - 1$$

- i.e. effective interest is the rate such that $P(1 + i_s)^m = P(1 + i_e)$

- **Converting nominal annual to effective annual rate:**

$$i_e = \left(1 + \frac{i_s}{m}\right)^m - 1 \quad \text{where } m = \text{number of compounding periods in a year}$$

- Continuous compounding – compounding period is infinitesimally small

$$\begin{aligned} i_e &= \lim_{m \rightarrow \infty} \left(1 + \frac{i_s}{m}\right)^m - 1 \\ &= e^{i_s} - 1 \end{aligned}$$