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ECONOMIC DECISION-MAKING: A NEUROECONOMIC PERSPECTIVE

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Abstract

This paper examines how individuals make decisions as economic agents from a neuroeconomic perspective, challenging the traditional classical and neoclassical assumption of perfect rationality. The neuroeconomic perspective draws evidence from neuroimaging using MRI, behavioural experiments, and computational modelling to explain the neural mechanisms and cognitive biases. This perspective has created a paradigm shift in the approaches to decision-making in Economics. A shift from perfect rationality to deterministic neural mechanism as the foundation of human behaviour has several implications for economic theories and policies. The paper also provides suggestions for future interdisciplinary research that could transform our understanding of market dynamics and interpersonal differences in decision-making under uncertainty.

Keywords: Decision making, Bounded Rationality, Heuristics

JEL classification: D81, D87, D03

Introduction

Over the past decade, there has been a lot of scholarly works on how the brain processes influence individuals' decision-making. This has dispelled the traditional classical and neoclassical economic arguments and theories of decision making. Neuroeconomics, which emerged as an amalgamation of Neuroscience, Economics, and Psychology, has gained attention as a realistic alternative to perfect rationality models in traditional Economics in the

21st century. This new way of understanding and predicting human decision-making poses three fundamental questions: firstly, is perfect rationality or free will as envisaged in the classical and neo-classical thought a myth?; secondly, if decision making is a deterministic neural process, choice doesn't and cannot be the result of a free preference; and thirdly, the fundamental axioms of consumer behaviour, namely consistency and transitivity in preferences, do not hold good if one takes neuroeconomic perspective reliable. The neuroeconomic reasoning has its origin in two places: in the developments following the neoclassical revolution of the 1930s and the birth of cognitive neuroscience during the 1990s (Glimcher et al., 2009). The article examines the various tenets of the neuroeconomic perspective to decision-making and the traditional Classical, Neoclassical, and behavioural perspectives on human nature and decision-making to understand the contrasts and convergences, if any.

The Classical and Neoclassical Approaches

The Classical economists viewed consumers as rational agents who constantly try to maximise their utility from consumption choice. Perfect knowledge and nonexistence of information asymmetry make consumer choices always at the optimal level, and this, in turn results in maximisation of social utility. Classical economists such as Adam Smith, David Ricardo, and John Stuart Mill believed that humans are rational agents who make decisions based on logic and self-interest. The choice behaviour given by the classical school has its roots in the rules of consumer behaviour given by Adam Smith.

In the classical tradition, economic agents seek to maximise their utility or wealth. According to the classicists, the only objective of economic actions is self-interest. This line of thinking completely discarded the rationale of altruistic behaviour. Simon (1992), in his study, addressed the issue of the reconcilability of altruism and traditional economic thinking. Several studies that came up in the late 20th and the present century argue in favour of human decision-making, taking into account larger societal interests. Rationality, as proposed in the classical theory, assumes that the individuals have full access to information and can process it efficiently to make optimal decisions. However, decision-making under uncertainty and asymmetric information has revolutionised economic thinking about human behaviour and decision-making. Several studies on decision-making under risk and uncertainty challenged the classical position (Kelly, 2003; Zhang et al., 2022).

The classical model assumes that the markets are perfectly competitive. This implies the assumption of perfect knowledge regarding the product and the market, which is an ideal situation but a rarity in modern complex markets. This approach assumes that people are fully aware of all available choices and the future consequences of their decisions.

Neoclassical economics that developed during the 19th century used psychological factors indirectly in decision-making. The next section examines how decision-making is conceived in the consumption theories in the neoclassical tradition.

Though Neoclassical economics builds on the classical model, it incorporates more realistic assumptions and mathematical tools in its analysis of consumer behaviour. The concept of economic man (homo Economicus) and constrained optimisation are the basic pillars of their analysis. Neoclassicists also emphasised rationality, but rational consumers could maximise utility subject to constraints such as income, time, and resources.

The concept of marginal utility in analysing the consumer choice is an improvement over classical economic thought. Economists like Alfred Marshall and William Stanley Jevons developed models that explain how individuals make decisions based on marginal utility. In this model, consumers are assumed to be driven by self-interest, and as such, their decisions maximise personal satisfaction or profit. Unlike the classical tradition, the neo-classists use time preferences in their consumer behaviour analysis. Thus, time plays an essential role, as individuals discount future utility or outcomes using a discount rate, implying that present outcomes are often weighted more heavily than future outcomes. This is essentially a psychological factor. Samuelson (1938) proposed the Revealed preference theorem in explaining the consumer choice and equilibrium. 'Choice reveals preference' is the basic axiom of the theorem. Preference is a psychological phenomenon rooted in one's cognitive abilities shaped by neural processes. This proposition sounds closer to the behavioural economic precepts.

Akerlof (1970) and Akerlof and Stiglitz (2000) argue that information asymmetry can lead to suboptimal decisions that might, in turn, result in market failures. Simon (1955) questioned the basic perfect rationality assumption of the neoclassical school with the concept of 'bounded rationality'. He further argues that most consumers and businesses are unable to make fully informed judgements while making their decisions because of the complexity of products and vast markets. Bounded rationality suggests that consumers opt to make satisfying decisions rather than optimal decisions. There are several constraints and limiting factors other

than information asymmetry and computational capacity. The economic man uses heuristics to make faster, efficient decisions in complex situations with limited information. The predictability of human behaviour in the neoclassical thought is also being questioned by several economists (Neumann & Morgenstern, 1944; Kahneman and Tversky, 1979).

Despite being more refined, Neoclassical economics still rests on the idea that human behavior is highly predictable and follows logical patterns driven by self-interest.

The Behavioural Economic Approach

There has been a paradigm shift in consumer behaviour theories with the emergence of the behavioural economics school, whose approach rests on bounded rationality and cognitive biases (Kahneman and Tversky,1979) and Glimcher et al. (2009). This school challenges the concept of perfect rationality and replaced it with bounded rationality. The psychologists Daniel Kahneman and Amos Tversky laid the foundations of behavioural economics. Behavioural economics introduces the idea that individuals as economic agents may not always act in their own best interests and that they often have irrational preferences influenced by heuristics, emotions, and social norms. This framework questions the assumption that markets are always efficient, as real-world decision-making is often imperfect and subject to emotional and cognitive flaws.

Cognitive bias influences economic decisions to a great extent. In situations where the decisions have to be made fast, more often individuals use heuristics or mental short cuts to arrive at the right decision at the right time in the right place. There are different kinds of heuristics, such as anchoring, availability, etc. The availability heuristic (the tendency to judge the likelihood of events based on how easily examples come to mind) often distorts economic decisions, especially when individuals rely on past experiences rather than statistical data.

The Prospect theory developed by Kahneman and Tversky (1979) challenges the traditional expected utility theory. The basic argument is that people perceive gains and losses asymmetrically and prefer avoiding losses over acquiring gains. They also discussed a non-linear S-shaped value function that describes how people value losses and gains. Loss aversion and framing effects, which describe how information is being framed in decision-making, form the basic pillars of the Prospect theory.

In contrast to the classical and neoclassical approaches, where economic agents are assumed to be perfectly rational, behavioural economics emphasises altruism. Human beings do not prefer unequal outcomes; in other words, they prefer to have fairness and justice. This approach paved the way for revolutionary thinking in decision theories. Neuroeconomics, which emerged in the present century, is a clear departure from the traditional thinking on how economic agents make decisions in a world of uncertainty, information asymmetry and risk,

The Neuroeconomic Approach

This approach to decision-making combines neuroscience, psychology, and economics to understand how the brain processes economic decisions. It studies how various brain regions are activated during decision-making and how this relates to the choices individuals make. Several researchers in the late 20^{th} and 21^{st} centuries have contributed to the development of this interdisciplinary branch of Economics. Noted among the contributors include Smith (1976), Camerer (2003), Cohen (2005), and Glimcher (2003). The use of Psychology in interpreting the way people make economic decisions gradually stemmed from behavioural economics research.

The neuroeconomic perspective draws evidence from neuroimaging using MRI, behavioural experiments, and computational modelling to explain the neural mechanisms and cognitive biases (Glimcher et al., 2004; Carmer et al., 2005). Several neuroimaging studies have revealed that many decisions are initiated by neural activity before reaching conscious awareness (Soon et al., 2008; Padoa-Schioppa,2006). This challenges the notion of free will and perfect rationality in economic choices. Researchers have identified specific brain regions, such as the prefrontal cortex, amygdala, and striatum, that play crucial roles in risk assessment, reward evaluation, and emotional regulation (Knutson et al.,2007; Ranget et.al, 2008).

Cognitive biases, such as loss aversion, anchoring, and overconfidence, are now understood as systematic outcomes of neural processing. These biases suggest that what appears to be free, autonomous decision-making is constrained by predetermined neural circuits (Tversky et al.,1974; Kahneman,2011).

The Neural Determinism Model, developed by Schultz (2002), is now used as a framework for understanding economic decision making. According to this model, economic decisions are driven by the interplay of neural reward systems, risk assessment circuits, and

social influence networks. Another tenet of this model is that the pre-conscious neural activity can predict economic choices before conscious awareness emerges. Cognitive biases, as suggested in the behavioural economic approach, are the manifestations of evolutionary adaptations that influence market behaviour. Besides, neuroimaging data, along with economic theories, are used by researchers to develop predictive models. This approach is used in analysing financial decision making by individuals. The basic mechanisms involved in understanding the decision-making process in a neuroeconomic perspective include:

Neurological evidence: Research using neuroimaging techniques (such as fMRI) shows that areas of the brain related to emotions, reward, and social behavior play a significant role in economic decision-making.

Dopamine and reward systems: The brain's reward system, which involves the neurotransmitter dopamine, is activated when individuals make decisions that lead to positive outcomes or rewards. This can explain why individuals might take risks or make decisions based on potential gains.

Social and emotional processing: The brain's social processing regions are involved when individuals make decisions related to cooperation, trust, or fairness, suggesting that social preferences and emotions significantly shape economic behavior.

Neuroeconomics challenges the idea of purely rational decision-making by showing that unconscious brain processes often guide choices, revealing the complexity of human nature in economic contexts. This also questions the consistency assumption in consumer choice theories in traditional economic thought. The neuroeconomic perspective is still in its experimental stage. Further research and investigation are needed to apply neuroeconomic methodology to understand the decision-making processes.

Conclusion and Suggestions for Further Research

The neuroeconomic perspective is a clear departure from the classical and neoclassical approaches to decision making. A shift from perfect rationality to deterministic neural mechanism as the foundation of human behaviour has several implications for economic theories and policies. The neuroeconomic approach has wide applications in the development of behavioural economic policies, in marketing and advertising, and financial decision making.

Several areas in neuroeconomics need further study and investigation. For example, longitudinal studies to investigate how neural decision-making patterns evolve over time and during economic cycles would help develop policy decisions to tide over such situations. Another area of research could be cross-cultural comparisons to examine whether the neural determinants of decision-making are culture-specific. Intensive research in advanced modeling techniques using multimodal data from neuroimaging, behavioural, and market data for improved predictive accuracy is to be developed.

Economic decision-making is a complex process influenced by various factors. While Classical and Neoclassical economics rely on assumptions of rationality and self-interest, Behavioral Economics and Neuroeconomics show that humans often deviate from pure rationality due to cognitive biases, emotional influences, and social factors. The neural determinism model is now more multifaceted, recognizing the interplay between the rational and irrational elements of human nature.

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