**Book Chapter- IIP**

**Futurization of Finance-Management**

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**The Future of Finance: Neurofinance**

When financial options are uncertain, time-bound, risky, and strategic, traditional finance will change how prices change and how economic resources change. are best allocated to (Peterson, 2010). Economic bubbles like the real estate bubble are an example of how investors violate basic assumptions of traditional finance because they are unable to consistently evaluate information rationally and incorporate it into their financial decisions. It's just As a result, behavioral finance has emerged as a subfield of behavioral economics to study and explain these violations empirically. Incorporating insights from other social sciences such as psychology and sociology showed that our economic decisions are influenced by emotions, psychological prejudices, stress and individual differences. The findings and their implications for financial theory have prompted some researchers to go a step further and explore how and why these injuries occur in the brain, and how to incorporate insights from neuroscience into existing research. I'm now looking to see if the model can be further improved. .

The neurofinance epistemology is different and reflects recent advances in decision-making neuroscience. As far as human rationality is concerned, we are initially agnostics. That said, I don't believe there is a limit to people's computing power. Rather, we infer their developmental status by observing their behavior and neural activity during cognitive experimental tasks. These cognitive tasks replicate challenges encountered in real-world financial decision making.

**Neurofinance Origins and Etymology**

The term was coined by David Edwards (2004) to describe the new science of analyzing financial markets using neurotechnology in trading behavioral scenarios. According to Rocha et al. (2013), the first study related to neurofinance was performed by Gehring and Willoughby (2002) using an electroencephalogram (EEG), in which brain activity associated with financial decision-making on a financial gambling task was Analyzed. According to the study, "negative polarity event-related brain potentials, which are more likely to be generated from medial frontal regions in or near the anterior cingulate cortex, are more likely to be generated when monetary choices result in losses than when they result in gains." (Armando Freitas da Rocha, Vieito & Rocha, 2013a, p. 9). Tseng (2006) was the first to identify neurofinance as a new field of research.Since 2006, some scholars have begun using the term “neurofinance” to identify academic research that uses neuroscientific and psychophysiological tools to understand heterogeneity in financial decision-making. Over the past five years, the term neurofinance has become very popular in academia, although some researchers have used the term as a keyword in research that does not actually use neuroscience tools. It has been observed using, and may confound new research in this area. It is worth noting that neuroscience is a multidisciplinary science with multiple disciplines that may or may not have a more direct relationship to financial issues. Lent's (2010) neuroscience division includes cognitive neuroscience, a field of particular relevance to public finance scientists. “Cognitive neuroscience deals with the more complex mental abilities typically unique to men, such as language, self-awareness, and memory. Sometimes called neuropsychology.” (Lent, 2010, p. . 6) Even with this seemingly plausible limitation, these boundaries between neuroscience disciplines are not always clear-cut and may need to be unified at another level to better understand financial issues. There is Neuro Finance, an interdisciplinary joint venture that evaluates the nervous system and the brain as units of analysis, whether investors rationally or irrationally, but using brain or physiological mapping to Examine the areas of the brain that are used in making decisions. Second hand equipment.

**Neurofinance and Behavioral Finance**

The difference between behavioral and neurofinance is that the former examines how people behave and interact during the financial decision-making process and is based on established psychological concepts and theories. The latter is to examine these whys and hows, whereas interpreting their actions on the basis of Behavior occurs based on observations of people's brain and hormonal activity (Tseng, 2006, p. 13). . Cognitive psychology, a branch of psychology that seeks to understand internal mental thought processes such as visual processing, memory, reasoning, learning, emotion, problem-solving, decision-making, judgment, and language, is used in behavioral finance. increase. (2012) (Kalra Sahi) Emotions are viewed as products of cognitive analysis of stimuli or events from the perspective of cognitive psychology (Merkle, 2007), using various experimental methods to identify biases, heuristics, and other identify intrusions in Reasonably. Comparing neurofinancing to behavioral finance, we find that not only rationality but also the unit of analysis that becomes the brain rather than the individual and, in the case of behavioral finance, to improve the efficiency of information processing rather than to provide enlightenment. Equivalent normative implications also change. , or even improve the efficiency of information about reasonable expectations. Gippel (2013)

**Introduction to Neurofinance**

The cognitive processes involved in acquiring and processing information in investment decisions can be discovered experimentally using neurofinance .It also allows us to understand how investors choose action plans based on their captured representation of the value of future investment opportunities. One of our goals is to identify the types of information the brain can and cannot process efficiently, as well as other factors such as environmental conditions that facilitate or inhibit information processing. Another goal of Neuro Finance is to understand how investment decisions are made based on various types of uncertainty assessments. Neuro Finance seeks to understand financial decision-making by combining insights from fields such as psychology and neuroscience with traditional financial theories. In addition to explaining individual and market behavior as a function of classical financial variables, we aim to explain how neural and physiological signals are related and lead to individual differences in financial decision-making. is. Neurofinance for this purpose includes non-invasive measurements of neural and physiological activity. Electroencephalography (EEG) and functional magnetic resonance imaging (fMRI) are indirect measures of regional brain activity. These are complemented by physiological signals such as heart rate, skin conductance, eye movements, hormones and genetic analysis. Researchers have used direct transcranial magnetic stimulation (TMS), tested patients with brain injuries, and administered drugs that manipulate hormones and neurotransmitters to find causal effects on observed behavior. Manipulate neural and physiological signals to establish relationships. Neurofinance includes some behavioral finance, but adds two main goals: (b) offer an alternative, physiologically motivated explanation for the apparent failure of standard monetary theory; Neuro Finance's epistemology is different, reflecting recent advances in decision-making neuroscience. As far as human rationality is concerned, we are initially agnostics. That said, I don't believe there is a limit to people's computing power. Rather, we infer their developmental status by observing their behavior and neural activity during cognitive experimental tasks. These cognitive tasks replicate challenges encountered in real-world financial decision making. Neuro Finance seeks to understand financial decision-making by combining insights from psychology and neuroscience with financial theory.Neuro Finance explores how we value information about uncertain, temporary, high-risk, and strategic financial options, and how emotions, psychological biases, stress, and individual differences influence economic decisions (gender, genetics, neuroanatomy, personality, etc.). In addition, we examine how the brain processes financial information and how personal decisions are formed from it. Finally, Neurofinance hopes to combine these experiments with computer models to provide alternative explanations for the apparent failures of classical financial theory. Indeed, neurofinance can bridge the gap between brain science and financial science, allowing us to better understand an individual's financial and economic decision-making. The study of the neurological underpinnings of mental states in making financial decisions is known as neurofinance. Second, the effects of different types of hormones on individual risk tolerance. The effects of different drugs and different conditions in people on how they make decisions have been studied in different parts of the brain and neural pathways. When it comes to emotion processing, the evidence represents different brain systems. Excessive activity or suppression of any of these systems can lead to erroneous decision-making, including financial decisions. Neurofinance uses brain imaging techniques to experimentally identify specific neural substrates involved in acquiring and processing financial information.

**Finance and Computational Neuroeconomics**

This computational approach reflects a new trend in neuroeconomics. This approach has traditionally been taken in functional imaging studies by identifying regions that implement specific computational processes rather than simply reporting the 'activation' of brain regions under specific experimental conditions. It allows a more persuasive form of reasoning than Process reflects new neurofinance trends. This approach has traditionally been taken in functional imaging studies by identifying regions that implement specific computational processes rather than simply reporting the 'activation' of brain regions under specific experimental conditions. It allows a more persuasive form of reasoning than process . In a rapidly changing environment, portfolio managers and traders need to process information on the fly. Little is known about how organizational and individual decision-making processes can be adapted so that people can process information efficiently in such situations. There are practical implications for how research in the field of neurofinance can improve investment and trading decisions at both the individual and organizational levels by identifying environmental factors that enhance efficient information processing. It is expected to provide results. Collecting visual and auditory stimuli, their selection and classification, processing and interpretation while providing information about investment opportunities are the most important stages of the decision-making process. These stages are influenced by genetic and personality traits, implicit (unconscious) memories of experiences, and perceptions of risk, uncertainty, or ambiguity. Many things happen automatically and unconsciously in the brain before a decision is made, and agents are aware of this. Neurofinance combines financial theory with insights from psychology and neuroscience to explain the pervasive irrationality in the behavior of financial actors in an interdisciplinary manner. Emotions, mental states, prejudices, stress, personality, gender, age, and experience can therefore be measured using various non-invasive clinical tools (fMRI, TMS, EEG, heart rate measurement, skin conductance detection, eye tracking, hormone measurements, etc.). Measured using levels, neurotransmitters, and genomic maps).

**Research evidences**

Neurofinance researchers collect neural signals to understand what is happening in the black box during the financial decision-making process. Since 2005, the number of Neuro-Finance articles and scientific texts has increased each year. The first article type in this neurofinance research topic includes the work of Ceravolo et al. The role of impulsiveness of color and personality traits in directing attention to financial information. The authors examined eye movement patterns during the early stages of information gathering while reading a KIID (a standardized document that provides essential information for investment decisions), using eye-tracking technology and ecological protocols. , assessing their independent role for unraveling color and impulsivity. In adjusting the distribution of attention They found that increased alertness induced by color offset individual impulsivity, providing important insights for regulators looking to improve transparency and protect investors. Jin et al. We discuss causality and transmission mechanisms between DLPFC and asset bubbles, and examine different predictive rules for individuals in the article Stimulation of the dorsolateral prefrontal cortex (DLPFC) reduces asset bubbles.

. The results suggest that activation of the rTPJ in competition influences overbids and bidding strategies, and also confirms that the rTPJ is involved in inferring mental state in competitive situations. A study by Liao et al. Considered in his second type of article. In healthy men, exogenous testosterone enhances the decoy effect. The authors investigated the role of testosterone in financial decision-making and how it affected decision-making when asymmetrically dominated prey options were included in the choice set. Participants in the testosterone group made more inconsistent and targeted decisions (i.e., the decoy effect) than participants in the placebo group. Based on existing evidence, these results are interpreted in light of the dual process theory, which suggests that testosterone promotes more intuitive and automatic judgment in human decision making.In their article "The Role of Emotional Versus Cognitive Intelligence in Economic Decision Making in Older Adults," Ramchandran et al. We investigate established relationships between emotions, bioregulatory processes, and economic decision-making in the context of age-related changes in fluid real-time decision-making skills. They explored this decision-making capacity in the neurobiology of aging by examining neuroanatomical correlates of intelligence and decision-making, particularly in regions containing subsets of the human mirror neuron system.

They describe the processes of his PFC depletion, E-RP changes, and DMN changes with aging, all of which can influence financial decisions. Alternative frameworks have been proposed for understanding the neural network underpinnings of economic decision-making biases in older adults. Zhang et al. In his paper, "The Neural Basis of Herding: Decision in Enterprise Clustering: An Event-related Potential Study," he explored the neural basis and processing of herding decisions in people's daily lives and, through event-related extraction, analyzed business decisions. demonstrated the presence of herd tendencies in decisions. Cerabolo et al. Their fMRI study, “Cash, Card, Smartphone: The Neural Correlates of Payment Methods,” focuses on innovations in information technology that have led to the irreversible digitization of payment transactions. The future of neurofinance is focused on new research related to neuroscience and business applications, not only to improve our knowledge of the neural aspects of decision-making in financial institutions, but also to increase value creation, transparency, especially in financial markets. It is also related to the field. Effectiveness of regulation to protect financial investors.

**Emergence of Neuromarketing**

The way people think about products is related to activating Nucleus accumbency, but charging exorbitant prices for products activates. This is the primary reason why businesses have begun to conduct neuromarketing and measure brain activation to determine whether their products will be successful. Another study of them, published in 2008471, confirmed that nucleus accumbency (NACC) activation spontaneously increases prior to financial risk taking. They predicted and discovered that anticipation of viewing rewarding stimuli, cues influence financial risk taking by altering anticipatory affect, and thus identify a neuropsychological mechanism that may underpin effective emotional appeals in financial, marketing, and political domains using event-related fMRI.

According to Behavioural and neural studies of temporal discounting (Zak, 2004), one of the major behavioural differences between humans and other animals is the ability to postpone immediate gratification in exchange for a future (possibly larger) reward. It is interesting to see the two main types of discounting: exponential discounting, which implies that a constant preference between rewards should exist over time, and hyperbolic discounting, which shows a clear tendency to discount expected outcomes proportionate to their delays.

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