Utility of sacrifices: Reorientation of the utility theory

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May 2023

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ABSTRACT

Utility theory is a pivotal concept in economics that provides insights into how an individual is motivated to act under budget constraints. The main assumption of this theory and the entire field of economics is that a rational human being and an individual derive utility from the consumption of goods and services under given budget constraints. **The aim** of this article is to explore these fundamental assumptions and introduce a new theoretical framework for deriving utility, which is termed the "utility of sacrifices". Various **methods** were employed in the study, including a review of existing literature, an analysis of prevailing theories, and observations in real-world scenarios. **The results** show that, through observations, a "rational" human being derives utility from both consumption and voluntary sacrifices. Therefore, in **conclusion**, it is proposed that the total utility of an individual is the sum of these two components. This theoretical framework provides a more comprehensive understanding of human decision-making and behavior in economics. It also provides novel insights for future research and applications in economics.

Keywords: utility; consumption; sacrifices; decision-making; behavior

INTRODUCTION

Utility theory has been the foundation of economics, especially in microeconomics, which is the key to behavior and decision-making [1]. The economists of the early 18th-century tried to find out why an individual acts in a certain pattern [2]. Jeremy Bentham was an English philosopher who introduced the utility concept into social science in 1789 [3]. Utility is the reflection of an individual's value or preference [4–7], which generates pain and pleasure in an individual from their action [8]. In the early stages, economists used utility theory to explain mainly two concepts – demand behavior and to justify or amend an economic policy [9]. It is, in the simplest terms, satisfying desire [10]. Under the Homo Economicus concept, utility has been considered a characteristic feature of an individual [11]. Frish (1926–1971) attempted to establish a quantitative definition of utility using an axiomatic representational theory of measurement [12]. Furthermore, economists have explained that utility comes from consumption [8, 11, 13–15]. There is another school of thought that assumes utility is generated from attributes of the product instead of the product itself [16]. There is still an ambiguous attitude towards utility among economists [8]. Nonetheless, there is no disagreement that whether utility comes from products or attributes, the final process is consumption. However, an individual gets some level of utility from voluntary sacrifices, which have not been mentioned or explained in the traditional utility theory. Therefore, incorporating this component into the theory makes it more realistic. Nonetheless, another dimension, utility as time, was also proposed [17]. It is important to note that utility maximization drives choice behavior and perceived value is about the trade-off between benefit and sacrifice [18].

Traditional utility theory

Historically, there have been two approaches to utility theory: the cardinal approach and the ordinal approach. The fundamental difference between these two approaches is the measurement of utility. The cardinal approach assumes that utility can be quantified and proposes a unit of measurement, *util*. However, the ordinal approach assumes that utility is a subjective concept that cannot be measured but can be compared.

The traditional utility theory makes several assumptions. The first assumption is the rationality of an individual. It means an individual has full capacity to properly process the available information [19]. Under this assumption, an individual is supposed to maximize his or her utility subject to a given budget constraint. Furthermore, to be a "rational" individual, one must be selfish, and utility is obtained through the consumption of goods and services. However, it is well-acknowledged that rationality has diverse manifestations [20]. Further, rationality has cognitive and axiological dimensions beyond instrumental and utilitarian functions [21].

Secondly, marginal utility is diminishing [22]. That means each additional unit of consumption produces less utility. Thirdly, the total utility of a basket of goods depends on the quantity consumed. Early versions of the theory assumed that utility was additive. In the cardinal approach, another assumption is the constant utility of money. In the ordinal approach, a diminishing marginal rate of substitution is adopted. Further, the assumptions of consistency and transitivity of choice are also added.

In the cardinal approach, if we consider a simple model consisting of a single commodity and a single individual, an individual tries to maximize the difference between his utility and his expenditure:

$$U - P_x q_x, \tag{1}$$

where U is the total utility and is a function of the quantity consumed.

Similarly, P_x and q_x are the price and quantity of the commodity x, respectively. It also represents the budget constraints of an individual:

$$U = f(q_x). \tag{2}$$

In the ordinal approach, given the money income (Y) of an individual and the market price of the commodities (P_i), the consumer tries to maximize his or her utility (U).

$$\text{Maximize } U = f(q_i), \tag{3}$$

where i = 1,2, ….n,

subject to

$$\sum_i^n q_i P_i = Y. \tag{4}$$

Proposed new theoretical framework

Nowadays, the utility concept is more important than ever [8]. Therefore, it demands a better understanding. Traditionally, it is assumed that utility is derived from consumption. However, it is easily observable that an individual does not only get his or her utility from the consumption of goods and services. Rather, an individual also gets utility from voluntary sacrifices.

Let us discuss an example. Consider an economically active person working hard for his livelihood. He works and earns money for his family, which consists of a wife and a child. For dinner, he brought three slices of pizza and three cans of drink – one for each. Suppose he spent all his earnings. While sitting for dinner, the child was hungrier, and after finishing his slice of pizza, he asked for more from his parents. There is no chance to get more pizza for their child. The parents, either one or both, must sacrifice some pieces of pizza from their slices and feed them to their child.

In the aforementioned case, either or both parents have not been able to consume their intended portion of the pizza. More clearly, they are consuming less than equilibrium, that is at the tangent of the budget line on the indifference curve.

For simplicity, let's consider that the father provides an extra pizza to his child from his slice. Based on traditional utility theory, the father must have a lower level of utility than he ought to have since his expected consumption was higher than what he actually has. In traditional utility theory, a decrease in utility is equivalent to a decrease in satisfaction. If this is true, the father must have some kind of bad feeling about his sacrifices. However, in reality, in such a case, the father would not be less happy or less satisfied because he could not have the expected amount of consumption under the given budget constraint. Rather, he would be at least as happy as if he had consumed at the initially expected level of consumption.

Consider another instance of any couple living in a relationship. In a healthy relationship, people do share. By sharing, individual consumption is reduced. However, the utility does not decrease when compared to the state in which all initial endowments are made by oneself.

Not only the sacrifices for the family but also for an unknown person will have some utility if the sacrifices are voluntary actions. For instance, if you are coming out of the store after purchasing some cookies and you encounter a hungry bagger asking for some food. In such a case, you may give some pieces of cookies to the bagger or may not. It is purely a voluntary action. If you provide some cookies to the bagger, in such circumstances, the expected utility you are supposed to derive from the consumption will be reduced. However, your total utility would not be reduced. That means the sacrifices are also creating some sort of utility for you. The aforementioned three cases indicate that an individual may derive utility from sources other than the consumption of goods and services. Rather, it is also generated through voluntary sacrifices. Therefore, the equation for total utility can be extended as follows:

$$Total\ Utility = f(x, y) - \Lambda(I - P_x x + P_y y) + f\left(\sum_1^i S_i\right) \qquad (5)$$

where f(x, y) represents a utility function, $Λ$ is the Lagrangian multiplier, P_x represents the price of an x commodity, P_y represents the price of an y commodity, and $\sum_1^i S_i$ is the sum of all sacrifices.

Alternatively, we can rewrite the equation (5) as follows:

$$Total\ Utility = Utility\ from\ consumption + Utility\ from\ sacrifices \quad (6)$$

which an individual tries to maximize.

Similarly, assuming utility is an ordinal concept, it can be compared. Further, sacrifices made by different individuals may create different levels of utility. More precisely, the level of utility generated from sacrifices to one's family and the level of utility generated from sacrifices to the unknown might have been at different levels. Therefore, one can assign various weights to these sacrifices. Hence, the equation (5) of total utility can be updated as follows:

$$Total\ Utility = f(x,y) - Λ(I - P_x x + P_y y) + f\left(\sum_1^i w_i S_i\right) \quad (7)$$

here w_i is the associated weight to each i.

Therefore, rather than maximizing utility from consumption, a rational individual tries to maximize total utility from consumption and sacrifices jointly.

Marginality in the utility of sacrifices and welfare

The concept of marginality is also important for the theory of the utility of sacrifices. In the marginality school, diminishing marginal utility is the key concept in modern economics. A voluntary sacrifice generally comes from individuals who have at least some amounts of goods and services to consume from which one can generate utility. Assume that an individual is sacrificing his or her last unit of consumption to an individual who does not have anything to consume. In such a case, the utility of sacrifices would be less than the utility of consumption by another individual as the first unit of consumption. This can be demonstrated by the following relation:

$$TU_1(x_0) < TU_2(x_1) + TU_3(x_2) \quad (8)$$

here, $x_0 = x_1 + x_2$.

That is, an individual sacrifices x_2 amount from his or her initial endowment x_0, and another individual generates utility by consuming it. It is impossible to measure the utility between or among individuals because of its subjective nature. However, intuitively, at the societal level, $TU_1(x_0)$ would be less than the summation of $TU_2(x_1)$ and $TU_3(x_2)$ even though x_0 is the summation of x_1 and x_2. Therefore, this concept could be helpful to describe total social welfare.

Budget constraints and resource constraints

Traditionally, utility theory also assumed that there are technically unlimited commodities to consume for an individual. It is only constrained by his or her budget limit. For the simplification of an economy, there is nothing to criticize. However, in various parts of the world that are basically isolated, there is an extreme scarcity of goods and services to consume. For example, in severely food-insecure regions, this might not be an issue of budget constraints. Despite having money in their pocket and not sufficient food on their plate, they are generating some level of utility that needs to be accommodated in the utility theory. Further, let us assume a severely food-insecure community of 100 inhabitants. From the selfish characteristic of a rational human being, everyone should try to satisfy their hunger. Let us assume, the food basket of the community can feed 50 inhabitants sufficiently. In this course of action, however, instead of feeding sufficiently 50 persons, they are happy to sacrifice some food for others and suffer from hunger. Such incidences indicate that humans are not perfectly selfish, rather they are altruistic.

Conclusion

Utility theory has a crucial foundation in modern economics, and its importance is ever increasing. Making every theory more realistic is desirable, and economists always try to do so. In the traditional utility theory, it is assumed that every rational economic agent – an individual – tries to maximize his or her utility by consuming

more and more commodities under given budget constraints. This framework assumes that a rational economic agent is selfish, and that his or her utility is only derived from the consumption of goods and services. However, intuitively, it is observable that although humans are basically selfish, but not absolutely. Further, contrary to the traditional assumption that utility is only generated from consumption. Nonetheless, it is observable that a rational individual is also generating utility from voluntary sacrifices. Furthermore, sacrifices from saturated or near-saturated individuals to less saturated would generate more utility in society as a whole. Therefore, adopting this theoretical framework of the utility of sacrifices would make the utility theory more realistic. Additionally, this work will contribute to the teaching of basic economics. Similarly, it also contributes to the development of the neuroeconomics concept of utility preferences as well as the ethics of family relationships.

REFERENCES

1. Alvino L., Constantinides E., Franco M. Towards a better understanding of consumer behavior: marginal utility as a parameter in neuromarketing research. *International Journal of Marketing Studies*. 2018;10(1). DOI: 10.5539/ijms.v10n1p90

2. Read D. Utility theory from Jeremy Bentham to Daniel Kahneman. London: London School of Economics and Political Science; 2004.

3. Sinisi C. Public school choice: parents' consumer behavior and utility maximization. University of Colorado. 1992.

4. Fishburn PC. Utility theory. *Management Science*. 1968;14(5):335-378. DOI: 10.1287/mnsc.14.5.335

5. Michael R.T., Becker G.S. On the new theory of consumer behavior. Scandinavian *Journal of Economics*. 1973;75(4):378-396. DOI: 10.2307/3439147

6. Burgess J.P. From preference to utility: A problem of descriptive set theory. Notre Dame. *Journal of Formal Logic*. 1985;26(2):106-114. DOI: 10.1305/ndjfl/1093870819

7. Sepúlveda W.S., Maza M.T., Uldemolins P., Cantos-Zambrano E.G., Ureta I. Linking dark chocolate product attributes, consumer preferences, and consumer utility: impact of quality labels, cocoa content, chocolate origin, and price. *Journal of International Food and Agribusiness Marketing*. 2022;34(5):518-537. DOI: 10.1080/08974438.2021.1908924

8. Kapteyn A. Utility and economics. *De Economist*. 1985;133(1):1-20. DOI: 10.1007/BF01675959

9. Stigler G.J. The development of utility theory. International Journal of Political Economics. 1950;58(4):307-327. DOI: 10.1086/256962

10. Rogers A.E. The theory of utility. *Science*. 1886;8(193):347-8. DOI: 10.1126/science.ns-8.193.347-a

11. David J. The homo economicus conception of the individual: an ontological approach. In U. MaKi. Handbook of the Philosophy of Science. *Philosophy of Economics*. 2012;13:459-482.

12. Boumans M. Measurement in economics. In U. Maki. Handbook Philosophy of Science. *Philosophy of Economics*.2012;13:395-423.

13. Browning E., Browning J. Microeconomic theory and applications. 2nd ed. New Delhi: Kalyani Publishers; 2003.

14. Evans D.J. The elasticity of marginal utility of consumption: estimates for 20 OECD countries. *Fiscal Studies*. 2005;26(2):197-224. DOI: 10.1111/j.1475-5890.2005.00010.x

15. Koutsoyiannis A. Modern microeconomics. 2nd ed. London: MACMILLAN PRESS LTD; 1979.

16. Lancaster K.J. A new approach to consumer theory. *Journal Political Economics*. 1966;74(2):132-157. DOI: 10.1086/259131

17. Zeckhauser R. Time as the ultimate source of utility. *The Quarterly Journal Economics*. 1973;87(4):668-675. DOI: 10.2307/1882037

18. Tanrikulu C. Theory of consumption values in consumer behaviour research: a review and future research agenda. *International Journal of Consumer Studies*. 2021;45(6):1176-1197. DOI: 10.1111/ijcs.12687

19. Urbina D.A., Ruiz-Villaverde A. A critical review of homo economicus from five approaches. *American Journal of Economics and Sociology*. 2019;78(1):63-93. DOI: 10.1111/ajes.12258

20. Kalberg S. Max Weber's types of rationality: cornerstones for the analysis of rationalization processes in history. *American Journal of Sociology*. 1980;85(5):1145-79. DOI: 10.1086/227128

21. Demeulenaere P. Are there many types of rationality? *Papers Revista de Sociologia*. 2014;99(4):515-528. DOI: 10.5565/rev/papers.2114

22. Dittmer T. Diminishing marginal utility in economics textbooks. *The Journal of Economic Education*. 2005;36(4):391-399