Lecture No.15

Farm Investment Analysis - Time comparison principles - Discounted and undiscounted measures.

A. COMPARATIVE ADVANTAGE PRINCIPLE

According to this well-known principle, different areas will tend to produce those products for which they have the greatest comparative and not just absolute advantage. The main factors involved in the law are simply an extension and application of the principles of specialization and diversification. The physical and economic conditions influencing production vary from country to country, region-to-region and farm-to-farm and even within a farm from field to field. Each farm or region produces those crops or raises that livestock which it can grow more profitably. In other words, the individuals or regions tended to specialize in the production of the commodities for which their resources give them a relative or comparative advantage. For example, farmers in Tamil Nadu specialize sugarcane cultivation and those in Punjab specialize in paddy cultivation.

Table 14.1 Yield per Hectare (in Quintals) During 1996 - 1997

Crop	Punjab	Tamil Nadu
Paddy	34.0	26.7
Sugarcane	638.2	993.0

Punjab has to give up 34 qtls of paddy for 638 qtls of sugarcane whereas Tamil Nadu has to give up 27 qtls of paddy for 993 qtls of sugarcane. The principle of comparative advantage is reflected in the market prices for farm products. The following factors may change regional production pattern over time:

i) Changes in product or output prices.

ii) Changes in biological factors such as increased pest infestations.

iii) Introduction of new technology such as high yielding varieties, IPM, etc.

iv) Conversion of dry lands into irrigated lands.

v) Change in mode or cost of transportation, so as to decrease or increase the disadvantage associated with being distant from markets.

vi) Change in population that results in large, new consumption centres.

vii) Shifts in resources, such as labour and capital between regions.

B. TIME COMPARISON PRINCIPLE

In previous chapters, future prices, yields and other events relevant to the production process were assumed to be known, and problems unique to the passage of time were not considered. Since such an environment is far from reality, it is necessary to study the effect of time, risk and uncertainty on production process.

i) Decision - Making over Time

A farm manager has to take decisions over varying horizons of time. Two aspects of such decisions are important, i.e., i) differences in profitability growing out of time alone and ii) differences in the desirability of investments due to risk and uncertainty factors. Time has a very significant influence on costs and returns. There are many decisions where this time comparison principle finds application, such as: soil conservation programmes which bear fruits over a long time; putting land under an orchard which may not give returns for 5-10 years; and so on. Two aspects of the problem are considered under such situations: a) growth of a cash outlay over time and b) discounting of future income.

ii) Growth of a Cash Outlay or Compounding Present Costs

The cash outlay grows over time due to the compounding of interest charges or opportunity costs involved in using the capital; if Rs.100 are put in a saving account with an annual interest at 12 per cent compounded, it will increase to Rs.125.44 by the end of second year. In symbolic terms, you now have the amount earned at the end of the first year. P + Pi, plus the interest that amount earned during the second year (P + Pi) i which could be expressed as:

(P + Pi) + (P + Pi) i (or) P (1 + i) + Pi (1 + i) which after factorising (1 + i), results in

Table 14.2 Compounding the Present Value

(Amount in Rs.)

Year	Beginning Amount	Interest Earned by the End of Year	Beginning Amount + Interest
1	100.00	100.00(0.12)=12.00	112.00
2	112.00	112.00(0.12)=13.44	125.44
3	125.44	125.44(0.12)=15.05	140.49
4	140.49	140.49(0.12)=16.86	157.35
5	157.35	157.35(0.12)=18.88	176.23

(P + Pi) (1 + i). Factorising P from the left term gives: P (1 + i) (1 + i) = P $(1 + i)^2$. In general, the compounded value, F (future value), of a present sum (P) invested at an annual

$$P = \frac{F}{(1 + .i)^n}$$

$$P = = \frac{176.23}{(1.12)^5} = \text{Rs.}100.00.$$

interest rate (i) for 'n' years is given by $F = P (1 + i)^n$ .This procedure is called compounding.

iii) Discounting Future Revenues

Costs incurred at one point of time cannot be compared with validity to revenues forthcoming at a later date. The future value of the present sum is estimated through: F = P(1 + i)n .Dividing both sides of this equation by (1 + i)n, the following equation is obtained:

Thus, if a pay-off, F, is due in 'n' years in future, its present value, P, can be determined using the above expression where 'i' is the interest rate. This procedure is known as discounting future returns. The present value of Rs.176.23 that could be at the end of 5 years if the appropriate discount rate is 12 per cent, is:

Discounting can be used to determine the present value of the future income stream earned by a durable input (asset).

Table 14.3 Discounting the Future Values

(Amount in Rs.)

Year	Value at the End of the Year (Rs)	Present Value, if Discount Rate is 12 Per Cent per Annum (Rs)
1	100	89.29
2	100	79.72
3	100	71.18
4	100	63.55
5	100	56.74
Total	500	360.48

The interest rate used to discount or compound sums of money should be at least as large as the current or market rate of interest. How much higher it might be depends upon the manager's opportunity costs. The important variables determining present and future values of a single payment or series of payments are: i) the number of years and ii) size of interest rate. Both factors interact to determine the total effects of discounting or compounding on present or future values.