CAPITAL BUDGETING-AN INTRODUCTION

FEATURES AND SIGNIFICANCE OF CAPITAL BUDGETING

• LONG TERM EFFECTS

- SUBSTANTIAL COMMITMENTS
- IRREVERSIBLE DECISIONS

E. Se

• AFFECT THE CAPACITY AND STRENGTH TO COMPETE

PROBLEMS AND DIFFICULTIES IN CAPITAL BUDGETING

Future Uncertainties

A. S.

1

Time element

Measurement problem

and a

TYPES OF CAPITAL BUDGETING DECISIONS

FROM THE POINT OF VIEW OF FIRMS EXISTENCE

- > NEW FIRM
- **EXISTING FIRM**
- REPLACEMENT AND MODERNIZATION DECISION
- **EXPANSION**
- DIVERSIFICATION
- **CONTINGENT DECISIONS**

A. S.

TYPES OF CAPITAL BUDGETING DECISIONS

FROM THE POINT OF VIEW OF DECISION SITUATION MUTUALLY EXCLUSIVE DECISIONS (ONLY THE BEST ONE) ACCEPT REJECT DECISIONS (ALL ARE GOOD ONES)

E. Se

CAPITAL BUDGETING DECISIONS AND FUNDS AVAILABILITY

THE FIRM CAN UNDERTAKE PROJECTS THAT FULFIL THE FOLLOWING CONDITIONS THE COST OF THE PROJECT DOES NOT EXCEED THE FUNDS AVAILABLE THE BENEFITS EXPECTED FROM THE PROJECT ARE MORE THAN THE COST CAPITAL RATIONING: THE SITUATION WHERE THE FIRM IS NOT ABLE TO UNDERTAKE ALL THE PROFITABLE INVESTMENT OPPORTUNITIES IS KNOWN AS CAPITAL RATIONING

ASSUMPTIONS OF CAPITAL BUDGETING

and the second

- CERTAINTY WITH RESPECT TO COST AND BENEFITS
- NO CAPITAL RATIONING

A. S.

a at

PROCEDURE OF CAPITAL BUDGETING

- ESTIMATION OF COSTS AND BENEFITS OF A PROPOSAL (METHODS OF MEASURING COST AND BENEFIT OF PROJECT CAN BE <u>Accounting Profit</u> or <u>Cash Flows</u>)
- ESTIMATION OF REQUIRED RATE OF RETURN
- USING THE CAPITAL BUDGETING CRITERION

CASH FLOWS-INITIAL

ORIGINAL OR INITIAL CASH FLOWS

- INSTALLATION COST
- **SUNK COST**
- SALVAGE VALUE OF OLD OR EXISTING ASSET

A. S.

- OPPORTUNITY COST
- ADDITIONAL WORKING CAPITAL REQUIREMENTS

Se at

feat

CASH FLOWS- SUBSEQUENT

Sales -Cost -Depreciation = profit before taxes -Tax = Profit after tax

E. Se

Cash inflows= profit after tax + non cash items (depreciation) – capital expenditures

Price

CASH FLOWS - SUBSEQUENT

- THE PROJECT MAY ALSO HAVE SUBSEQUENT CASH OUTFLOWS APART FROM INITIAL CASH OUTFLOW.
- IF ADDITIONAL WORKING CAPITAL IS REQUIRED BY THE PROJECT THEN IT IS CONSIDERED OUTFLOW AND IF ANY WORKING CAPITAL IS RELEASED THEN IT IS INFLOW.
- THE MORE QUICKLY OR EARLY CASH INFLOWS OCCUR, THE MORE VALUABLE THESE ARE.

CASH FLOWS - TERMINAL

• TERMINAL CASH INFLOWS: THE CASH INFLOWS FOR THE LAST YEAR WILL ALSO INCLUDE THE TERMINAL CASH INFLOWS ALONG WITH THE ANNUAL CASH INFLOWS. THESE CASH INFLOWS OCCUR WHEN THE PROJECT GETS COMPLETED (TERMINATED).

 TERMINAL CASH INFLOWS = SALE PRICE OF ASSET (NEW) +/- TAX EFFECT OF SALE VALUE OF ASSET + WORKING CAPITAL RELEASED

TECHNIQUES OF CAPITAL BUDGETING



No.

and the

6.5

a star

A SHIT AND A SHE AND

PAYBACK PERIOD

- THE PAYBACK PERIOD IS DEFINED AS THE NUMBER OF YEARS REQUIRED FOR THE PROPOSAL'S CUMULATIVE CASH INFLOWS TO BE EQUAL TO ITS CASH OUTFLOWS.
- IN OTHER WORDS, THE PAYBACK PERIOD IS THE LENGTH OF TIME REQUIRED TO RECOVER THE INITIAL COST OF THE PROJECT.
- WHEN ANNUAL CASH INFLOWS ARE EQUAL:

E. Se

PAYBACK PERIOD = INITIAL OUTFLOW/ANNUAL INFLOW

PAYBACK PERIOD

WHEN CASH INFLOWS ARE EQUAL

year	Annual Inflows	Cumulative Cash Flows
1	8000	8000
2	6000	14000
3	4000	18000
4	2000	20000

CASH OUTFLOW = 18500

1

PAYBACK PERIOD= 3 YEARS(18000 EARNED TILL 3 YEARS) + 500/2000

Se at

500=18500-18000 AND WE ASSUME THAT CASH INFLOWS OCCUR EVENLY THROUGH OUT THE YEAR

ACCOUNTING RATE OF RETURN

THE ARR IS DEFINED AS THE ANNUALIZED NET INCOME EARNED ON THE AVERAGE FUNDS INVESTED IN A PROJECT.

• ARR= $\frac{Average Annual Profit (after tax)}{Average Investments in the Project} * 100$

- IN CASE OF UNEQUAL PROFITS OVER DIFFERENT YEARS, THEN THE ARR IS CALCULATED BY FINDING OUT THE AVERAGE ANNUAL PROFITS (SIMPLE ARITHMETIC MEAN).
- AVERAGE INVESTMENT=1/2 (INITIAL COST+ INSTALLATION EXPENSES SALVAGE VALUE) + SALVAGE VALUE

DECISION CRITERIA OF TRADITIONAL METHODS

Payback Period

 The project with shorter payback period is selected

Accounting rate of return

• The project with higher ARR is selected.

NET PRESENT VALUE

- THE NET PRESENT VALUE (NPV) OF A PROPOSAL IS DEFINED AS THE SUM OF PRESENT VALUES OF ALL CASH INFLOWS LESS THE SUM OF PRESENT VALUES OF ALL CASH OUTFLOWS ASSOCIATED WITH A PROPOSAL.
- NPV= PRESENT VALUE OF ALL INFLOWS PRESENT VALUE OF ALL OUTFLOWS

• NPV=
$$\sum_{i=1}^{n} \frac{CF_i}{(1+k)^i} - C_0$$

- CF_i = CASH FLOWS OCCURRING AT TIME 1,2,3,.....N
- k = DISCOUNT RATE
- n = LIFE OF PROJECT IN YEARS

E Ste

• $C_0 = CASH OUTFOWS$

PROFITABILITY INDEX

PROFITABILITY INDEX IS DEFINED AS THE BENEFITS PER RUPEE INVESTED IN THE PEROPOSAL

• THE TECHNIQUE IS A VARIANT OF NPV, IS ALSO KNOWN AS BENEFIT-COST RATIO.

• $\mathbf{PI} = \frac{Total \ present \ value \ of \ Cash \ Inflows}{Total \ present \ value \ of \ Cash \ Outflows}$

INTERNAL RATE OF RETURN

- THE INTERNAL RATE OF RETURN IS DEFINED AS THE DISCOUNT RATE WHICH PRODUCES A ZERO NPV.
- IT IS ASCERTAINED BY TRIAL AND ERROR PROCEDURE.
- STEPS IN IRR CALCULATION
- A MAKE AN APPROXIMATION OF THE IRR ON THE BASIS OF CASH FLOWS DATA WHICH CAN BE DONE WITH THE HELP OF ROUGH PAYBACK PERIOD.
- TWO RATES ARE IDENTIFIED ONE WHICH HAS NEGATIVE NPV AND ONE WITH POSITIVE NPV.
 TO FIND THE EXACT IRR INTERPOLATION IS DONE BETWEEN THE TWO RATES IDENTIFIED IN STEP 2.

IRR INTERPOLATION FORMULA

$$\mathbf{RR} = L + \frac{A}{A-B} (H-L)$$

- L = LOWER DISCOUNT RATE, AT WHICH NPV IS POSITIVE
- H = HIGHER DISCOUNT RATE, AT WHICH NPV IS NEGATIVE
- A = NPV AT LOWER DISCOUNT RATE
- B = NPV AT HIGHER DISCOUNT RATE

1

DECISION CRITERIA OF MODERN METHODS

NPV

 The project with highest positive NPV is selected

E. St.

P

• The project with highest PI index (and above 1) is selected IRR

• The project with IRR higher than hurdle rate is selected.

REASONS FOR CONFLICTING NPV AND IRR Ranking

- SCALE OR SIZE DISPARITY AMONG DIFFERENT ALTERNATIVE PROPOSALS
- DIFFERENT TIMING OR TIME DISPARITY AMONG ALTERNATIVE PROPOSALS. (REINVESTMENT RATE ASSUMPTION)
- LIFE DISPARITY OR PROPOSALS WITH UNEQUAL LIVES (EQUIVALENT ANNUITY METHOD IS USED TO SELECT THE PROJECTS)

RISK IN CAPITAL BUDGETING

• **RISK ADJUSTED DISCOUNT RATE**: TO ADJUST THE DISCOUNT RATE TO REFLECT THE RISK

• CERTAINTY EQUIVALENTS: TO ADJUST THE CASH FLOWS TO INCORPORATE THE RISK AND THEN TO USE A RISKLESS DISCOUNT RATE.

RISK ADJUSTED DISCOUNT RATE

1

and the second

- $k_a = k + a$
- $k_a =$ **RISK ADJUSTED DISCOUNT RATE**
- k = RISK FREE DISCOUNT RATE
- a =**RISK ADJUSTMENT PREMIUM**

1

CERTAINTY EQUIVALENT

Sand State Port in the

feat

• RISK ADJUSTED NPV=
$$\sum_{i=1}^{n} \frac{\alpha_i CF_i}{(1+k)^i} - C_0$$

•
$$\alpha = \frac{Certainty Cash Flow}{Expected Cash Flow}$$

CONCLUSION

- THE CHAPTER DISCUSSES VARIOUS METHODS OF EVALUATING A PROJECT. EACH HAVE A DECISION RULE.
- PAYBACK TECHNIQUE IGNORES TIME VALUE MONEY BUT CAN BE USED AS A SECONDARY CRITERIA
- ARR TECHNIQUE ALSO IGNORES TIME VALUE OF MONEY. IT IS USED ONLY WHEN FIRM WANTS TO FIND RETURN FROM INVESTMENT.
- THE PI METHOD HELPS THE COMPANIES THAT ARE HAVING FUNDS CONSTRAINTS AND ARE LOOKING FOR PER RUPEE RETURNS,
- BOTH NPV AND IRR IMPLIEDLY ENHANCE THE WEALTH OF SHAREHOLDERS.

6.00

• NPV TECHNIQUE IS SUITABLE TO FIRMS THAT ARE INTERESTED IN RANKING VARIOUS PROPOSALS IN ORDER OF ADDITION EXPECTED FROM THESE PROPOSALS.