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Revealed Preference Theory

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***Abstract*-- Professor Samuelson's Revealed Preference Theory is a behaviourist ordinal utility analysis as distinct from the introspective ordinal utility theory of Hicks and Allen. It is 'the third root of the logical theory of demand', and has been called by Hicks as the Direct Consistency Test under strong ordering. This theory analysis consumer's preference for a combination of goods on the basis of observed consumer behaviour in the market.**

Professor Samuelson's theory is based on the premise that choice reveals preference. Keeping this fact into view, a consumer buys a combination of two goods either because he likes this combination in relation to others or this is cheaper than others. The theory assumes consistency in consumer prefers bundle A over bundle B in one situation, they will not choose B over A in another, given the same options. Revealed Preference Theory provides robust frame work for analysing demand without requiring knowledge of the consumer's utility function, making it a powerful tool in empirical economics.

Keywords-- Consumer's Behaviour, Consistency, combination, Utility. strong ordering, Weak ordering, fundamental theorem of consumption.

I. INTRODUCTION

This theory is associated with the name of Prof. Samuelson. This theory is called the **behaviourist ordinal-utility theory**. Instead of the unrealistic assumption that the consumers operate with a complete and consistent scales of preferences set out in the form of indifference curves, most economists now prefer to analyse situations in which their hypothesis can be tested. Both Marshallian utility analysis and Allen-Hick's indifference curve technique apply the introspective method or the subjective method. But Samuelson's revealed preference theory makes use of hypotheses which are observable and testable. There is thus a shift from the psychological to behaviouristic explanation of consumer behaviour.

According to the revealed preference theory, the consumer is supposed to reveal the nature of his preferences. He shows the goods he would prefer to purchase in a given situation even though he may not be able to show his scale of preferences on an indifference map. Thus, in the theory of revealed preference, it is un-necessary to assume that the consumers can describe their preferences on indifference maps. This is one merit of the revealed preference theory. Also, as Sir John Hicks observes, revealed preference theory lends itself to use by econometricians.

II. ASSUMPTIONS

Rational Consumer: when we use the revealed preference theory in order to find out the effects of a change in price of a commodity on the demand for it, we make certain assumptions. We assume that we are considering an ideal consumer or a rational consumer. That is, we assume that the consumer seeks to maximise his satisfaction from the resources he has. As such he will choose a combination of goods which he deems most satisfying i.e., which he prefers the most. It therefore, follows that in one set of market conditions, he selects one combination and his choices will be different under different market situations.

Consistency: we also assume that the consumer's choices are consistent. The choices of actual consumers may not be consistent but those of the ideal or rational consumer may be supposed to be consistent. This consistency implies (a) two-term consistency and (b) transitivity. The two-term consistency means, for instance, that if a particular combination of goods P is better than Q combination and Q is better than R, then P must also be assumed to be better than R, and R cannot be better than P. transitivity ensures that there should be no such circular relationship.

Positive Income-Elasticity of Demand: Another very important assumption underlying revealed preference theory is that the income-elasticity of demand of the consumer must always be positive. That is, if his income increase, his demand for the commodity must also increase; it should not remain the same (i.e., zero elasticity) and it should not also decrease (i.e., negative elasticity) as it happens in the case of inferior goods.

Strong Ordering: A distinguishing feature of Samuelson's theory is that of 'strong ordering.' there are two kinds of ordering, viz., strong and weak. In a strong ordering, each item in a consumer's scheme of purchases is assigned a definite place or number and at each number there is only one item so that the consumer definitely reveals his preferences. For instance, a consumer reveals his preference when he is observed to choose. Say, Q combination of goods in preference to all others or he rejects the rest. In other words, choice reveals preference, by choosing one combination and rejecting others, the consumer has showed his definite preference. It is a case of strong ordering. In a weak ordering there may be some items which cannot be arranged in order or preference, so that the consumer is unable to indicate which items he prefers to which.

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Strong ordering: more is preferred to less

It may be noted that there is strong ordering so far indifference curves themselves are concerned, because each indifference represents a different level of satisfaction. As between indifference curves, you can at once say which you would prefer the most. But there is a weak ordering so far as the combination of goods on the same indifference curve are concerned because they represent the same level of satisfaction. Since they are equally satisfactory, the consumer hesitates and cannot at once reveal his preference.

A weak ordering divides the items of purchase into groups; the groups may be strongly ordered showing a definite sequence of preference but there is no such preference within the group itself, i.e., there is weak ordering within the group.

There may be two or more positions at the top and the choice between these cannot be easily explained. In case the ordering is strong, the consumer chooses the most preferred position and the preference explains the choice.

The conventional indifference curve is an illustration of weak ordering because all points on the same indifference curve are equally preferred to represent a non-ordered group. Samuelson's theory assumes strong ordering. The assumption underlying the indifference curve technique. Viz., that a consumer is capable of ordering all conceivable alternatives indicated by several points on the indifference curve, appeared obviously to be unrealistic.

Weak ordering; Gulab Jammu & Rasagoolahs are preferred equally

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Samuelson, therefore, rules out the possibility of weak ordering. He does not regard indifference as an operationally significant concept. Samuelson thinks that in the choice that a consumer makes he reveals his preference. Thus, the behaviour of the individual reflects his preference. That is how the revealed preference theory derives a demand theorem from the actually observed behaviour of the consumer. The axiom of revealed preference " provides the necessary operational link between observed choice-behaviour and the behaviourist's welfare conclusions". Thus, the relation of indifference is rejected on operational grounds.

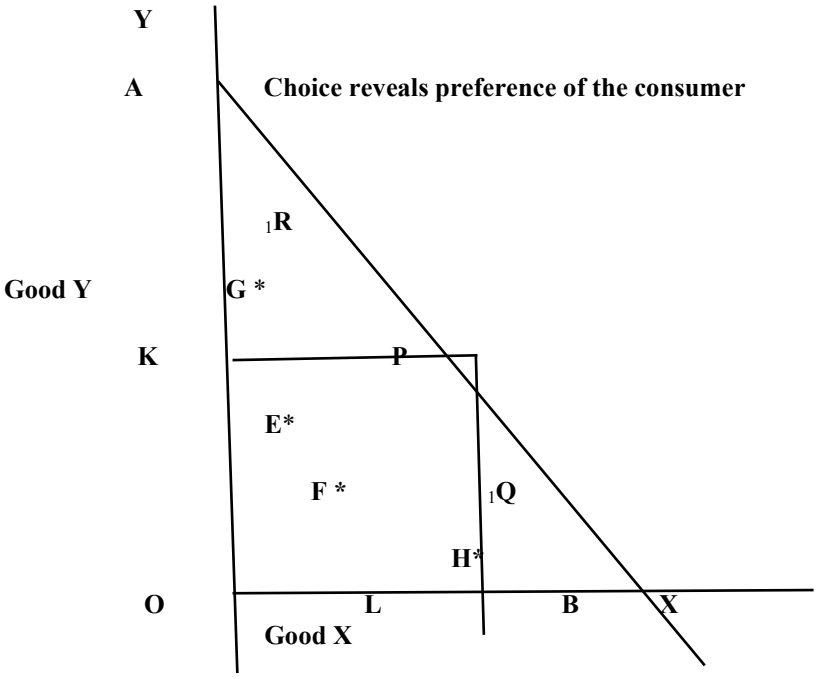
But, as already explained, the consumer behaviour should not be self- contradictory. If, for instance, he prefers coffee to tea at one time, he cannot consistently choose tea rather than coffee at another time. Hicks has called this 'two-term consistency', which is an important assumption underlying Samuelson's theory. This consistency relates to an individual's each single act of choice.

III. Preference Hypothesis A Strong Ordering

Prof. Samuelsons revealed preference theory has laid emphasis on "Choice reveales preference" or strong ordering to explain his theory of demand. A consumer reveals his definite preference regarding the combination of two goods 'X' & 'Y' consumption which he chooses. The preference hypothesis is based on the following assumptions.

1. Choice of consumer reveals his preference.
2. Strong ordering concept
3. Bigger quantity of combination is preferred to smaller one.
4. It is based on "Ordinality principle"
5. It is actual behaviour of a consumer, rather than just psychological reactions.

'AB' is the budget line, if a consumer spends all his income on good 'Y', then he will buy 'OA' amount whereas if spends on good 'X' he will get 'OB' of 'X' or the consumer can buy any amount of combination within ΔOAB.



The consumer shows his strong preference at point 'P' that means, 'OK' of good 'Y' and 'OL' of good 'X'. Other combinations on line AB, i.e., point 'R' & 'Q' gives him less quantity of 'X' & 'Y'.

Even the point below the 'AB' line i.e., point 'G', 'E', 'F' & 'H' all gives less quantity of all 'X' & 'Y'. Hence in the strong ordering preference hypothesis. A consumer reveals his preference which gives him the maximum amount of good 'X' & 'Y'.

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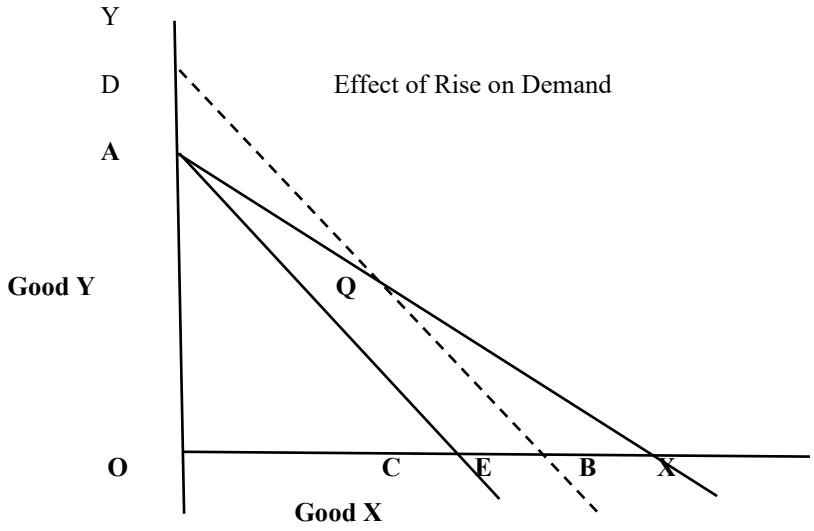
IV. Fundamental Theorem Of Consumption Theory

It can be easily explained that the Marshallian law of demand can be derived with the aid of revealed preference hypothesis. According to the Marshallian law of demand, demand extends

With a fall in price and contracts with a rise in price, other things remaining the same, i.e., consumer's income and other relevant prices do not change. Samuelson has tried to demonstrate this inverse relationship between price and the amount demanded by assuming income elasticity of demand to be positive.

Samuelson states the demand theorem under the title "Fundamental Theorem of Consumption Theory" thus: "Any good (simple or composite) that is known always to increase in demand when income alone rises must definitely shrink in demand when its price alone rises." In this proportion, income elasticity of demand has been assumed to be positive.

This theorem can be illustrated by the following diagram.



In this diagram consumer's income in terms of good X is shown by OB and in terms of good Y by OA. He is supposed to spend his entire income on these two goods X and Y. AB is the price line and as such shows all the combinations of the two goods X and Y that the consumer can buy in this price-income situation. Let us suppose the consumer is observed to choose the combination represented by Q on the price line AB as giving him the maximum satisfaction.

Price Effect: Now suppose that the price of good X rises, while the price of Y remains the same. The demand for X contracts from OB to OC. This gives the new price line AC. In this new price- income situation, Q which put the consumer in equilibrium before, becomes now beyond his reach. In order to enable him to buy the same combination earlier, we give the consumer some extra money to overcome the higher price resistance. For this purpose, we draw a line DE parallel to AC but passing through Q. we give the consumer CE more money to put him on this new price line DE to enable him to buy Q combination, because Q is on this price line too. Prof. Samuelson calls the extra money as Over-Compensation Effect and Hicks call it cost-difference.

Now, since Q combination becomes available to the consumer again in the price-income situation indicated by DE price line, he will not choose any combination lower than Q (i.e., lying on QE part of DE). They were available to him before since they lie within the triangle AOB made by the price line AB but were rejected by him in favour of Q. Hence, he will now choose Q or any higher combination lying on QD part of the price line DE. If he selects Q, it will mean that he is buying the same amount of goods X and Y as before. But if he chooses any combination above Q on QD portion of DE, it will mean he is buying less of X and more of Y. this shows the **Substitution effect** of a price rise since some units of Y have been substituted for some units of X which has become dearer.

Thus, even when we have given some extra money to the consumer to compensate for the rise in the price of X, he either buys the original quantity of X or less quantity at a higher price. If extra money were not given to him, he would definitely buy smaller quantity of X when its price has risen. This establishes the inverse relationship between price and the quantity demanded when price of good has risen.

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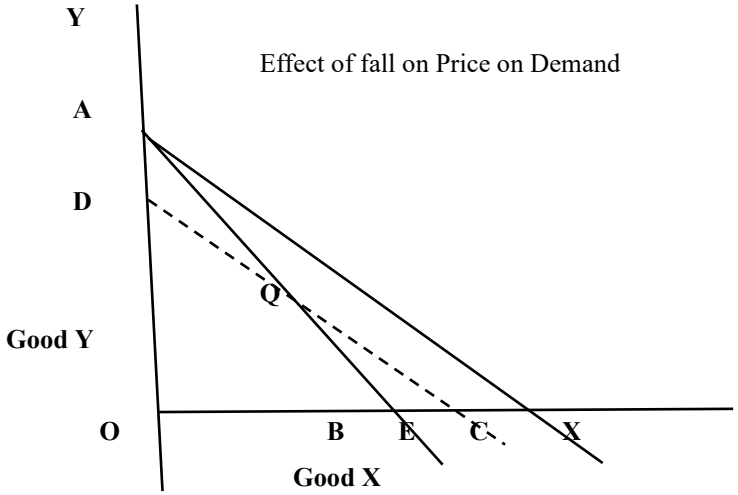
Now suppose the price of good X falls. The effect of fall in price is illustrated by the diagram as that of rise was illustrated by the below diagram.



In the above diagram, take AB as the original price line and suppose our hypothetical consumer reveals his preference for Q combination of goods X and Y to all other combinations in or on the triangle OAB.

Now suppose the price of X falls and as a result the demand for X extends from OB to OC. Thus, the price line shifts from AB to AC. The consumer now feels he is better off than before. If he is to purchase the original combination of X and Y as represented by Q, we have to take away from him some money so that he is neither better off nor worse off than before. For this purpose, we draw DE price line parallel to AC. In this way, the amount of money withdrawn from the consumer is CE. Now Q being on the new price line DE also, the combination represented by Q becomes available to the consumer. But owing to reduction in his money income he cannot purchase any combination above Q, i.e., lying on QD portion of DE. These combinations were available to him but had been rejected in favour of Q. Hence, he will either choose Q or any other lying below Q, i.e., on the QE portion of DE. If he chooses Q, it will mean that he buys the same quantity of goods X and Y as in the original price-income situation represented by AB. But if he chooses any other combination below Q, it will mean that he buys more of X and less of Y than what he did originally in the price-income situation of AB.

When the consumer's income is reduced, he buys either the same quantity of X or more of it at a lower price. If no money is taken away, he is on the AC price line, he will definitely buy more of X at the lower price provided that his demand for X increases, as his income rises, i.e., his income elasticity of demand for good X is positive.

Thus, we have proved the "Fundamental Theorem of Consumption Theory" in both cases of rise and a fall in the price of commodity. The inverse relationship between price and quantity demanded is established.

Consumer's Equilibrium: Incidentally, we have indicated how a consumer reaches an equilibrium with revealed preference hypothesis and the income effect, the substitution effect and price effect of which the former two are components.

V. Critical Evaluation

Merits: we have already pointed out some merits of the revealed preference theory. There is no doubt that, in several respects, it is an improvement on the Marshallian utility analysis and Hicks-Allen indifference curve technique:

1. In the first place, it is behaviouristic and draws the demand theorem from the actually observed behaviour of a consumer. On the other hand, both Marshallian utility analysis and the Hicks-Allen indifference curve techniques are introspective and give psychological explanation of consumer demand. The revealed preference theory studies the actual behaviour of a consumer and not an ideal or imaginary consumer. It is, therefore, more realistic and more scientific. As Prof. Tapas Manjumdar says, "Behaviourism has certainly great advantages of treading only on observed ground; it cannot go wrong."

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2. Samuelson's revealed preference theory has another advantage over the earlier theories. It steers clear of the dubious assumptions upon which the earlier theories were based. The Marshallian and the Hicksian theories were based on the utility maximisation principle. This principle is more restrictive and difficult of realisation in actual practice. On the other hand, Samuelson's theory seers clear of the utility maximisation principle and uses instead the consistency principle to derive the demand theorem whicj is much less restrictive but more realistic.
3. The indifference curve is based on the assumptions of continuity, whereas revealed preference theory does not assume continuity. Indifference curve is continuous in the sense that it depicts all conceivable combinations some of which may be so unrealistic as to be ridiculous. that is why Prof. Samuelson has given up the assumption of continuity in his revealed preference theory. Although, price line is drawn continuous, yet no continuity is actually involved because the theory is based on the actually observed choice of the consumer from among such combinations as are actually available in the given price-income situation.

Demerits: whereas revealed preference theory has several merits as compared with the earlier theories, it is not free defects:

1. It is based on strong ordering and as such does not admit of indifference. But since observed choice implies a number of possible alternatives, indifference cannot be ruled out altogether. It may be that no definite preference emerges from a large number of observations. The consumer is sometimes confronted with alternatives which are equally desirable and he is hesitant to choose between them.
2. It is very reasonable to assume that an individual is able to compare the different alternatives open to him. Hence, there is a possibility of indifference and of remaining at the same level of satisfaction by sacrificing some units of a good in order to obtain additional units of some other good. As Mr. Tapas Majumdar points out, capacity to compare is the very basis of welfare economics.
3. Further, Mr. Armstrong asserts that round about every chosen point there are points of indifference. A consumer goes through these points to reach the most desirable end. The combination actually chosen is thus a point of the series of points of indifference.
4. Moreover, it is pointed out that since Samuelson's revealed preference theory is based on actually observed behaviour, there is no room for making a distinction between income effect and substitution effect. And since response of demand to a change in price has two components, income effect and substitution effect, it is supposed that Samuelson's revealed preference theory gives only a partial explanation of change in demand as a result of a change in price. But Samuelson makes a clear distinction between income effect and what he calls overcompensation effect which is similar to substitution effect.
5. Another flaw in the theory of revealed preference arises from the assumption of positive income elasticity of demand. In view of this assumption, this theory fails to enunciate the demand theorem when income-elasticity of demand is negative. It only enunciates the demand theorem in a case in which substitution effect of a price change has been reinforced by positive income effect. It cannot, therefore, explain Giffen's paradox in which the income effect is negative and this negative effect is so powerful that it out-weighs the substitution effect. Samuelson's theorem explains the inverse relationship, between price and the quantity demanded, but in Giffen paradox this relationship is direct.

   Samuelson thus denies are phenomenon of Giffen paradox. But we know that this paradox is theoretically conceivable. We know that in the case of inferior goods demand changes in the same direction as price. In this respect, Hicks-Allen indifference theorem is more general than Samuelson's revealed preference theory.
6. Finally, objection is raised against his axiom 'choice revealed preference'. But "this axiom is invalid for situations where the individual chooser is to be capable of employing strategies of a game theory type."

VI. Conclusion

With all these flaws in the revealed preference theory, we must admit that this theory is superior to other demand theories in that it applies a scientific and behaviouristic method to consumer's demand. Samuelson's enunciation of the preference hypothesis makes a valuable contribution. But it is circumscribed by the fact that it must reject a hypothesis which is not directly testable. The revealed preference theory is not more general than the Marshallian Law of demand and, unlike Hick's indifference curve, it does not cover the Giffen case. It is unable to explain a case in which income-elasticity of demand zero or is negative and the income-effect larger than the substitution effect. Hence, Hicksian theory of indifference has greater operational significance than Samuelson's revealed preference theory.

A theory of consumer demand based entirely on strong ordering cannot be very satisfactory, because the consumer is actually confronted sometimes with alternatives which are

equally desirable. Hence indifference analysis cannot be altogether ruled out.

Therefore, conclude that neither for the purpose of formulating a general theory of demand nor on any operationally relevant consideration is it necessary to subscribe to the revealed preference theory.

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