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A Study on Neurofinancial decision dynamics

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Abstract

Current Article is a conceptual research paper to highlight the conception of Neurofinancial decision-making dynamics. Researchers have spent a couple of days to comprehend the notion and connotation of the Neurofinancial decision dynamics. The paper encompasses data from secondary sources. It has been discerned from the studies undertaken that the Investment Pattern of individuals habitually follow a set of decision-making processes which are conversed in the present article. The investigation recognizes that the formal applications and techniques provides a prominent authentication of the brain activities related with financial decision-making and thus demonstrating the significance of Neurofinance as a successful and valuable tool for enhanced and ameliorated monetary decisiveness.

The study additionally finds the viability and efficacy of each model considered in this article and explicates the correlation of the models with Neurofinancial decision-making process. The findings help towards apprehending the risk preferences and the fortitude during investments. Neurofinance is an interdisciplinary field that attempts to expose the human decision-making, the neural activity which shapes the suppositions of the brain, the expertise in processing various alternatives available subsequent to a specific game-plan.

Keywords: Neurofinance, Neurofinancial decisions, Decision-making dynamics (DDM), Decision-making models

Introduction

Decision-making is a continuous and essential component before any investment. Every individual investor has different mindset while making any decision and wishes that his/ her hard earned money to be invested in most protected and liquid avenue. Rational or sound Decision-making is always a tricky and knotty process because this process includes many factors like costs, motives, inadequate resources, perceptions, expectations, security and the alternatives available. Individuals consciously and subconsciously gather information from all the sources available, refer to other people, they fear to the repercussions and past experiences, thereby ensuring the best possible results.

The primary type of financial decision-making generally consists of two things - Investment and Source of finance.

Investment is one of the prime concerns of every individual investor. An investment is a decision by an individual revolves around spending capital on assets that has certain level of hazard and gives the likelihood of creating returns over some undefined time frame.

Financing alludes to a way of credit or other means of supports that are conveyed to an individual or to help satisfy different uses, advance commitments, or to pay for the products and services required. Financing can be through personal savings, mortgaging, borrowing from known or unknown sources, etc.

Neurofinancial decision-making

In Neurofinance, we check experimentally the

Financial decision-making

nature of the cognitive processes engaged in amassing, processing the information in financial decision-making. We additionally examine how individuals select action plans based on the acquired representations of the values of potential speculation scenario. The societal objective of Neurofinance is to perk up the theory of decision-making. If the reason behind the mistakes and sub-optimal financial choices that are made are known, then tools can be developed to improve the decision-making. Understanding brain mechanisms will help comprehend the financial markets and make the decision-making processes more fathomable.

Decision-making models

How the brain work and what does influences it to respond against monetary choices? We do not know the genuine hidden underpinnings of the monetary mind. Is the brain alert? Is it rational? Or, on the other hand is it excited? No conclusive answers are obtained yet. Neurofinance seeks to appreciate the way the financial preferences are made by focusing at the activities in different parts of the brain. Better financial models can be built, if one gains an understanding about neuroscientific headway in how brains make decisions. Recent discoveries about how we calculate risk and reward points out the financial predictions the brain makes even when the individual does not have the knowledge of finance. Understanding the reason behind it will improve the theory of financial decision-making.

A 07-step model to envisage Decision-making process

Decision-making is the process of making choices by identifying an alternative, Information Congregation, Distinguishing the alternatives, authenticating the alternatives, Select from the alternatives, exertion of the decision and reevaluation of the decision.

A well-ordered decision-making process enables the investors in making more attentive choices by sorting out significant data and characterizing the available alternatives. This approach increases the chances that you will choose the most fulfilling alternative choice possible.

Identifying an alternative and making a decision: One has to select among the alternatives available to settle on a choice by making a decision. Individuals should attempt to unmistakably

characterize the idea of the choice they should make as this initial step is very essential.

Information Congregation: Pertinent information has to be gathered before making a decision. The information needed (External/ internal), its sources and the route in procuring it are important.

Distinguishing the alternatives: As the investor gathers the information, he/ she will most likely distinguish a few feasible ways of actions or options. They can likewise utilize their curiosity, creative energy and extra data to build new options. In this progression, one has to list all conceivable and attractive options

Authenticating the alternatives: Draw on your information and feelings to envision if the alternatives are carried out to the end. Assess whether one has succeeded in identifying an alternative and making a decision. This will support in choosing an option appear to have a higher potential for achieving your objective. The alternatives can be prioritized based on the investor's framework.

Select from the alternatives: When the buyer has measured all the proofs, he/ she are prepared to choose the option/ alternative that is by all accounts the best for them. This can even be a blend of choices. This strives towards the validation of the chosen alternative

Exertion of your decision: The investor has to take a positive action towards the implementation of the alternative and make an arrangement for usage by setting aside and addressing any inquiries or worries that may emerge

Reevaluation of the decision: In this last stride, the investor has to consider the consequences of his/ her choice and assess regardless of whether it has settled the need one has distinguished in finding an alternative. On the off chance that the choice has not met the distinguished need, the investor might need to rehash certain steps of the process to settle on another choice and explore additional alternatives

A 5 Step model to visualize the decision making process

When making a decision, there are many steps that can be followed. The ultimate goal is to make good decisions. This includes Spotting the objective, accumulating the required Information, Considering the outcomes, Making the decision and Assessing the Decision.

Spot the objective: A standout amongst the best

decision-making strategies is to keep an eye on one's aim/ objective. This essentially implies distinguishing the purpose of the investor's decision and unravel the issues pertaining to it

Accumulate the required Information: When using sound judgment it is best to accumulate essential information that is specifically identified with the issue. This helps in better comprehending the problem and will likewise produce thoughts for a conceivable arrangement. Consider every possible alternative when gathering the information, opinions and suggestions of the specialists and experts can be considered for making an ultimate choice

Consider the outcomes: This is a critical step as this enables the investor to decide how his/ her ultimate choice will affect oneself and additionally others included now and in the near future as well. This is a basic stride since it enables you to survey the upsides and downsides of the distinctive alternatives that you recorded in the previous step

Decision-making: Since you have recognized your objective, assembled all fundamental data and measured the results, the time has come to settle on a decision and really execute your ultimate choice. Understanding that this progression can also cause a few people a considerable measure of uneasiness/ worries is imperative. The investor has to trust his/ her instincts and step forward

Assess Your Decision: When you have settled on your ultimate decision and put it into action without hesitation, it is important to assess the choice and the means you have taken to guarantee that it works. This final step is as vital as setting your objective, because this aids the investor to further develop their decision-making skills for future issues. One may also have to search out for novel information and roll out a few improvements en route. This step basically requires some endurance and firmness as may take some time to witness the ultimate result. Perceiving that if the main choice is not working, you may need to backpedal to step two and pick another choice. Continually searching for and reckoning sudden issues will help mitigate undue anxiety, as and when an issue arises

Customary confrontations of Decision-Making

Although the aforesaid steps will help the investors make more effective decisions, there are some pitfalls as well. Here are common challenges/ disputes that may transpire while making decisions:

Having additional information or lacking the same: Accumulating the required germane information is the key towards the decision-making process. Extra information may misguide the investor or even puzzle him/her, whereas the dearth of essential information can have devastating effects down the line.

Misidentification of the problem: When the decision is complex and the main issue is not properly found out, it is better to speak with the experts before jumping into a conclusion as this needs a lot of time and energy in the long run.

Audaciousness in the aftermath: Even though the decision-making steps are followed properly, there is still a likelihood that the outcome is not what the investor exactly had in his/ her mind. Hence it is vital to identify a suitable option that is conceivable and realizable. **Audaciousness/** overconfidence in an unlikely outcome can lead to adverse results.

Poor Timing: When settling on real choices, it advantageous to take as much time as necessary so as to settle on the best decision from your alternatives. But understanding the timing process is very essential as it is best to delay a decision, and other times delaying a response may also cause further problems. There are also times when making a speedy decision is beneficial as it allows you more time to make basic changes that arise with the problems. Some of these choices require little exertion, while others require additional time and more profound idea before going to a last arrangement.

The brain map

Kuhnen's and Knutson observation confirms that the neuroeconomics of financial decisions focused on two areas of the brain which influences these decisions: The nucleus accumbens triggers in the anticipation of a reward and the *insula* reacts to the negative pro-prioceptive states like queasiness, revulsion, nervousness or even the expectation of pain and this gets activated two seconds before a person makes a risky and/or wrong choice. According to the authors, *insula's* activity is also correlated with a diminished risk-taking behavior.

Recent studies also say that orbitofrontal cortex (a part of the prefrontal cortex) is the area in the brain that works as the interface between the estimation of repercussions of our decisions and the emotions we feel when the results of our choices are tacit.

Decision-making Dynamics (DDM)

Dynamic decision-making is inter-reliant decision-making that occurs in a setting which changes over time either due to the preceding actions or due to incidents that are outside of the control of the investor. Dynamic decisions are not at straightforward and customary one-time choices, but are normally more complex and occur in real-time and engage in observing the degree to which people are bright in using their experiences to manage a complex system, together with all the experiences that lead to enhanced decisions over time.

Features of dynamic decision-making environments

The primary characteristics of dynamic decision environments are dynamics, intricacy, opaqueness and dynamic complication. Dynamics in the system could be determined by positive or negative feedbacks.

The dynamics of the environments refers to the dependence of the system's state on its previous state.

Intricacy/ Complexity cites to the number of collaborating or interconnected components inside a framework that can make it hard to anticipate the conduct of the framework. However, the meaning of unpredictability could at present have issues as framework segments can change as far as what number of parts there are in the system, number of connections amongst them and the idea of those connections.

Opaqueness is the physical invisibility of some facets of a dynamic system which may also be dependent on an investor's ability to acquire knowledge of the components of the system.

Dynamic complexity refers to the investor's capability to have power over the system using the feedback he/ she receives from the system. This feature may also make the system hard for the decision makers to appreciate and control the system.

Decision-making Dynamics in the real world

There has been emphasis on Decision-making Dynamics research to spotlight on decision-making in the real world, which reveals the extensive notion of the research underlying this concept by bringing it closer to the situation awareness and expertise. Under the Decision-making Dynamics in the real world, individuals are more fascinated towards Objective setting, scheduling, Showing intuition and emotions,

attentiveness in recording the required information, prognosticating the outcomes, having command over the decisions he/ she makes and attending to feedback.

Decisions with emotions

These issues emerge in quick perceptual choices that lone enable the subject to control the weighting of the approaching confirmation and the end results. In any case, the mix time-scale, the fleeting weights and final proof can shift and this unequivocally influences the choice execution and the fit with the information

Adaptive/ Modifying decision-making

These are the choices that extend over a longer time-frame, enable the subject to control the proof amassing process, and to frame and refresh convictions about the condition of nature

Primacy or Inclination based choices

This forms the preference formation, in hazardous and multi-trait situations which do not follow a goal/regulating paradigm, yet rather leaves this to the subject's control.

New or integrative choices

The framing of a decision is to institute preferences and make commitments. Here, the alternatives are not predefined and the investor has to undergo a diversified restrictions and clashes. The dynamic decision-making deals with cognitive capabilities such as problem-solving, planning and combined decision-making

Conclusion

The financial behavior of the individual investors depends on the investment alternatives available and their preferences. Decision-making is a key aptitude for any individual investment. Following any of the aforementioned consistent methodologies/ steps in decision-making by monitoring regular difficulties and challenges guarantees both thoughtful Decision-making and positive results. Financial risk is always unpredictable and investors try to adapt finance to their brains. The basic goal of neurofinance is to progress the decision-making capabilities of the individual investors and help them in making **better decisions**. Under any circumstances, the dynamics inspire development, advancement, or transformation within a system or process. Through the Decision-making models, the investor can gain a deeper understanding of the underlying neural processes and avoid impaired choices.

References

1. Bourgeois-Gironde, S. (2010), "Regret and the rationality of choices", Philosophical Transactions of the Royal Society, B. vol. 365, pp. 249-258.
2. Busemeyer J. R., Townsend J. T. (1993) "Decision field theory: a dynamic-cognitive approach to decision-making in an uncertain environment", Psychol. Rev. 100, 432-459 10.1037/0033-295X.100.3.432
3. Dimson, E., Marsh, P. & Stauton, M. (2004) "Irrational optimism", Association for Investment Management and Research 60, 15-25.
4. Gonzalez, C., Lerch, J. F., & Lebiere, C. (2003) "Instance-based learning in dynamic decision making", Cognitive Science, 27(4), 591-635.
5. Johannes Friedrich and Máté Lengyel (2016) "Goal-Directed Decision Making with Spiking Neurons", The Journal of Neuroscience DOI: 10.1523/JNEUROSCI.2854-15.2016
6. Kahneman, D. & Tversky, A. (1979) "Prospect theory: an analysis of decision under risk", Econometrica 47, 263-291.
7. Kuhnen, C. and Knutson, B. (2005) "The Neural Basis of Financial Risk Taking", Neuron, 47, pp. 763-770.
8. Lo, A.W. & Repin, D.V. (2002) "The psychophysiology of real-time financial risk processing", Journal of Cognitive Neuroscience 14, 323-339.
9. McClure, S. et al. (2004) "Separate Neural Systems Value Immediate and Delayed Monetary Rewards", Science, 306, pp. 503-507.
10. Roe R. M., Busemeyer J. R., Townsend J. T. (2001) "Multialternative decision field theory: a dynamic connectionist model of decision making" Psychol. Rev. 108, 370-392 10.1037/0033-295X.108.2.370
11. Rorie AE, Newsome WT (2009) "A general mechanisms for decision-making in the human brain?" Trends in Cognitive Sciences. 9(2):41-43
12. Sapra, Steven G. and Zak, Paul J., (December 1, 2008) "Neurofinance: Bridging Psychology, Neurology, and Investor Behavior", Available at <http://dx.doi.org/10.2139/ssrn.1323051>
13. Simen P. (2012) "Evidence accumulator or decision threshold - which cortical mechanism are we observing"? Front. Psychol. 3:183 10.3389/fpsyg.2012.00183
14. Simon, H.A. (1955) "A behavioral model of rational choice", Quarterly Journal of Economics 69, 99-118.
15. Willems, E. P., & Clark, R. D., III. (1971) "Shift toward risk and heterogeneity of groups", Journal of Experimental and Social Psychology, 7, 302-312.
16. https://www.umassd.edu/media/umassdartmouth/fycm/decision_making_process.pdf
1. https://www.google.co.in/search?biw=1600&bih=745&tbm=isch&sa=1&q=decision+making+of+the+brain&oq=decision+making+of+the+brain&gs_l=psy-ab.3...409279.415834.0.416100.0.0.0.0.0.0.0.0.0...0...1.1.64.psy-ab..0.0.0.zfEtXUDhipA#imgrc=M_CfEB3ZhD40BM: