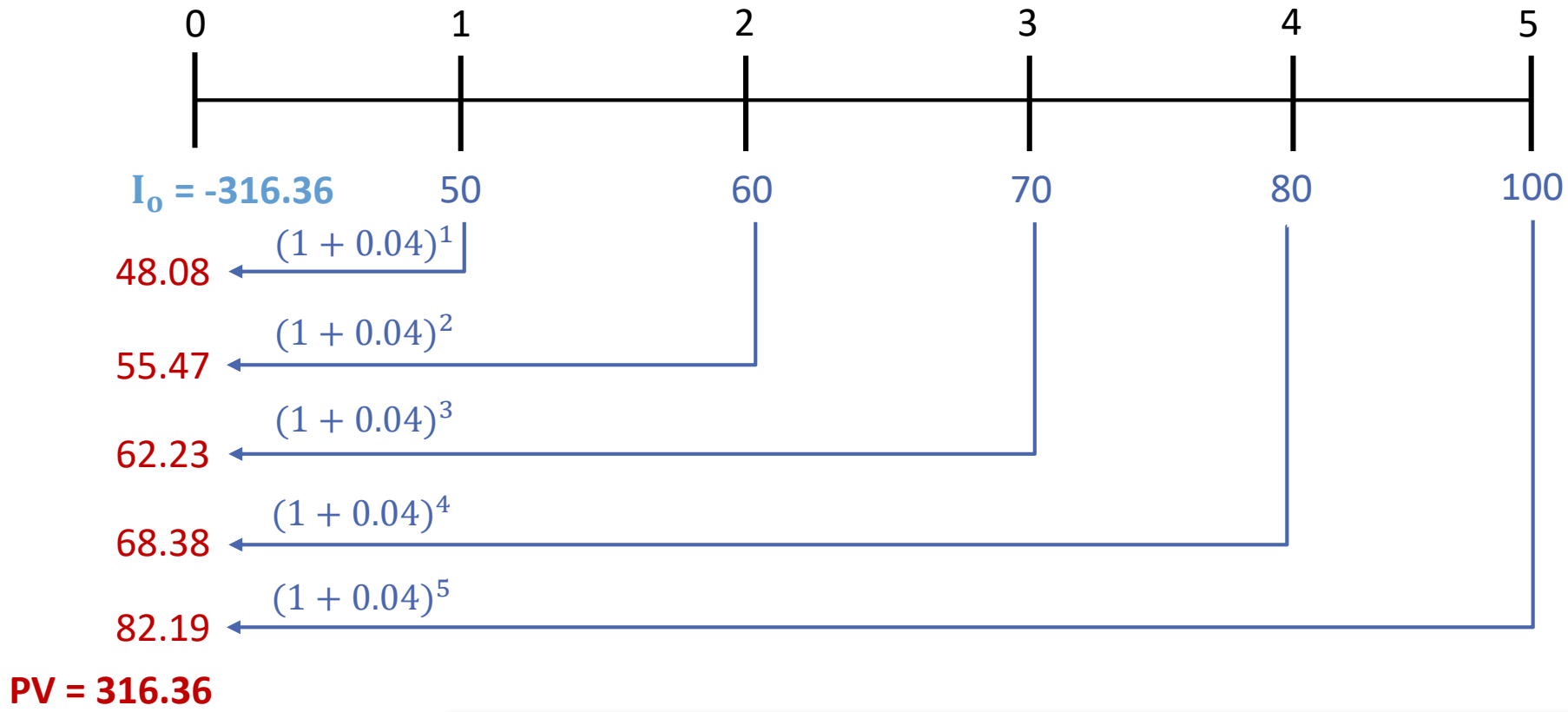
PV many CFs - Solutions

Structured Bank Product



$$PV = -I_0 \quad | \quad I_0 + PV = 0 = NPV$$

Real World Investments Projects

typically $I_o \neq PV$

Example:

The XYZ Company evaluates to buy an additional machine that will increase future profits/cashflows by
- 20 USD in t1,
- 50 USD in t2,
- 70 USD in t3,
- 100 USD in t4,
- 50 USD in t5. (each cf at period´s end)

The machine costs **200 USD** (Investment in to). Calculate the Project´s **NPV** and evaluate whether XYZ should pursue the project. XYZ´s required rate of return (Cost of Capital) is **6%** p.a.

Formula:

$$NPV = I_o + \sum_{t=1}^{N} \frac{CF_t}{(1+r)^t}$$

NPV: Net Present Value
I_o: Initial Investment (negative)
CF_t: cashflow @ timestamp t
N: Total number of periods
r: required rate of return
t = timestamp (0, 1, …, N)

Investments Projects and NPV

Simple Decision Rule:

Accept the Project if NPV > 0

Reject the Project if NPV < 0

Interpretation of NPV:

- Pursue the Project: Increase Today´s Company Value by NPV
- Total Company Value is the sum of all Projects´ NPVs

Required Rate of Return (Cost of Capital)

$$NPV = I_o + \sum_{t=1}^{N} \frac{CF_t}{(1+r)^t}$$

WACC

Intuition behind the Required Rate of Return:

- Opportunity Costs: (Expected) Return of comparable / alternative Projects
- Weighted Average Costs to fund Capital Outflow I_o
  - Cost of Debt (Interest Rate charged by Bondholders / Banks)
  - Cost of Equity (Required Return by Shareholders)