

The Impacts of the Mental Accounting Bias on People's Decisions When Encountering Unanticipated Windfalls

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Abstract: The rational choice theory has led to considerable advances in economics regardless of some unrealistic assumptions. Challenging the rational choice theory and the expected utility theory, the prospect theory explains some irrational phenomena except for some limitations. Furthermore, the mental accounting bias sometimes elaborates with sunk cost effect and loss aversion, leading to extra costs and irrational decisions. This paper further explores the utilization of the mental accounting bias, the establishment of different non-transferable mental accounts with disparate utility placed into them, when encountering small and unanticipated windfalls, especially coupons. Depending on the number of bargains obtained, and the price elasticity of demand, consumers and firms/producers can benefit and lose to a different degree. Additionally, this paper evaluates possible solutions and policies to deal with or reduce the impacts of the mental accounting bias and discusses the utilization of the theory of reciprocity when encountering the small windfalls.

1. Introduction

Adam Smith was one of the first economists to introduce the rational choice theory, stating that all individuals in the economy will manage to maximize their gains and minimize their losses in any circumstances by contemplating and making rational choices as per the available information. And by negating the existence of any other economic actions which are not purely calculative and rational, the key element in the rational choice theory – all economic activity is rational in nature – is highlighted. Moreover, those individuals who make rational choices in the economy are considered as rational actors and the foundation of the rational choice theory. There are three common assumptions of the theory – all individuals have preferences based on their self-interest, their utility should be fully maximized, and they make meticulous calculations according to the comprehensive information they obtain [1]. Also, not being restricted in the economic domain only, the rational choice theory can apply to explain the character of some intricate social phenomena. For instance, as the theory asserts that individuals are motivated to behave freely courtesy of the

avoidance of pain and the pursuit of gain, it further explains why the homicides may choose to commit certain crimes: lessening quantum of punishment, easiness, and fun [2].

More significantly, the rational choice theory was developed through the study of the invisible hand theory by Adam Smith. Similar to laissez-faire pattern, the invisible hand theory expounds that rational actors who value self-interest will make rational decisions, leading to tremendous benefits to the entire economy. And it implies that there's no need for government intervention, courtesy of that the market will inevitably return to equilibrium, at last, driven by free-market forces, namely, the demand and supply of goods and services. Thereby, the invisible hand theory and rational choice theory are also utilized to argue for market economy against planned economy in which the government completely regulates all economic activities like the distribution of goods and services and the establishment of prices, because underlying the theory, all entrepreneurs will be profit-motivated and make the most rational economic decisions, thus achieving higher efficiency, productivity, and more output and maximizing the public interest.

However, there are a few criticisms against the rational choice theory. First and foremost, according to the theory of bounded rationality proposed by Nobel laureate Herbert Simon, it's very likely that individuals have a lack of comprehensive information when making economic decisions, contributing to information failure. And many different types of information failure are present, such as information asymmetries, representing the scenario in which two parties have unequal share of information or the case of the failure of disclosing all information to the rational actors, and lack of education, with which individuals might be less aware of the true personal cost and benefit of the goods and services, like cigarettes and alcohol. Likewise, when purchasing goods, individuals' familiarity with them plays a vital role. Thus, it's unrealistic for individuals to always be rational when they are unable to assess all the potential gains and costs they could get. Secondly, the idea of mental accounting proposed by the economist Richard Thaler demonstrates that people are prone to behave irrationally by valuing some dollars more than others, although all dollars are the same and fungible. To illustrate it, comparing the prices of the same product in different malls, individuals might want to shop in another mall to save \$50 on a \$100 purchase rather than shop elsewhere to save \$50 on a \$5,000 purchase. Thirdly, the majority of the choices in the real world are context-dependent [3], meaning that the legitimacy of the economic decision-making process must be evaluated on a case-by-case basis. Various factors need to be taken into account, for example, environmental factors, and the emotional state of the individuals. Fourthly, social norms are quite difficult to alter, implying that some individuals might grow up with diverse traditions due to their beliefs in religions or their historical context, etc. In this case, the tendency to make decisions based on social responsibility instead of selfish interest is undeniable. At last, in the real world, there must be some social structures that cannot be broken down into many individuals, suggesting that the assumption of the rational choice theory – the rational actors must be individuals – is violated.

Challenging rational choice theory, prospect theory, the foundation of behavioral economics, was formulated in 1979 and further developed in 1992 by Amos Tversky and Daniel Kahneman in the domain of behavioral economics [4], describing the process in which people perceive the probability of each option and make their decisions. Further, the prospect theory splits the choice-making process into two phases – the editing phase and evaluation phase. Moreover, editing phase combines six major processes [4]: coding – regarding all outcomes as gains and losses, combination – combining all the outcomes with same probabilities, segregation – separating the riskless outcomes from the risk ones, cancellation – eliminating the same components from all the prospects, simplification – approximating probabilities, and detection of dominance – detecting dominated alternatives.

Furthermore, the expected utility hypothesis refers to that the weighted average of all possible total satisfaction as a result of consuming any good or service in the case of uncertainty will be the utility at any circumstance. And rational actors must choose the option with the highest utility. However, three major biases in prospect theory always avoid individuals from making rational decisions, challenging both the rational choice theory and the expected utility hypothesis. Initially, on one hand, the weight function illustrates that the occurrence of any event with a relatively lower possibility generally has higher decision weight, leading to the attractiveness of gambling and insurance, while that with very high probabilities has lower decision weight. On the other hand, the weight function also implies that when facing a potential gain and an absolute gain, individuals tend to overvalue the risk with little possibility of loss of the potential gain, thus individuals always choosing the absolute gain. Thereby, how the first bias of prospect theory – certainty effect – works is expounded. The certainty effect refers to the phenomenon that people tend to overweigh outcomes which are certainly compared with those which are merely probable. Also, it elaborates well with the value function, which is based on the reflection effect – depending on whether people gain or lose, “risk preferences” are exactly the opposite. In the positive domain of the tangent-shape graph of the value function, the gradient is gentler than that in the negative domain. Consequently, when people’s options involve absolute and probable gains, they tend to select the option with the absolute gain because they want to evade any risk, namely, loss aversion (the second bias in the prospect theory). On the contrary, when people’s choices involve absolute and probable losses, they tend to choose the one with the probable loss because they want to seek for risks and try to avoid potential loss. To summarize, increasing certainty leads to the increase of the aversiveness of any loss and the pursuit of gains, thus advancing the risk-seeking behaviors when facing a certain loss and the risk-averse behaviors when facing a certain gain. The third bias in the prospect theory is isolation effect [4], indicating that people tend to abandon the common components shared by all prospects, but many ways of decomposing components will inevitably contribute to different ultimate preferences and even inconsistencies.

However, the prospect theory is not always realistic because its presumption only includes the essence of financial motives. But there can be multi goals acting together when making decisions. Firstly, people sometimes have to make irrational or unnecessary decisions because the outcomes stemming from those decisions are the prerequisites of their actual desire. In this case, to achieve the actual goals, people have to demand the complements to their goals first. Secondly, people’s emotions might act as a stimulator for them to make irrational decisions. And people tend to perform the hedonic consumption relative to the utilitarian consumption because of their demand for satisfaction and pleasure. Thirdly, people’s social norms may drive them to make irrational decisions. [5]

Undoubtedly, the prospect theory illustrated well the irrational phenomena in the early stage of the development of behavioral economics. Since then, more scholars began their studies on irrational phenomena as well. As they explored and discussed, more bias and theories against the rational choice theory appeared on stage. And one of the most well-known ones is the mental accounting bias.

2. Mental Accounting, or “Two-Pocket Theory”

Mental accounting, or “two-pocket theory,” was introduced by Nobel Prize winner and economist Richard H. Thaler in 1999 in the domain of behavioral economics. It states that individuals are prone to set up different mental accounts which are non-transferable, assign a various amount of money, and place disparate utility into them, thus treating them differently. Although it’s against

the rational choice theory, a majority of people utilize it without recognizing its presence. What's more, Thaler experimented to elaborate with the mental accounting bias successfully [6]. In this experiment, 46% of the testees chose to purchase another ticket after they paid the ticket price of \$10 and then lost the ticket. On the contrary, 88% of the respondents chose to purchase another ticket once they've decided to watch a movie but lost the budget of \$10. The general pattern is that most testees refused to pay for the ticket again once their movie budget was used in the first scenario. But if their movie budget wasn't used in the second scenario, most testees wanted to purchase another ticket. The finding implies that people are prone to treat money differently located in various mental accounts such as accounts for daily expenses, housing maintenance account, investment account, and retirement account, etc. based on subjective criteria, although all the money is perfectly fungible and identical regardless of where does the money come from and what it is utilized for. Furthermore, the mental accounting bias can result from the sunk cost effect, defining that after people have spent some money on something's achievement, they commonly want to devote more until they fully attain it regardless there are extra costs exerted and total costs exceed the total benefits because people attribute the extra costs to another mental account [7].

Besides that, the mental accounting bias can impact not only every-day expenses but also the investment and debt-payment decisions by increasing people's loss. To illustrate it, many investors segregate their speculative account from their safety account and try not to let a net loss in their speculative account impact their safety account. However, there is no difference in net loss eventually, but the investors waste lots of their time and effort in separating them from impacting each other. What's more, the mental accounting bias is often accompanied by the second bias in the prospect theory, loss aversion. If the investors currently own a stock with gain and a stock with loss, and they must sell one of them to increase the liquidity of their cash flow, the majority of them will choose to sell the stock with gain because they are risk-averse and want to keep the stock with a current loss until it gains instead of selling it and admitting the sure loss. However, it's not a rational choice because the investors can pay less tax if they sell the weaker investment and weaker investment is always less competitive. [8] Also, the mental accounting bias sometimes leads to the loss during the process of the debt payment. For example, people are prone to manage their debts irrationally, challenging the rational choice theory. They are debt-averse, so the majority of them might pay the debts ordered from the smallest to the greatest. However, as the largest debt is compensated the last, it probably represents a higher interest rate and its interest might've grown tremendously between the period of paying the smallest debt to pay it [9].

Nevertheless, mental accounting bias can bring benefits. By putting their money into the retirement account, people will try to avoid any net loss in any account from affecting their retirement account, thus securing their elderly life. Also, mental accounting bias can prevent people from enacting hedonic consumption [9], because when people perform hedonic consumption, which is to consume good or services for pleasure, they are often regretful afterward and doubt their previous decision, thus weakening their fun due to hedonic consumption [10]. Consequently, every time before they consume something, people will try to prevent themselves from consuming hedonically and are in favor of necessities rather than frivolous goods. However, luxurious goods and services might be under-consumed by them.

Besides that, sometimes firms trap the consumers by utilizing the mental accounting bias when distributing coupons.

2.1. The Utilization of the Mental Accounting Bias When Encountering Small Windfalls

The mental accounting bias implies that individuals are prone to create mental accounts to manage their purchasing decisions. Thus, individuals tend to respond to unexpected windfalls by setting up a unique account mentally for them and purchasing goods and services that they might not buy without the windfalls. For instance, individuals might respond to sweepstake winnings by performing hedonic consumption, which is the consumption of products, such as vacation and luxurious goods, for experiencing fun and pleasure. Another more pronounced phenomenon related to the mental accounting bias is concerning online shopping with coupons, such as \$20 off purchases of \$100.

When consumers finish purchasing what they demand or when special festivals come, consumers quite often receive coupons with monetary values as special rewards, but being restricted in specific consuming domains, like clothing, personal care, and phones. Depending on the attractiveness of the coupons, individuals might want to continue to purchase goods or stop purchasing them. And the attractiveness of the vouchers could be increased if their numerical values of the coupons, the degree to which the consumers feel like they've gained, or consumers' desire towards the specific goods which the coupons could apply increases. What's more, consumers' benefits due to the utilization of the coupons generally depend on the level of the bargain they obtained, including the number of additional products obtained, quality, monetary values, and convenience of the deals. Consequently, in this scenario, the consumers might want to set up a unique mental account for the coupons which is separate from their budget account to enact their consumption. Thereby, they may spend more than usual to buy items they would not otherwise purchase because to them, the coupons are like a meaningful shock to their wealth in the relevant mental account. To support this claim, when receiving a \$10-off coupon, people increase their spending by \$1.59 on average, controlling for customer fixed effects and other factors [11]. Also, statistics presenting the influence of coupons on purchasing decisions in the U.S in 2007 by product category suggests that stated that the coupons influenced 60.8% of respondents on their decision-making process when purchasing grocery products, and influenced 36.9% of respondents on where to dine out [12].

Although consumers sometimes lose due to the mental accounting bias, a few firms and producers benefit from it.

2.2. Discussion

As the coupon sales increase, the firms which provide those coupons will gain more loyalty, subscribers, and revenues, indicating that lots of producers are profiting from the mental accounting bias. Also, the increase in coupons sales implies a higher demand for the firms' production. Consequently, as costs are spread over a larger number of goods, more firms will have lower marginal costs and achieve economies of scale which are cost advantages reaped by firms when production becomes efficient. For instance, firms can achieve lower marginal transportation fee if they purchase a bulk of raw materials. Moreover, when it comes to economies of scale, larger firms tend to benefit more from the cost savings. Not only do vouchers act as a commercial advertisement, but they also attract more potential consumers and help the firms increase their retained profits if lots of individuals purchase more unintended products and the revenues gained exceed the costs of distributing the coupons. More significantly, by providing coupons, the selling prices might be at a quite competitive level, avoiding consumers from choosing substitute products. Also, the coupons act as efficient tools of advertisement and monetary inducement to avoid

individuals from purchasing products from the competitors' firms. However, the responsiveness of the quantity demanded of a good or service relative to a decrease in its price when nothing, but the price changes often varies based on the concept of price elasticity of demand (PED) whose formula is changed in percentage of the quantity demanded of a product relative to change in percentage of the price level of that product. For instance, given that the numerical value of PED is greater than 1, meaning that demand responds more than proportionately to a change in price, a small decrease in price will lead to a larger quantity demanded, thus leading to an increase in total revenues. However, if the numerical value of PED is equal to 1, a decrease in price will result in the same proportionate increase in quantity demanded, leading to no effect on revenues and implying that the coupons are meaningless to the firms. Moreover, if the numerical value of PED is smaller than 1, a decrease in price will contribute to a less proportionate increase in quantity demanded, indicating that the firms are facing a net loss. To summarize, it's tremendously significant for the producers to look at multiple aspects before deciding to distribute the vouchers.

Although producers are utilizing the mental accounting bias properly as their advantages, consumers might've spent out of their budget without recognizing that the products they've purchased are not what they do need. It's quite unlikely to introduce a particular law to address this issue for the consumers because it's the producers' right to make profits from the bias and more consumer consumption also indicates a higher gross domestic production, more output, and economic growth. However, to avoid the mental accounting bias, the governments could spend a portion of their budget in the positive advertisement to let all individuals treat the money as perfectly fungible.

Additionally, information asymmetries always occur between producers and potential consumers because producers have access to the information that consumers don't. To avoid the issue, governments could devote their budget in boosting the information flow and providing an equal share of information, including the costs, revenues, retained profits, potential problems existed in the products, for both potential consumers and producers. By informing the potential consumers of all detailed information controlled by the producers, consumers and producers further have an equal amount of information bear in their mind when making purchasing and selling decisions, thus avoiding information failure. When consumers want to purchase something that they do not need because of the provision of coupons, they are more aware of the gains and losses if they purchase it instead of only recognizing the gains from bargaining. In this case, they will make their purchasing decisions more rationally. Also, better information flow helps individuals recognize merit/demerit goods which occur when the consumption or production of goods causes a benefit/a bad impact on a third party. Thus, individuals are more aware of the benefits/disadvantages resulting from the merit/demerit goods. For example, by injecting vaccination (merit good), the neighbors living around the individual also benefit because the individual is less likely to pass the disease to others, indicating that marginal social benefit exceeds the marginal private benefit. What's more, cigarettes belong to the demerit goods because as the individual's health condition gets worse by smoking, others surrounding the individual also have a higher risk of suffering from lung diseases due to passive smoking, thus implying that the marginal social cost exceeds the marginal private cost. Thereby, consumers who have been affected by the advertisement might want to consume more merit goods and fewer demerit goods, thus benefiting society and eliminating both the positive and the negative externality. However, better information flow doesn't solve the problem of mental accounting bias but instead reducing its impact on individuals' decision-making process and increasing the socially beneficial consumption. And the spending governments' budget might lead to government budget deficit and that amount of money could've been spent on other more socially beneficial programs, such as education and health care services, leading to opportunity costs.

Nonetheless, besides the mental accounting bias, a psychological concept, the theory of reciprocity, could also explain consumers' behaviors when encountering the unexpected coupons. Reciprocity is a corresponding behavioral response to perceived kindness and unkindness [13]. Thus, positive emotions resulted from small windfalls like coupons tend to act as stimulators for individuals, further inducing them to spend more money on purchasing additional goods and extend their purchasing patterns.

3. Conclusion

From the mental accounting bias, we can conclude the phenomenon that consumers often respond to unanticipated windfalls, such as sweepstake winnings and coupons, by classifying them into a unique mental account and performing additional consumption of goods and services that people themselves tend not to buy without the windfalls, depending on the bargain obtained during the deal. Also, the theory of reciprocity can expound the phenomenon, because consumers might generate positive emotions when they receive windfalls, thus motivating them to perform additional consumption. Besides, although the mental accounting bias harms the consumers, it does benefit the producers or the firms because their general sales revenues, retained profits, and loyalty are all increased when the price elasticity of demand for the products sold is greater than 1. And this phenomenon even helps them expand and better achieve the economies of scale. Thereby, to reduce the impact caused by the mental accounting bias to the consumers, the government can distribute more positive advertisement to help consumers understand the property of money – fungibility – and boost the information flow to let consumers and producer share an equal amount of information, thus decreasing the impact of information asymmetries, reducing the occurrence of information failure, boosting the consumption of merit goods, and suppressing the consumption of demerit goods. However, the governments need to spend a great portion of their budget, leading to opportunity costs and even budget deficit.

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