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About Utility

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Abstract: The concept of utility is one of major interest in any serious approach to microeconomic phenomena. The article discusses a number of issues regarding the actual method of determining usefulness based on relationships and preferably indifference and facets of marginal utility.

Keywords: utility; marginal; indifference

1. Introduction

The utility, along with the production function represents the key concepts of any microeconomic theory. The utility always stayed in the center of debates and polemics of economical nature, from the simple fact that while the rest concepts were more or less clear, it was often a nebulous especially in terms of actual implementation.

At Physiocrats the concept of utility is confused with value, utility being in fact the difference between the utility created and consumed, while the value is given by the difference between price and cost of production (Ioan, 2017).

For Adam Smith, the utility is given by the value of use which "is more a matter of individual and subjective" (Ioan, 2017).

In "On the Principles of Political Economy and Taxation", David Ricardo says that the utility or use value is a necessary condition of exchange value, but is not the unit of its (Ioan, 2017).

John Stuart Mill believes that the usefulness of a good is only its ability to satisfy a desire (Stuart, 1848).

A qualitative leap in the approach of the utility is brought by Carl Menger which, in his Principles of Economics, introduces the concept of marginal utility.

The founder of the School of Lausanne, Leon Walras considers the final degree of utility as last intensity needs met by a certain amount of goods consumed.

2. What is the Utility?

In most scientific works, utility or satisfaction is achieved by the consumption of a particular good or unit of preferences for a specific good or basket of goods and services.

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From the point of view of the author, each of these meanings bring fundamental shortcomings in understanding and, especially, the practical application of the concept. If the concept of utility is virtually synonymous with the satisfaction, in which case the first definition becomes a mere transposition of another term as generally, the second assertion necessarily requires a system of axioms by which to quantify the phenomenon.

This system of axioms must, on the one hand be general enough to catch all facets of the problem but, on the other hand, simple enough to apply it easily in the immediate reality.

Often in various books or in proposed applications we meet statements such as: let either one or two goods that have utility function following obviously a function that we could hardly a practical imagine. Where does this, why is this utility function and no other, are legitimate questions which puts everyone!

Therefore, a utility function have to come naturally when the buyer is faced with a choice. The best way for construction of theoretical concepts is the author's opinion, departing from viewing the concrete phenomenon.

Therefore, how a consumer proceeds when faced with the choice of a basket of goods and different amounts of goods?

The first thing is to establish the consumer space (Ioan, 2015) ie the totality of goods ordered sets that are needed. Consumer space is essentially a n-dimensional rectangle, Cartesian product of closed intervals of the form $(0, M_k)$ where M_k is the maximum amount of good G_k that can be purchased $(1 \leq 1k \leq n)$. Hence, the discussion already split into two directions: acquisition of one good or at least two. If for the purchase of a single good, the discussion revolves around a "rewarding" growing up at a time, followed by a decrease in its, discussion with several goods it is much more complicated.

A good can be replaced sometimes in a certain proportion with another or any combination of other goods, and sometimes a good acquisition entails the purchase of additional units of other goods. Sometimes the consumer waives all or part of a number of goods for others, so that (skipping phenomenon caused dissatisfaction waiver) to preserve their "satisfaction".

So we build a relationship of equivalence in the set of baskets of goods in the consumer space, saying that two baskets will be equivalent if their choice is indifferent. Unlike the utility function which is one purely mathematical, the indifference relationship is one natural, often depending on factors not necessarily objective (such as the number of calories to food or thickness of winter clothing etc.) but other factors: psychological, social, climatological etc.

Thus, in a hot weather, the consumption of a particular assortment of plain water may arise relations of indifference that, otherwise, being not satisfied.

An equivalence relation is necessarily reflexive (i.e. any good is himself indifferent), symmetrical (any good indifferent to other generates a reciprocal relationship in the sense of indifference) and transitive (if a good is indifferent to another and the second to the third, first is indifferent to the third or in an equivalent formulation using symmetry, if two goods are indifferent to a third, they are indifferent between them).

An equivalence relation generates so-called equivalence classes ie all elements that are equivalent to one point. In the context of the relationship of indifference, indifference class will therefore be made of the sum of all goods/baskets of goods that are indifferent between them. So the indifference class of water in a hot day will be given by a bottle of any water.

As a result of such a division, the consumer space becomes the union of indifference classes (required disjoint between them).

It is obvious that a reduction in analysis only to classes of indifference would greatly narrow the scope. Thus, it is likely that a bottle of cold water may be replaced by an ice cream, both offering the same thermal comfort. On the other hand, a child will prefer ice to water (even the final effect will be the same), and someone with diabetes will reverse preference.

We define therefore the relationship preferably on equivalence classes which will have to satisfies, on the one hand, the axioms of an order relationship (reflexivity, transitivity and antisymmetry – i.e. two goods are preferred each other become indifferent to each other) and total orderly in the sense that for every two goods classes we can determine which is preferred other. A number of other conditions are absolutely necessary are present in the work Ioan C.A., A New Approach to Utility Function, published in 2015.

Once defined these concepts, we introduce the consumer area corresponding to a basket of goods as all those who gave preference basket. Typically, the condition that requires the consumption zone is to be convex in the sense that a linear transition (i.e. varying in proportion to the quantities of products) from one basket to the next higher that the items of reference to be made only by upper intermediate baskets. Basically, this condition is not always met, sometimes the transitions leading to "dissatisfaction" temporary, but with a happy ending! On the other hand, further compelling mathematical requires this approach!

Once defined these concepts the next step, is to define the utility function.

We define essentially axiomatic the utility as satisfying two conditions: indifferent baskets of goods will have the same utility and a basket preferred to other items will be at least equal to the first utility. Also, the empty basket will have null utility. The latter condition is not imperative, leading to elegant results. Specifically, we can define the utility in terms of cardinal or ordinal aspect (in the order of preference and not necessarily by value), the only requirement being that the utility to satisfy the above axioms.

Another necessary condition after the above discussion is that the utility function is quasi-concave that is in transition between two baskets, the segment (i.e. a linear transition, proportional differences between the two baskets) between them, if they have utility greater than $a \in \mathbf{R}$, the intermediate approach is staged all utility greater than or equal to a.

One question immediately arising is: how do we define concrete yet a utility function?

The process is not simple, but not terribly difficult. First define a norm in the consumer space that is an application that measure the "distance" (as defined metrics) from the origin to the point that has the coordinates corresponding quantities of the consumption basket. The additional assumptions (Ioan, 2015) demonstrated the existence of minimal consumer basket (not necessarily unique) relative to the norm that is a basket indifferent to the initial and having a minimal norm. Such a definition satisfies all axioms necessary.

3. What is the Marginal Utility?

After defining a utility function, the next step would be the implementation of that concept at work. In essence, the utility does not really tell us much. Moreover, it shows that it is determined to an increasing application, so its absolute values are more than indicative.

As in mathematical analysis often the process itself is less important than its speed variation, the utility has no independent value but with its relative dynamics.

We could therefore define the marginal utility as the tendency of variation of the utility to change the structure of the consumer basket. As, however, the calculus is known that there is no indicator purely numerical measure the speed of a phenomenon simultaneously with the change all parameters (referring to numbers and not to expressions such differential of a function) will have that this approach is staged and broken.

Thus, with the additional assumption that, relative to a basket of goods, consumption remains constant except one fixed, the marginal utility will be defined as the rate of change in relation to the total utility of that good, that nobody else than the corresponding partial derivative. If the phenomenon is discreet, the marginal utility is derived numerically calculated as the average variation range of variation given by a good unit.

Usually it is calculated by varying the utility from past to present at a change with one unit of good. On the other hand, when there is a set of data, a much better approximation will be (the data stored within the system) the arithmetic mean of the left and right of that point.

Summarizing therefore, the marginal utility measured plus (or minus) the satisfaction obtained from the consumption of good.

It should also be noted that with only marginal utilities (which can be quantified much simpler than the global one), total utility can be recovered in both discrete and continuous cases.

4. References

Ioan, C.A. (2015). A New Approach to Utility Function. Galati: *Acta Universitatis Danubius. Oeconomica*, Vol. 11, No.2, pp. 193-222.

Ioan, G. (2017). *Economic Doctrines*. Galati: Zigotto.

Ioan, C.A. & Ioan, G. (2012). *Matheconomics*. Galati: Zigotto.

Stuart, Mill John (1848). *Principles of Political Economy with some of their Applications to Social Philosophy*. London.