

## Conceptualizing Irrationality as an Implicit Economic Variable

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### Abstract

We review the necessary concepts of irrationality that emerged in economics over the last few decades. In this paper we propose irrationality as an implicit economic variable with the irrational customers as economic agents. The theory of Utility maximization and Bounded rationality along with social welfare is kept as the building block of the new conceptualization. The discussion centers around the commodity market alone, however, the basic concept is applicable to any economic transaction. If a decision is irrational, the transaction shifts away from equilibrium in a macroeconomic setup.

**Keywords:** Irrational Behavior, Utility Maximization, Bounded Rationality, Commodity Market equilibrium

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## **Introduction**

Modern economic researches, with an emphasis to behavioral economics, are keen towards modeling irrationality in economic theories which seem to be more logical and useful in predictive analysis. Rational choice has never been practical even where the product is homogeneous and the customer willing to make rational choice. The reasons shall be discussed later but it can be well understood that customers themselves are not aware always whether they make rational choice or not. In this paper we first try to collate various angles from which irrationality is studied or can be studied. Perspective of Utility maximization, theories of search cost, bounded rationality, rationality and social welfare are briefly elaborated.

Thereafter, we conceptualize irrationality as an implicit economic variable. As per (Kahneman, 1994), assumption of rationality is just a useful approximation sometimes and not a practical situation and hence can be studied at its face value. So instead of putting irrationality as something exogenous we propose it as an implicit correction factor in macroeconomic models.

Finally, the correction is extended to choice in general. It is not only about product or service choice, which gets restricted to the commodity market only; we extend the discussion to any choice encompassing labor or financial market. The issue that is most thought provoking is that whatever decision is taken at whatever level of the economy it has a direct or indirect impact on economic stability. Any decision is an economic transaction and hence can be well correlated with our previous study, that it can create a ripple in the economic space. Hence, irrational decision or choice is that which causes the ripple and rational decision is that which subsides or nullifies a previous ripple.

## **Literature Review**

Agent-based models in economic theory are quite useful in framing complicated structures where assumption of rationality is relaxed. Irrational agents are basically the customers making an incorrect choice (Mandler, 2014). What is an incorrect choice is a debatable question which we shall address later in the paper. But we must appreciate that agent based models are becoming an important tool in studying irrational behavior.

One thought is the utility maximization models where the perceived utility of the customer is assumed to be the maximum utility possible. Restricting ourselves to a single purchase, this is where the assumption of rationality holds. The reverse is irrationality. Economists had been strongly of the opinion that rationality is never a practical assumption. With these factors in mind, bounded rationality emerged as a concept which worked as a substitute to pure irrationality.

As per Bounded rationality when individuals make decisions, their rationality is bounded by the tractability of the decision problem (how easily the problem can be understood), the cognitive limitations of their minds (how much information can the mind process), and the time available to the decision maker (Gigerenzer et al, 2002). Tisdell in Part I of the book first discusses what is bounded rationality which according to him is essential for decision making. In Part II he talks about decisions by individuals including planning and learning by doing. Next in Part III he dwells on group decisions, discussing group rationality, information transmission and transfer pricing. In Part IV he deals with wider economic and social issues. We encompass social issues and social welfare also in the sense that rationality should always pave the path for higher social welfare measurable in terms of Human Development Index. HDI is a composite index of general well being, knowledge of life expectancy, per capita income, etc. It is based on two primary aspects whether people are able to exist or they are able to do some that they desire beyond just survival. It can be leisure or actualization. Whether their choice in doing is rational or irrational is therefore governed by whether ultimately it increases or decreases the welfare.

According to Taylor (1975), the cognitive strain is important for decision making to be effective. The author makes an attempt to study these in his paper. He tries to review the psychological processes of the decision makers which are affecting the operation of cognitive strain. He also ponders on how the impact of cognitive strains constraints or bounds the rational decision making. Lastly he discusses how the complex decision problems of decision makers are handled. Rational decisions of individuals are affected by whether the decision problem can be tracked or not, limitations of cognitive development of their minds and the time available to make these decisions. The individuals as decision makers have to face three inevitable problems: one, only partial information is available to them; two, any human being has a limited information processing capacity; and three, the time available to the individuals for making the decisions is also limited. So individuals tend to make choices by compromising in complex situations.

Because of these bounds/limits on rationality, the individuals find it impossible to make an efficient decision.

Now the question is whether Bounded Rationality in any form of decision is bad for Social Welfare? Gal (2016) in his research suggested that Tor actually identified certain parameters whose role is immense when bounded rationality is facing economically irrational entry decisions. Tor (2016) also made certain observations about regulations and the effect of algorithmic applications on decisions by entrepreneurs with respect to Bounded rationality.

### **The Initial Model**

To begin with, let us consider the commodity market equilibrium  $Q_d = Q_s$  and let the current demand be at the point  $Q_d^*$ . We shall focus only on the demand side of the economy, since the supply side has nothing to do with customer choice. Hence the supply curve is assumed to be constant.

At the micro level, let there be a commodity bundle  $C_1$  to  $C_n$ , out of which  $C_i$  maximizes the customer utility. The Perceived Utility function  $U_P$  be:

$U_{Pi} = U_{ti} - (P_i + S)$ , where  $U_{Pi}$  be the perceived utility of the  $i$ th commodity,  $U_{ti}$  be the total utility of the  $i$ th commodity,  $P_i$  be the unit price of the  $i$ th commodity and  $s$  be the search cost. Considering the search cost to be function of the perceived utility itself, we get the implicit function:

$$U_{Pi} = U_{ti} - (P_i + \phi(U_{Pi}))$$

Now from the commodity bundle  $C$ , if the customer encounters products  $m$  to  $n$  (suppose), the search cost becomes:  $\sum_{i=m}^n S_i$

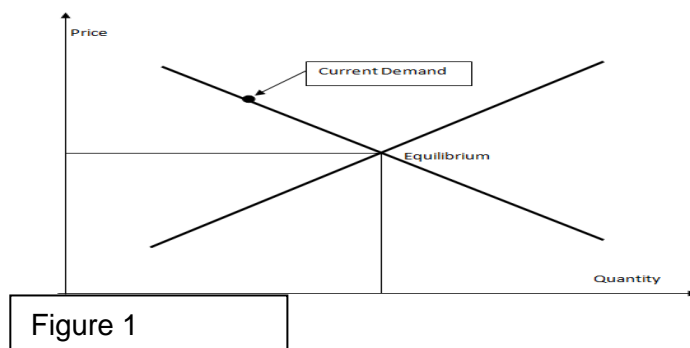
With abundantly large group of products, we integrate the function:  $\int_{i=m}^n \phi(U_{Pi}) dU$ , so the perceived utility can be thought of as  $\int U_{ti} - (P_i + \int_{i=m}^n \phi(U_{Pi}) du) du$

Now this perceived utility is not same as the maximum utility possible from the product bundle. The difference between the two is:  $Max(U_i) - \int U_i - (P_i + \int_{i=m}^n \phi(U_{pi}) du) du$ . As per the utilitarian view the foresaid component is the level of irrationality of a single customer.

### The Equilibrium and Irrationality

Equilibrium can be static as well as dynamic under the neo-classical model (Solow, 1956), where the temporal aspect is given prominence but is mostly studied under partial equilibrium models involving a single market. Hence, here we shall deal with a single market only. There can be multiple equilibrium models too. In a game set up the culture and historical trends seem to be decisive factors in the market choosing one of the equilibrium points (Schelling, 1960). In the foresaid game setup Haltiwanger and Waldman (1985, 1989) consider various games where the main motive is to see how irrational agents and their degree of irrationality affect equilibrium outcomes. The results stem from the fact whether strategic complements or substitutes are present. Further research was carried out to carefully study this analysis [Fehr and Tyran (2005) and Camerer and Fehr (2006)].

We first do away with the assumption that market operates at the equilibrium. Let the following figure 1 denote the equilibrium and the current demand point. The discussion follows from what we had assumed in Section 3.



The definition of irrationality that we propose is when any choice made by a customer governed by the utility maximization principle discussed in the previous section, the current transaction point may get shifted towards the equilibrium or away from the equilibrium. This incident is shown in figure 2a and 2b.

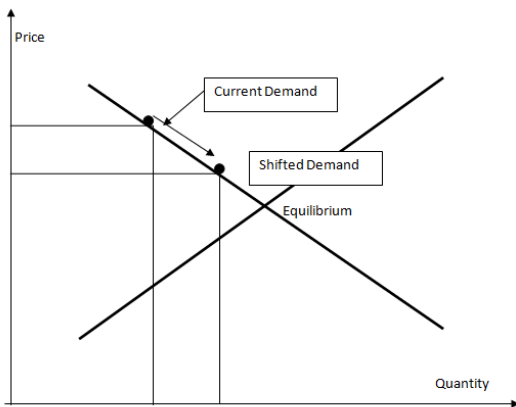


Figure 2a: Rational Choice

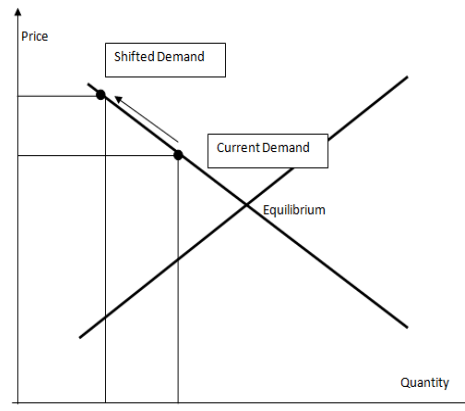


Figure 2b: Irrational Choice

In the next figure (3), we propose the equilibrium structure with the irrationality correction. The movement of the point on the demand schedule makes the demand curve shift to correct for the irrational aspect of individual decisions. For group decisions however, the effect needs to be studied under experimental set up.

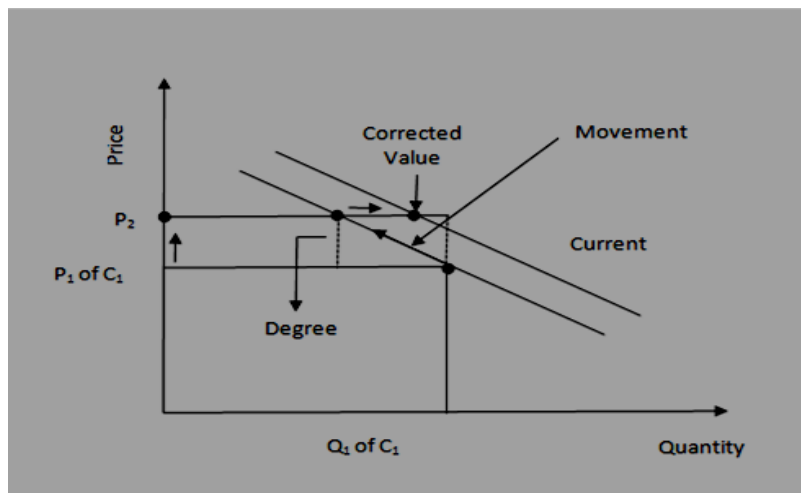


Figure 3

## Conclusion

In this paper, we propose that irrational choice is not something exogenous to economic models. The fundamental assumption of rationality has the scope of encompassing irrationality in it. Rather, rationality is just a special case where the customer choice is somehow bounded by cognitive factors. Furthermore, any decision can be thought of as irrational that shifts the market

operation away from the equilibrium. Assuming that the equilibrium point is never stable and the market forces helps the economy to move towards equilibrium, we can safely say that, irrational decisions are implicitly defined in the economy. The factor for consideration hence is only the degree of irrationality. A strong footed research can now be carried out to differentiate the perceived irrationality and the actual irrationality. Customers are always not aware of the irrational decisions they take. At the macro level, it can be judged using the notions developed in this paper, but at the micro level, it is a lot more personalized. Unless the degree is known to the decision maker, the utility of the choice will also be misleading. We shall in future attempt to study this facet in details.

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