

commodities Q_1 and Q_2 are substitutes if the cross substitution effect is positive. They are said to be complements if the cross substitution effect is negative. Thus when $\frac{\lambda D_{21}}{D} > 0$ the two commodities are substitutes and when $\frac{\lambda D_{21}}{D} < 0$, the two commodities are complements. However it should be noted that in the two good case there can be no complementarity between Q_1 and Q_2 . They are always substitutes. For showing complementarity we should assume at least three goods.

5.16. Compensating Variation and Equivalent Variation in Income

There are two income changes corresponding to any price change: compensating variation in income and equivalent variation in income. Suppose that the initial equilibrium position of the consumer is disturbed by a change in the price of one commodity and as a result the consumer moves on to a new indifference curve. Then the compensating variation in income is defined as that amount of income which would compensate the change in price and bring the consumer back to his old indifference curve, though at a different point. The consumer remains on the same indifference curve as before the price change since the change in income compensates the gain or loss which could have accrued due to change in price. The equivalent

variation in income is defined as that amount of income which would have taken the consumer to the new indifference curve (where he has gone due to price change) with no change in price. The change in income is then equivalent to the change in price in the sense that the consumer moves on to the new indifference curve due to change in either of the two.

The two types of income change can be explained with the help of the following diagram (fig 5.26). Suppose that there are two

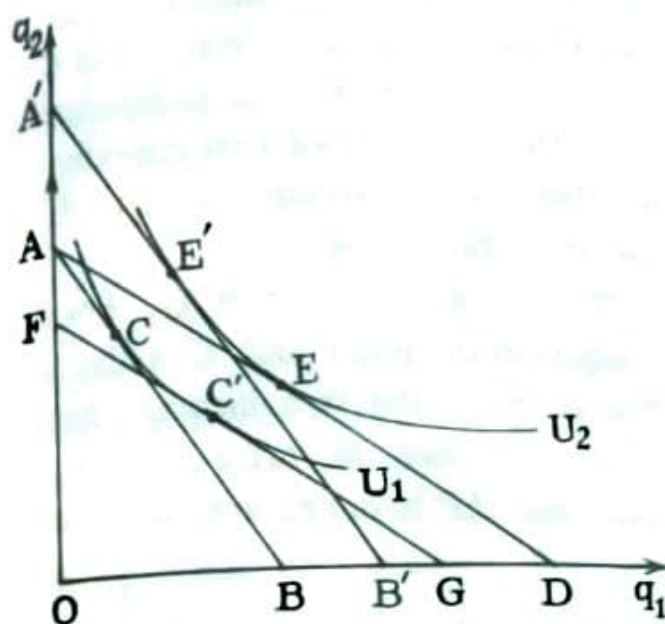


Fig. 5.26

commodities: one is a generalised commodity (M) and the other is Q_1 . The generalised commodity may be identified with the income of the consumer. Q_1 is plotted on the horizontal axis and M is plotted on the vertical axis. AB is the initial budget line and C is the initial equilibrium point. Now suppose that the price of Q_1 falls and the

budget line becomes AD . AD is tangent to a higher indifference curve U_2 at E . The consumer has therefore moved from a lower indifference curve U_1 to a higher indifference curve U_2 . This represents the gain in real income resulting from the fall in price. Now suppose that the price of Q_1 remains lower but money income of the consumer is lowered so as to wipe out the gain in real income. This happens when the budget line AD shifts parallelly to the left to its new position FG such that FG is tangent to the indifference curve U_1 at C' . Then AF is the compensating variation in income corresponding to the fall in the price of Q_1 . If this amount of income is withdrawn when price of Q_1 falls the consumer remains on the same indifference curve U_1 .

Now suppose that instead of the fall in the price of Q_1 , there is an increase in money income so that the old budget line AB shifts parallelly to the right. Suppose that $A'B'$ is the new position of the budget line where it is tangent to the indifference curve U_2 . Thus

when price of Q_1 falls income remaining the same the consumer moves on to the indifference curve U_2 . Again when money income rises by AA' , price of Q_1 remaining the same, then also the consumer moves on to the same indifference curve U_2 . AA' is therefore the equivalent variation in income corresponding to the fall in the price of Q_1 . Thus when price falls from C to E , AF is the compensating variation in income and AA' is the equivalent variation in income. Alternatively, the movement from C to E is the price effect. It can be decomposed into an income effect and a substitution effect. If we consider first the substitution effect (movement from C to C') and then the income effect (C' to E) we get the compensating variation in income AF . On the other hand if we first consider the income effect (C to E') and then the substitution effect (E' to E) we get the equivalent variation in income AA' .

Consider now the effect of the rise in the price of Q_1 . For this consider that E is the initial equilibrium point and C is the final equilibrium point. For the rise in price the two income changes interchange their positions. For the rise in price AA' is the compensating variation in income and AF is the equivalent variation in income.

5.17. Comparison between the Marshallian approach and the Indifference curve approach

In comparing both the approaches to the theory of consumer behaviour let us first point out the similarities between them:

1. In both the approaches we assume that the objective of the consumer is to