Session 4.1
Project Evaluation Criteria

Introductory Course on Economic Analysis of Investment Projects

8 May 2008

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Cost Benefit Analysis

Ex-Ante vs. Ex-Post Analysis

- Identification and quantification of costs and benefits
- Discounting
- Comparison of benefits and costs – economic efficiency
  - NPV
  - IRR
  - B/C ratio
- Sensitivity Analysis
- Distribution Analysis

Net Present Value

$$NPV^0 = \sum_{t=0}^{n} \frac{B_t - C_t}{(1+r)^t}$$

Decision Rules

- Do not accept projects with negative NPV
- Mutually exclusive projects, no cost constraint – select the project with largest NPV
- Above rules are applicable for any time profile of net cash flow
- NPV is sensitive to discount rate

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Internal Rate of Return

Discount rate at which NPV is zero

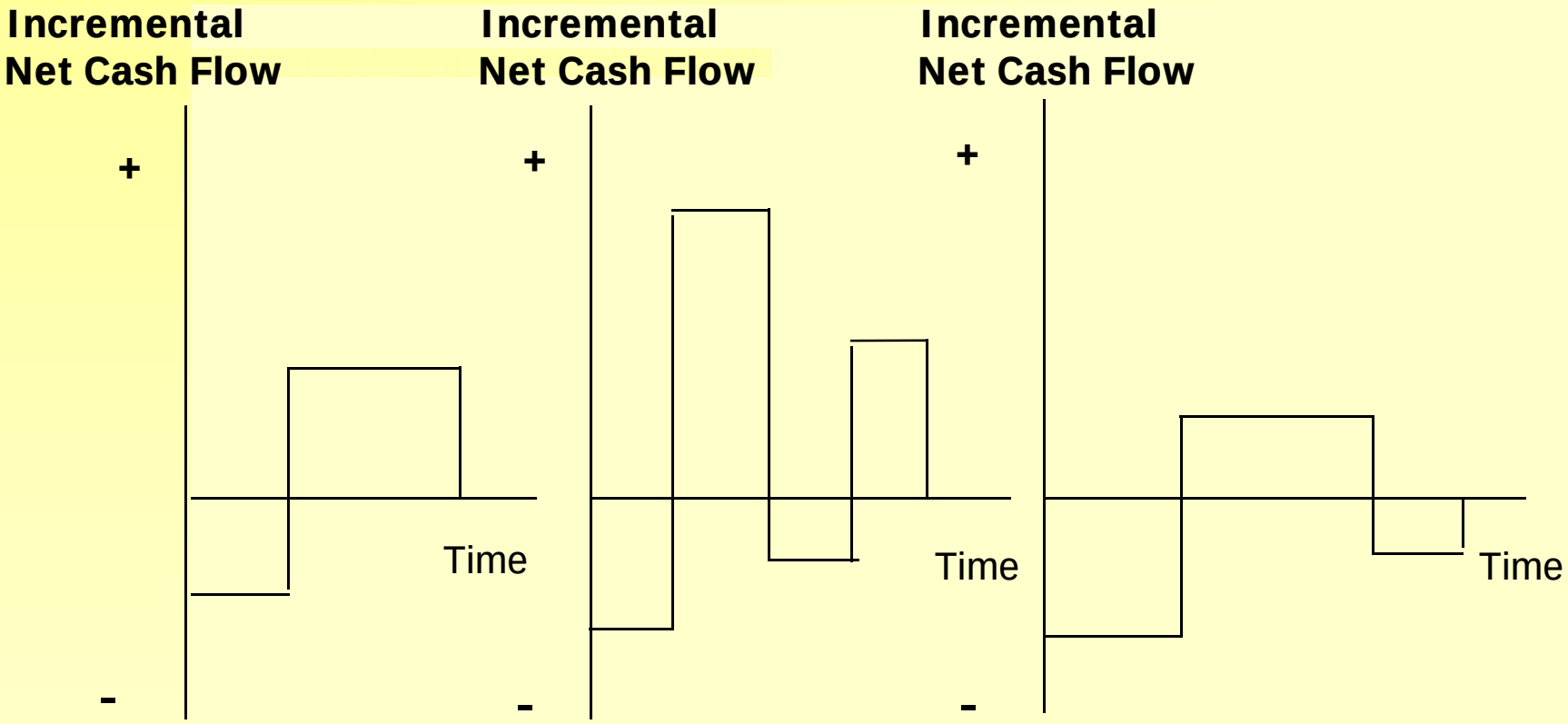
Decision Rules:

- Do not accept if IRR < cut off point
- May provide incorrect results in ranking

Problems:

- Multiple IRR or no IRR
- IRR is not additive
- Generally favors projects with shorter lifespan
- IRR is independent of the starting time
- Incorrect results for irregular cash flows

Time Profiles of the Incremental Net Cash Flows for Various Types of Projects



Benefit Cost Ratio

$$\textbf{BCR} = \frac{\text{PV of Economic Benefits}}{\text{PV of Economic Costs}}$$

Decision Rules:

- Reject the project if BCR < 1
- Selection of mutually exclusive projects may provide incorrect results

Example:

	PV of Capital Costs	PV of Net Cash Flows	NPV of Project	BCR
Project X	1,000	1,300	300	1.3
Project Y	8,000	9,400	1,400	1.175
Project Z	1,500	2,100	600	1.4

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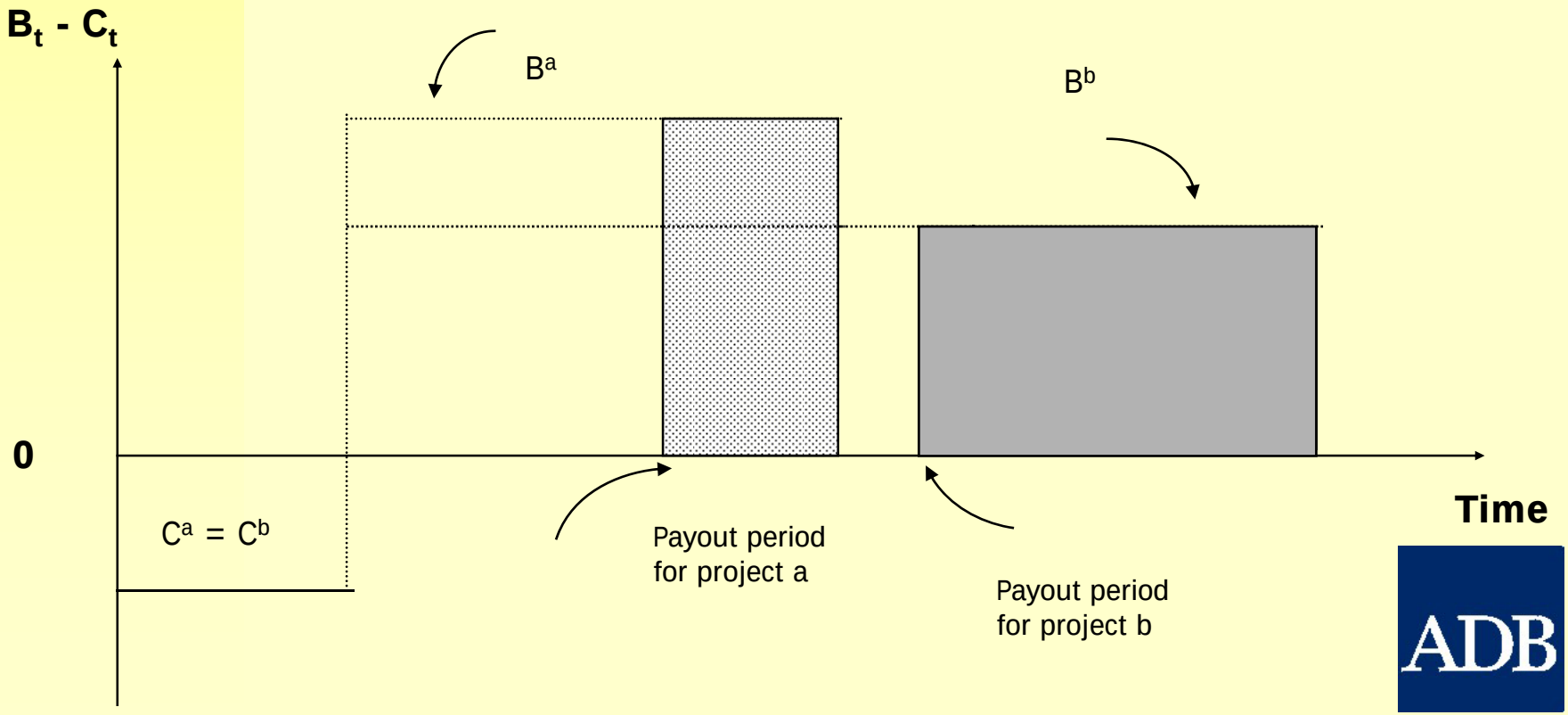
Pay Back Period

- Number of years it takes to repay investments
- More applicable to private sector operations – political risks

Problems:

- Quick yielding projects are not necessarily superior



Debt Service Capacity Ratio (DSCR)

- DSCR determines the ability of the project to pay operating expenses and debt servicing obligations

$$\text{ADSCR} = \frac{\text{ANCF}^{t}_{\text{real}}}{(\text{Annual Debt Repayment})^{t}_{\text{real}}}$$

$$\text{DSCR} = \frac{\text{PV (ANCF}_{\text{end year of debt}})}{\text{PV (Annual debt repayment}_{\text{end year of debt}})}$$

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Calculation of Debt Service Capacity

Year	0	1	2	3	4	5	6	7	8	9	10
Net Cashflow	**0**	**320,000**	**320,000**	**360,000**	**440,000**	**380,000**	**100,000**	**200,000**	**480,000**	**540,000**	**640,000**
Debt Repayment	**0**	**298,316**	**298,316**	**298,316**	**298,316**	**298,316**					
ADSCR		**1.07**	**1.07**	**1.21**	**1.47**	**1.27**					

Thank you