ReThink Finance - integrating innovative paradigms and digital technologies into financial teaching and literacy
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Intensive Summer Programme
“From traditional finance to neurofinance”
PERIOD: From 12th to 22nd of JUNE 2023
Training materials
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ULBS (Diana Mihaiu, Radu-Alexandru Șerban)

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Intensive Summer Programme “From traditional finance to neurofinance”
Training Materials
Setting the Stage: Psychological attitudes in economics and finance
Author: Marta Maciejasz, University of Opole

1. Cognitive psychology and its elements

Before starting explanations connected with behavioural economics it’s crucial to know some basic concepts of psychology. Main questions concerning this element are:

1. What does cognitive psychology tackle with?
2. How people perceive information?
3. How people learn?
4. How people remember?
5. How people think?
6. How people make decisions?

There are basic elements diagnosed and described within cognitive psychology. Attention is the first one. Attention is the phenomenon by which a person can actively process a limited amount of information from the vast amount that is available to him through senses, memory and other cognitive processes. In comparison consciousness is a phenomenon thanks to which a person actively processes information and is also aware of it. Certain types of active processing of sensory information, memory information, and cognitive information may occur outside of consciousness.

So, why does a man need attention? There are different reasons for which a man uses attention:

- To control interactions with the environment
- To connect past experiences with the present
- To control and plan future activities

But what happens when consciousness doesn't work? Then pre-conscious processes are activated and information that is not available to consciousness but can be cognitively processed, e.g. stored memories that are not currently in use, can be recalled at any time. Also subliminal perception can occur and thanks to it processing a specific stimulus without being aware of doing it is done. Priming means that a specific stimulus activates mental pathways, which strengthens the ability to process a stimulus that is somehow related to the priming stimulus. The priming stimulus may or may not be perceived consciously (low intensity, background full of noise, short presentation, etc).

Depending on the use of attention controlled vs. automatic processes can be led. Although automatic processes are faster and less burdening cognitive processes than controlled ones, they can also lead to some errors.

Perception is next element of cognitive processes. What is the difference between attention and perception? Sensory data and cognitive processes that do not come to
consciousness affect what a person thinks and how they perform tasks. Man adjusting to the fact of having limited cognitive resources uses unconscious processes and information. Thanks to this, attention is not overloaded. Perception is a set of processes by which a person recognizes, organizes and gives meaning to impressions received from the outside.

There are several types of perception: vision, hearing, touch, smell and taste, as well as several theories explaining it. According to pattern theories in shape perception man stores in his mind countless sets of patterns that constitute highly detailed models of patterns that can potentially be recognized. He compares what is seen with a set of patterns and chooses the right one that matches the best. According to prototype theories in shape perception a prototype is the best representative of a class of related objects or patterns that integrates all the most typical (i.e. most observed) features of a shape or pattern. People can make a prototype even when they haven't seen an item that fits the prototype. According to feature theories in shape perception people try to match the features of a given pattern with those stored in memory, not with the entire pattern or prototype.

Memory is next, very important cognitive process. Memory as a process consists of few phases (usually three), and the number of phases varies depending on the degree of detail of the description. The phases of the memory process can be improved. First one is sensory buffer. Perception is possible if a specific sensory analyzer is triggered and it leaves a trace of the active stimulus in the sensory buffer. The sensory buffer (sensory memory, ultra-short) stores a complete picture of the perceived stimulus in a very short time (approx. 300 milliseconds). Sensory buffer contains information on the spatial location of the stimulus and its physical size, but does not take into account semantic elements. Next stage is short- and then long-term memory. They work differently and are used for different purposes, creating specific relations between them.

Memory can be also considered as an ability, a part of the mental equipment of the individual, which shows large individual differences. It is a component of intelligence and consists of many specific abilities, i.e. visual and auditory memory, which are arranged hierarchically.

There are also some memory metaphors, which simply explain how it works. Footprint in the sand metaphor says that the memory footprint is like a fact imprint in the brain that is very clear at first, but fades and weakens over time. The renewed contact with a given fact causes the print to be renewed. Tape metaphor says that memory works like a tape
The information on the cassette is stored in memory and played back when needed. Unfortunately, it doesn't explain why people forget. Computer metaphor claims that there are two types of memory (operational and permanent). Both types of memory are located in different areas of the brain. Memory is based on discrete coding (neurons - stimulated or not) and the information address is also stored in the memory (Strelau, 2006).

Memory can be classified based on various criteria (Strelau, 2006):

- According to the time criterion:
  - Ultra-short memory
  - Short-term memory
  - Long-term memory
- According to the transparency criterion
  - Declarative memory
  - Non-declarative memory
- Declarative memory
  - "Knowing that ..."
  - Explicit memory, the content of which can be made aware and verbalized
  - Semantic memory - refers to objects and their properties, facts and relationships between them
  - Episodic memory - Refers to events
- Non-declarative memory
  - "Knowledge of how ..." (procedural memory)
  - Latent, implicit memory that allows to perform certain activities in a precisely defined situational context
  - Skills
  - Priming
  - Conditioning
  - Habituation / sensitization

2. Behavioural economics and finance

The crucial question here is what behavioural economics deal with? It deals with analyzing human behaviour in economic circumstances. By analyzing the socio-psychological mechanisms underlying economic behaviour, it creates the model of "real man" and not "economic man". It aims to give economic models a more realistic dimension and thus increase their relevance. There are several sub-disciplines of BE (Maciejasz-Świątkiewicz, Musiał, 2014):

- behavioural microeconomics, which deals with the way of making individual decisions (consumer, employee, financial and enterprises) in the field of economics, and within it:

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o behavioural aspects of individual consumption that show how decisions are made in the context of purchasing goods and services,
o behavioural aspects of work that show the behaviour of employees on the labour market,
o behavioural finance, a description and explanation of real behaviour of investors and their impact on the market,
o behavioural entrepreneurship, which deals with the behaviour of entities in the context of undertaking economic activity and participating in organizations,
• behavioural macroeconomics, which examines the behaviour of economies as the resultant behaviour of individual entities operating within it.

Behavioural approach towards economics differs from traditional one considering its (Maciejasz-Świątkiewicz, Musiał, 2014):
• narrowness, i.e. narrowing the scope of applied methods of analysis or the scope of research,
• rigidity, i.e. attachment to specific research methods and lack of flexibility in their selection and adjustment to the nature of the phenomenon studied,
• intolerance, i.e. disregarding research that does not fit in the discipline's canon and hostility to alternative approaches,
• mechanicalness, i.e. the degree of treating the behaviour of the subjects as mechanical and determined,
• separateness, i.e. the degree to which a given trend is separated or not integrated with other related non-economic disciplines,
• individuality, i.e. the degree to which a given behaviour can be explained by referring to the behaviour and properties of the individual

And the main concept used within traditional economics which is criticized by behavioural economists is homo oeconomicus. Who is homo oeconomicus? Is a model of a decision-maker who does not experience sentiments, personal material costs and benefits are the only things he cares about and cares only about his own interest (doesn’t contribute voluntarily to charities, keeps promises only if it pays to do so). Is a real man behaving like that? Usually not – does not think in algorithm way but uses shortcuts. It causes misbehaviours…

3. Heuristics, fallacies and biases - introduction

Fallacies, heuristics, and cognitive biases are all related to how our minds process information, but they refer to different types of mental shortcuts or errors. Heuristic is a mental shortcut that we use to make decisions or solve problems quickly and efficiently, i.e. availability heuristic. Fallacy is a type of reasoning that is flawed or incorrect, i.e. conjunction fallacy. Cognitive bias is a systematic error in thinking that can lead us to
Heuristics are mental shortcuts to make decisions quickly, without the expenditure of too much cognitive effort. They are automatic, intuitive and do not require conscious thought. Rules of thumb are simple and (reasonably) efficient procedures for forming judgements and making decisions. Typical heuristics are: availability heuristic, representativeness heuristic, anchoring and adjustment heuristic or affect heuristic.

Fallacies are type of reasoning that is logically invalid, or that undermines the logical validity of an argument. For example conjunction fallacy – the assumption that an outcome simultaneously satisfying multiple conditions is more probable than an outcome satisfying a single one of them or Kafkatrapping – a sophistical rhetorical device in which any denial by an accused person serves as evidence of guilt.

Biases are systematic patterns of deviation from norm and/or rationality in judgment. They are often studied in psychology, sociology and behavioral economics. For example apophenia - the tendency to perceive meaningful connections between unrelated things or confirmation bias - the tendency to search for, interpret, focus on and remember information in a way that confirms one's preconceptions.

One of the very popular examples of misbehaviour is endowment effect. It’s based on loss aversion. "Pain (...) is, in almost in all cases, a more pungent sensation than the opposite and corresponding pleasure" (A. Smith). Stronger tendency to prefer avoiding losses than achieving gains of the same magnitude. According to Thaler (1980) people value the things they own much higher than the things they do not. Kahneman et al. led (1990) mug experiment in which participants were given a mug and then offered the chance to sell it. "Sellers" had to decide at what price they would be willing to sell it => $7.12, while "Buyers" – at what price they would be willing to pay => $2.87. It was found that the price participants required as compensation for the mug once their ownership of the mug had been established ("willingness to accept") was approximately twice as high as the amount they were willing to pay to acquire the mug ("willingness to pay").

Money perception in another mistake commonly made by people. Economic attitude towards money differs from psychological attitude towards money (it conveys meaning and inter-personal value; intangibles). Money is not a neutral transaction tool, but an object of various emotions (Tang, 1992). Moreover, according to Fisher (1928) there is a tendency to think of currency in terms of the numerical value (the nominal value) rather than in terms of its purchasing power (the real value). According to Tversky and Kahneman (1981) people bundle their financial resources according to their intended purpose. People who earn more often feel positive emotions, assess their competences higher and are more optimistic (Argyle, 2001). The utility of money in making us happy is high at the beginning, but each subsequent unit makes less and less happy. It turns out that more money means more fear of losing it, stress, worse social relations, worse family relationships. And as shown by a study by Brickman et al. (1978) conducted among the winners of large amounts on lotteries, these people were just a little happier than other
people (4.0 vs. 3.8 on a 5-point scale). Smith and Razzell (1975) stated that people who became rich and quit their jobs, broke off social relations, had a sense of social exclusion and were under severe pressure because family and friends expected them to share money (Frey and Stutzer, 2002).

Perception of money is a very individual matter. Every person feels the need to have money in different ways and on a different scale (Goldberg and Lewis, 2000). Although in economics money is treated as a tool to meet needs, it seems that nowadays it sometimes becomes an aim itself. In this approach, the need for money can be placed even before biological needs, which are perceived as basic ones. In order to be able to satisfy them, a person must have adequate resources. This approach explains the commonly observed "rush to money". Elements shaping attitudes towards money are (Tang, Tang and Luna-Arocas, 2005):

- an emotional approach in which money perception depends on highly subjective beliefs, experiences, traditions or habits;
- an active approach, in which having money is the result of actions taken by people;
- functional approach, under which having money is associated with the privilege of performing specific functions in society, both in a formal and informal sense.

So, how it affects the market? According to mainstream attitude towards market at which homo oeconomicuses are active market is effective. The definition of market effectiveness is related to the belief that market participants behave in a rational way, i.e. maximize their usability and are able to process all information. In fact there are several reasons for which market are ineffective:

- "We are first people and then investors" D. Niederman
- Misconception about a given phenomenon, the so-called mental blockages
- Lack of time and the possibility of investigating the phenomenon
- Lack of trust in analyst recommendations
- Discrediting decisions
- Obtaining conflicting advice and information

So the final question arises, whether we can fight with that? Yes…, firstly by popularizing effects. Remembering that anomalies are not universal (country, time, choice of calculation method) and that it’s more profitable to trust to financial analysts.

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Neurofinance: understanding how the brain works and why it matters for finance
Authors: Lorenzo Costantino, Giulia Costantino, Mario De Martino, Stefano Natale, Institut de Haute Formation aux Politiques Communautaires

1. Introduction

In the rapidly evolving field of finance, an exciting and interdisciplinary discipline has emerged - neurofinance. This training course provide an exploration of the human brain and its profound influence on financial decision making. By bridging the realms of neuroscience, psychology, and economics, neurofinance offers valuable insights into the inner workings of the human brain and its implications for financial behaviors.

The overarching goal of this programme is to equip learners with a comprehensive understanding of neurofinance and its practical applications. By delving into the intricate connections between the human brain and financial decision making, learners will gain a solid foundation for comprehending the complex dynamics of the financial world.

The learning objectives encompass two primary areas of focus. Firstly, learners will develop an understanding of the human brain and its role in financial decision making. This includes exploring the concept of the triune brain - a model that illuminates the interplay between reactive and reflective decision-making processes in finance.

Secondly, this training programme seeks to familiarise learners with emerging concepts and practices in the field of finance. By highlighting the connections between neuroscience, psychology, and economics, learners will grasp the significance of neurofinance in driving innovation and advancements in finance. Furthermore, learners will critically evaluate the potential benefits and limitations of applying neurofinance to financial contexts, shedding light on both the hype and the reality of this discipline.

Throughout this course, real-world case studies will be utilised to showcase the practical applications of neurofinance. Learners will delve into specific areas such as cash versus digital payments and the implications of neurofinance for small and medium-sized enterprises (SMEs). By examining these tangible examples, learners will gain valuable insights into how neurofinance can inform and enhance financial decision making in diverse settings.

Drawing from current research and evidence-based practices, learners will engage with a comprehensive body of knowledge to deepen their understanding of neurofinance. The aim is to bridge the gap between theoretical frameworks and practical implications, providing a holistic perspective that resonates with both learners and practitioners in the field.
2. Understanding the Human Brain

The human brain, a remarkable organ of intricate complexity, serves as a complex web of communication and facilitates a vast array of functions, ranging from fundamental bodily movements to intricate cognitive processes. This visual expedition from Neuralink - [https://neuralink.com/science/](https://neuralink.com/science/) - takes us on a journey through the intricate workings of the human brain, providing insights into its structure, functions, and extraordinary abilities.

Central to this exploration is the recognition that the human brain transcends its constituent cells and synapses, revealing itself as a symphony of interconnected regions. Each region plays a unique role in shaping our cognitive abilities, emotional experiences, and sensory perceptions. From the brainstem governing basic bodily functions to the cerebral cortex orchestrating higher-order thinking, the human brain unveils its marvels through its intricate organisation.

During this captivating visual journey, the intricate networks facilitating internal communication within the brain are witnessed. These networks ensure the seamless transmission of information and integration of cognitive processes. Marveling at the capabilities arising from the interplay of neurons and neurotransmitters, the human brain grants individuals the power to think, reason, remember, and perceive the world with astonishing precision.

Immerse yourself in the brain’s structure, functions, and capacities. This immersive journey lays the groundwork for comprehending the profound interplay between the brain and finance, setting the stage for an exploration of neurofinance.

2.1 Overview of the Brain’s Structure and Functions

The intricacy and interconnectedness of the brain are evident in its composition of approximately 86 billion neurons. These remarkable cells are connected through synapses and engage in communication through electric signals, which can be recorded and studied.

Within the brain, various regions exist, each with its own specific functions, working in harmony to coordinate our actions and support our cognitive processes. Notably, the cortex encompasses key regions that contribute to our perceptual experiences:

- The Visual Cortex is responsible for processing information received from our eyes, allowing us to perceive and interpret visual stimuli
- The Auditory Cortex aids in the perception and interpretation of sound, enabling us to appreciate and understand auditory input
• The Somatosensory Cortex plays a crucial role in processing sensations of touch, facilitating our ability to sense and respond to tactile stimuli
• The Motor Cortex is responsible for planning and executing voluntary movements, giving us the ability to carry out intended actions

Moreover, the brain serves various functions that underpin our daily lives:

• Motor Function: The brain exerts control over both voluntary and involuntary movements, allowing us to navigate and interact with our environment
• Cognitive Function: Enabled by the brain, thinking, learning, memory formation, and problem-solving are integral to our cognitive capabilities
• Emotional Function: The brain significantly influences our emotions, motivations, and social interactions, shaping our affective experiences
• Sensory Function: Processing sensory information, the brain allows us to perceive and make sense of the world around us, integrating stimuli from our senses

These multifaceted functions collectively contribute to the intricacies and significance of the human brain, serving as the foundation for understanding its profound interplay with the field of finance in the realm of neurofinance.

2.2 Introduction to the Triune Brain

The Triune Brain model, originally proposed by neuroscientist Paul MacLean, offers a comprehensive framework for understanding the human brain and its role in shaping our financial decision-making. This model highlights three dominant and interconnected structures within the brain: the Lizard Brain (comprising the brain stem and cerebellum), the Rat Brain (encompassing the subcortical region), and the Monkey Brain (representing the cortex).

Traditionally, it was believed that these brain structures operated independently, each serving distinct functions. However, contemporary research has revealed that these structures are simultaneously active in all circumstances, working in concert to shape our behaviors and choices. By exploring the intricacies of the Triune Brain model, we can
gain insights into the interplay between these structures and their influence on financial
decision-making processes.

While scientific advancements have challenged some aspects of the Triune Brain model, it remains a valuable tool for understanding the complexities of the human brain. It is now recognised that the brain is not simply a collection of isolated components, each dedicated to a specific mental function. Rather, it is a vast network of neurons that can serve multiple purposes. For example, neurons within the anterior cingulate cortex are involved in various cognitive processes, including memory, emotion, decision-making, pain perception, moral judgments, imagination, attention, and empathy.

It is important to note that the brain does not evolve in distinct layers or prioritise rationality over emotions. Neuroscientist Lisa Feldman Barrett emphasises the integrated nature of the brain, where cognitive, emotional, and sensory processes interact in complex ways. Despite these advancements, the Triune Brain concept continues to be employed in teaching due to its simplicity and effectiveness in conveying key principles.

By recognising the evolution of our understanding and the dynamic nature of the brain, we can delve deeper into the field of neurofinance. This exploration enables us to appreciate the profound interplay between neuroscience and finance, providing valuable insights into financial decision-making, risk assessment, and consumer behavior. Ultimately, a nuanced understanding of the brain’s complexities enhances our ability to navigate the realm of finance and make informed choices.

2.2.1 The Lizard Brain: Reactive Decision Making

The Lizard Brain, situated at the brainstem, is the core of our primitive instincts and survival behaviors. Responsible for regulating essential functions such as breathing, heart rate, and fight-or-flight responses, it forms the foundation of our decision-making processes.

Characterised by its reactive nature, the Lizard Brain is associated with impulsive behaviors and the pursuit of immediate rewards. It operates on a subconscious level, driven by primal instincts and instinctual reactions to stimuli. In the realm of finance, the influence of the Lizard Brain can manifest in impulsive decision-making and fear-based responses to market fluctuations.
When the Lizard Brain takes control, individuals may succumb to the allure of quick gains and overlook long-term considerations. The focus shifts to short-term gratification, disregarding the potential risks and consequences associated with impulsive actions. This reactive decision-making can lead to suboptimal financial outcomes and hinder long-term wealth accumulation.

Recognising the influence of the Lizard Brain is crucial in developing strategies to mitigate its impact on financial decision-making. By understanding the subconscious drivers of impulsive behaviors, individuals can employ techniques such as mindfulness, emotional regulation, and cognitive reframing to counteract the dominance of the Lizard Brain. These practices promote a more reflective and deliberate decision-making process, aligning with long-term financial goals and mitigating the detrimental effects of reactive decision-making.

2.2.2 The Rat Brain: Memory-Based Decision Making

Nestled within the middle region of the brain, the Rat Brain plays a pivotal role in shaping our emotions, social behaviors, and memory. It serves as the driving force behind our desires, motivations, and attachments to others, influencing our decision-making processes in profound ways.

Operating on the foundation of emotional responses and past experiences, the Rat Brain relies on memory-based decision-making. It draws upon our personal history and recollections to assess the potential outcomes of various choices. This reliance on past experiences can be both beneficial and detrimental when it comes to financial decision-making.

The Rat Brain’s involvement in decision-making is closely intertwined with our reward system and pleasure-seeking behavior. It seeks immediate gratification and the pursuit of rewards, often prioritising short-term gains over long-term considerations. This inclination can lead to risky investments and decisions driven by greed, as the Rat Brain craves the thrill of potential rewards without fully weighing the associated risks.

By acknowledging the influence of emotions and past experiences, individuals can employ strategies to mitigate the potential pitfalls associated with memory-based decision-making. This may involve establishing disciplined investment strategies, conducting thorough research and analysis, and maintaining a long-term perspective when assessing potential risks and rewards.

Through a conscious awareness of the Rat Brain's impact on financial decision-making, individuals can strive for a more balanced and rational approach. By integrating
the knowledge of past experiences with careful analysis and prudent decision-making, one can navigate the complexities of the financial landscape with greater confidence and resilience.

### 2.2.3 The Monkey Brain: Reflective Decision Making

Situated in the outer layer of the brain, the Monkey Brain represents the pinnacle of our cognitive abilities. It bestows upon us the power of rational thinking, logical reasoning, and problem-solving, enabling us to navigate complex situations with precision and foresight.

The Monkey Brain is responsible for advanced cognitive functions that play a crucial role in decision-making. It equips us with the capacity to evaluate the long-term consequences of our actions and make informed choices based on careful analysis. In the realm of finance, the Monkey Brain serves as an asset, allowing us to assess the risks and rewards associated with different investment options.

One of the key strengths of the Monkey Brain lies in its ability to strike a balance between immediate gratification and long-term financial stability and growth. While the Lizard Brain and the Rat Brain may gravitate towards impulsive actions and short-term gains, the Monkey Brain weighs the potential outcomes and considers the broader implications. It assists us in making calculated financial choices that align with our long-term goals and aspirations.

Through the lens of the Monkey Brain, individuals can approach financial decision-making with a sense of rationality and prudence. It encourages us to evaluate investment opportunities based on objective analysis, taking into account factors such as market trends, economic indicators, and risk assessments. By harnessing the capabilities of the Monkey Brain, individuals can make strategic financial decisions that are grounded in logic and supported by a comprehensive understanding of the market dynamics.

However, it is important to note that while the Monkey Brain excels in reflective decision-making, it is not immune to biases and cognitive limitations. Behavioral biases, such as overconfidence, confirmation bias, and herd mentality, can still influence our judgment, even when the Monkey Brain is engaged. Recognising and managing these biases is crucial for ensuring that our financial decisions remain rational and aligned with our long-term objectives.
2.3 Monkey vs Lizard: What type of Brain are you?

Embark on a captivating journey into the fascinating realm of neurofinance, where the mysteries of decision-making tendencies and the influential forces of brain types on financial behavior are unveiled. This thought-provoking interactive quiz - [https://www.scottishconflictresolution.org.uk/brain/monkeyvslizard/question](https://www.scottishconflictresolution.org.uk/brain/monkeyvslizard/question) - offers profound insights into the interplay between reactive instincts and reflective cognition, inviting participants to explore the intricacies of their own cognitive processes and discover the dominant brain type shaping their financial behavior.

Through a series of stimulating questions, participants are prompted to contemplate various financial scenarios and their responses to them. By examining the thought patterns and choices made, the quiz aims to reveal whether impulsive reactions or rational analysis guide participants’ financial decision-making. The exploration of these cognitive tendencies provides valuable understanding of the dominant brain type at play.

This enlightening quiz empowers participants with heightened self-awareness of their financial strengths and weaknesses. Armed with this knowledge, individuals can make more informed financial decisions, leveraging their cognitive tendencies to their advantage. The quiz serves as a catalyst for self-reflection and personal growth, enabling participants to unlock the secrets of their brain type and deepen their understanding of the profound connection between neuroscience and finance.

3. Setting the Stage: Neurofinance… Hype and Reality

Neurofinance delves into the intricate workings of the human brain, investigating its activity and influence at different stages of financial decision-making, encompassing the acquisition, processing, and interpretation of information. This interdisciplinary field explores the interplay between genetic and personality traits, implicit memory, risk perception, and market context, shedding light on the multifaceted factors that shape financial decision-making processes.

The growth and maturation of neurofinance over the years have transformed it from a subject of mere speculation to a substantive discipline of scholarly inquiry. Its sustained annual growth since 2005 attests to its increasing relevance and recognition as a field that holds significant promise for unraveling the complexities of financial decision-making.

Looking ahead, the further advancement of neurofinance hinges upon the pursuit of deeper insights into the neural underpinnings of financial behavior while forging stronger connections between neuroscience and business applications. This integration aims to maximise the value derived from neuroscientific findings, fueling progress in financial markets by fostering transparency and safeguarding the interests of investors.
By harnessing the knowledge gleaned from neuroscience, neurofinance seeks to enrich our understanding of the intricate mechanisms through which the brain operates in financial decision-making. Through the fusion of neuroscience with real-world business practices, neurofinance has the potential to revolutionise conventional approaches to financial decision-making, empowering individuals and institutions to make more informed, rational, and optimal choices.

Embarking on a captivating intellectual journey into the realm of neurofinance, where the boundaries of traditional finance intersect with the frontiers of neuroscience, individuals delve into the complexities of the human brain and its profound implications for finance. This exploration unlocks a wealth of knowledge and opportunities, ushering in a new era of scientific inquiry and practical applications in the realm of financial decision-making.

3.1 A Matter of Connections

Neurofinance and Behavioral Finance emerge as interdisciplinary fields that delve into the influence of psychological processes within the brain on individual behavior during financial decision-making. These fields combine financial theories, psychology, and neuroscientific insights to elucidate the pervasive irrationality observed in financial behavior and the inefficiencies within markets.

While closely related, Neurofinance and Behavioral Finance adopt distinct approaches and models. Behavioral Finance focuses on studying how individuals make financial decisions and interprets their behavior based on psychological concepts. It acknowledges the impact of psychological variables and seeks to understand how individuals behave and interact in economic decision-making contexts.

In contrast, Neurofinance employs neurotechnology and brain imaging techniques to investigate the neural mechanisms that underlie financial behaviors. Its aim is to uncover the cognitive processes and underlying factors contributing to financial decision-making. By examining the biological factors, Neurofinance expands the scope of Behavioral Finance, offering alternative explanations for the limitations of traditional finance theories and integrating findings from neuroscience to enhance existing models.

In summary, Neurofinance serves as a bridge between traditional finance, behavioral economics, and neuroscience. It holds the potential to inform various fields such as business, economics, and everyday financial choices by integrating insights from multiple disciplines to gain a comprehensive understanding of the intricacies of financial decision-making.
3.2 Definition and Terms: A Taxonomy for Neurofinance

Neurofinance, as a multidisciplinary field, integrates the realms of neuroscience and finance to explore the intricate relationship between neural mechanisms and biological processes in shaping financial decision-making.

Over time, the understanding of decision-making in finance has evolved from the traditional rational model centered around the concept of *Homo Economicus*. Recognising the limitations of human cognition and the influence of emotions, the field has embraced the concepts of bounded rationality. This paradigm shift acknowledges that decision-makers are not always fully rational and objective in their choices.

Amidst this evolution, neurofinance has emerged as a valuable tool to delve deeper into the underlying processes of decision-making. By utilising tools and findings from neuroscience, neurofinance aims to unravel how the brain processes financial information, evaluates risks, and ultimately makes economic choices.

Through the lens of neurofinance, researchers and practitioners seek to uncover the neural mechanisms that underpin financial decision-making, shedding light on the cognitive processes, emotional responses, and biases that shape economic behaviors. This multidimensional perspective enhances our understanding of the complexities involved in financial decision-making and offers new insights that can inform more accurate models and strategies in the field of finance.

Specifically, Neurofinance employs various non-invasive measures such as functional magnetic resonance imaging (fMRI), electroencephalography (EEG), physiological signals, and genetic analysis to study brain activity and its correlation with financial choices.

By using techniques like transcranial magnetic stimulation (TMS) and studying patients with brain damage, it aims to establish causal relationships and explain how the brain processes information, leading to individual decisions.

Neuroimaging studies reveal complex neural processing of risk and ambiguity, challenging traditional economic models.

Different brain regions are associated with risk processing and ambiguity encoding. These findings underscore the need for a nuanced understanding in neurofinance.
3.3 Why Neurofinance Matters for Finance

By understanding how the different brain’s regions collaborate and processes financial information, it will be possible to make more informed financial decisions that are backed by scientific research.

In this regard, the factors that determinate financial decisions in the context of neurofinance are:

- Emotions: The influence of emotional states, such as fear, greed, or excitement
- Cognitive biases: Prejudices or biases that can lead individuals to deviate from rational decision-making, such as anchoring bias or confirmation bias
- Stress: The impact of stress on decision-making abilities and risk perception
- Personality: Individual differences in personality traits, such as risk tolerance or impulsivity
- Gender: How gender can play a role, considering any differences in risk aversion or investment preferences
- Age: The influence of age, particularly in older adults, including changes in cognitive abilities and risk perception
- Experience: How past experiences and knowledge shape decision-making processes, including implicit memory and learning from previous financial decisions

The application of neuroscience principles to the realm of finance opens up possibilities for developing strategies that can mitigate biases and emotional responses that often impede our everyday financial and investment decisions.

Strategies such as mindfulness, self-awareness, and rational decision-making are instrumental in leveraging the insights gained from neuroscience to optimise financial outcomes. Mindfulness allows individuals to cultivate a heightened sense of awareness and attention to their thoughts, emotions, and biases, enabling them to make more deliberate and objective financial choices. Self-awareness empowers individuals to recognise their own cognitive biases and emotional triggers, helping them navigate these influences more effectively. Rational decision-making involves employing logical reasoning and objective analysis to evaluate investment options, reducing the impact of impulsive or emotional decision-making.

Neurofinance, with its deep understanding of the lizard, rat, and monkey brain studies, holds particular significance for investors. By integrating the insights derived from these studies and incorporating an awareness of biases and neural mechanisms, investors can enhance their decision-making processes. Armed with this knowledge, they
can minimise risks, avoid common investment pitfalls, make more rational choices, and ultimately achieve greater financial success.

By embracing neuroscientific insights and applying them to their investment strategies, investors can gain a deeper understanding of the underlying drivers of financial behavior. This awareness empowers them to make informed decisions that are grounded in evidence and rationality, leading to improved outcomes and increased financial well-being.

3.4 Neurofinance for Financial Professional - Overview

Neurofinance, with its comprehensive understanding of the brain’s influence on financial decision-making, has practical applications across various domains.

In the realm of investment management, neurofinance offers valuable insights for optimising investment strategies. By incorporating knowledge about how the brain processes financial information, assesses risks, and makes economic choices, investment professionals can develop more effective and tailored investment approaches. Understanding the neural mechanisms that drive investor behavior can help identify patterns, anticipate market trends, and make well-informed investment decisions.

Risk assessment is another area where neurofinance proves beneficial. By delving into the neurological substrates underlying risk perception and decision-making, neurofinance provides a deeper understanding of how individuals assess and respond to risks. This knowledge can assist risk managers and financial institutions in developing robust risk assessment frameworks, identifying potential vulnerabilities, and implementing strategies to mitigate risks effectively.

In the realm of consumer behavior, neurofinance offers valuable insights into understanding consumer behaviors and decision-making processes. By investigating the neural mechanisms associated with consumer choices, neurofinance helps unravel the cognitive and emotional factors that influence purchasing decisions. This knowledge can be leveraged by marketers, advertisers, and businesses to create more targeted and persuasive marketing strategies, enhance customer experiences, and drive consumer engagement.

By integrating neuroscience principles into these domains, professionals can make more informed decisions, mitigate risks, optimise strategies, and better understand the complexities of human behavior in financial contexts.
4. Neurofinance in Practice

Neurofinance, with its ability to uncover the underlying cognitive and neural processes in financial decision-making, finds practical applications in various real-world scenarios. This unit explores two specific examples that highlight the significance of neurofinance in understanding consumer behavior and decision-making, as well as its role in Small and Medium Enterprises (SMEs).

The first case study focuses on the comparison between cash and digital forms of payment. By applying neurofinance principles, valuable insights can be gained into consumer behavior and decision-making when it comes to payment methods. Understanding how the brain processes and evaluates different payment options provides valuable information for businesses and policymakers to optimise payment systems, enhance user experiences, and influence consumer preferences.

Furthermore, the role of neurofinance in understanding financial decision-making within Small and Medium Enterprises (SMEs) will be explored. SMEs play a vital role in the global economy, and their success heavily relies on effective decision-making. Neurofinance offers a unique perspective by uncovering the neural mechanisms and cognitive processes that influence the financial choices made by SMEs. By integrating neuroscientific insights into the analysis of SME decision-making, potential biases can be identified, financial strategies can be optimised, and overall financial performance can be improved.

These practical applications of neurofinance highlight its relevance and potential impact in diverse contexts. By leveraging the knowledge gained from studying the brain’s intricacies, businesses, policymakers, and individuals can make informed decisions, optimise processes, and drive positive financial outcomes.

4.1 Case in point: Cash vs Digital Payments

The field of neurofinance offers valuable insights into the relevance of payment systems, specifically the comparison between cash and digital forms. Neuroscientific research reveals that cash payments elicit greater activation in brain regions associated with the perceived utility of motor behavior (parietal cortex) and emotional involvement. This heightened activation indicates increased salience and negative affective valence associated with cash transactions.

In a study titled “Cash, Card or Smartphone: The Neural Correlates of Payment Methods”, published in the “Frontiers in Neuroscience” journal in November 2019, findings suggest that cash may serve as a more effective self-regulating tool compared to card or smartphone payments. These insights have implications for regulating compulsive...
shopping or digital gambling behaviors. By understanding the neural processes involved in different payment methods, researchers and designers can gain a deeper understanding of their impact on consumer behavior and decision-making.

The implications of these findings are significant for the design of payment systems and strategies. By considering the neural mechanisms and emotional responses associated with different payment methods, designers can develop systems that align with consumers’ cognitive and emotional needs. This understanding can help create payment systems that promote responsible financial behavior, mitigate impulsive spending, and support financial well-being.

4.2 Neurofinance and SMEs

Practical implications of neurofinance extend to various stakeholders, including entrepreneurs, financial advisors, and policymakers. Each group can benefit from the insights gained through neurofinance research, enabling them to make informed decisions and improve financial outcomes.

For entrepreneurs, incorporating neurofinance principles can lead to more effective financial decision-making. By adopting a professional and rational approach, entrepreneurs can analyse relevant information aligned with their financial goals. This includes considering factors such as risk appetite, financial resources, and market conditions. By understanding the neural mechanisms underlying decision-making processes, entrepreneurs can minimise biases, enhance strategic thinking, and optimise their financial strategies.

Financial advisors play a crucial role in guiding individuals and organisations in their financial endeavours. By utilising neurofinance insights, advisors can gain a deeper
understanding of clients’ emotions, preferences, and decision-making tendencies. Emotion questionnaires and video clips can provide valuable data on clients’ emotional responses to financial situations. This understanding can enable advisors to tailor their advice and recommendations, ensuring alignment with clients’ cognitive and emotional needs.

Policymakers also stand to benefit from neurofinance research. They should pay attention to existing policies, particularly those related to financial support for entrepreneurs. Access to capital, non-financial support, and dissemination of information about available resources can significantly impact entrepreneurial success. By incorporating neurofinance findings into policy considerations, policymakers can design more effective support systems, better aligning them with the cognitive and emotional characteristics of entrepreneurs.

Future research in neurofinance and SME financial decision-making can further deepen our understanding of the topic. Laboratory experiments that examine brain activation patterns can provide insights into the neural processes underlying financial decision-making. Exploring heuristics as moderators can help identify decision-making biases and their impact. Structural equation models (SEM) can be employed for comprehensive analysis, offering a holistic view of the relationship between neurofinance variables and SME financial decision-making outcomes.
Innovative ways to look into financial decision making: bias detection, behavioral finance, FOMO

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1. Introduction

In this module, an exploration of innovative approaches is undertaken to reshape the understanding of financial decision-making. Within the complex and evolving financial landscape, the conventional notion of the rational *homo economicus* is being challenged, giving rise to new insights into the decision-making process. Cutting-edge techniques and concepts are examined to gain a deeper understanding of how individuals make daily financial and investment decisions.

The journey begins by investigating the operational implications of neurofinance in the financial decision-making process. The concept of bias detection and its application are unravelled, enabling the identification and mitigation of cognitive biases that can lead to suboptimal or irrational financial choices. Insights from neuroscience, psychology, and economics are integrated to develop a holistic understanding of the complex interplay between the human brain and financial decision-making.

Next, the principles and key insights of behavioral finance are explored. This interdisciplinary field examines how psychological factors and cognitive biases influence financial behavior, challenging the traditional assumptions of rational decision-making. Behavioral biases are examined to gain valuable insights into the drivers of financial decisions and their implications for market outcomes.

The phenomenon of Fear of Missing Out (FOMO) takes centre stage as the impact on investment decisions is examined. FOMO refers to the fear or anxiety experienced by individuals when they perceive others benefiting from missed opportunities. Understanding the psychological mechanisms underlying FOMO and its effects on decision-making provides a nuanced perspective on how it influences investment behavior and market dynamics.

Lastly, the behavior of traders in daily financial markets is explored. Through the analysis of their decision-making processes, risk attitudes, and interactions with market dynamics, valuable insights into the complexities of financial markets are uncovered.
Empirical research and behavioral models contribute to a deeper understanding of the factors that drive trading decisions, market volatility, and price dynamics.

Through this comprehensive exploration, the aim is to deepen knowledge and understanding of innovative approaches to financial decision-making. By embracing the academic and scientific principles underlying these concepts, individuals are equipped with the tools and insights necessary to navigate the complex and dynamic financial landscape with greater efficacy. Join this transformative journey to expand horizons and enrich decision-making abilities in the realm of finance.

2. Bias and Bias Detection

Within this unit, a deep exploration of the concept of biases and their implications is undertaken, shedding light on their potential pitfalls and the significance of detecting and mitigating biases in the realm of financial decision-making. Cognitive biases, which are inherent shortcuts or distortions in our thinking processes, have the capacity to introduce systematic errors and steer individuals away from rational and objective decision-making.

Recognising the presence of biases is of paramount importance for investors, traders, and financial professionals alike, as it allows for more accurate assessments and the avoidance of costly mistakes. By gaining a comprehensive understanding of different biases and their impact on financial choices, individuals can develop effective strategies for detecting and managing biases in the decision-making process. The ultimate goal is to uncover the hidden biases that can sway financial decisions and to cultivate the skills necessary to navigate the intricate landscape of biases in a way that promotes informed and effective decision-making.

2.1 Understanding Biases in Decision-Making

Within the realm of understanding biases, several key concepts come to the forefront. Biases, which are cognitive shortcuts, play a significant role in decision-making processes and can lead individuals to deviate from rationality, resulting in irrational or suboptimal choices. Emotions, such as fear, greed, and overconfidence, exert a powerful influence on financial decisions and can contribute to the manifestation of biases.

Heuristics, or mental rules of thumb, are utilised in decision-making processes but can introduce biases and judgment errors. These cognitive shortcuts often stem from a need for efficiency and simplicity in decision-making, but they can lead to biased outcomes. Additionally, social factors, including social influence, peer pressure, and herd behavior, impact investment choices and have the potential to introduce biases into decision-making processes.
The concept of rationality serves as an idealised benchmark for decision-making, emphasising the importance of objective analysis and the maximisation of utility. However, biases can impede the attainment of rational decision-making, highlighting the need for individuals to recognise and address the influence of biases in their financial choices.

By understanding these key concepts surrounding biases, individuals can develop a more nuanced perspective on decision-making processes and take proactive steps to identify and mitigate biases in order to make more informed and rational financial decisions.

2.2 Confirmation Bias and Its Influence

Confirmation bias is a widely recognised cognitive bias that profoundly influences decision-making, particularly in the context of investment choices. It refers to the tendency of individuals to selectively seek out and interpret information in a manner that confirms their pre-existing beliefs or biases, while disregarding or downplaying contradictory evidence. Investors who hold a particular belief or expectation about an investment are especially susceptible to confirmation bias, as they actively seek information that supports their viewpoint while neglecting conflicting data.

This bias can have significant consequences for the decision-making process, as it distorts individuals’ perception of reality and limits their consideration of alternative perspectives and potential risks. By selectively processing information that aligns with their preconceived notions, investors may develop an inflated sense of confidence in their investment decisions, while neglecting crucial factors that could impact the outcome. As a result, confirmation bias often leads to suboptimal investment decisions, as it impedes the objective evaluation of available information and hinders the consideration of diverse viewpoints.

Understanding the mechanisms and influence of confirmation biases is paramount for individuals seeking to make more objective and informed financial decisions. By recognising the presence of confirmation bias and its potential impact, investors can develop strategies to mitigate its effects. This may involve actively seeking out diverse perspectives, challenging one’s own beliefs, and consciously considering contradictory evidence. By adopting these approaches, investors can broaden their decision-making process, enhance their evaluation of investment opportunities, and ultimately make more prudent and well-informed financial choices.

To overcome confirmation bias, investors should cultivate a mindset of intellectual humility and actively seek out information that challenges their existing beliefs. Engaging in rigorous research, seeking diverse opinions, and maintaining a critical mindset can help investors uncover blind spots and consider alternative viewpoints. Additionally,
implementing systematic processes, such as peer reviews or devil’s advocate roles, can serve as checks and balances to minimise the influence of confirmation bias. By incorporating these strategies into their decision-making process, investors can reduce the impact of confirmation bias and make more rational and unbiased financial decisions.

### 2.3 Tools and Techniques for Detecting Biases

In order to detect and mitigate biases in financial decision-making, individuals can utilize various tools and techniques. Self-reflection and awareness play a fundamental role, as individuals need to examine their own cognitive biases and reflect on how these biases may influence their investment decisions. This introspective process allows individuals to gain insights into their own thinking patterns and biases.

Cognitive assessment tests are another valuable tool for detecting biases. These tests provide individuals with a structured assessment of their cognitive strengths and weaknesses, shedding light on potential biases that may be at play. By understanding their cognitive tendencies, individuals can develop strategies to counteract biases and make more informed decisions.

Data analysis and quantitative models also offer an objective approach to detecting biases. By analysing historical data and utilising quantitative models, individuals can identify patterns and trends that may indicate the presence of biases. These data-driven approaches provide valuable insights into decision-making processes and can help individuals make more rational and objective choices.

Seeking external perspectives through peer review and input from mentors or external experts is another effective strategy for detecting biases. By engaging in discussions and receiving feedback from others, individuals can gain alternative viewpoints and challenge their own biases. This external input serves as a valuable check and balance to ensure more comprehensive decision-making.

Structured decision-making frameworks, such as cost-benefit analysis or scenario analysis, offer a systematic approach to mitigating biases. By adopting these frameworks, individuals can introduce structured evaluations and considerations into their decision-making process, reducing the influence of biases and increasing objectivity.

Advanced technologies, including machine learning algorithms, can also be utilised to detect biases. These technologies enable the analysis of large datasets and the identification of patterns that may indicate the presence of biases. By leveraging these tools, individuals can uncover hidden biases and make more informed decisions.
Continuous education and learning are crucial for detecting and addressing biases. Staying updated with research and literature in the field of behavioral finance and decision-making allows individuals to gain insights into the latest findings and techniques for bias detection. This ongoing learning process enhances individuals’ ability to recognise and mitigate biases in their financial decision-making.

Combining multiple approaches is often the most effective way to detect and address biases. By utilising a combination of self-reflection, cognitive assessment tests, data analysis, external perspectives, decision-making frameworks, technology, and continuous education, individuals can adopt a comprehensive approach to bias detection in financial decision-making.

3. Fear of Missing Out (FOMO)

This unit offers an exploration into the “Fear of Missing Out”, or FOMO. In the rapidly evolving financial landscape, traditional notions of rationality are being challenged, prompting the need for new approaches to comprehend the complexities of decision making. The focus of this unit is on FOMO, a psychological phenomenon that has garnered significant attention in recent years.

Within the realm of finance, FOMO represents the fear experienced by traders and investors when they perceive potentially lucrative investment or trading opportunities that they might miss out on. This fear becomes intensified when assets undergo rapid value growth within a short timeframe. By examining the cognitive biases and emotional factors associated with FOMO-driven behaviors, we can gain insights into the implications for financial decision making.

Throughout this unit, the multifaceted dimensions of FOMO and its impact on investment choices will be thoroughly explored. The psychological underpinnings of FOMO will be examined, shedding light on the impulsive and irrational tendencies it can induce in investors. Strategies for detecting and managing FOMO will be discussed, providing individuals with the means to make more informed and rational financial decisions.

An essential aspect of our analysis will revolve around examining FOMO within specific financial contexts, such as the cryptocurrency market. By analysing case studies like the rise of Dogecoin and its association with FOMO, valuable insights can be gained into the dynamics of FOMO-driven investment decisions and the resulting market volatility.

The ultimate objective of this module is to equip learners with a comprehensive understanding of FOMO and its impact on financial decision making. By acquiring insight into the complexities of FOMO, individuals can develop the knowledge and tools
necessary to navigate the intricate financial landscape, fostering a greater capacity for informed and prudent decision making.

3.1 A Formal Definition of FOMO

FOMO, or Fear of Missing Out, has gained significant attention in recent years. Coined by marketing strategist Dan Herman in a 2000 academic paper titled “The Journal of Brand Management”, FOMO refers to the fear of not utilising all available possibilities and the potential loss of joy associated with not exploring these opportunities fully.

This phenomenon manifests in various contexts, including social interactions, novel experiences, memorable events, and profitable investments. In terms of social interactions, individuals fear missing out on constant access to social media platforms and the potential connections and experiences they offer. Additionally, FOMO extends to seeking out novel experiences to avoid the fear of missing out on unique and exciting opportunities.

Memorable events, such as concerts, previews or finals of major competitions, also trigger FOMO. The scarcity of tickets for these events often leads to inflated secondary market prices as individuals strive to avoid missing out on a once-in-a-lifetime experience.

In the realm of investments, FOMO frequently arises in the context of cryptocurrencies. As the value of certain cryptocurrencies surges, individuals may experience the fear of missing out on significant profits, leading to impulsive investment decisions driven by the desire to capture potential gains.

The impact of FOMO on financial decision-making is substantial. The fear of missing out can distort rational judgment and lead individuals to make hasty and ill-informed investment choices. The psychological pressure to conform to prevailing trends or not miss out on potential opportunities can cloud individuals’ assessment of risks and rewards.

Understanding FOMO and its influence on decision-making is crucial for investors and financial professionals. By recognising the presence of FOMO and its potential consequences, individuals can take steps to manage its impact. Developing strategies to assess investment opportunities objectively, considering risk factors, and maintaining a long-term perspective can help mitigate the negative effects of FOMO on financial decision-making.

3.2 FOMO in Plain - Financial Context

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FOMO, as defined in the financial markets and trading context, encompasses the fear felt by traders and investors when they miss out on potentially profitable investment or trading opportunities. This fear intensifies when an asset experiences significant value growth within a short timeframe. These insights, highlighted by Binance Academy, shed light on the psychological dynamics underlying FOMO in financial context.

FOMO can have significant implications for financial decision-making. It often leads to emotional decision-making rather than logical reasoning, resulting in impulsive or irrational investment choices. This fear-driven behavior poses risks for both individuals and the market community, as decisions are motivated by the fear of missing out on opportunities.

Undisciplined retail investors are especially vulnerable to the effects of FOMO. They may be more susceptible to trading assets at overpriced levels and increasing the risk of financial losses due to their desire to participate in perceived profitable ventures. It is crucial for individuals to recognize the influence of FOMO and develop strategies to mitigate its impact.

Understanding and managing FOMO is essential for individuals and market participants alike. By maintaining a disciplined approach to investment, conducting thorough research, and adhering to a long-term investment strategy based on sound fundamentals, individuals can make more informed decisions and reduce the negative effects of FOMO on their financial outcomes.

3.3 Case in Point: Dogecoin (DOGE)

Dogecoin, a cryptocurrency introduced in 2013, has gained significant attention as a light-hearted and meme-inspired digital currency. With its logo featuring the Shiba Inu dog from the popular “Doge” meme, Dogecoin has garnered a devoted community and a strong presence on various social media platforms. However, its association with Elon Musk and his periodic quotes has propelled its popularity to new heights.

The quotes by Elon Musk, a prominent figure in the business and technology world, have coincided with notable price surges for Dogecoin. Investors, driven by the fear of missing out (FOMO), eagerly sought to invest in Dogecoin, viewing it as a promising gem in the cryptocurrency market, particularly when endorsed by Musk. This surge in demand led to dramatic price increases, reflecting the impulsive buying behavior influenced by the belief that Dogecoin’s value would continue to soar.

Consequently, Dogecoin’s value has experienced significant fluctuations in the market. While its viral presence and the support it garnered from social media communities have contributed to its popularity, the reliance on FOMO-driven investment...
decisions has exposed the coin to heightened volatility. The perception that Dogecoin holds immense potential and the influence of Elon Musk’s remarks have amplified the market dynamics surrounding this cryptocurrency.

In a specific example, in April 2022, Elon Musk assumed the role of CEO at Twitter, a widely recognised social media platform. Then, on April 3, 2023, a notable event occurred when the desktop version of Twitter featured a Shiba Inu image, the iconic representation associated with Dogecoin, instead of its customary blue bird logo. This change generated a surge in interest and investment activity, resulting in a substantial increase in Dogecoin’s value by 32.8%.

These instances highlight the influence of social media and prominent personalities in shaping the perception and market behavior surrounding cryptocurrencies. The combination of FOMO-driven investment decisions, viral social media presence, and endorsements by influential figures like Elon Musk can have profound effects on the value and volatility of cryptocurrencies like Dogecoin.

3.4 FOMO vs FUD

The dynamic interplay between FOMO and FUD in financial markets presents contrasting behaviors and outcomes. FOMO is characterised by compulsive buying driven by the fear of missing out on potential gains. This psychological state fuels increased demand, leading to exponential price increases. Conversely, FUD, or “Fear, Uncertainty, and Doubt”, induces negative spikes and price collapses through panic selling.

FUD commonly refers to the dissemination of negative or false information about a specific financial item. This tactic aims to instil fear and doubt among investors, triggering a wave of panic selling. The intentional spread of FUD can be employed by individuals or groups seeking to manipulate the market for their own advantage.

The impact of FOMO and FUD on market dynamics is significant. FOMO-driven buying frenzies can create inflated prices and speculative bubbles, while FUD-induced panic selling can lead to sharp price declines and market instability. These behavioral patterns reflect the powerful influence of investor sentiment and highlight the need for cautious decision-making and critical evaluation of information in financial markets.

Understanding the dynamics of FOMO and FUD is essential for investors and market participants. By recognising these psychological states and the potential manipulation associated with them, individuals can make more informed investment decisions and navigate market fluctuations with greater resilience and discernment.
4. Traders’ Behavior and Daily Finance

The comprehensive examination of FOMO and FUD, encompassing compulsive buying and panic selling, paves the way to conclude this module by delving into the intricate realm of investors and traders’ behavior and their daily financial choices. This exploration is pivotal in the field of finance, as it elucidates the underlying factors that shape market dynamics and ultimately influence investment outcomes.

By delving into the study of traders’ behavior and daily finance through the interdisciplinary lenses of behavioral finance and neurofinance, a profound understanding of the intricate psychological and neural mechanisms at play can be attained. This nuanced comprehension holds the potential to yield significant implications for various domains within the financial landscape.

One such domain is risk management. Analysing the behavior of traders enables the identification of patterns and tendencies that may contribute to the perception and management of risk. By recognising the cognitive biases and emotional drivers that shape decision-making processes, financial practitioners can develop more robust risk management strategies, minimising the adverse impact of biases and improving overall risk-adjusted returns.

Furthermore, the study of traders’ behavior sheds light on the development of effective investment strategies. Uncovering the behavioral and cognitive biases that influence traders’ decision-making processes allows for the refinement of investment approaches. By integrating insights from behavioral finance and neurofinance, investors can design strategies that leverage the strengths of individuals’ decision-making capabilities while mitigating the impact of biases, resulting in more informed and potentially more successful investment decisions.

Moreover, an understanding of traders’ behavior and daily financial choices extends to the realm of individual financial well-being. By unravelling the psychological and neural mechanisms that underpin financial decision-making, individuals can gain insight into their own behaviors, biases, and decision patterns. Armed with this knowledge, individuals can adopt proactive measures to enhance their financial well-being, such as implementing effective budgeting, savings, and investment strategies tailored to their own risk preferences and financial goals.

In conclusion, the examination of traders’ behavior and daily finance through the lenses of behavioral finance and neurofinance opens up a vast landscape of possibilities for enhancing risk management, refining investment strategies, and improving individual financial well-being. By fostering a deeper understanding of the complex interplay between psychology, neuroscience, and finance, the following units equip learners with
the knowledge and insights necessary to navigate the intricacies of investors’ behavior and make informed financial decisions in an ever-evolving financial landscape.

4.1 Panic Selling: the Case of Eli Lilly and Free Insulin

Within the realm of social media, the focus remains to Twitter and the entry of Elon Musk as CEO. Under the new management, a notable innovation introduced in beta was the opportunity for users to obtain a “blue check”, indicating a verified profile, for a monthly fee of approximately $8.

During this time, an incident occurred involving a fake Twitter account impersonating Eli Lilly, a pharmaceutical company. Notably, this imposter account had managed to obtain the coveted blue checkmark through the new verification method. The deceptive account posted a false announcement, claiming that insulin would now be available for free.

The impact of this false information was swift and significant, triggering a wave of panic selling among investors. As a result, the stock share price of Eli Lilly experienced a sharp decline, plummeting by 4.37% or $16.08 in a single day. This decline, by traditional financial standards, represents a substantial decrease in stock market value.

This scenario exemplifies a classic case of FUD, or “Fear, Uncertainty, and Doubt”. Although the dissemination of false information was not illegal, it effectively manipulated the market and instigated a panic-driven response from investors.

To address the situation and provide clarification, the genuine Twitter account of Eli Lilly and Company, known as @LillyPad, made efforts to rectify the confusion later that same day. Their intervention aimed to dispel the false information and restore confidence among investors and the market community.

This instance serves as a poignant illustration of the impact that false information can have on financial markets, particularly when disseminated through social media platforms. It underscores the need for vigilance and critical evaluation of information in order to mitigate the effects of FUD and ensure the integrity and stability of the financial ecosystem.

4.2 Behavioral Finance

Traders’ behavior in financial markets frequently diverges from rationality, influenced by various behavioral tendencies that can significantly impact decision-making processes. One prominent theory that sheds light on these deviations is Prospect Theory,
which posits that individuals tend to value potential gains and losses differently. As a result, they exhibit risk-seeking behavior when facing losses and risk-averse behavior when confronted with potential gains.

The theory suggests that traders may make irrational investment choices driven by subjective evaluations of potential gains and losses, rather than relying on objective probabilities. This subjective evaluation process can introduce biases and distortions into their decision-making, leading to suboptimal investment outcomes.

A notable insight from research conducted by Lucy and Dowling in 2005 is the profound influence of emotions on the decision-making process. Their assertion that “every aspect of the decision-making process is influenced by the feelings of the decision-maker” underscores the significant role that emotions play in shaping traders’ behavior and their subsequent investment choices.

These findings highlight the importance of considering the psychological and emotional factors that drive traders’ decision-making processes. By recognising the impact of emotions and subjective evaluations on investment decisions, traders can strive to adopt a more rational and objective approach. This awareness can help mitigate the influence of biases and enhance the overall decision-making quality, leading to more informed and potentially more successful investment outcomes.

4.3 Loss Aversion and Head Behavior

Loss aversion is a prominent behavioral tendency observed among traders, whereby the pain of losses is felt more intensely than the pleasure derived from gains. This phenomenon leads traders to exhibit a preference for avoiding losses rather than maximising gains. Consequently, they may hold onto losing positions for extended periods, which can have a detrimental impact on their overall investment performance.

Herd behavior is another prevalent behavioral tendency observed among traders, whereby individuals are influenced by the actions of others in the market. This can manifest as traders making decisions based on social influence rather than conducting independent analysis. The susceptibility to herd behavior poses significant risks as it can contribute to the formation of market bubbles or crashes. Traders may be driven by the fear of missing out (FOMO) and blindly follow the actions of others, leading to distorted market dynamics.

These deviations from rationality in traders’ behavior underscore the importance of considering behavioral factors and biases when seeking to understand market dynamics and make informed investment decisions. By analysing the impact of loss aversion and herd behavior, traders can adopt strategies that mitigate the negative effects of these
tendencies. This may involve developing disciplined risk management approaches, conducting independent research and analysis, and maintaining a long-term perspective that aligns with their investment goals.

Understanding and incorporating behavioral factors into the decision-making process is crucial for traders and investors to navigate the complexities of financial markets successfully. By doing so, individuals can mitigate the influence of biases and behavioral pitfalls, enhancing their ability to make informed investment decisions that align with their financial objectives. Moreover, recognising the impact of behavioral tendencies on market dynamics can inform regulatory efforts to promote stability and mitigate systemic risks associated with irrational trading behaviors.

4.2 Best Practice: Mind Over Money

Mind Over Money is an exemplary organization at the forefront of applying neurofinance principles to improve individuals and organizations’ financial decision-making. With their claim of “Humanizing Finance to unlock potential”, they have established themselves as a best practice in promoting better daily financial decision-making through the integration of neurofinance knowledge.

Mind Over Money recognises the interplay between psychology, behavioral science, and financial skills training in shaping decision-making processes. By combining these disciplines, they empower individuals to make more informed choices and develop a deeper understanding of their financial behaviors. Through an empathetic and supportive approach, Mind Over Money equips individuals with the necessary skills and tools to thrive financially.

One notable tool offering from Mind Over Money is a free and open tool - [https://www.wearemindovermoney.com/moneypersonalityquiz](https://www.wearemindovermoney.com/moneypersonalityquiz) - designed to assess individual financial challenges associated with behavioral tendencies. This tool allows individuals to assess their own financial challenges related to behavioral tendencies, enabling them to better understand the factors influencing their financial decision-making.

By leveraging neurofinance insights, Mind Over Money provides a comprehensive approach to addressing behavioral challenges in financial decision-making. They emphasise the importance of bridging the gap between financial knowledge and behavioral biases, enabling individuals to make more rational and effective financial decisions.

Through their commitment to humanising finance and unlocking individual potential, Mind Over Money serves as a best practice in promoting better financial
decision-making. By combining the knowledge of neurofinance with practical tools and resources, they empower individuals to navigate the complexities of the financial landscape and achieve greater financial well-being.
Exploring the Failure of Silicon Valley Bank (SVB): A Case Study of Mismanagement and Social Media’s Impact
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1. Introduction

This study presents an in-depth analysis of the failure of Silicon Valley Bank (SVB) while focusing on the implications of mismanagement and the role of social media. The case study of SVB provides valuable insights into the intricate relationship between mismanagement and organisational challenges within a financial institution.

The analysis begins by examining the internal mismanagement and organisational issues that contributed to SVB’s downfall. By exploring the factors that led to mismanagement, such as poor decision-making, internal conflicts, and operational inefficiencies, we aim to understand the underlying causes of SVB’s failure and its broader impact on the financial institution.

Furthermore, the study investigates the role of social media in shaping public perception and reputation within the financial industry. Social media platforms have emerged as powerful influencers, significantly impacting customer trust, investor confidence, and regulatory scrutiny. Through an examination of social media’s impact on SV’s failure, valuable insights into the profound influence of digital platforms on the financial sector are gained.

By analysing SVB’s failure within the broader financial landscape, it is possible to identify interconnected factors that contribute to systemic risks and the potential contagion effect within the industry.

This study contributes to the broader discourse on mismanagement in financial institutions and the transformative impact of social media. By unravelling the complexities of SVB’s failure, it provides valuable lessons and insights applicable to both academia and industry. Effective management, risk assessment, and reputation management in the digital age emerge as crucial elements in navigating the challenges faced by financial institutions.

Through this comprehensive exploration, a deeper understanding of the intricate dynamics at play is sought, emphasising the significance of prudent decision-making, operational efficiency, and effective communication in mitigating risks and ensuring the long-term success of financial institutions.
2. Mismanagement and SVB’s Failure

In this unit, the captivating case study of Silicon Valley Bank (SVB) is explored, unraveling the intricate web of mismanagement that led to its ultimate downfall. Through an examination of internal organisational issues, critical factors that played a pivotal role in SVB’s failure are brought to light. This case serves as a valuable learning experience, providing profound insights into the consequences of mismanagement and its impact on the financial institution. The exploration of SVB’s failure enables an understanding of the importance of effective decision-making, operational efficiency, and organisational resilience in navigating challenges and ensuring long-term success in the financial industry.

2.1 Introduction to SVB and Case Study

Silicon Valley Bank (SVB) holds a prominent position in the financial landscape, having been established in 1983 as a specialised commercial bank catering to technology, innovation, life science, and venture capital (VC) companies. With its headquarters located in Santa Clara, California, SVB has long been recognised as a key player within the thriving Silicon Valley ecosystem, providing essential financial services and support to start-ups and emerging tech firms.

However, despite its initial success and industry reputation, SVB’s downfall can be attributed to internal mismanagement and a series of organisational issues. These critical factors ultimately led to a decline in the bank’s reputation and a subsequent financial collapse. The repercussions of SVB’s failure reverberated throughout the broader financial industry, underscoring the necessity for recalibrating risk management practices and acknowledging the influential role of social media as a significant threat to financial institutions.

The case of SVB serves as a poignant reminder of the potential consequences that internal mismanagement can have on the stability and sustainability of financial institutions. It highlights the importance of robust risk management frameworks, effective governance structures, and proactive measures in addressing organisational challenges. Moreover, the recognition of social media as a force that can shape public perception and impact reputation underscores the need for financial institutions to adapt and integrate digital communication strategies in their risk management frameworks.

By delving into the specifics of SVB’s failure, this case study offers valuable lessons and insights for financial professionals, regulators, and scholars alike. It emphasises the importance of vigilance, transparency, and accountability in ensuring the long-term success and resilience of financial institutions within a rapidly evolving and interconnected digital landscape.
2.2 Internal Mismanagement and Organisational Issues

The failure of Silicon Valley Bank (SVB) has been described by Michael Barr, the Federal Reserve’s vice chair for supervision, as a textbook case of mismanagement. This assessment highlights the pivotal role that mismanagement played in SVB’s downfall and subsequent financial collapse.

Several key elements of mismanagement within SVB contributed to its failure. One such element was the inadequate management of interest rates, which resulted in a lack of sufficient coverage for the bank’s exposure to rising interest rates in its long-term government bond holdings. This vulnerability exposed SVB to significant financial risks and undermined its financial stability.

Another area of mismanagement was the handling of liquidity risk. SVB exhibited deficiencies in liquidity risk management, including inadequate contingency funding and liquidity stress testing. These shortcomings left the bank ill-prepared to navigate periods of financial stress and volatility, further exacerbating its financial troubles.

The failure of SVB can also be attributed to insufficient risk management and internal controls. The bank’s risk management practices were found to be lacking, and internal controls failed to adequately mitigate and address potential risks. This weakness left SVB vulnerable to operational inefficiencies, financial irregularities, and heightened exposure to external market forces.

Furthermore, SVB’s failure can be attributed to a failure to address internal problems and strengthen its balance sheet. The bank neglected to address underlying issues within its operations and failed to take proactive measures to strengthen its financial position. This lack of strategic foresight and decisive action ultimately contributed to the erosion of SVB’s financial health and viability.

Lapses in the internal audit function further compounded SVB’s mismanagement. Inadequate oversight and deficiencies in the internal audit process allowed for the perpetuation of operational weaknesses and failed to identify and rectify issues in a timely manner. This failure to maintain robust internal audit practices hindered SVB’s ability to address internal deficiencies effectively.

Lastly, the failure of SVB also highlighted regulatory oversight and supervision failures. Regulatory authorities were unable to effectively monitor and address the bank’s mismanagement issues, indicating shortcomings in the supervisory framework and regulatory processes. The lack of timely intervention and corrective measures further exacerbated the impact of SVB’s mismanagement on its operations and the broader financial industry.
Through a comprehensive examination of SVB’s mismanagement, it becomes evident that multiple factors and systemic weaknesses contributed to its failure. Addressing these elements of mismanagement is crucial for financial institutions to safeguard their stability, enhance risk management practices, and reinforce internal controls. The case of SVB serves as a cautionary tale, underscoring the need for proactive measures, robust internal governance, effective risk management frameworks, and stringent regulatory oversight to ensure the resilience and long-term viability of financial institutions.

2.3 Resulting Downfall and Failure of SVB

On March 9th, 2023, SVB experienced a significant outflow of funds as customers hastily withdrew over $40 billion from the bank. This mass withdrawal was triggered by SVB’s disclosure of a staggering $1.8 billion loss in its bond portfolio, which eroded confidence in the bank’s financial stability and viability.

The downfall of SVB stands as one of the most significant bank failures in US history, ranking as the second largest in terms of its impact. Unlike the protracted collapse of Washington Mutual in 2008, SVB’s demise unfolded rapidly within a compressed two-day timeframe. This swift and dramatic unravelling further highlighted the severity of the bank’s mismanagement and the extent of its financial distress.

The abruptness of SVB’s collapse sent shockwaves throughout the financial industry, underscoring the fragility and interconnectedness of the banking system. The repercussions of SVB’s failure reverberated not only within the bank itself but also across the broader financial landscape, raising concerns about systemic risks and the potential domino effect on other financial institutions.

The compressed timeline of SVB’s collapse serves as a cautionary tale, illustrating how severe mismanagement and financial vulnerabilities can lead to rapid and devastating consequences. It underscores the importance of robust risk management.
practices, effective internal controls, and proactive regulatory oversight in safeguarding the stability and resilience of financial institutions.

The downfall of SVB and the subsequent mass withdrawal of funds reflect the critical role of public trust and confidence in the banking system. The incident also highlights the need for transparency, timely disclosure of financial information, and effective communication to mitigate the adverse impact on customer sentiment and market stability.
3. The Role of Social Media

Social media platforms have revolutionised the financial landscape, exerting a profound impact on market dynamics, investor behaviors, and public perception. In the case of SVB’s failure, the role of social media was pivotal, accelerating events and amplifying their consequences. This unit explores the multifaceted role of social media in SVB’s failure, examining its implications on investor panic, reputation damage, and the broader financial industry.

The accelerated nature of SVB’s downfall can be attributed to the central role played by social media platforms. The rapid dissemination of information, opinions, and sentiments through these digital channels intensified the impact and reach of negative sentiments, eroding investor trust and triggering a surge of withdrawals that exacerbated the bank’s financial distress. This underscores the need for financial institutions to effectively navigate the influential realm of social media, especially in the current digital age.

Social media’s influence extends beyond individual depositors, shaping investor behaviors and fuelling market reactions. Notable quotes and tweets from industry experts and investors capture the swift and disruptive nature of the events surrounding SVB’s failure, underscoring the profound influence of social media in disseminating information and driving market sentiment.

The negative sentiment and alarming information spread through social media had tangible consequences for SVB. It damaged the bank’s reputation, eroded customer trust, and contributed to the loss of the customer base. This case highlights the importance of proactive online presence management, transparent communication, and crisis response strategies to mitigate the impact of negative sentiments and maintain stakeholder confidence.

Regulators also face new challenges in monitoring and responding to social media dynamics to ensure the integrity and stability of the financial system. The rapid spread of news, opinions, and rumours on social media platforms necessitates vigilant monitoring, early detection of misinformation, and effective measures to address market volatility and systemic risks.

As the influence of social media continues to grow, financial institutions, regulators, and market participants must adapt their risk management frameworks and strategies. By understanding the interplay between social media, market behavior, and public perception, they can navigate the challenges and harness the opportunities presented by the dynamic digital era.
3.1 Introduction to Social Media on Finance

According to Professor Michael Imerman from the Paul Merage School of Business at the University of California-Irvine, SVB’s failure can be characterised as a “bank sprint” rather than a traditional bank run, largely attributed to the pervasive influence of social media in shaping public perception and triggering rapid reactions.

In a traditional bank run, a large number of depositors simultaneously withdraw their funds from a bank due to concerns about its solvency or stability. This loss of confidence in the bank’s ability to fulfil withdrawal requests can lead to liquidity problems, insolvency, and potentially the collapse of the institution.

However, in SVB’s case, the events unfolded at an accelerated pace, propelled by the central role played by social media platforms. The swift dissemination of information through these digital channels amplified the impact and reach of negative sentiments, triggering a surge of withdrawals and exacerbating the bank’s financial distress.

Social media’s influence extends beyond individual depositors and encompasses a broader spectrum of stakeholders in financial markets. It has the power to shape investor behaviors and fuel market reactions, with the potential to amplify panic and exacerbate systemic risks.

The speed and reach of information dissemination on social media platforms have transformed the landscape of financial markets, creating new challenges for financial institutions and regulators. The instantaneous spread of news, opinions, and rumours through these channels can trigger rapid shifts in market sentiment, amplifying volatility and heightening the vulnerability of financial institutions.

The case of SVB’s failure serves as a stark reminder of the need for financial institutions to effectively navigate the dynamic and influential realm of social media. It underscores the importance of proactive reputation management, crisis communication strategies, and robust risk mitigation measures in mitigating the impact of negative sentiments and maintaining stakeholder confidence.

Furthermore, it highlights the critical role of regulators in monitoring and responding to social media-driven market dynamics. Regulators must remain vigilant and adaptive, harnessing technology and data analytics to detect early warning signs, address misinformation, and ensure the integrity and stability of financial markets.

As the influence of social media continues to grow, financial institutions must continually adapt their risk management frameworks and develop strategies to monitor and respond to online sentiment. By understanding the intricate interplay between social media, market behavior, and public perception, financial institutions can enhance their
resilience, reputation, and long-term viability in an increasingly interconnected digital era.

3.2 Quotes and Tweets

“If you see a bomb disposal expert running down the street, don’t ask them what’s happened, just try to keep up”, remarked Daniel Davies, a columnist for the Financial Times, emphasising the swift and disruptive nature of the events surrounding SVB’s failure.

Patrick McHenry, a member of the US House Financial Services Committee, coined the term “the first Twitter-fuelled bank run” to capture the influential role played by social media platforms in triggering and amplifying the run on SVB.

A study published on April 24, 2023, by SSRN highlighted the predictive power of Twitter conversations during the bank run period. The study found that the intensity of Twitter discussions about a bank could forecast hourly stock market losses, underscoring the significant impact of social media on market dynamics.

Mark Tluszcz, the CEO of Mangrove Capital, issued a stern warning, stating that it was the responsibility of board members and shareholders to advise companies to secure their cash holdings, reflecting the heightened sense of concern and urgency among industry insiders.

Jason Calacanis, an investor, expressed his alarm on Twitter, stating, “YOU SHOULD BE ABSOLUTELY TERRIFIED RIGHT NOW!”. His message encapsulated the heightened emotions and panic associated with the unfolding crisis.

Echoing similar sentiments, another investor on Twitter asserted that such reactions were justified in the face of a bank run and the ensuing contagion, reflecting the collective anxiety and fear permeating social media platforms.

Recognising the significance of monitoring social media, Patricia McCoy from Boston College emphasised the need for regulators to be vigilant around the clock. Regulators should actively seek out signs of unsubstantiated rumours and mounting panic on social media to proactively address potential risks and maintain market stability.

These quotes and tweets illustrate the profound impact of social media in disseminating information, shaping public sentiment, and influencing market behavior during times of financial distress. They underscore the urgency for regulators, financial institutions, and market participants to closely monitor and respond to social media dynamics to ensure the integrity and stability of the financial system.

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Intensive Summer Programme “From traditional finance to neurofinance”
Training Materials
3.3 Impact of Social Media in SVB’s Failure

The impact of social media on SVB’s failure was profound, amplifying the challenges faced by the institution and contributing to its ultimate downfall. As negative sentiment spread rapidly across social media platforms, it eroded investor trust, damaged SVB’s reputation, fuelled investor panic, and resulted in a loss of customer base. These repercussions highlight the need for businesses to proactively manage their online presence, prioritise transparent communication, and address customer concerns on social media. Additionally, SVB’s failure underscores the importance of considering the role of social media in financial regulation to mitigate risks and ensure the stability of the industry.

Specifically, the lack of transparency surrounding SVB’s operations and financial health was exacerbated by the rapid dissemination of negative information and rumours on social media platforms. This widespread circulation of negative sentiment eroded investor trust and contributed to the accelerated downfall of SVB.

The damaging impact of social media on SVB’s reputation cannot be understated. Negative posts and discussions on social media platforms tarnished SVB’s brand image, creating a perception of incompetence or unethical behavior. These damaging associations further undermined investor confidence and contributed to the loss of trust in the institution.

The role of social media in fuelling investor panic cannot be ignored. The rapid spread of negative sentiment and alarming information on social media platforms triggered a mass exodus of funds from SVB. This panic-selling intensified the financial instability and hastened the collapse of the institution.

The negative sentiment expressed on social media platforms also had tangible consequences for SVB’s customer base. Dissatisfied customers took to social media to voice their frustrations, leading to a significant loss of trust and loyalty for SVB. This erosion of customer relationships further exacerbated the institution’s decline, ultimately contributing to its fall and collapse.

SVB’s failure serves as a critical lesson for future businesses operating in the digital era. It highlights the importance of proactive online presence management, transparent communication, and effective customer support on social media platforms. Maintaining trust and addressing concerns raised on social media are vital for businesses to safeguard their reputation and customer base.

Furthermore, SVB’s failure underscores the need for new regulations that consider the impact of exogenous variables, such as social media, on financial institutions. Regulators
should assess the role of social media in shaping market dynamics and consider implementing measures to mitigate risks and ensure the stability of the financial industry in the face of rapid information dissemination and sentiment amplification on social media platforms.
Crypto-based scenario: evolving perceptions and attitudes
Author: Robert Poskart, University of Opole

The following topics will be discussed:
How people perceive money?
Money - definition
The survey
Research questions
Research hypotheses
Trust to financial system
Money trust
Cryptocurrencies
Conclusions

Perception of cryptocurrencies and the fiat money by young financial market participants in times of military conflict.
Example of Romania, Poland and Ukraine.

- Money is not a neutral transaction tool, but an object of various emotions.
- Money and people's attitude towards money is not only an economic but also a psychological problem.
- Perception of money is a very individual matter

Money - definition
- Money as "a commodity accepted by general consensus as a means of economic exchange. It is a medium in which prices and values are expressed; as a currency it circulates anonymously from person to person and from one country to another, thus facilitating trade, it is also a basic measure of wealth" (Encyclopedia Britannica).
- Money evolution
- Virtual money as “a type of non-regulated digital money that is issued and usually controlled by its creators and used and accepted by members of a specific virtual community” (Virtual Currency Schemes – ECB).
- Definition of the European Central Bank (ECB):
- “a type of unregulated digital money that is issued and typically controlled by its creators and used and accepted by members of a particular virtual community”
  [Source: Virtual Currency Schemes, European Central Bank, Frankfurt am Main, October 2012, p. 13]

The survey
- Pilot study in Poland, the Russian Federation, China, Germany, Czech Republic
- This survey was conducted in May 2023 in Poland, Romania and Ukraine.
- 245 respondents: 148 from Poland, 83 from Romania and 14 from Ukraine.
- Elements of survey:
  o Trust to financial system
  o Money trust
  o Cryptocurrencies

Research questions
Q1: Are there any differences between countries concerning perception and use of cryptocurrencies?
Q2: What are the differences in using cryptocurrencies by respondents from different countries?
Q3: Is the war in Ukraine changing perceptions and levels of trust in traditional fiat money, the banking system and cryptocurrencies?

Research hypotheses

- H1: There are differences between countries in perception and use of virtual money
- H2: There are differences in the level of knowledge about cryptocurrencies between different countries
- H3: War significantly changes the perception and level of trust in money, and monetary system based on fiat currency

A. Trust to financial system
B. Money trust

C. Cryptocurrencies
Conclusions

- Money is constantly developing and attitudes towards it and its perception is evolving too.
- The first and second hypotheses were confirmed because several contrasts were seen between respondents from the chosen countries. These discrepancies can have cultural or historical background.
- However, there is skepticism towards cryptocurrencies, which are treated as the distant future of the financial system, which does not pose a significant systemic threat to it at the moment.
- Participants in the survey show a relatively high level of confidence in the current shape of the financial system, both domestic and international, and in their own currency and other world currencies.
- It’s not easy to say whether third hypothesis was confirmed or not.
- There appear to be differences in perceptions of traditional money and cryptocurrencies by Ukrainians, but it’s not perfectly clear whether the exact reason is war.
- The practical usefulness of the whole study is that gathered information will permit to examine the economic and financial literacy of the respondents and their preferences for the use of innovative financial instruments.
- Thus, it can help to protect people from serious mistakes and their consequences in using cryptocurrencies.
- …
BEHAVIOURAL FINANCE

ASYMMETRIC INFORMATION

definitions
relevance for Finance
relationship
BEHAVIOURAL FINANCE
The emotional perspective and biases – COGNITIVE «LACKS»

ASYMMETRIC INFORMATION
The market perspective and information – TRANSPARENCY «LACKS»

!!?
Where imperfections and market failure come from

(1) The emotional perspective

(2) Lack of Transparency

MARKET

COGNITIVE
Where imperfections and market failure come from

**MARKET**

INFORMATION low quality

«they» don’t disclose

(2) Lack of Transparency

Why !?

physiologic (market features)
intentional
lack of regulation
...

60% disclosed

50% understood

30% transferred and 70% missing

**USERS**

Depositors
Investors
Policy holders
...

«COGNITIVE deficits»

«they» don’t understand

(1) The emotional perspective

Why !?

low financial culture
Individual biases
lack of regulation
...

ReThink Finance
What is Behavioral Finance?

It is a field of study that utilizes psychology to understand how investors make financial decisions, both individually and as a whole, while challenging

(1) the “rationality,”
(2) “self-interest,” and
(3) “perfect information” of traditional economic theory.
The field of Behavioral Finance asserts:

1). Rather than “rational,” human behavior is driven by fear and greed.

2). Rather than “self-interest,” people can be self-destructive, charitable, religious, and be inclined to volunteer to help others.

3). Rather than “perfect information,” people today are exposed to virtually an infinite amount of information, and often do not read the most relevant or important market data (can’t discriminate)
What is the Adaptive Market Hypothesis?

It is the research that modifies the efficient market theories with behavioral economics, asserting that markets evolve over time as individuals utilize biases to make investment decisions.

Markets tend to be inefficient because investors have a bias towards “survival” rather than rational economic decisions, profit, and utility. Markets have cycles, trends, panics, manias, and crashes.

Rather than being efficient, markets have anomalies that can be exploited by investors (!!?)
1. **Technical Anomalies**: Technical analysis of charts and volume history can be used to forecast future stock prices. Technicians will also analyze relative strength, moving averages, support, and resistance, to take advantage from anomalies.

2. **Fundamental Anomalies**: Fundamental analysis of valuation metrics including price to earnings, price to cash flow, and price to book value can be used to find companies trading below their intrinsic value. Studies have shown that, historically, undervalued stocks tend to outperform the broad stock market over the long term with less risk.
3. **The January Effect**: Stocks tend to rebound from tax at the end of the year. Returns tend to be abnormally higher for the month of January than the rest of the year.

4. **Arbitrage Opportunities**: Often derivatives such as convertibles, preferred stock, and options can be mispriced by the market.

5. **More Inefficient Asset Classes**: Historically, small capitalization stocks, international stocks, and venture capital investments have tended to be the most inefficient and the best long term opportunity for investors. However, they tend to have a higher standard deviation (statistical measure of volatility) and a great deal of risk as well.
The BIASES
people emphasize ideas that confirm their beliefs while devaluing ideas that contradict their beliefs.

Herd behavior happens when investors follow others rather than making their own decisions based on financial data.

This is an emotional bias, where investors have an unreasonable faith in their own judgement, reasoning, and analytical abilities.

An experiential bias occurs when investors' memory of recent events makes them biased or leads them to believe that the event is far more likely to occur again.

Investors have a stronger desire to avoid losses than obtain gains by a ratio of 2 to 1. This causes investors to focus on avoiding risk.
Confirmation bias:
- This is both a cognitive and belief-perseverance bias where people emphasize ideas that confirm our beliefs while devaluing ideas that contradict our beliefs.
- The confirmation bias occurs when the investors align to the information that matches with their beliefs. The data could be wrong, but as long as it fits with their views, they end up relying on it.

Experiential bias:
- An experiential bias occurs when investors’ memory of recent events makes them biased or leads them to believe that the event is far more likely to occur again. For this reason, it is also known as recency bias or availability bias.
- In practice, it occurs when an investor’s memories or experiences from past events make them choose sides even when such a decision is not rational. For instance, previous or current bad experience leads them to avoid similar positions.

Loss aversion:
- Investors have a stronger desire to avoid losses than obtain gains by a ratio of 2 to 1. This causes investors to focus on avoiding risk.
- Often investors who suffer from loss aversion bias want to hold a losing investment position until they get back to even, regardless of the poor future prospects for the security. Loss aversion makes investors avoid taking a risk even if it earns high returns.

That’s true for it confirms what I thought about:
- If it has happened yesterday it will happen again tomorrow

I am more scared to lose 100 than happy for having won 200
Overconfidence:
- This is an emotional bias, where investors have an unreasonable faith in their own judgement, reasoning, and analytical abilities.
- Overconfidence reflects when investors overestimate their abilities or trading skills and make decisions forgoing factual evidences.

Disposition bias:
- It explains the propensity of investors to hold on to the stocks even if the prices are declining, believing that the prices will appreciate in the future and, at the same time, sell the well-performing stocks.
- Such investors tend to hold on to a stock losing money, hoping that the price will soon increase.

Familiarity bias:
- The familiarity bias is reflected when investors place their investment in the stocks from the industry they know and understand rather than going after securities from an unrelated field.
- In this process, they may lose new or innovative opportunities that are revolutionary.

That’s true for it is also my own opinion, and I am smart.

Soon or later my stocks will increase again to the previous values.

That’s good for I am familiar with it, I know what they do and I feel in my comfort zone.
### Mental Accounting:
- This is a cognitive and information processing bias, where people categorize and group assets into separate mental accounts, even though money is the same regardless of its use.
- For instance, people may spend for luxury in a mall or while on vacation, and they also possess a modest lifestyle at home. Or people tend to gamble more or spend more money when using credit cards rather than cash.

### Anchoring Bias:
- Anchoring is a phenomenon where someone values an initial piece of information too much to make subsequent judgments. In investing, this can influence decision-making regarding a security, such as when to sell or buy an investment.
- An example of anchoring and adjustment bias would be when an investor owns a stock at 200 and it drops to 150 but the investor wants to wait until it gets back to 200 (the “anchor” price), even though there is significant negative news that should cause the stock to decline further.

### Herd Behavior Bias:
- Herd behavior happens when investors follow others rather than making their own decisions based on financial data. People follow the herd because it feels safer. There’s also the “fear of missing out”: If your colleagues are making money investing in a particular stock, it feels uncomfortable to sit on the sidelines.
- Herd behavior can create massive bubbles like the Dutch tulip market bubble, the Dot-Com bubble, or the real estate bubble of the mid-2000s.

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**Different attitude to spend, depending on the context in which I spend**

Soon or later my stocks will be back to the price I paid for them.

Behaving like the others is safe, and also, I won’t lose the opportunity everybody is taking.
The endowment effect (also known as divestiture aversion and related to the mere ownership effect in social psychology) is the finding that people are more likely to retain an object they own than acquire that same object when they do not own it.

Endowment bias is an emotional bias therefore, where investors value an asset more when they own it, whether due to purchase or inheritance. It can be seen as the underweighting of opportunity cost.

Affinity bias: An investor tends to make uneconomical investment decision based on how he or she believes a purchase or sale of a security will affect their values. For example, often investors suffer from “home-country bias” and favor investing in domestic equities.

Often affinity bias will lead investors to buy stocks of retail companies they like to shop at or “environmental, social, and governance (ESG)” stocks that they feel will have a positive impact on the world, even though these companies may have poor prospects for future performance.

Outcome bias: This is a cognitive and information processing bias, where investors make a decision based upon the outcome and not based upon the process that led to that result.

An example of outcome bias would be when investors focus only on the recent 3-year track record of return when selecting an investment manager, rather than analyzing the process of that investment manager that led to that return.

That’s the best for I own it (but I wouldn’t buy it if it was not mine)

That’s a matter of good feeling with the context, analogous to familiarity (even less rational)

Focussing on the latest outcome, no attention paid to the process leading to that outcome
Self-control Bias:

- Self-control bias is an emotional bias, where people do not act in their best long-term interest because they lack self control. Often people prefer high standards of living in the present, rather than saving for retirement.

- People who suffer from self-control bias often spend today and sacrifice their retirement, and do not invest in equities or take part in the benefits of dollar-cost averaging.

Unaware (foolish) attitude
The PRINCIPAL - AGENT problem
and the asymmetric information
Asymmetric Information

- We have thus far assumed that buyers and sellers have the same information.
- In many markets it may be easy to verify information about the quality of what is being sold.
- In financial markets, however, it is costly to verify information about assets and some participants may simply have different information.
- Asymmetric information is at the core of finance, and is a central tool in the financial economist’s toolbox.
Types of Asymmetric Information

- There are two main forms of asymmetric information: adverse selection, and moral hazard.
- Adverse selection is a hidden information problem: when one side is unable to observe the type or quality of the goods on the other side of the market.
- Moral hazard is a hidden action problem: when one side of the market is unable to observe the actions of the other.
The PRINCIPAL - AGENT problem
and the asymmetric information

Where in FINANCE !!?
Banks vs Insurers
Where the Asymmetric Information played / plays / will play a role
What is **Securitisation** and why it does matter
MARKET Depositors, Investors, and Insurance Policy Holders

The \textit{MONEY} racetrack … mostly bilateral

- \textsc{CENTRAL BANK}
- \textsc{BANKS} and other Derivatives Originators
- \textsc{ENTERPRISES}
- \textsc{INSURERS}
- \textsc{RE-INSURERS}
- \textsc{MARKET} Depositors, Investors, and Insurance Policy Holders

\textit{non-direct "credit"}

\textit{direct credit}
The **RISKS** racetrack

1. **CENTRAL BANK**
   - Credit Risk to **BANKS**
2. **BANKS**
   - Credit Risk (direct) to **ENTERPRISES**
3. **ENTERPRISES**
   - Credit Risk to **INSURERS**
4. **INSURERS**
   - Pure Risk to **RE-INSURERS**
5. **RE-INSURERS**
   - Pure Risk to **MARKET**: Depositors, Investors, and Insurance Policy Holders

**Credit Risk** flows from the **BANKS** and **ENTERPRISES** to **INSURERS** and **RE-INSURERS**. **Pure Risk** flows from **INSURERS** to **RE-INSURERS** and then to the **MARKET**.
The **MONEY** racetrack …
mostly bilateral

**DEPOSITS vs SERVICES**
non-direct "credit"

**MONEY vs BONDS**
direct credit

**PREMIUMS vs COMPENSATION**

**MARKET**
Depositors, Investors, and Insurance Policy Holders

**CENTRAL BANK**

**BANKS**
and other Derivatives Originators

**ENTERPRISES**

**INSURERS**

**RE-INSURERS**

**MONEY**

Re-financing

**LOANS vs reimbursement + interest**

**CENTRAL BANK**
The **RISKS** racetrack

**BANKS**
and other Derivatives Originators

**CORPORATIONS**

**INSURERS**

**RE-INSURERS**

**MARKET**
Depositors, Investors, and Insurance Policy Holders

**Credit Risk**

**Credit Risk (direct)**

**Pure Risk**
The following graph is to illustrate the **Traditional Way** of risks routing between actors, what we call “Managed Finance” (in contrast with the New Way Structured Finance would constitute).
The OLD way …

- **BANKS and other Derivatives Originators**
- **ENTERPRISES**
- **INSURERS**
- **RE-INSURERS**
- **SPV**
- **MARKET**

**Credit Derivatives and other Structured Products**

- **Credit Risk Securitization**
- **Credit Risk**
- **Pure Risk**
- **CAT Risk**

subscription of primary certificates and policies

**depositors**

**investors**

**policy holders**

**traditional instruments**

**CR securitization**
the “reason WHY” of Securitization

it was invented to move bad risks (e.g. bad loans) off-balance

- Loans
  - bad loans
  - cash
  - low risk assets

- risk weighted capital

- capital may be lowered

Lowering needed capital and Enhancement of credit capacity
BANK originator

assets

Loans $100

Good loans $80
Good loans $70.4 (t2)
+ 9.6$ from the reinvestment

Bad loans $20 (t1)
(nonperforming)
Bad loans $17.6 (t2)
+2.4$ from the reinvestment

liabilities

Equity

Deposits $100 (t1)
Deposits $88 (t2)

SPV

MARKET
depositors

Deposits $100 (t1)
Deposits $88 (t2)
ABSs $12 (t2)

Outcome
100% no risk (t1)
94% no risk (t2) (188/200)

collateral

Expected recovery rate 60%
Issued nominal 20$ / actual 12$ bonds

Outcome
88,9% good loans (t2) (160/180)

80$ good loans (t1)
88$ + 12$ = again 100$ to be allocated in (t2)
... again 20$ will be bad loans in (t2)
the market would accept refused risks

1st round >>>

INTERMEDIARY (MIXED risks)

GOOD risks (retained)
on balance

BAD risks (unwanted)
off balance

needed capital

2nd round >>>

INTERMEDIARY
GOOD risks + new mixed risks

INTERMEDIARY
GOOD risks (retained)

BAD risks (unwanted)

MARKET
unwanted risks
... securitized

CUSTOMERS
GOOD risks

CUSTOMERS
BAD risks
Securitization in detail
CUSTOMERS

family & business insured

INSURER

pure risk

A - traditional risk warehousing

EXCESS RISK

RETAINED RISK

REINSURER

CAPITAL (C1)

B - financial intermediation approach

EXCESS RISK

UNWISHED RISK

RETAINED RISK

MARKET (alternative transfer)

MARKET

CAPITAL (C2)

new capacity

(C1-C2)

securitised risk
BANKS and other Derivatives Originators

ENTERPRISES

INSURERS

RE-INSURERS

MARKET
Depositors, Investors, and Insurance Policy Holders

SPV

Credit Risk Securitization

Credit Derivatives and other Structured Products

Credit Risk

Pure Risk

CAT Risk

subscription of primary certificates and policies
If Traditional Way assumes that

>>> Banks deal with credit and speculative risk, and
>>> Insurers with pure risk,

the New Way traces a completely different scenery, where about everything becomes possible.

Hybrid policies ensue,
capable to serve investment and speculative needs, besides their (core) security function;
as well as in the opposite field new financial instruments try to face precautionary intents.

At the same time, banks begin to act as policies sellers (Bancassurance), and Insurers – few years later – begin to act as retail bankers (Insurbanking).
The whole process, starting at the mid nineties, speeds up during the following years, and brings a serie of novelties; namely ...

• **An increased role of the market** in subscription of both financial and pure risk, as Securitization involves/contaminates insurance sector also;

• A **“cross-sector, or diagonal risk transfer”,** as financial risks become insurable to some extent, and pure risks enter financial portfolios in order to obtain a better diversification;

• **New intermediaries emerge,** whose function is just to manage instruments conceived to unload balance-sheets of firms and intermediaries through Securitization (**the Special Purpose Vehicles**);
• New instruments, new markets and a considerable development of OTC markets;

• Higher complexity level as far as terms and conditions, as “linked instruments” spread over;

• A reduction of the transparency, which emphasizes asymmetric information consequences;

• A late reaction of supervision, whose inadequacy to control side effects of innovation becomes manifest.
Banks and other derivatives originators

Enterprises

SPV

Credit risk

Business pure risk securitization

Insurers

SPV

Life and nonlife risk securitization

Re-insurers

SPV

No more traditional transfer

Market

Former depositors, investors, insurance policy holders and speculators

Credit derivatives and other structured products

Lower traditional subscription of primary certificates and policies

The NEW way …
According to the above mentioned trends, we may summarize what has happened during the last decades in the BANKING and the INSURANCE sectors as follows ...

new risk-coverage instruments and new strategies revealed themselves:

as far as CREDIT and “SPECULATIVE risk”
• hedging (derivatives)
• credit/financial risk securitization (remote, since ‘80)

as far as “PURE risk” (more recently)
• risk financing
  (apart from traditional Insurance >>> Financial Re-insurance)
• pure risk securitization (ILS)
• Alternative/unconventional risk transfer

always to change/improve the risk profile of the company OR to provide finance to the firm at lower costs ...

... without involving creditworthiness evaluation if possible
That’s a matter of

Structured Finance
... what is Structured Finance!??

That is the process by which firms raise funds in a nontraditional way, altering the firm’s risk profile in the process.

In other words ... SF is the process by which firms raise funds in a manner that is independent of their fundamental creditworthiness, thus enabling them to rise funds at a cost independent of their overall risk profile.
In particular, most structured investments ...

(i) combine traditional asset classes with contingent claims, such as risk transfer derivatives and/or derivative claims on commodities, currencies or receivables from other reference assets, or

(ii) replicate traditional asset classes through synthetisation or new financial instruments.
... that’s a wide environment (some sort of “jungle”)
and NEW WAY emphasizes

the relationship between financial engineering and

information asymmetries
BANKS and other Derivatives Originators
SPV ENTERPRISES
SPV INSURERS
SPV RE-INSURERS
Credit Derivatives and other Structured Products
Credit Risk Securitization
Business Pure Risk Securitization
Life and Nonlife Risk Securitization
no more traditional transfer
no more traditional transfer
no more traditional transfer
lower traditional subscription of primary certificates and policies
MARKET
Former Depositors, Investors, Insurance Policy Holders and Speculators
INFORMATION ASYMMETRIES
BANKS and other Derivatives Originators

Credit: Derivatives and other Structured Products

ENTERPRISES

Business Pure Risk Securitization

no more traditional transfer

INSURERS

Life and NonLife Risk Securitization

no more traditional transfer

RE-INSURERS

lower traditional subscription of primary certificates and policies

MARKET

Former Depositors, Investors, Insurance Policy Holders and Speculators

INFORMATION ASYMMETRIES
CDO transaction

**ASSET MANAGER**
manages the issuer's assets-the assets of the CDO

**SPE**
in charge of securitization

**ISSUER**
(Special Purpose Entity)
buys bonds/loans from the seller and issues asset-backed securities using the bonds/loans as a collateral

**SELLER/SERVICER**
ORIGINATOR/protection buyer
Sells a portfolio of bonds and/or loans to the issuer of the asset backed securities

**BOND/LOAN PORTFOLIO**
Collateral for the ABSs

**INVESTORS / protection sellers**
Buy the rated asset backed securities

**CREDIT ENHANCER**
Guarantees payment of interest and principal on the asset backed securities issued according to the CDO

**SWAP counterparty**
Enteres into an interest swap to allow hedging against interest rate risk

**ASSET MANAGER**
protects the investor’s interest in the CDO and performs other fiduciary and reporting duties

$ fee for services
rated securities (tranches)
periodic interest and principal payments on securities

$p.folio of bonds$
$proceeds$
$interest and principal (bonds/loans)$
$proceeds$
swap agreement

$ fee for services
$ fee for services
$...
How structured finance fueled crisis: the process ...

- A series of mortgage debts are concentrated by the originator in a portfolio and securitized by a SPV.

- Resulting CDO is sold to investors (protection sellers).

- Investors (and speculators) buy CDSs to cover their exposure (to speculate).

- Resulting CDSs may be concentrated by a financial intermediary in a Synthetic CDO.

Credit default swap (CDS), is a financial derivative contract that allows an investor to "swap" his credit risk with that of another investor. To swap the risk of default, the lender buys a CDS from another investor who agrees to reimburse the lender in the case the borrower defaults. The buyer of the swap makes payments to the swap's seller until the maturity date of a contract.
How structured finance fueled crisis ...

1st level failure (individual exposures failure)

2nd level failure (basket)

3rd level failure (CDO can’t repay)

4th level failure (charged CDSs counterparts fail as well)

5th level failure (SYNTHETIC CDO (CDO of CDSs) can’t repay)
the propagation ...

CDO² (CDO of CDOs)
Where imperfections and market failure come from

(1) The emotional perspective

(2) Lack of Transparency

- Herd behavior can create massive bubbles like the Dutch tulip market bubble, the Dot-Com bubble, or the real estate bubble of the mid-2000s.
FOUR SETS OF coloured CARDS
TRAINING SESSION - Instructions

You’ve four different sets of CARDS

1. ACTORS
2. BIASES
3. TRANSPARENCY degree
4. ASYMMETRIC INFORMATION
a) Split in four people groups and design leaders

b) Leaders take **three** cards from the first set, **four** from the second, **one** from the third, **one** from the fourth ...

You’ve 9 cards then, as a group.

a) Each group is required:
i) to design a scenario / tell a story where all drawn actors are involved,
ii) to make sure both Behavioural Biases and Market inefficiencies from Asymmetric Information are implied, and
iii) to finalise the simulation by assigning different % degrees of responsibility to market and cognitive lacks (market + cognitive = 100%), according to your hypotheses and perception.
Simulation and gamification in finance using Traderion simulator
Author: Florin Grosu, Bold Tech
go to SIMULATOR.TRADERION.COM
I. Join Multiplayer Session
1. Go to **LIVE** tab

2. Click on **SEARCH FOR LIVE SESSIONS** to refresh the list of active sessions

3. Click on **JOIN SESSION** to be redirected to the session's main page
II. Start Single player Session
1. Go to Scenarios tab, to open a list of historical trading scenarios.
2. Click on **Filter** to choose one asset class and hit Apply Filter.

3. Choose any unlocked scenarios. Every time you play a scenario, you gain XP points. The XP points will help you unlock scenarios with increased difficulty levels.

4. Click New Session and a pop-up window is displayed.

5. Click on Start and you will be redirected to the scenario dealing screen.
III. How to play!

a step by step guide
Step 1. Check the **RULES OF THE SESSION**

1. **LOT** refers to how much you are allowed to trade per transaction. This refers to amounts you trade in the Electronic Broker or when calling other banks/brokers.

2. **MAXIMUM QUOTE SPREAD** is the biggest spread you are allowed to use when quoting to other banks/brokers in the Incoming Calls section.

3. **POSITION LIMIT** refers to the maximum risk exposure in total number of shares you can have during the scenario.

4. **MAT** is short for Management Action Trigger. This is how much you are allowed to lose over the scenario. Essentially, MAT works as a global STOP LOSS measure for you!
Step 2. Read the **MORNING BRIEF**

1. Go to **MACRO** tab!

2. The very first piece of news is the **MORNING BRIEF**

3. Click on the **MORNING BRIEF** line

4. Read the **MORNING BRIEF** content
Step 3. Read and vote on **BREAKING NEWS**

1. Read the headline
2. Click on the headline to read the news body
3. Evaluate news impact
4. VOTE on market direction and impact power!
Step 4. **BIG BOARD DEALING** (Market Taker)

**Market LHS - BID**
(Left-hand side)

This is the bid of the market, the price at which other banks are willing to buy.

Current size of the bid (in shares) is displayed in the top corner.

One click trading is enabled.

Click on the price to SELL at the market bid.

SELL current lot amount.

**Market RHS - OFFER**
(Right-hand side)

This is the ask of the market, the price at which other banks are willing to sell.

Current size of the ask (in shares) is displayed in the top corner.

One click trading is enabled.

Click on the price to BUY at the market bid.

BUY current lot amount.
Step 5. **BIG BOARD DEALING** (Market Maker)

BUY order

Click on PLACE BID to place a buy order. A pop-up screen appears where you can select the order type, expiry time and order price.

SELL order

Click on PLACE ASK to place a sell order. A pop-up screen appears where you can select the order type, expiry time and order price.
Step 5.1. **BIG BOARD DEALING** (BUY order details)

1. **Select order type**
   Click on the list to select an order type that best suits your strategy and risk positions.

2. **Select order expiry**
   Click on the list to select time limit for your order.

3. **Insert order price and amount**
   Insert amount in the upper box. Click on the "Cents" input box and insert your price. Big figure is preset or it can be changed.
### Step 5.2. ORDER TYPES

<table>
<thead>
<tr>
<th>Order Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Order</td>
<td>Executes immediately at the market.</td>
</tr>
<tr>
<td>Limit Order</td>
<td>Executes at a given price.</td>
</tr>
<tr>
<td>Immediate or Cancel</td>
<td>Attempts to execute all or part immediately and then cancels any unfilled part of the order.</td>
</tr>
<tr>
<td>Fill or Kill</td>
<td>Executes immediately at the market or a specified price or cancels if not filled entirely.</td>
</tr>
<tr>
<td>Iceberg</td>
<td>Large order that is split into several smaller orders (top-ups) to conceal the &quot;real&quot; size of the order.</td>
</tr>
<tr>
<td>Limit Plus</td>
<td>Searches for liquidity in the dark pool. It is always pegged to the best price in the market.</td>
</tr>
<tr>
<td>Iceberg Plus</td>
<td>Searches for liquidity in the dark pool. It is always pegged to the best price in the market.</td>
</tr>
</tbody>
</table>
Step 6.1 DEALING WITH CLIENTS (RHS)

Lincoln National **BUYS** from me, I need to **BUY** at the market **OFFER** to cover, hence RHS 213.15

To make money, I need to quote a **HIGHER OFFER** than the market.

Any number greater than 213.15 will be a good quote.

Insert your quote and click on the **SEND** button.

Observe the maximum spread from the contract with your client!
Wellington Mgmt. Sells to me, I need to sell at the market bid to cover, hence LHS (212.32).

To make money, I need to deal at a lower bid than the market.

Any number smaller than 212.32 will be a good quote.

Insert your quote and click on the send button.

Observe the maximum spread from the contract with your client!
Step 7. **BROKER-DEALER MARKET - Outgoing Calls**

<table>
<thead>
<tr>
<th>Counterparty</th>
<th>Amount</th>
<th>Bid</th>
<th>Ask</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santander</td>
<td>500</td>
<td>75</td>
<td>75</td>
<td>NOTHING THERE</td>
</tr>
<tr>
<td>BNP Paribas</td>
<td>500</td>
<td>73</td>
<td>77</td>
<td>NOTHING THERE</td>
</tr>
<tr>
<td>Goldman Sachs</td>
<td>500</td>
<td>74</td>
<td>77</td>
<td>NOTHING THERE</td>
</tr>
<tr>
<td>Credit Suisse</td>
<td>500</td>
<td>75</td>
<td>75</td>
<td>NOTHING THERE</td>
</tr>
</tbody>
</table>

**Step 1:** Choose the amount.
**Step 2:** Press CALL
**Step 3:** Analyze the quotes.
**Step 4:** Click to SELL/BUY
Step 8. BROKER-DEALER MARKET - Incoming Calls

Step 1: Click on the call line to answer.

Step 2: Insert/Change the big figure.

Step 3: Using the arrow keys, choose your BID and OFFER (cents).
- up +5 cents
- down -5 cents
- left -1 cents
- right +1 cents

Step 4: Click on the QUOTE button.
Step 9.1 DARK POOL DEALING (Market Maker)

Use the DARK POOL (DP) feature to trade larger orders without having a big impact on the price. Select side, order type, amount and price and hit the PLACE button. If called, the order is displayed in your blotter and in the MATCHED VOLUMES section of the DP feature of the DEALING EXTRA menu.

BUY ORDER
Click on PLACE BID to place a larger buy order. A pop-up screen appears where you can select the order type and the order price.

SELL ORDER
Click on PLACE ASK to place a larger sell order. A pop-up screen appears where you can select the order type and the order price.
Step 9.2  DARK POOL ORDERS

1. Select order type*
   
   Click on the list to select a Limit Order or a Market Order

2. Select order amount
   
   The Limit Order will be placed in the Dark Pool at the selected price.
   
   The Market Order will be placed at mid price of the running lit book.

3. Insert order price for a Limit Order only
   
   Both type of orders will be executed if the required liquidity is matched with other orders (of the same type) in the DARK POOL.

The Dark Pool runs continuously.
### Step 9.3. **DARK POOL ORDER TYPES**

<table>
<thead>
<tr>
<th>Order Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Order</td>
<td>Executes at the mid price of the lit market if it matches other market orders on the opposite side of the market.</td>
</tr>
</tbody>
</table>
| Limit Order    | Executes at a given price if it matches other limit orders on the opposite side of the market placed at the same or a better price.  
  
  - **BUY limit**: Fills if it matches an ASK limit placed at the same or lower price.  
  - **SELL limit**: Fills if it matches a BID limit placed at the same or higher price. |
| Sweep Order    | Searches for liquidity in the Lit market as well.                           |
Step 10.1 AUCTIONS

1. If available, the market starts with an Opening Auction, ends with a Closing Auction and may experience any number of Intraday Auctions.

Reference price is where the market previously closed.

2. At the end of an Auction, a single price is computed from the orders that were placed. All the market orders will be called at that price.
Step 10.2 **AUCTIONS**

3. Select order type (Market Order or Limit Order), side of the market (BID or OFFER), amount price (only for Limit Orders)

Click on the green **ENTER** button to place the order during the auction!
Step 11. DEALING EXTRA
Step 11 DEALING EXTRA

1: Log of trades (blotter)
- S = SELL
- B = BUY
- X = unfilled order
- BB = Big Board
- DP = Dark Pool
- CLNT = Client deal
- DD = Direct Dealing (Broker Dealer)

2: Market Depth
Shows market liquidity levels: next prices from market best bid and ask, amount on each price (Qty) and how many participants have the current interest per price (#).

3: Dark Pool Tape
Shows all deals concluded in the Dark Pool, real time.
Step 11 DEALING EXTRA

4: Own Orders Book
All your orders are recorded here. When filled, the order is erased from the book and printed in the log of trades (blotter).

5: Rules of the session
Observe the rules of the session: lot size, quote spread, position limit, stop loss levels.

6: Settings
Set standard ticket amount
Enable/Disable sound
IV. End of Session Report

Check your own session report
1. Go to HISTORY tab

2. The last played session is always top of the list.

3. Click on VIEW REPORTS to open the report in a new browser tab
Portfolio Simulation ➔ Historical scenario ➔ Cash approach ➔ Benchmark Portfolio
Step 1. Log into the simulator

1. Open any browser (we recommend Chrome, Mozilla or Safari)

2. Go to PORTFOLIO.TRADERION.COM

3. Log in with the username and password provided

(!) Multiple logins are allowed on the same account.
Step 2. Add new / Select user to / from the team accounts

1. On first login, you will be asked to add your name to the team account.

2. Input your name in the text box and click on ADD NEW PERSON.

3. Select your username and click OK.

4. You will have then access to the sessions’ list.

5. On following logins, you will only be prompted to select your username from the team members.
Step 3. Join an active session

1. Select a session from the table (usually, only 1 session is available)

2. If the session is PAUSED, there is no access (the JOIN button is not present).

3. If the session is RUNNING, click JOIN and you are asked to either select your username from the list or to add yourself to the team account.

4. You are then redirected to the Portfolio Screen.

5. The redirect might take up to 30 seconds with the first log in, as the simulation loads all necessary data.
Step 4. Check benchmark composition

1. Click on **Session Details**

2. Check the Benchmark Composition and any other updates on the session.
Step 5. Read the News

1. In the beginning of the session, go to the NEWS tab, to read about important developments in the financial markets prior to your session.

2. New breaking news are printed every minute.

3. Their headlines are available for 10 seconds on every page you browse during the session.

4. If you want to get more details, go to the NEWS tab and click on the News, to open the full article.

5. Read the new breaking news carefully and assess ‘their impact on your portfolio and overall market.

4. Rebalance your portfolio in the MARKETS tab.
1. In the beginning of the session, you will start with a preset $ amount or with an initial portfolio.

2. Exchange USD to other currencies to be able to invest in non-USD instruments.

3. BUYING an instrument will take away the cash, while SELLING an already existing LONG position will add cash.

4. SHORT SELLING an instrument adds cash to the respective account. However, there is a SHORT SELL limit you need to observe.
Step 6.2 Manage your portfolio – Exchange one currency for another

1. Click Exchange if you want to exchange one currency into another.

2. Exchange USD to other currencies to be able to invest in non-USD instruments.

3. The cash exchange is done at the exchange rate prevailing in the market.
1. The JOIN SESSION button redirects to the MARKETS SCREEN.

2. You have instant access to instruments: Equities, ETFs, Bonds, FX, Metals.

3. You can SELECT any instrument from the tables. This updates its price chart in the top right corner of the page and also enables trading on that instrument.

4. You have access to Portfolio metrics: Value, Return (current % and evolution chart against benchmark).
1. When the instruments are live, they turn white and become active.

2. You can filter on Region and Currency.

3. You can search for a particular instrument in the NAME column.

4. Click **SELECT** to open the chart in the top right corner of the page and to enable trading.

5. Click **Trade** to open the Trade Pop-up Window.

6. Click **ODA** to place an one-cancels-the-other (OCO) order on the open position.
Step 6.4.1 Filter Instruments

1. You can search for a particular instrument in the NAME column.

2. You can filter on Classification

3. You can filter on Underlying Currency
Step 6.5 Trade Instruments – Place order

1. The TRADE button opens the Trading Pop-up Window.

2. You can BUY, SELL or SHORT SELL (if allowed) any instrument.

3. You can choose an amount in the given limit (calculated real time).

4. You can select the order type: Market order (filled instantly), Limit order (filled when the market touches the limit price).

5. You can record your anticipated price target: drag the cursor on the price forecast timeline or write the target price in the box below.

6. You can add a detailed investment rationale and/or choose between the time horizon (Short term vs. Medium Term) and analysis (Technical vs. Fundamental).

7. Click on **PLACE ORDER**

8. Check order status in either the BLOTTER or OPEN ORDERS TABs.
1. The TRADE button opens the Trading Pop-up Window.

2. You can BUY or SHORT SELL in the given limit.

3. You can SELL only if there is a long position opened already on the instrument.

<table>
<thead>
<tr>
<th>Order</th>
<th>Fill</th>
<th>Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market order</td>
<td>At Market</td>
<td>Blotter</td>
</tr>
<tr>
<td>Limit order</td>
<td>When the Market touches the level</td>
<td>1. Open orders</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Blotter</td>
</tr>
</tbody>
</table>
1. Click on Bonds in the Portfolio tab

2. Select the desired bonds and hit TRADE.

3. The TRADE button opens the Trading Pop-up Window.

4. The quantity (only in BONDS trading) refers to the face amount of the bonds.

In this example, buying $10,000,000 worth of bonds at a price of 99.59% will generate a cash spending of $10,000,000 * 99.59% = $9,959,000
1. Click ODA to open the OCO order pop-up window.
2. Set Stop Loss
3. Set Take Profit
4. Click Set ODA to set up an OCO order.
5. The order is mapped in the Open Orders tab.

OCO = one cancels the other
1. Filled orders are recorded in the **BLOTTER**.

2. Open positions are shown in the instruments table, on the corresponding instrument’s row.

3. Unrealized and Realized PnL are computed on every instrument.
1. Limit orders are recorded in the **Open Orders** tab.

2. They will not show in the instruments tab (unlike market orders).

3. You can DELETE orders.
1. All open positions are printed in the Portfolio tab.

2. Tactical Asset Allocation is displayed here.

3. Bond Duration Breakdown shows the amounts invested in bonds per duration buckets. Long and short positions are netted within the same duration bucket.
1. Click on the Metrics tab.

2. Metrics are updated every minute during the historical run.
Step 8.1 Monitor portfolio metrics - Bonds

1. Click on the Portfolio tab.

2. You have access to the Bond Maturity Breakdown, which takes into account the amount traded in the available tenor buckets.

3. Click on the Metrics tab.

4. You have access to Duration for the long and short positions.
Behavioral Asset Allocation: from efficient to effective portfolios
Author: Ruggero Bertelli

1. Questionnaire: are you sure you know how to invest (and not lose your money?)

Results of a questionnaire published in the Italian Economic and Financial newspaper Il Sole 24-Ore in 2016. 3.000 readers of the online publication.

Main topics: loss aversion, narrow framing, extended framing, Samuelson’s problem.

Output: the VALUE TEST.

On behalf of Il Sole—24 Ore, an Italian financial newspaper, I put together a simple questionnaire to assess attitudes toward financial investments. It was published during a time of market stress (20 February, 2016). It comprises five simple questions, and about 3,000 readers took part. The results are interesting, in part because Il Sole’s readers are far more competent than average in financial matters, and keep constantly abreast of the evolution of the market. The questionnaire, which was published in the newspaper on a Saturday, was available online for a full week.

Unfortunately, it was not possible to collect information on the participants, other than they are readers of a financial newspaper and took part in the questionnaire on a voluntary basis. Additionally, the questionnaire was published during a time of strong market volatility.


I cannot anticipate the results, because this is a part of the experiment that I will realize with students.

The conclusions are obviously coherent with the scientific experiments by Kahneman: loss aversion and framing, substitution effect, WYSIATI (What you see is all there is).
2. Prospect theory and value test

We will present the “Loss aversion ratio”. This is the main topic we will use to introduce the perceived value of an investment.

We will recall the Prospect Theory utility function and the idea of the Decision Probability.

Using a Kahneman’s example based on coin tosses (chapter 21 of Kaneman’s Thinking fast and low), and considering the results presented in “The boundaries of loss aversion” by Novemsky and Kahneman, we will construct a VALUE TEST transforming the outcome of repeated tosses in a single coin toss with the same mean and variance.
This opens the road to an application to financial markets.

We will start with the classical S&P 500 in the last 10 years.

### 3. Performance and Risk perception under Prospect Theory

Application of the VALUE TEST to S&P500 of the last 10 years (for weekly and monthly data) or 20 years (for yearly data).
Presenting the S&P500 actual vs. S&P500 perceived will be interesting to comprehend the effects of perception of value.

We will present how transform the price of S&P 500 in an equivalent coin toss and how to apply the VALUE TEST.

4. Application of the VALUE TEST to some financial markets (indices)

US and German 2 to 10 years government bond benchmarks (source: Datastream).
US High Yield Master Index (source: ICE Bank of America)
EURO Corporate Index (source: ICE Bank of America) …
And CASH (3 months JPM EURO index)

So we will have the confrontation between the actual and the perceived value of different asset classes, and so we can build the risk/reward map.

The last ten years have been very difficult for investors, notwithstanding the positive performances of almost all asset classes we considered.

5. Actual Efficient Frontier and perceived “frontier”

We built a classical efficient Frontier with portfolios of different volatility (1% to 10% standard annual standard deviation) and we will apply the VALUE TEST.
The results are impressive (from an investor point of view).

The perceived value of risk assumption is always negative!


Is it possible to give investors a perception of value using a Dynamic Asset Allocation? The VALUE TEST helps to construct an effective asset allocation, I mean an asset allocation that is perceived valuable and it worth to maintain during an extended period of investment.
We used a Monte Carlo Simulation to realize a DAA with a 65% and 70% probability of monthly success, and the results are interesting (from an investor perspective).

BUT …

7. … the real world is more difficult than the simulation: the BTOP50 index …

We applied the VALUE TEST to the Barclay BTOP50 index …
8. … and we backtested a Moving Average Strategy (S&P 500 or Cash)

![Graph showing S&PMAV ACT vs. S&PMAV PERC]

9. Conclusion: are markets efficient and investors rational? An experiment.

I will conclude my lesson with an experiment to explore from a behavioral point of view the tremendous topic of efficient markets.

It will be only a provocative experiment, just to “Think” o Re-Think” the problem.

The experiment is inspired by the Keynesian Beauty contest … and the conclusion will be apply to the S&P 500 Forward Price Earning Ratios.

Who will win? The Taher’s Human or the Fama’s Econ?
For more guidance and information about this topic please register on the project platform:  