

## **Neurofinance: An interdisciplinary Science of correlating the Neurology and the Individual Investment Patterns of Buyers**

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### **Abstract**

Present article is a conceptual research to document the importance Neurofinance. Researchers have spent a couple of days to understand the concept and approach for the Investment Patterns of Buyers in any sector. This comprises of the data from secondary sources. It has been observed that the Investment Pattern of individuals is based on their reaction and perception. The study identifies that the formal procedures and practices provide a striking substantiation of the brain activity associated with financial decision-making, thus showing the importance of Neurofinance as an effective tool for improved economic decision-making through brain mapping techniques. The findings help towards understanding the risk preferences and the wherewithal while investing. Neurofinance is an interdisciplinary area that attempts to elucidate the human decision-making, the neural activity that shapes the understanding of the brain, the adeptness in processing various alternatives available following a particular course of action.

**Keywords:** Neurofinance, Investment Patterns, Individual Decision-making

### **Introduction**

In the course of recent years, market analysts have amassed a lot of proof on how singular speculators deal with their monetary portfolios over time. Behavioral characteristics influence investors' decisions and is been studied by financial researchers throughout the last two decades. These results have formed a self-governing division within financial knowledge, known as "behavioral finance". The terms "behavioral finance" and "behavioral economics" started to come into sight in the 1990s in scholastic journals, practitioner publications, finance magazines and daily newspapers. Neurofinance coalesces the research methods from behavioral finance, neuroscience, cognitive and social psychology. Econometric models with heuristic restrictions cannot explain

the market behaviors of the investors, as minds and thinking of people are involved. Hence, the delicate system that decides on certain decisions of the individuals in poignant, risk, dreadful, improbability, manipulative and other circumstances are decoded and the assuring outcomes are acquired within the emerging field called Neurofinance.

### **Neurofinance**

From many a years' using a numerous strategies, Social and natural scientists are attempting to understand how individuals make Investment decisions. From two decades, by combining these approaches, Neurofinance as an interdisciplinary field seeks to clarify human decision-making, the potential to process multiple alternatives and to proceed with a course of action. It scrutinizes how

economic behavior can shape our perception of the brain, and how neuroscientific discoveries can restrain and direct the models of economics. Decision under risk and uncertainty has created a center of attention in microeconomics, behavioral neuroeconomics, neurofinance and econophysics and neuroendocrinology of decision-making. Neurofinance is more related to the analysis of the decision-making of the investors. Neurofinance coalesces Neurosciences knowledge and technologies to examine the running of the brain for making financial decisions. In simple words, Neurofinance presents all the data that is on the brain on the Internet in practical form which includes images, models of neuron behavior and maps of the genes that are "turned on" in different brain regions. This shows how human brain reasons, plans, and solves problems.

**Disparity between Traditional finance, Behavioral finance and Neurofinance**

	<b>Traditional finance</b>	<b>Behavioral finance</b>	<b>Neurofinance</b>
<b>Markets</b>	Rational	Irrational	Irrational
<b>Investors</b>	Rational	Irrational	Emotional
<b>Portfolio</b>	Rational	Optimal	Optimal
<b>Human behavior</b>	Explains "how"	Explains "how"	Explains "how" and "why"

**Investment Decision-making**

Investors always try to make rational decisions to maximize their profits and minimize their losses. Most of the finance theories are based on the premise that individuals act rationally and sensibly in which the buyer know his preferences,

has transitivity, autonomy and Permanence. And the behavioral finances conclude buyers' choice based on behavioral biases. In disparity, neurofinance - the amalgamation of psychology, neurology and finance by combining both theoretical and empirical tools endeavors to appreciate behavior by examining the physiological processes in the human brain when exposed to monetary risks. The Investment decision-making being a subjective act, it is based both on subjective and objective factors. According to classical and neoclassical economics, decisions are made based on information and cost-benefit analysis. But as a matter of fact, the decision making process is much more intricate than formerly thought. Decision-making being interdisciplinary, Scientists map the mind to study how psychological, emotional and neurobiological factors drive the financial markets. Measuring a person's emotional state is considered one of the most complex problems in affective science (Mauss and Robinson, 2009). At the instance of investment decision making, investors confront with innumerable and untold emotions of all sorts like fear, anxiety, anger, disgust, trust, anticipation, contempt and other unexpressed tender feelings. Risk is never a disconnected part in investment decisions and Investment decisions without risk analysis should never be made, which maybe smaller or bigger risks. Risk and uncertainty (probabilistic choice) which are heterogeneous among individuals and are major topics in microeconomics may have an edifying

and supportive role in the decision-making processes.

### Objectives of the study

1. To know the Investment Patterns of Buyers in relation to Neurofinance
2. From the above observations, to make conclusions of Neurofinance based on the study.

### Correlation the Neurology and the Individual Investment Patterns of Buyers

Our brain reacts in expectation to a possible reward. Humans are not balanced as per the rules of the conventional theory of finance. In a social environment, an individual can understand and duplicate the feelings and emotions from others, which may change sundry other preferences and utilities and which is a key feature of decision-making, providing internal information what can imply the amplification of a given choice as well. Decision-making is such a seamless brain progression to the point that we are normally ignorant of it - until our decision brings about startling outcomes.

According to Neurofinance, the human brain is categorized into three main parts.

**The forebrain/ Cerebrum** is the largest and rational part of the brain consisting of the cortex and the limbic system, which helps in taking financial decisions.

**Mid-brain** takes care of the mental picture, hearing, vision and body movement and the

**Hind-brain/ Little Brain** maintains vital bodily processes.

Neurofinance gives a better mastery of human decisions related to wealth by using brain science and economic theory.

### Brain Secretions

Dopamine is secreted at the time of unexpected profits or losses. This is responsible for overconfidence and Optimism in the buyers. Serotonin reduces during investment losses and is responsible for the feelings of nervousness, melancholy and craving.

### Technologies to Map the Brain

Why would scientists take upon the demanding task of brain mapping? As Lichtman says "To know our brains in detail and a lot of our thinking about the brain is based on imperfect awareness of what is actually there". To study the brain's structure and function, Scientists use various technologies. Connectomics method allows researchers to see all the connections between neurons in an intact brain. Brainbow and the ATLUM (Automatic Tape-Collecting Lathe Ultramicrotome) are being used only to study animals.

The tools used in brain mapping by taking the images of the brain includes the following which captures the participants' brain electric activity during the investment process

- **Computerized Axial Tomography (CAT) Scan** This is an X-ray procedure which combines many X-ray images with the help of a computer to generate cross-sectional views and three-dimensional images of the internal organs and normal/ abnormal structures of the body.

- **Magnetic resonance imaging (MRI)** is often divided into structural MRI and functional MRI (fMRI)
- ✓ structural MRI offers delicate anatomical feature and high sensitivity to pathological alterations. This does not use ionizing radiation.
- ✓ Functional MRI (fMRI) is used to understand how different parts of the brain respond to outside stimuli or unreceptive activity in an inactive condition
- **Diffusion tensor-MRI (DTI)** images "tracts" of neurons that connect brain sections by following water movement in the brain.
- **Electroencephalography (EEG)** is a noninvasive, electrophysiological monitoring method to record electrical activity of the brain with the electrodes placed along the scalp
- **Positron Emission Tomography (PET)** is a nuclear medicine functional imaging technique that takes images of radioactive markers in the brain to observe metabolic processes in the body
- **Transcranial Magnetic Stimulation (TMS)** noninvasively stimulates parts of the brain to trigger certain behaviors.
- **Single Photon Emission Computed Tomography (SPECT)** is a noninvasive nuclear medicine tomographic imaging technique using gamma rays After imaging the brains, statistics are generated and the researchers will make sophisticated brain maps. Brain mapping associated with investment decisions differs between

individuals when making buying, selling or holding decisions. The results evidently exhibit that people may use different reasoning strategies and approaches to make financial decisions clinging to on their all kinds of experiences.

### Conclusion

In today's rapidly changing business environment, we need a better pecuniary edification of how our brain process financial decision-making. Neurofinance, as emergent science, is mounting and widening the field of experimental and behavioral economics, which tries to relate the brain processes to the investment behavior. Research indicates that Empiricists have started testing the newly-developed models of investor behavior. The neural data gives unswerving verifications with relative wealth inclination. Refuting the traditional finance theories, Neurofinance is constantly proving that investors are utilizing multitudinous strategies in their decision-making, instead of considering ultimate lucid decisions; which are based on their economic experiences that differ from one person to another. This monetary experience is very much governed by the person's socioeconomic status, intentions in life and also the biological variables that exert influence upon brainpower, traits and learning capabilities.

People must be prepared to cope with the increasing financial complexities of our societies. Brain imaging techniques are not only used in treatment by doctors. Apart from diagnosing neurodegenerative diseases; Scientists and researchers are able to interpret Anticipated

emotions and Immediate emotions during decision-making which are both positive and negative. Decision-making process is based on an objective as well as the subjective outlook of the investor. These findings should encourage all the researchers to adopt the practice of brain mapping techniques for investment decisions of individuals. This helps in the positive and tireless advance of the buyers towards their investment patterns by understanding the working of their brains.

### References

1. Damasio, A.R. (1994) "*Descartes' Error: Emotion, Reason, and the Human Brain*", New York: Grosset/Putnam.
2. Deppe M, Schwindt W, Kugel H, Plassmann H, Kenning P (April 2005) "*Nonlinear responses within the medial prefrontal cortex reveal when specific implicit information influences economic decision making*", *J Neuroimaging*. 15 (2):171–180. [PMID 15746230](#). [doi:10.1177/1051228405275074](#).
3. "*fMRI: Not the Only Way to Look at the Human Brain in Action*", Observer. Retrieved 14 October 2014.
4. John Cassidy (2006), "*Mind Games. What neuroeconomics tells us about money and the brain*", *New Yorker*, September
5. Kable, Je "*Neurobiology of Decision: Consensus and Controversy*", *Neuron* 63, 733-745
6. McClure S.M.; Laibson D.I.; Loewenstein G.; Cohen J.D. (2004) "*Separate neural systems value immediate and delayed monetary rewards*", *Science* 306 (5695): 503-507  
[PMID 15486304](#). [doi:10.1126/science.1100907](#).
7. Platt, ML and Huettel, SA (2008) "*Risky Business: The neuroeconomics of decision making under uncertainty*", *Nat Neurosci*. 11: 398-403.
8. Priya Jinda and Shilpa Bahl (2016) "*The New Era of Finance: Neurofinance and Investment behavior*", *International Journal of Research in Finance and Marketing*, ISSN(o): 2231-5985  
<http://euroasiapub.org/current.php?title=IJRFM>
9. S. K. Sahi, "*Neurofinance and investment behaviour*", *Studies in Economics and Finance*, vol. 29, no. 4, pp. 246–267, 2012.
10. Shiv B, Loewenstein G, Bechara A. (2005) "*The dark side of emotion in decision-making: when individuals with decreased emotional reactions make more advantageous decisions*", *Brain Research Cognitive Brain Research* 23(1):85-92.
11. [https://www.researchgate.net/publication/270848951\\_Emotions\\_in\\_Economic\\_Decision\\_Making\\_A\\_Multidisciplinary\\_Approach](https://www.researchgate.net/publication/270848951_Emotions_in_Economic_Decision_Making_A_Multidisciplinary_Approach)
12. [https://www.researchgate.net/publication/259172378\\_Investment\\_Decision\\_Making\\_and\\_Risk](https://www.researchgate.net/publication/259172378_Investment_Decision_Making_and_Risk)
13. <http://science.howstuffworks.com/life/inside-the-mind/human-brain/brain-mapping1.htm>