A GENERAL ASSESSMENT ON THE ROLE OF OPPORTUNITY COST IN DECISION MAKING UNDER RISK AND UNCERTAINTY

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Abstract

Consumer needs are unlimited, but resources are limited. Therefore, satisfying one wish means not satisfying the other wish. The most valuable alternative that we have to give up for a sure choice or behavior is the opportunity cost of that choice or behavior. Economists argue that before a rational individual chooses an option, he/she will consider the opportunity cost, which is the highest value alternative that he/she must give up to pursue that option. However, many experimental studies have proven that people's chooses are not always rational for risk and uncertainty. This study evaluates the role of opportunity cost in decision-making under risk and uncertainty.

Keywords: Prospect theory, opportunity cost, reference point, framing effect, endowment effect.

JEL Classification: C91, D81, D91

Özet

Tüketicilerin istekleri sınırsızdır fakat kaynaklar sınırlıdır. Bu nedenle, bir isteği tatmin etmek, diğerini tatmin etmemek anlamına gelir. Kesin bir seçim ya da davranış için vazgeçmemiz gereken en değerli alternatif, o seçim ya da davranışın fırsat maliyetidir. Ekonomistler, rasyonel bir bireyin bir seçeneği seçmeden önce, o seçeneği takip etmek için vazgeçmesi gereken en yüksek değerli alternatif olan fırsat maliyetini dikkate alacağını savunmaktadır. Ancak birçok deneysel çalışma, insanların tercihlerinin risk ve belirsizlik açısından her zaman rasyonel olmadığını kanıtlamıştır. Bu çalışma, risk ve belirsizlik altında karar vermede fırsat maliyetinin rolünün bir değerlendirmesidir.

Anahtar Kelimeler: Beklenti teorisi, fırsat maliyeti, referans noktası, çerçeveleme etkisi, sahiplik etkisi.

JEL Sınıflandırması: C91, D81, D91

1. Introduction

Since the existence of economic activities, the choosing of individuals has been a subject of interest to researchers. Especially in recent years, research on how people make choices has led psychology and economics researchers to conduct interdisciplinary studies. This field, called behavioral economics, criticizes the neoclassical economic approach, based on the findings of psychologists and economists who conduct laboratory experiments to examine how individuals actually make choices. For this reason, behavioral economists draw on the findings of psychologists who conduct laboratory experiments to examine how people make decisions.

Behavioral economists receive psychological support to increase the reality in their economic analysis. In this context, cognitive psychologists' studies on evaluating economic decisions since the early 1970s played an essential role in the development of behavioral economics. The findings of these studies are often described in a plain

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language consisting of psychological principles or constructs that can be expressed in basic terms. Thus, there has been a significant increase in the tendency of economists to link their studies to psychological foundations. For example, a psychologist, Kahneman disagrees that the individual in economic theory acts rationally and is selfish (Kahneman, 2003: 162). Subsequently, Kahneman and Tversky conducted many experiments that showed that people generally do not act rationally when making decisions under risk and uncertainty. Kahneman and Tversky, in their study published in 1979, the theory is named the prospect theory that invalidates the expected utility theory and explains how people make decisions under risk and uncertainty. The findings of the experimental studies conducted within the scope of this theory show that when it is necessary to decide risk and uncertainty, the responses to gains and losses may diverge from the framework of rational behavior.

Despite limited resources, the unlimited desires of consumers mean that one wish is satisfied while the other is not. This situation, which is called opportunity cost, is "the evaluation made for the one with the highest value among the rejected alternatives or opportunities" (Buchanan, 2008) or "the loss of other alternatives when one alternative is selected." Opportunity costs are the economy's foundation, and consumers should rationally factor in opportunity costs in every decision. The finding of most behavioral studies shows that individuals often neglect opportunity costs (Becker et al. 1974; Friedman and Neumann, 1980; Northcraft and Neale, 1986; Legrenzi et al. 1993; Jones et al. 1998; Langholtz et al. 2003; Frederick et al. 2009).

Economic theory argues that opportunity costs should be weighed equally against other costs. However, some studies show that consumers often neglect opportunity costs (Frederick et al. 2009; Thaler, 1980). The tendency to underweight opportunity costs, especially the opportunity costs of losing opportunities, may explain why individuals systematically fail to exploit opportunities (Weis and Kivetz, 2019: 518). Opportunity cost is the number of goods or gains that must be forgone, forgone, to increase any good production any good by one unit. In other words, it is the second-best alternative that must be abandoned when making an economical choice. There is an opportunity cost in the decisions of the producer, consumer, and government (tr.wikipedia.org). In this study, opportunity cost will be examined in terms of consumers.

2. Decision Making At Risk And Uncertainty

Economics assumes are that human beings are rational and selfish, and their preferences cannot change. Kahneman and Tversky criticized the assumptions of economics by conducting many experiments that showed that people generally do not act rationally when making decisions under risk and uncertainty. With the study published by Kahneman and Tversky in 1979, the findings of the new theory, which invalidates the expected utility theory and explains how people make decisions under risk and uncertainty, were revealed. This theory, which has made an essential contribution to the development of behavioral economics and is called prospect theory, has gained significant momentum, especially since the early 2000s. In this

context, in 2002, Daniel Kahneman and 2017 Richard Thaler were awarded the Nobel Prize in Economics for their successful work is one of the most significant proofs of the increasing importance of behavioral economics.

3. Opportunity Cost and Choice

Classical economic theories state that all the choices we make have a cost. In other words, there is no gratuitousness in the choices we make. When we want to get something we like or do something, we have to stop having something else or doing something else. The most valuable alternative that we have to give up for a sure choice or behavior is the opportunity cost of that choice or behavior. Opportunity cost, also called alternative cost, can be briefly defined as a decision abandoned while implementing a decision (Yıldırım, 2016: 29). Any profit opportunity within the realm of possibility but rejected becomes a cost of carrying out the preferred course of action (Buchanan, 1969: 28).

Opportunity cost is the expected value of "what could happen" if the choice is made differently. It should be noted that without the qualifying reference to preference, "what could be" is of no value. The most important determinant of opportunity cost is choice. Several consequences arise when this fundamental relationship between preference and opportunity cost is accepted. The primary relationship between opportunity cost and preference requires a person who makes a choice first. In this person's mind, the value is the value attributed to the unchosen option as an opportunity cost. Therefore, the cost should be borne only by the person making a choice. That is, the opportunity cost should be subjective. In other words, the opportunity cost is in the person's mind making a choice and cannot be objectified or measured by anyone other than that person. In addition, the opportunity cost exists only at the time of the decision when the choice is made (Buchanan, 1991: 520-521).

Satisfying one wish means not satisfying the other wish because of the limited resources in the face of unlimited demands of consumers. This situation, which means opportunity cost, can also be expressed as "rejected alternatives or evaluation attributed to the highest value of opportunities" or "loss of other alternatives when one alternative is selected." Opportunity costs form the basis of economics, and usually, consumers should take opportunity costs into account in every decision (Spiller, 2011: 595). All individuals, especially accountants, economists, and behavioral scientists, consider opportunity costs when making decisions. From an economic point of view, detailed reporting of these costs for decision-making can improve the quality of future decisions (Hoskin, 1983: 78).

Opportunity costs reflect the potential benefits of the unchosen best option. For example, when buying a movie ticket for 15 ₺, the same money cannot be used for other purchases. In this case, opportunity costs reflect the best alternative use of a different product or service for the same money, giving up buying movie tickets at that moment. In neoclassical economics, it is assumed that consumers consider all possible options and take opportunity costs into account when evaluating a potential

purchase. However, empirical research shows that people often do not fully consider the alternatives that are not offered, which leads to opportunity cost neglect (Frederick et al. 2009: 553). Such omissions are revealed by the findings of experimental studies conducted on behavioral economics, especially in recent years.

The idea of opportunity cost helps address five issues ranging from the fundamental to the complex. Expressing the economic problem is the simplest and most basic purpose of opportunity cost. When faced with scarcity, we must make choices, and we face costs. Its second purpose is to view cost as a forgone alternative rather than spending cash. Its third purpose is to identify and accurately determine the abandoned alternative. Its fourth purpose is to use appropriately defined cost alongside a suitably defined benefit to rationally choose and analyze it. The fifth and most complex purpose is to derive theorems about determining relative prices. When the concept of opportunity cost was first used, its primary purpose was the fifth, but over time, the concept's primary purpose turned towards the first three purposes (Parkin, 2016: 20).

Ferraro and Taylor (2005: 3-4), in their study with 199 PhD students in economics, the following multiple-choice question was designed to test students' understanding of the concept of opportunity cost:

You have won a free ticket to the Eric Clapton concert, and you cannot sell this ticket to anyone else. The same night Bob Dylan concert is another alternative activity for you. Dylan's tickets for the concert are $40. You are willing to pay up to $50 to see Dylan on any given day. Let us assume there is no other cost to see both artists. What is the opportunity cost of going to Eric Clapton's concert based on this information?

A. 0 $ B. 10 $ C. 40 $ D. 50 $

The distribution of responses from economics doctoral students, who could frankly be described as well-educated economists, was surprising. 27.6% of the students chose the option indicating 50 dollars, 25.6% 40 dollars, 25.1% 0 dollars and 21.6% 10 dollars. The correct answer is $10, although the answers appear to be nearly evenly distributed among the four alternatives. Because when you go to the Clapton concert, you give up the $50 advantage you get when you go to the Dylan concert. You also forego the $40 expense of going to the Dylan concert. An avoided benefit is also a cost, and an avoided cost is a benefit. Thus, the opportunity cost of seeing Clapton, the value you lose by not going to the Dylan concert, is $10. In other words, it is the net benefit foregone.

4. How Do Individual Decisions At Risk And Uncertainty Affect Opportunity Costs?

4.1. Effect of Framing Effect on Opportunity Cost

Behavioral decision theory researches have revealed why individuals deviate from the rational prediction of economic models. According to the prospect theory, individuals are risk-averse when choosing between certain gains and the risk of more significant

or lesser gains but pursue risk when choosing between certain losses and more significant or lesser losses (Tversky and Kahneman, 1981). Most importantly, depending on the framing effect, the way a decision is expressed or presented, that is, whether the outcomes are "framed" in terms of losses or gains, will influence the evaluation of the prospects of each alternative and the choice decision (Northcraft and Neale, 1986: 350).

Evaluating opportunity costs requires consumers to evaluate external options that are not apparent components of a purchasing decision. The assumption that they do so is inconsistent with many psychological studies that show that judgments and preferences are primarily based on clearly presented information (Kahneman and Frederick, 2002). For example, this inconsistency can also be seen in the experience of a customer shopping for a stereo. This customer was undecided between a 1000 ₺ X brand and a 700 ₺ Y brand stereo. Seeing this indecision, the seller immediately intervened and said, "Well, do you want to buy only the X brand stereo, or do you want to buy the Y brand stereo for the same price and a 300 ₺ CD with it?" framed the customer's choice. The decision, which seemed very difficult just a few minutes ago, was now a Y brand stereo and a 300 ₺ CD. In this example, the consumer could subtract 700 ₺ from 1000 ₺ and think that he could buy a CD with 300 ₺ or use 300 ₺ in another way. However, this point of view was ignored, despite about an hour of reflection on the selection. Although this example showing the effect of framing effect on opportunity cost does not represent all consumer decisions, it can be said that opportunity costs are affected by various manipulations and are often neglected (Frederick et al. 2009: 553-554).

The customer did not consider buying anything other than a CD with 300 ₺ and neglected the opportunity cost. Because people rarely think about foreign goods when making consumption decisions (Frederick et al. 2009: 557). Similarly, Thomas Brown found that less than 10% of respondents referred to foreign goods when asked to describe how they determined they were willing to pay for certain items (Brown, 2005: 373).

There is a framing effect in the neglect of opportunity cost. When making decisions, individuals often passively accept the way options are presented to them. When evaluating options, individuals limit their thoughts to clearly presented information and generally do not consider the information that remains implicit. This causes individuals to often neglect opportunity costs. As a result, manipulating options can affect people's choices (Lucas, 2015: 267).

4.2. Effect of Endowment Effect on Opportunity Cost

People value objects or possessions more than they do not have. In other words, the object in the person's hands is more valuable than the other object that does not have and has the same characteristics. This situation is called the effect of possession or endowment effect by behavioral economists, leading individuals to non-rational

choices. Many examples show that individuals do not constantly evaluate the opportunities that positively come before them.

A vintner offered $100 per bottle for a box of wine that Mr. R bought for about $5 per bottle in the late 1950s. Mr. R, who had not paid more than $35 for a bottle of wine before, rejected this offer (Thaler, 1980: 43). Mr. R, in the example, is an economist named Richard Rossert, and he has a wine collection. He states that he drinks these wines from time to time but cannot even imagine paying $100 for these wines. In this case, it seems more rational for him to sell the wines and buy another wine he wants to drink for less than $100. However, Mr. R states that he is aware of not exhibiting a rational behavior and that this behavior is not in his hands (Thaler, 2015: 17).

Supporting the views of economists about opportunity costs, it is seen that individuals who consider opportunity costs make better decisions (Lynch et al. 2010). However, Mr. R, as an economist, does not fit this argument. The opportunity cost of drinking a $100 bottle of wine is the price the merchant is willing to pay Mr. H, and economists have trouble equating opportunity costs with out-of-pocket costs. Giving up the opportunity to sell something does not hurt as much as paying the same money from your wallet to buy it. Opportunity costs are intangible and uncertain compared to paying cash, and buying something do more harm than giving up the opportunity to sell it. Opportunity costs are both intangible and uncertain compared to cash payments.

It is possible to explain the endowment effect on opportunity cost through many examples (Thaler, 1980: 43-44). For example, Mr. H and his neighbor live on the same estate and have an equal-sized garden area. According to the site rules, no gardener will be employed, and everyone will mow their share of the lawn in the garden. The neighbor's son also volunteers to mow the lawn in Mr. H's share for 8 dollars. When his neighbor asked Mr. H if he would cut his lawn for $20 in his sons' absence, Mr. H's answer was negative. Because even though it is the same size, his garden is more valuable to Mr. H, and he states that his neighbor's son cannot do the work that his son does for 8 dollars, even for 20 dollars, which is more than double. In another example, individuals were asked two survey questions.

(a) Suppose you are exposed to an illness that causes rapid and painless death within a week. Your probability of getting the disease is 0.001. What is the maximum amount you are willing to pay for the treatment of this disease?

(b) Suppose volunteers are needed to research the above disease. The most significant risk is to expose yourself to a risk of contracting the disease at a rate of 0.001. Given that treatment is not possible if you get sick, what is the minimum payment required to volunteer?

The average of the responses to the survey questions was $200 for (a) and $10,000 for (b). Because in option (b), the risk and cost are much higher.

The opportunity cost of an activity is what we give up by doing it. People find the things they have more value than what they can have but do not have yet. In the

examples explained above, this effect, which we call the endowment effect, shows that individuals abuse opportunity costs and do not act rationally.

4.3. Effect of Loss Aversion on Opportunity Cost

Unlike classical economic theory, prospect theory argues that individuals respond to changes in their level of well-being rather than their level of wealth. Specifically, individuals' levels of wealth, classified as gains or losses, are assumed to have a reference point. An individual may make different decisions involving the same absolute levels of wealth depending on the reference point. Kahneman and Tversky argue that risk aversion is more common in gains and risk-seeking in the area of losses. Loss aversion means that individuals will risk more significant losses than accepting small losses (Gilboa, 2010: 43).

Kahneman and Tversky's (1979) prospect theory argues that people tend to avoid risk in gains and risk-seeking in the area of losses. The following experiment proves this argument (Kahneman and Tversky, 1979: 266):

Experiment 1: Choose one of the following options.

A. There is an 80% probability that you will win $4000.

B. You will earn $3000 for sure.

Experiment 2: Choose one of the following options.

A. There is an 80% probability that you will lose $4000

B. You will lose $3000 for sure.

Most of the participants preferred B in Experiment 1 and A in Experiment 2. At the same reference point, the participants preferred to earn a sure $3,000 by avoiding risk in the earnings area, as in Experiment 1. In Experiment 2, on the other hand, the 80% probability of the participants choosing to lose $4000 shows that they are looking for risk in the area of losses. That is, they are chasing risks.

According to Chang (2005), participants have a third choice in Experiment 1. Because they are in the earning zone, maintaining their original wealth that points to their reference point becomes the third option. However, in Experiment 2, there is no third option in the area of losses; there is a possibility that participants will not return to their original wealth state since both options carry the possibility of loss. Kahneman and Tversky (1979: 269) stated that people prefer to seek risk in the field of loss; Chang (2005), on the other hand, argues that people abuse opportunity costs in the area of losses.

5. Conclusion

Behavioral economists analyze decision-making under risk and uncertainty through empirical research. Prospect theory in behavioral economics argues that people exhibit risk aversion in gains and risk-seeking in the area of losses. Encoding their conditions as loss or gain constitutes the reference point source in their preferences.

Individuals will take their decisions in the direction of the alternative presented by framing them more positively when choosing because framing plays a role in encouraging individuals to take risks or avoid them. The studies on prospect theory reveal that individuals avoid risk under favorable conditions and take risks under unfavorable conditions. In other words, people tend to "avoid risk in the field of gain" and "seek risk in the field of loss," taking into account their reference points.

Loss aversion and the endowment effect have an essential place in individuals' abstention in the face of uncertainties. Individuals attach much more importance to what they have than what they do not have. Therefore, individuals tend to avoid loss by protecting what they have. Thus, instead of rationally evaluating the opportunities that come their way, they make decisions based on their intuition.

Economists argue that a rational decision-maker would consider opportunity costs before choosing an option. A rational individual who does not know the probability of each alternative would be expected to seek better alternatives if they are costly to learn until the expected cost outweighs the expected benefits. Thus, the individual will compare the focused option with the best-known alternatives.

Satisfying one wish means not helping the other want because of the limited resources in the face of unlimited demands of consumers. The opportunity cost of an activity is what we give up by doing it. The findings of experimental studies under the headings of framing effect, endowment effect, and loss aversion explain how individuals evaluate the opportunity cost when making decisions under risk and uncertainty. In general, the reference points of the value function in the gains and losses of individuals are different. Therefore, it is seen that individuals abuse the opportunity cost when making decisions under risk and uncertainty. When the national literature is examined, it is seen that there are few empirical studies on opportunity cost. It is thought that the study will contribute to the literature in terms of increasing awareness on the subject and creating ideas for future studies.

References

BECKER, Selwyn W., Joshua RONEN and George H. SORTER; (1974), “Opportunity Costs: An Experimental Approach”, Journal of Accounting Research, 12 (2), pp. 317-29.

BROWN, Thomas C.; (2005), “Loss Aversion without the Endowment Effect, and Other Explanations for the WATA-WTP Disparity”, Journal of Economic Behavior & Organization, 57(2005), pp. 367-379.

BUCHANAN, James M.; (1991), “Opportunity Cost”, John EATWELL, Murray MILGATE and Peter NEWMAN (Ed.), The World of Economics, The New Palgrave, Palgrave Macmillan, London, pp. 520-525.

BUCHANAN, James M.; (2008). “Opportunity Cost,” Steven N. DURLAUF and Lawrence E. BLUME (Ed.), The New Palgrave Dictionary of Economics,

Palgrave Macmillan, New York, http://www.dictionaryofeconomics.com, 10.07.2021.

BUCHANAN, James M.; (1969), Cost and Choice: An Inquiry in Economic Theory, The University of Chicago Press, Chicago.

CHANG, Kuo-Ping; (2005), "Prospect Theory or A Misuse of the Concept of Opportunity Cost?", http://ssrn.com/abstract=687704, 16.07.2021.

FERRARO, Paul J. and Laura O. TAYLOR; (2005), "Do Economists Recognize an Opportunity Cost When They See One? A Dismal Performance from the Dismal Science", Contributions in Economic Analysis & Policy, 4(1), pp. 1469-1469.

FREDERICK, Shane, Nathan NOVEMSKY, Jing (Jane) WANG, Ravi DHAR and Stephen NOWLIS; (2009), "Opportunity Cost Neglect", Journal of Consumer Research, 36(4), pp. 553-561.

FRIEDMAN, Laurence A. and Bruce R. NEUMANN; (1980), "The Effects of Opportunity Costs on Project Investment Decisions: A Replication and Extension", Journal of Accounting Research, 18(2), pp. 407-19.

GILBOA, Itzhak; (2010), Rational Choice, The MIT Press, Cambridge, London.

HOSKIN, Robert E.; (1983), "Opportunity Cost and Behavior", Journal of Accounting Research, 21(1), pp. 78-95.

JONES, Steven K., Deborah FRISCH, Tricia J. YURAK and Eric KIM; (1998), "Choices and Opportunities: Another Effect of Framing on Decisions", Journal of Behavioral Decision Making, 11(3), pp. 211-26.

KAHNEMAN, Daniel; (2003), "A Psychological Perspective on Economics", The American Economic Review, 93(2), pp. 162-168.

KAHNEMAN, Daniel and Amos TVERSKY; (1979), "Prospect Theory: An Analysis of Decision under Risk", Econometrica, 47(2), pp. 263-291.

KAHNEMAN, Daniel and Shane FREDERICK; (2002), "Representativeness revisited: Attribute substitution in intuitive judgment", Tom GILOVICH, Dale GRIFFIN and Daniel KAHNEMAN (Ed.), Heuristics and biases: The Psychology of Intuitive Judgment, Cambridge University Press, New York, pp. 49-81.

LANGHOLTZ, Harvey J., Antoinette T. MARTY, Christopher T. BALL and Eric C. NOLAN; (2003), Resource-Allocation Behavior, Kluwer Academic Publisher, USA.

LEGRENZI, Paolo, Vittorio GIROTTO and Philip N. JOHNSON-LAIRD; (1993), "Focusing in Reasoning and Decision Making", Cognition, 49(1-2), pp. 37–66.

LUCAS, Gary M.; (2015), "Out of Sight, out of Mind: How Opportunity Cost Neglect Undermines Democracy", New York University Journal of Law & Liberty, 9(249), pp. 249-343.

LYNCH, John G., Richard G. NETEMEYER, Stephen A. SPILLER and Alessandra ZAMMIT; (2010), "A Generalizable Scale of Propensity to Plan: The Long and the Short of Planning for Time and for Money", The Journal of Consumer Research, 37(1), pp. 108-128.

NORTHCRAFT, Gregory B. and Margaret A. NEALE; (1986), "Opportunity Costs and the Framing of Resource Allocation Decisions", Organizational Behavior and Human Decision Processes, 37(3), pp. 348-56.

PARKIN, Michael; (2016), "Opportunity cost: A reexamination", The Journal of Economic Education, 47(1), pp. 12-22.

SHILLER, Robert J.; (1998), "Human Behavior and the Efficiency of the Financial System", NBER Working Paper, No. 6375, pp. 1-56.

SPILLER, Stephen A.; (2011), "Opportunity Cost Consideration", Journal of Consumer Research, 38(4), pp. 595-610.

THALER, Richard; (1980), "Toward A Positive Theory Of Consumer Choice", Journal of Economic Behavior & Organization, 1(1), pp. 39-60.

THALER, Richard; (2015), The Making of Behavioral Economics: Misbehaving, W. W. Norton & Company, New York.

tr.wikipedia.org, https://tr.wikipedia.org/wiki/F%C4%B1rsat_maliyeti, 07.07.2021

TVERSKY, Amos and Daniel KAHNEMAN; (1981), "The Framing of Decisions and the Psychology of Choice", Science, 211, pp. 453-458.

WEISS, Liad and Ran KIVETZ; (2019), "Opportunity Cost Overestimation", Journal of Marketing Research, 56(3), pp. 518-533.

YILDIRIM, Kemal; (2016), İktisada Giriş-I. Anadolu Üniversitesi Açıköğretim Fakültesi Yayını No: 2140, Eskişehir.