CHAPTER 4
PROJECT APPRAISAL AND SELECTION

Time Preference for Money

An individual's preference for possession of a given amount of cash now, rather than the same amount at some future time is called "Time Preference for Money"

Reasons:

1. ***Live under uncertainty*** –not certain about future cash receipts.
2. ***Preference for present consumption over future consumption*** of goods and services.
3. Prefer present cash than future cash because of available ***investment opportunities*** (For example, they can earn additional cash –interest, when they deposit the same in a bank).

Time preference for money is generally expressed by an interest rate ➔ risk free rate. For receiving money in future, this ***required rate of return will be***: ***Risk free rate + Risk premium.***

The process of determining present value of future payments (or receipts) Or a series of future payments (or receipts) is called discounting. The compound interest rate used for discounting cash flows is also called the discount rate.

Principles of project appraisal

While appraising the projects [defining the costs and benefits of a capital expenditure proposal], the following principles must be borne in mind:

1. ***Cash flow principle:*** costs and benefits must be measured in terms of cash flows—costs are cash outflows and benefits are cash inflows. These cash flows represent the flow of purchasing power.
2. ***Post-tax principle:*** cash flows must be measured in post-tax terms because that represents the net flow from the point of view of the firm.
3. ***Incremental principle:*** cash flows must be measured in incremental terms. According to the incremental principle, the changes in the cash flows of the firm, arising from the adoption of the proposed project, alone are relevant. In estimating incremental cash flows the following cautions should be followed:

a) ***Consider all incidental effects:*** Effects on enhancing the profitability of some lines of existing activities, or detracting from the profitability of some lines of existing activities- all these effects should be considered.
b) ***Ignore Sunk costs:*** Sunk costs are bygones. Hence they do not matter for present decision-making
c) ***Include opportunity costs:*** If a project employs some resources available with the firm, it should be charged the opportunity costs of these resources. For example, if some spare capacity is used in the manufacture of a new product, the new product should be charged with the benefits that would arise from putting the spare capacity to its best alternative use.
d) ***Question the allocation of overhead costs:*** For purposes of investment appraisal what matters is the incremental overhead costs [along with other incremental costs], not the allocated overhead costs.

4. ***Long-term funds principle:*** In capital investment appraisal the principal focus is usually on the profitability of long-term funds. Hence cash flows relating to long-term funds need to be segregated.
5. ***Interest exclusion principle:*** Interest on long-term debt should be excluded from the computation of profits and taxes because the cost of capital used for appraising the cash flow stream reflects the time value of money. Hence interest cost, which represents the time cost of debt, must be excluded from the cash flow estimation. Otherwise, double counting will occur.

To sum up, the costs and benefits of a project must be defined in terms of post-tax incremental cash flows relating to the long-term funds employed in the project.

Capital Budgeting Decision Rule (Techniques) - Criteria

Once we determine the relevant cash flows information necessary to make capital budgeting decisions, we need to evaluate the attractiveness of the various investment proposals under consideration. The investment decision will be to either accept or reject each proposal. Five key methods are used to rank the projects and to decide whether or not they should be accepted for inclusion in the capital budget.

The Ideal Evaluation Method should:

a) Include all cash flows that occur during the life of the project,

b) Consider the time value of money,
c) Incorporate the required rate of return on the project.
d) The decision rule should consider the riskiness of cash flows.
e) The decision rule should always rank projects so that those projects that add the most to the value of the firm are ranked highest.

Mutually Exclusive vs. Independent Projects

Mutually Exclusive projects are any set of projects in which choosing one makes the other projects no longer possible. For example, we are considering upgrading our printing press and have the choice of two alternatives. The first is a low-cost model that will need replaced in 3-years and the second is a more expensive model that will need replaced in 5-years. We can only choose 1 of these options, so they are mutually exclusive.

Independent (sometimes called stand-alone) ***projects*** are any set of projects in which choosing one has no impact on our decision to choose another project from that set. For example, McBurger Inc. may have the following capital budgeting projects to consider. The first is a new deep-frying system for their French fries. The second is a new order placement system for the drive-thru. McBurger could choose to take the new deep fryer or the new order placement, or it could choose both. Taking one project does not influence the other, so they are independent.

Many decisions made by the firm are neither independent nor mutually exclusive, but are instead interdependent. In this case, the decision to take one project impacts our decision to take another, but they are not mutually exclusive. For example, Videogames R Us may decide to introduce a new video game machine along with some game cartridges for the system. The two projects are not independent (the game machine will sell better with more game cartridges available) nor mutually exclusive (producing the cartridges does not preclude producing the game machine). However, they are interdependent in that each project will perform better if both are produced.

Capital budgeting techniques

Capital budgeting techniques are used by firms to select projects that will enhance owner wealth.
It can be:

A. **Traditional methods** (Non-discounted methods)
   1) Pay back periods

2) Accounting rate of return

B. **Discounted methods**

3) net present value

4) Internal rate of return.

A) Traditional method (non-discounted method)

1) Payback period (PBP)

i) Even cash inflow (annuity)-is to measure the expected number of years to recover the original investment. If the project generates constant annual cash inflows, the PBP is computed by dividing the initial investment by the cash inflow through increased revenue or cost saving.

$$\textbf{PBP} = \frac{\textbf{Initial Investment}}{\textbf{Annual cash inflow}}$$

Example 1: Assume that initial investment of a project is 120,000 birr and yields after tax cash inflow of 25,000 for 10 years and the maximum payback period set by firm's managements is 5 years. The payback period of the project is

$$\text{PBP} = \frac{120{,}000}{25{,}000} = \textbf{4.8 Years}$$

Accept Reject Rule

Accept the project if the actual or computed payback period is less than the maximum payback period set by the firm otherwise the project is rejected. In ranking two projects having the same maximum allowable payback, the project with shorter payback period should be chosen because it pays for itself more quickly.

Therefore, accept the project because the payback period (4.8 years) is less than the Maximum allowable payback period (5 years).

ii) Uneven cash inflow (mixed stream): In case of unequal cash inflows, the payback period can be found out by adding up the cash inflows until the total is equal to the initial investment.

Example 2: Compute the payback period for the following cash flows, assuming a net investment of birr 25,000 and target payback period of 3 years?

Year	Net investment	Cash in flows
0	25,000	0
1		10,000
2		7,000
3		6,000
4		2,000
5		2,000

Solutions

Year	Net cash inflows	Commutative net cash inflows	Costs to be recovered
0	**-**	**-**	**25,000**
1	**10,000**	**10,000**	**15,000**
2	**7,000**	**17,000**	**8,000**
3	**6,000**	**23,000**	**2,000**
4	**2,000**	**25,000**	**0**
5	**2,000**		

Payback period= **4 years**

Reject the project as the computed payback period of 4 years is greater than the target payback period of 3 years.

Example 3: Melat pvt ltd.co is evaluating two projects with the following cash inflows.

Year	Cash inflows	
	Project A	Project B
0	(56,000)	(56,000)
1	14,000	22,000
2	16,000	20,000
3	18,000	20,000
4	20,000	14,000
5	25,000	17,000

Requited: Compute the PBP for each project and, show which one is more desirable?

Solution

PBP for project A;

Year	Net cash inflows	Commutative net cash inflows	Costs to be recovered
0	(56,000)	-	56,000
1	14,000	14,000	42,000

2	16,000	30,000	26,000
3	18,000	48,000	8,000
4	20,000		
5	25,000		

PBP for project A= 3Years +(8,000/20,000)

= 3Years +0.4

= <u>3.4 Years</u>

PBP for project B;

Year	Net cash inflows	Commutative net cash inflows	Costs to be recovered
0	(56,000)	-	56,000
1	22,000	22,000	34,000
2	20,000	42,000	14,000
3	20,000		
4	14,000		
5	17,000		

PBP for project B= 2 Years + (14,000/20,000)

= 2 Years + 0.7 Years

= <u>2.7 Years</u>

Melat should prefer project B over project X because it has a shorter payback period of 2.7 Years

<u>Advantage of payback period</u>

1) It is easy to understand and easy to calculate.
2) It costs less than most of the sophisticated techniques which requires a lot of the analyses time & the use of computers.
3) It provides a crude measure of risk because it considers projects with shorter payback period as less risky.
4) It measures the time required for a project to recover the initial investment & therefore, it provides a measure of *liquidity*.

<u>Disadvantage</u>

1) It doesn't measure the profitability of investment because it ignores cash inflows earned after the payback period.

For example, consider the following project X & Y

	Project x	Project y
Initial Investment	15,000	15,000
Cash Inflows		
Year 1	5,000	4,000
2	6,000	5,000
3	4,000	6,000
4	0	8,000

		Ignored
5	0	9,000 "
6	0	3,000 "

PBP: project X=3 years
Project Y=3 years

As per the payback rule both the projects are equally desirable since both return the initial investment in 3 years. However, from profitability point of View, ***project Y is more attractive than project X.***

2) It ignores the time value of money for it fails to consider the magnitude and timing of cash inflows.

	Project x	**Project y**
Project cost	15,000	15,000
Cash inflow year		
1	10,000	1,000
2	4,000	4,000
3	1,000	10,000
Total cash inflows	15,000	15,000

Both projects have the same PBP, but project X would be more acceptable because of the time value of money. Cash today is better than cash tomorrow.

3) It biases capital budgeting decisions in favor of short- term projects and against long term projects.

2) Accounting Rate of Return (ARR):

Accounting Rate of Return measures profitability of the capital investment from conventional accounting stand point by relating or associating accounting Net Income with initial investment.

- Tells us the percentage of net income that has already generated as a result of commitment of certain money.
- It is based on accounting information rather than on cash flows.
- Depreciation is a non-cash flow expense, so, it should be added with net income to come up with the cash flow(NI=CF- Depreciation)

$$\textbf{ARR} = \frac{\textbf{NI}}{}$$

Average investment

Example 1: Anwar Company is considering an investment in x- project based on the following information:

Initial Investment	**15,000**
Annual net income	**3,000**
Useful life	**5 years**
Target ARR	**30 %**

ARR= NI /Average investment

= 3,000

15,000 Average

2

ARR= 40%

***Accept Reject Rule*:** Accept the project if the *computed ARR* is Greater than the minimum *target* ARR set by the firm otherwise the project is rejected.

Anwar Company should accept the investment in x- project because the actual ARR (40%) is greater than the target ARR of 30 %

Example 2: Asteway co is considering an investment in project X based on the following information.

Initial investment	15,000
Annual cash inflow	4,500
Useful life	5 years (straight line method of depreciation is used)
Target ARR	30 %

Required: Determine ARR?

Solution

Deprecation exp =15,000/5 years

= 3,000

NI=CF- Depreciation EXP

=4,500-3,000

=1,500

NI .

ARR= Average Investment

=1,500
7,500

ARR= **20%**

Asteway co should reject the investment in project X because the actual ARR (20%) is less than the target ARR of 30%

Exercise: A project will cost 60,000 birr. Its stream of earnings before depreciation and taxes during first year through five years is expected to be birr 20,000, 22,000, 25,000, 27,000& 29,000, respectively. Assume estimated life and salvage value is 5 years & 5000 birr, respectively. Again assume income tax rate is 55% .Target ARR is 15%. Depreciation is to be computed on straight line method.

Required: Determine ARR?

Solution

Year	Profit before Depreciation & tax	Depreciation. exp	Profit after Depreciation	Tax (55%)	NI
1	20,000	11,000	9,000	4950	4050
2	22,000	11,000	11,000	6050	4950
3	25,000	11,000	14,000	7,700	6,300
4	27,000	11,000	16,000	8,800	7,200
5	29,000	11,000	18,000	9,900	8,100

Total Net income

30,600

Average Annual net income=30600
5

= **6120**

Depreciation Exp= (60,000-5000)/5

=**11,000**

Average net investment= (cost of machine-Salvage) +Salvage
2

= (60,000-5,000) +5000
2

=**32,500**

ARR= NI .

Average investment

= 6,120/32,500

=**18.83%**

Therefore, the project is accepted because the computed ARR is greater than the target ARR.

Advantages of ARR

1. It is easy to calculate.
2. It is understandable
3. It considers the entire stream of income in calculating the project's profitability.

Disadvantages of ARR

1) It uses accounting income rather than cash flows.
2) It ignores the time value of money

3) Net present Value (NPV)

It is one of the discounted cash flow (DCF) techniques explicitly recognizing the time value of money. NPV can be found out by subtracting initial investment from present Value of cash inflows.

Steps in the calculation of NPV

1. Net cash flows of the investment project should be forecasted based on realistic assumptions.
2. Appropriate discount rate should be identified to discount the forecasted cash flows. The appropriate discount rate is the firms opportunity cost of capital which is equal to the required rate of return expected by investors on investments of equivalent risk.
3. Compute the present value of net cash flows & summing up to come up the present value of the net cash flows generated by the project
4. Compute the excess of sum of present value over the initial investment.

NPV=∑ of PV- Initial Investment.

Accept Reject Rule

- Accept if NPV>0(i.e. NPV is positive)
- Reject if NPV<0(i.e. NPV is negative)
- Project may be accepted if NPV=0

Example 1

A company is considering the following investment projects.

Net cash inflows:

Year	Project A	Project B
1	**12,000**	**5,400**
2	**10,000**	**8,000**
3	**8,000**	**10,000**
4	**5,400**	**12,000**
Total	**35,400**	**35,400**

Assume initial investment is 25,000 and discount rate is 12% .Determine NPV of project A& project B?

Project A

Year	NCF	PV @ 12%	PV of cash inflows
1	12,000	$(1.12)^{-1}$	= 10714.3
2	10,000	$(1.12)^{-2}$	=7971.93
3	8,000	$(1.12)^{-3}$	= 5694.24
4	5,400	$(1.12)^{-4}$	= 3431.79
		Present Value=	**27812.26**
		Less: Initial Investment=	25,000.00
		NPV=	***2812.26***

Project B

Year	NCF	PV @ 12%	PV of cash inflows
1	5400	$(1.12)^{-1}$=	4,821.43
2	8,000	$(1.12)^{-2}$=	6,377.55
3	10,000	$(1.12)^{-3}$=	7,117.80
4	12,000	$(1.12)^{-4}$=	7,626.22
		Present Value=	**25,943.00**
		Less: Initial invest=	25,000.00
		NPV=	**943.00**

Therefore, both project A & B are acceptable since their NPV Positive.

Mutually exclusive Decisions: Two or more investment are said to be mutually exclusive when accepting one of them excludes all others from being accepted. Mutually exclusive decisions occur whenever a corporation

receives competitive bids for a given project. The bids are mutually exclusive because the winning bid exclude all other bids from being accepted.

4) The Internal Rate of Return

The internal rate of return (IRR) of an investment proposal is defined as the discount rate that produces a zero NPV. Thus, the actual rate of return that a project earns profits and the time value of money are taken into account.

i) When cash flows are in Annuity form

When the cash flows of an investment are in annuity form, its IRR can be computed very easily.

Example: A project that required a net investment of birr 100,000 produces annual cash flows for 16 years each of birr 14,000 and a required rate of 10%. The IRR for this project is found by dividing the value of one cash flow into the net investment and locating the resulting quotient in the present value annuity table

100,000/14,000=7.143

Table value	IRR
7.379	11%
6.974	12%

Thus, the IRR for this project is between 11% and 12 % and computed as follows:

1. Identify the closest rates of return
2. compute the NPV for each of these two closest rates

NPV at 11% = 14,000/(7.379)-100,000=3,306
NPV at 12%=14,000/(6.974)-100000= -2,364

3. Compute the sum of the *absolute* values of the NPVs obtained in step2
4. Divide the sum obtained in step3 into the NPV of the smaller discount rate identified in step 1. Then add the resulting quotient to the smaller discount rate

3,306/5670=0.58
IRR=11%+0.58=11.58%

Accept if IRR is greater than the cost of capital. Therefore accept the project.

When cash flows are not in Annuity form

When the cash flows of an investment are not in annuity form, the computation of its IRR can become tedious. In order to minimize the difficulty, it is necessary to make a good first guess at the project's IRR and apply ***interpolation methods***.

Example,

A project with a net investment of birr 60,000, a required rate of return of 13 %, and the following cash flows:

Year	CF
1	20,000
2	20000
3	20000
4	15000
5	15000
6	15000

Required: Calculate the IRR?

Guess at 20 % and compute the Npv, the Npv=405

At 21% the Npv= -940

Then the IRR with interpolation computed as follows:

Interest	NPV
20%	405
IRR	0
21%	-940

Therefore, IRR=20%+(0-405) (21-20)%

-940-405

20%+405 (1)%

1345

20%+0.3%

IRR= **20.3%**

Conflicting ranking

Conflicting ranking using NPV and IRR result from differences in the magnitude and timing of cash flows. Which approach is better NPV or IRR? On a purely theoretical basis, Npv is the better approach to capital budgeting but evidence suggests that in spite of theoretical superiority of NPV, financial manager prefer to use IRR. The preference for IRR is attributable to the general disposition of business people toward *rates of return* rather than actual birr amounts.

Capital Rationing Decisions

Capital rationing happens when a situation in which a corporation is unable to finance its entire capital budget.

Example,

Assume that a corporation is considering three independent capital budgeting projects. The corporation advertises for competitive bids on each project. One bid is received on project A, three bids are received on project B, and two bids are received on project C. the corporation's financial managers then calculate the following net investments and NPV coefficients on all the bids for each project:

		Net investment	**NPV**
Project A			
	Bid A-1	3,000,000	250,000
Project B			
	Bid B-1	3,000,000	200,000
	Bid B-2	3,500,000	250,000
	Bid B-3	4,000,000	225,000
Project C			
	Bid C-1	5,000,000	300,000
	Bid C-2	6,000,000	325,000

Since only one bid is available for project A, it is evaluated on accept /reject basis. The bid is acceptable because its NPV is positive.

The three bids on project B are mutually exclusive B-2 is chosen because it shows the largest positive NPV. The two bids on project C are also mutually exclusive. C-2 is chosen.

In the absence of capital rationing, the capital budget would consist of alternatives A-1, B-2 and C-2. The total investment required in order to adopt this budget is 3 million+3.5 million+6 million=12.5 million. If 12.5 million is available, the capital budget can be adopted. However, if only 12 million is available, **capital rationing** exists because the funds needed for the capital budget exceed the amount of funds available.

The decision rule for capital rationing problems selects a capital budget from sets of feasible investment alternatives. A group of investments alternatives is called a ***feasible set*** when it meets the following conditions:

1. The set contains no mutually exclusive alternatives.
2. The total net investment required for the set does not exceed the net investment constraint, or capital constraint.
3. When all the feasible sets have been identified, ***choose the set of feasible investment alternatives that contains the largest total***

Feasible sets for projects A,B,C for a capital rationing

Examples,

Feasible set	Net investment	NPV
A-1,B-1,C-1	11 million	750,000
A-1,B-1,C-2	12 million	775,000
A-1,B-2,C-1	***11.5 million***	***800,000***
A-1,B-3,C-1	12 million	775,000

The feasible project with capital rationing is A-1,B-2, and C-1.

Risk Analysis - Sensitivity Analysis

Financial evaluation under conditions of uncertainty-

While appraising of an investment project, importance is given to the reliability of data assessed and of the project design (marketing concept, sales program, project inputs, technology, engineering design, management, personnel and organization) as well as implementation of the project. To minimizing uncertainty, the financial analyst should check whether the feasibility study covers all aspects relevant to the investment and financing decisions. The most common reasons for uncertainty, however, are inflation,

changes in technology, false estimates of rated capacity and length of construction and running periods. Other reasons include changes in political, social, and commercial and business environment, as well as changes in technology, productivity and prices.

To cope with the risks, management has basically two options: to seek insurance against various risks on investment project; to identify the possibilities for active risk control or risk management. Insurance strategy can be successful only when his risks are spread over a number of carefully selected investments.

When the aspects of uncertainty are to be included in the financial evaluation, three variables in particular should be examined, namely sale revenues cost of products sold and investment costs. Sensitivity analysis is a proper instrument for identifying these critical variables and the extent to which they could affect the financial feasibility of a project.

Sensitivity analysis

With the help of sensitivity analysis it is possible to show how the net cash returns or the profitability of an investment alter with different values assigned to the variables needed for the computation [unit sale prices, unit costs, sales volume etc.]. By applying sensitivity analysis during planning stage, the uncertainty could be reduced by finding the optimistic and pessimistic alternatives and thus determining the commercially most realistic combination of the project inputs for the business environment.

Sensitivity analysis is a way of analyzing change in the project's NPV (or IRR) for a given change in one of the variables. It indicates how sensitive a project's NPV (or IRR) is to changes in particular variables. The more sensitive the NPV, the more critical the variable. The following three steps are involved in the use of sensitivity analysis:

1. Identification of all those variables which have an influence on the project's NPV (OR IRR)
2. Definition of the underlying (mathematical relationship) between the variables.
3. Analysis of the impact of the change in each of the variables on the project's NPV.

The decision maker, while performing sensitivity analysis, compute the project's NPV (or IRR) for each forecast under three assumptions: a). pessimistic, b) expected, and c) optimistic. It allows him to ask "what if"

questions. It can be applied to any variable which is an input for the after-tax cash flows.

A sensitivity analysis can be conducted with regard to volume, price, costs etc. In order to do so, we must obtain pessimistic and optimistic estimates of the underlying variables.

Let us assume the following pessimistic and optimistic values for volume, price and costs.

Forecasts under Different Assumptions

Variable	Pessimistic	Expected	Optimistic
Volume (units)	750,000	1,000,000	1,250,000
Unit selling price (Birr)	13.50	15.00	16.50
Unit Variable cost (Birr)	7.425	6.75	6.075
Annual fixed costs (Birr)	4,800,000	4,000,000	3,200,000

If we change one variable (others holding constant), the projects NPV are recalculated in the following way:

Sensitivity Analysis under Different Assumptions

Net Present Value

Variable	Pessimistic	Expected	Optimistic
Volume	(1430)	3276	7082
Unit selling price	(147)	3276	6699
Unit variable cost	1736	3276	4816
Annual fixed cost	1451	3276	880

The above Table shows project's NPV when each variable is set to its pessimistic and optimistic values. The project does not seem to be that attractive with change in assumptions. The most critical variable is sales volume followed by the unit selling price. If the sales volume declines by 25% (to 750000 units), NPV of the project becomes negative (-Birr 1430). Similarly, if the unit selling price falls by 10% (to Birr 13.50), NPV is Birr minus 147.

Advantages of Sensitivity Analysis

1. It compels the decision maker to identify the variables which affect the cash flow forecasts.
2. It indicates the critical variables for which additional information may be obtained.
3. It helps to expose inappropriate forecasts, and thus guides the decision maker

Limitations

1. The terms optimistic and pessimistic (range of Values) could mean different things to different persons in an organization.
2. It fails to focus on the interrelationship between underlying variables. For example, sales volume may be related to price and cost. A price cut may lead to high sales and low operating cost.

With the help of sensitivity analysis it is possible to identify the most important project inputs, such as raw materials, labor and energy and to determine any possibilities of input substitution, as well as the critical elements of the marketing concept.

Economic Analysis/Social Cost-Benefit Analysis

Social cost-Benefit Analysis is a methodology for evaluating projects from the social point of view. The national development impact of a project is assessed and evaluated. In this analysis, the focus is on social costs and benefits of a project.

Projects inputs and outputs are valued at shadow prices that reflect their true value to the national economy. Direct effects on the economy (imports, export, employment, foreign exchange, supply & demand, ecological conditions etc.) as well as indirect effects (affecting performances-underutilization of capacities, new investment initiative etc.,) are included in the analysis where significant.

Shadow Prices

“Shadow Prices refers to the value of the contribution to the country’s basic socio-economic objectives made by any marginal change in the availability of commodities or factors of production.”

Shadow prices will depend on both the fundamental objectives of the country and the economic environment in which the marginal changes occur.

Need for Shadow Prices in economic project appraisal

There are two main categories of market failure where shadow prices are required -***Imperfect Competition*** and ***Externalities.***

- Most markets are characterized by a degree of imperfect competition, which means that market price will exceed the marginal cost of production.
- Externalities occur when an economic activity has an impact on someone other than the consumer or producer. Environmental damage is one common type of external cost.

Analysts adjust observed prices or assign values when appropriate observed prices do not exist. For example: -- Prices charged by paper factories may understate the true social cost of paper if the production process generates pollution.

There are two principal approaches emerged for social cost-benefit analysis: ***UNIDO approach*** and ***Little- Mirrless approach.***

UNIDO approach

The UNIDO method of project appraisal involves five stages:

- Calculation of the financial profitability of the project measured at market prices
- Obtaining the net benefits of the project measured in terms of economic (EFFICIENCY) prices
- Adjustment for the impact of the project on savings and investment
- Adjustment for the impact of the project on income distribution, and
- Adjustment for the impact of the project on merit and demerit goods.

The measurement of financial profitability of the project in stage one is similar to the financial evaluation.

Stage two is concerned with the determination of the net benefit of the project in terms of economic (efficiency) prices also referred to as shadow prices.

Stage three of the INIDO method seeks to answer the following questions: Given the income distribution impact of the project what would be its effect on savings? What is the value of such savings to the society?

Stage four of the UNIDO method is concerned with measuring the impact of the project on income distribution. This calls for suitably weighting the net gain or loss to various groups in the society and summing them.

A key issue in shadow pricing is whether a good is tradable or not. For a tradable good, the shadow price is the border price, translated in domestic currency at market exchange rate. The shadow price of a non-traded good is measured in terms of consumer willingness to pay or cost of production depending on the impact of the project on the rest of the economy.

(A good is fully traded when an increase its consumption results in a corresponding increase in import or decrease in export or when an increase in its production results in a corresponding increase in export or decrease in import.)

(A good is non-tradable when the following conditions are satisfied: Import price is greater than its domestic cost of production, and its export price is less than its domestic cost of production.)

Little –Merriees (L-M Approach)

L-M approach to social cost benefit analysis has considerable similarity with the UNIDO approach. However, there are certain important differences as well.

As per the L-M approach, the outputs and inputs of a project are classified into the following categories: (1) traded goods & services, (2) non-traded goods & services, and (3) Labor.

The shadow price of a traded good is simply its border price. If a good is exported its shadow price is its FOB price and if a good is imported its shadow price is its CIF price. The shadow prices of non-traded items are defined in terms of marginal social cost and marginal social benefit.