

# NEUROFINANCE

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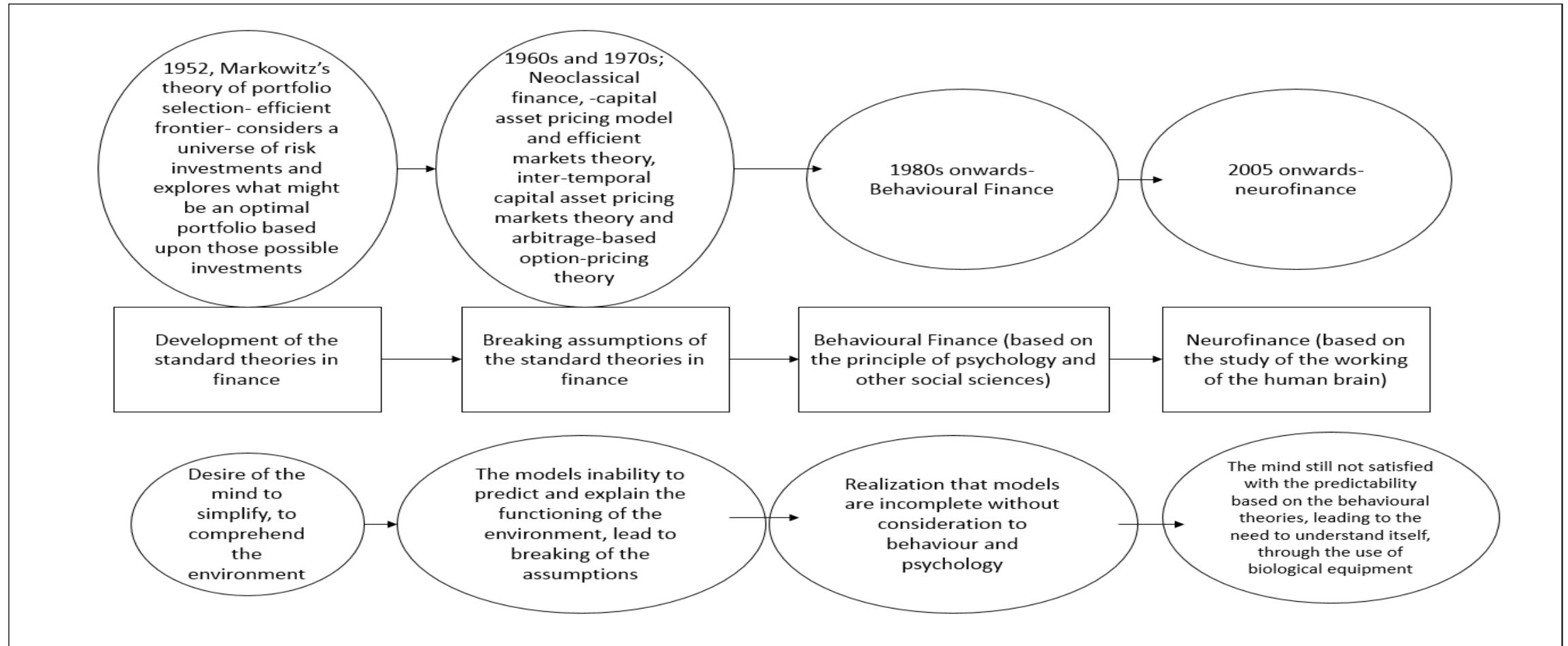
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# INTRODUCTION

- Neurology states that human behaviour is laid down by autonomic mechanism. It is the outcome of neuro processes occurring away from consciousness.
- **Neuro-economics** is about studying the behaviour of people while making economic decisions and it concludes that their decision making is not always rational and is affected by emotional and psychological factors too.
- **Neuro-finance** is a part of neuro economics which only deals with the decision making of the investor. “Neuro-finance examines the nature of cognitive processes of acquiring and processing information in financial decision making and how people select the best action plans out of the potential investment prospects”.

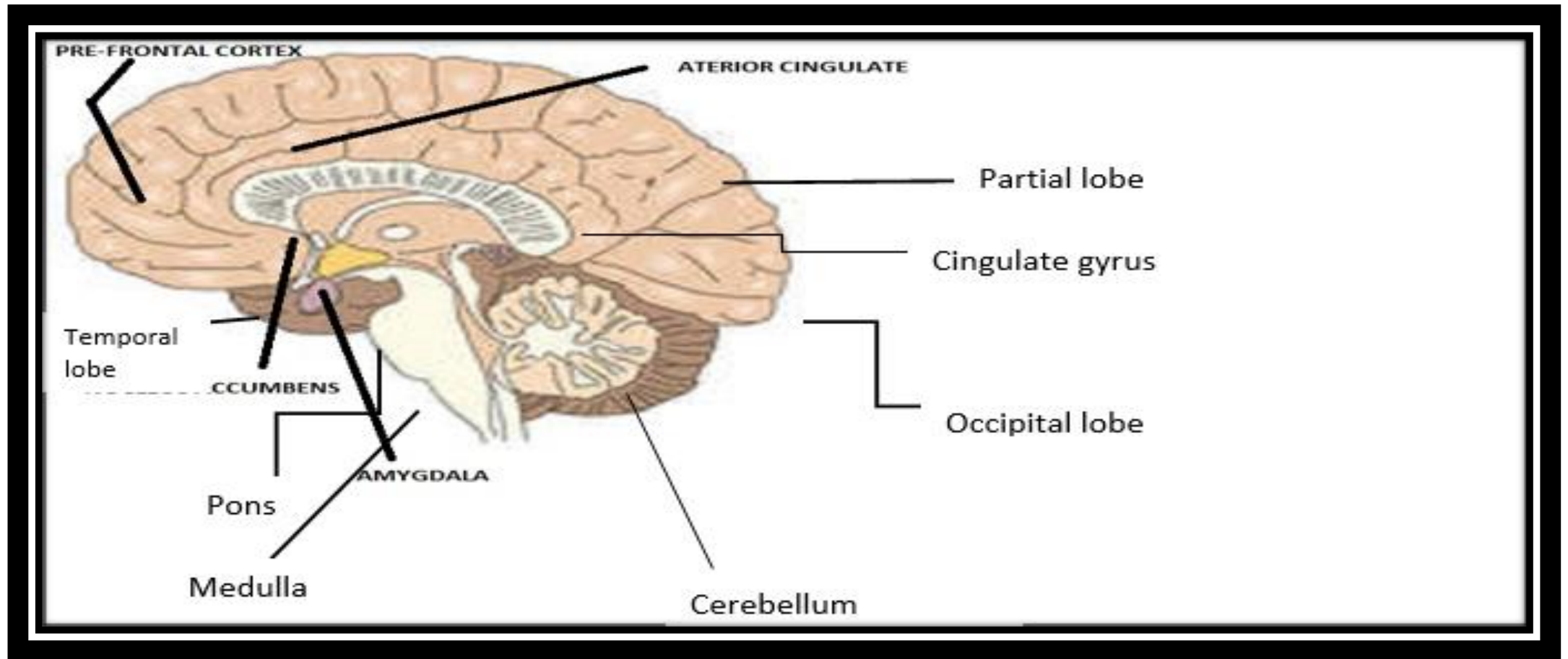
# HISTORICAL BACKGROUND



# BEHAVIOURAL FINANCE, NEUROFINANCE AND TRADITIONAL FINANCE- A COMPARISON

<b>Behavioural Finance</b>	<b>Neurofinance</b>	<b>Traditional finance</b>
Describes the behaviour of people making investment decisions.	Takes the help of Neuro technology to understand the behaviour of investors.	Explains different ways through which people can make rational decisions for investment.
Investigates how people act and interact in the process of making investment decisions.	Determines how and why these behaviours occur based upon the observations of people's brain and hormonal activities.	Considers rationality as the basis of accurate knowledge and decision-making. Rejects people's emotions.

# THE HUMAN BRAIN



PART OF BRAIN	ROLE	IMPLICATIONS
AMYGDALA	<p>Emotions such as liking something, developing fear and post-traumatic stress.</p> <p>“Fight or flight” behaviour of investors.</p>	<p>The selling behaviour of investors in bearish markets.</p> <p>In the bear phase, investors tend to go short due to fear.</p>
PRE-FRONTAL CORTEX	<p>Complex decision making.</p> <p>Memorizing, analyzing and drawing conclusions from different situations.</p> <p>Expression of personality.</p>	<p>Cognitive errors like overgeneralization cause pre-frontal cortex to filter accurate and appropriate data.</p> <p>Making informed decisions is affected due to such errors.</p>
NUCLEUS ACCUMBENS AND ANTERIOR CINGULATE	<p>Nucleus accumbens is a group of neurons which help in developing addictive behaviour.</p> <p>Anterior cingulate helps in making decisions by anticipating the rewards.</p> <p>Together they both help in identifying patterns and evaluating alternatives.</p>	<p>Helps in analyzing pictorial form of data like graphs and charts which do not have detailed explanations.</p> <p>Helps studying trends.</p>

# BRAIN SECRETIONS

	ROLE	IMPLICATIONS
DOPAMINE	<ul style="list-style-type: none"> <li>• It is a chemical which is released in brain at the time of feeling of pleasure.</li> <li>• Unexpected profits earned easily</li> <li>• Secretion of dopamine stops when there is unexpected loss resulting in depression.</li> </ul>	<ul style="list-style-type: none"> <li>• Risk taking behaviour of investors</li> <li>• Behavioural biases like herd behaviour, over- confidence and optimism in the investors.</li> </ul>
SEROTONIN	<ul style="list-style-type: none"> <li>• A transmitter at the nervous system and digestive tract.</li> <li>• E.g. - anxiety, depression and appetite.</li> </ul>	<ul style="list-style-type: none"> <li>• It is an unsatisfied expectation like losses on investment lowers the level of serotonin.</li> <li>• Investors take unpredictable decisions to avoid losses</li> <li>• Multiplied losses and high transactions</li> </ul>



# NEUROTECHNOLOGY

- ERP (**E**vent **r**elated **p**otential)
- ERF (**E**vent **r**elated **f**ield)
- Transcranial magnetic stimulation (TMS)
- PET (**P**ositron **e**mission **t**omography)
- MRI (**M**agnetic **r**esonance **i**maging)
- fMRI (**F**unctional **m**agnetic **r**esonance **i**maging)

# Real life experimental findings

- Camelia Kuhnen and Brian Knutson (2005) used functional imaging to scan the brains of subject. The results show that *nucleus accumbens* were activated when profit is expected and *insula* is activated in anticipation of investment loss.
- In another experiment by Trujillo and Knutson (2006), people were shown either a happy, fearful or angry photo of a human face. People responding to happy faces were found to have higher tolerance for risk (up to 30%).

# Thank You

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- Chapter-14

## NOISE TRADING

Continued...