# 10 Book Notes

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## The Social Discount Rate

$W_t$ = weights → $NPV = \sum_{t=0}^{\infty} W_t NSB_t$

↳ social discount factors

$W_t = 1/(1+SDR)^t$

↳ SDR = real social discount rate

Weights generally decline over time

$W_t = W_{t-1}/(1+SDR)$ where $t > 0$ and $W_t = 1$

To determine SDR:
1) social opportunity cost of capital (SOC) → descriptive
2) social time preference (STP) → prescriptive

### 10.1 Does the choice of Discount Rate matter?

yes!

### 10.2 When there's no doubt about the value of the social discount rate

**time preference**

**Marginal rate of time preference (MRTP)**

#### 10.2.1 Individual marginal rate of time preference

money now or later?

#### 10.2.2 Equality of MRTPs and market rates in perfect markets

C = Consumption  i = interest rate  T = PV of $

Max $U(C_1, C_2)$ s.t. $C_1 + C_2/(1+i) = T$

**Marginal rate of substitution (MRS)**

#### 10.2.3 Equality of social rate of time preference and the return on investment in imperfect markets

**Social indifference curves**

#### 10.2.4 Complications in real economics

**Consumption rate of interest (CRI)**

### 10.3 The social opportunity of cost of capital (SOC) method

$SOC = (a \cdot CRI) + (b \cdot ROI)$

#### 10.3.1 Special cases of the SOC

#### 10.3.2 Estimation of, and numerical values for, the SOC

### 10.4 The social time preference (STP) method

#### 10.4.1 The Ramsey formula

W = social welfare

$W = \int_0^{\infty} e^{-pt} U(C_t)\,dt$

$U(C_t)$ = utility from per capita consumption during period t

$e^{-pt}$ = discount factor

p = future utility discount rate

$STP = p + ge$  g = % Δ in per-capita consumption; e = elasticity of marginal utility

#### 10.4.2 Estimation of, and numerical values for, the STP

#### 10.4.3 Special case for STP: Shadow Price of Capital (SPC)

**Consumption equivalents**

$SPC = ROI/STP$

#### 10.4.4 Numerical Values of the SPC

### 10.5 Discounting intergenerational projects

**hyperbolic discounting**

### 10.6 The social Discount Rate in Practice