

## **ANALYSIS OF THE BEHAVIOR OF INVESTORS IN RELATION TO COGNITIVE FACTORS, INVEST IN BANKS**

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### **Abstract**

*Behavioral finance which generally is described as the practice of psychology in the financial knowledge, specially "after the price bubble explosion of the technological companies' share" in March 2000 has changed to the issue of the day. For those who consider the role of psychology in the financial knowledge as an effecting factor on the stock market and the investors' decision as so obvious, it would be a difficult behavior to accept the existence of the doubt in financial credit. In the present paper, by complying a logical-emotional scenario and by using the technique of tracking the eyes, the subjects were analyzed. The results indicate that there is a meaningful behavioral difference between the emotional people and the logical ones in analyzing and investigating the elements and the criteria of investing in the banks.*

*Keywords: Behavioral finance, cognitive factors, eye tracker, fovea, occipital lobe, investors*

### **INTRODUCTION**

Behavioral finance is a paradigm where financial markets are studied using models that drop the two basic and limitative assumptions -expected utility maximization and full rationality- of traditional paradigm. Behavioral finance has two building blocks: limits to arbitrage, which argues that it can be difficult for rational investors to exploit arbitrage opportunity, because this action requires accepting some risk; and psychology, which surveys investors' behavior and

judgment as well as errors made by people when they judge (Raei, Reza, Fallahpour, Saeed, 2009).

Behavioral finance which generally is described as the practice of psychology in the financial knowledge is a discussion which existed in 2009 as a result of explosion of the price bubble of the technological companies' shares. The relationship between the financial science and the other fields of the social sciences which are known as the financial psychology investigates the decision-making process of the investors and their reactions to the different conditions of the financial markets and the emphasize is more on the effect of the characteristics of the culture of the investors' judgments on the investors' decision-making. On the other hand, the emergence of the phenomena such as the investment market price bubble, the reaction of the investors to the new information and the existence of the unusual volatilities in the market are put in contrast with the theory of the capital market functionality.

### **Human being's mental structure**

The human's mind is composed of different cognitive systems. Some of these systems have the duty of processing the external data. For example, the visual system is one of these systems which by considering the perceived wave lengths of the surrounding environment recognize the painting on the wall. The hearing system is the other system which by considering the kind of the perceived air by the ear can recognize the sounds. Some of the other systems perform in a more abstract level. For example, the language system has the duty to investigate the grammar and the meaning of the sounds recognized by the hearing system and ultimately extracts the meaning of the sentence said to the person. Some of these cognitive systems make Fodor Modularity and some of them do not make the Fodor Modularity.

In the present research we should get familiar with the concepts of the eye tracking, the eye perceiving area (fovia) and the visual processing in the brain.

### **Eye tracker**

This research sought to identify some possible applications of a Neuromarketing tool (NM) called Eye Tracking (ET) in traditional areas of marketing. ET is a tool for the analysis of visual attention and from the perspective of NM, it seeks to associate visual attention with the cognitive and emotional responses of consumers. This issue has attracted increasing interest in recent years (Solnais, Andreu-Perez, Sánchez-Fernández, & Andréu-Abela, 2013). Consumer neuroscience emerged in the late twentieth century (Martinez, 2011). It deals with the conditions, the psychological significance, and the behavioural consequences that underlie consumption (Reimann, Schilke, Neuhaus, Weber, & Zaichkowsky, 2011). Consumer

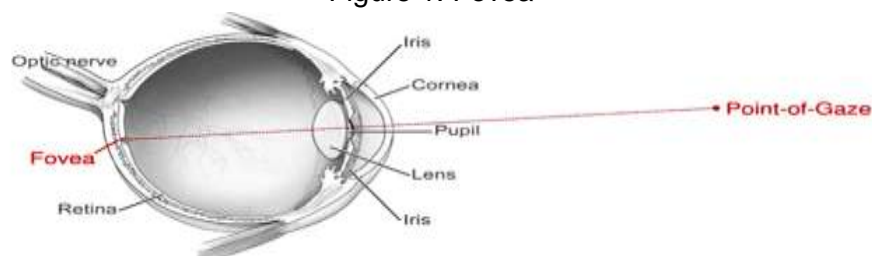
neuroscience incorporates both new and more traditional tools that were not commonly used for this purpose.

This paper performed a mapping of ET as a NM tool and identified possible new potential applications of this NM tool in the area of marketing. ET measures what the user is looking for (the gaze point on the screen), the eye movement in relation to the head, and pupil dilation (Zurawicki, 2010). The different ET systems are able to estimate an eye's point of attachment on a computer screen, or on the shelf of a supermarket, and may determine precisely where the user's attention is directed (Duchowski, 2003). To Hoffman and Subramaniam (1995), eye movements can be seen as an objective indicator of where a person's overt attention is focused and help to filter visual information.

### Fovea

The fovea centralis (the term fovea comes from the Latin, meaning pit or pitfall) is a small, central pit composed of closely packed cones in the eye. It is located in the center of the macula lutea of the retina. The fovea is responsible for sharp central vision which is necessary in humans for activities where visual detail is of primary importance - reading and driving. The fovea is surrounded by the parafovea belt, and the perifovea outer region. The parafovea is the intermediate belt, where the ganglion cell layer is composed of more than five rows of cells, as well as the highest density of cones; the perifovea is the outermost region where the ganglion cell layer contains two to four rows of cells, and is where visual acuity is below the optimum. The perifovea contains an even more diminished density of cones, having 12 per 100 micrometres versus 50 per 100 micrometres in the most central fovea. This, in turn, is surrounded by a larger peripheral area that delivers highly compressed information of low resolution following the pattern of compression in foveated imaging. Approximately half of the nerve fibers in the optic nerve carry information from the fovea, while the remaining half carry information from the rest of the retina. The parafovea extends to a radius of 1.25 mm from the central fovea, and the perifovea is found at a 2.75 mm radius from the fovea centralis (Hans-Werner Hunziker, 2006).

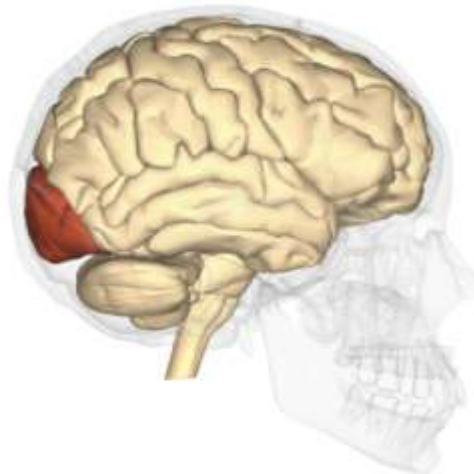
Figure 1: Fovea



## Occipital lobe

The occipital lobe is one of the four major lobes of the cerebral cortex in the brain of mammals. The occipital lobe is the visual processing center of the mammalian brain containing most of the anatomical region of the visual cortex. The primary visual cortex is Brodmann area 17, commonly called V1 (visual one). Human V1 is located on the medial side of the occipital lobe within the calcarine sulcus; the full extent of V1 often continues onto the posterior pole of the occipital lobe. V1 is often also called striate cortex because it can be identified by a large stripe of myelin, the Stria of Gennari. Visually driven regions outside V1 are called extrastriate cortex. There are many extrastriate regions, and these are specialized for different visual tasks, such as visuospatial processing, color differentiation, and motion perception (Schacter, D. L., Gilbert, D. L. & Wegner, D. M., 2009).

Figure 2: Occipital lobe



## METHODOLOGY

In this paper, the investors' behavior is investigated and analyzed by using the determined scenario about the logical and emotional behaviors by means of the eye-tracking technique (sample size: 10). The subjects are the individuals who intend to invest in the capital market. The research results are processed visually and variance analysis interpretation are performed on the quantitative data.

After interviewing with the capital market specialists, the features of the logical people in investing are extracted as follow: They think long-term in the capital market; they think about the capital profit; they pay attention to the product growth potential; they do not go just for the income; they pay attention to the operational profit; they do not pay attention to the market rumors; they do not pay attention to the news and media; they pay attention to the discussions

and holding the meetings; they have information hierarchy; they have a complicated formula for decision-making; they have sustainability in decision-making; they pay attention to the board members' composition as well as the composition of the share-holders; they pay attention to the index trend and not to the daily index; they consider the trend of the previous years and they pay enough attention to the life curve of the company.

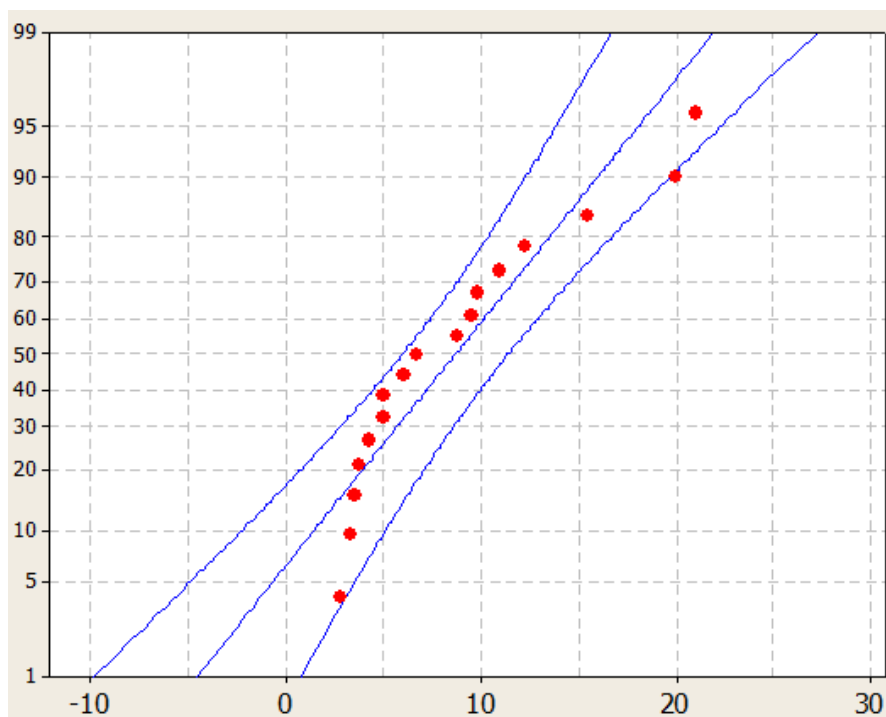
Investing in the banks are influenced by the factors of confidence (trust), advertisement, net profit, risk aversion and the paid facilities which the details are as follows: Profit attraction (profit payment type), bank credit, bank bigness (branch attraction factors), approvers, newly established banks, advertisement, bank previous performance, inflation risk and the lost investment.

Table 1: Result of eye tracker

AOI Name	AOI Duration (sec – U = UserControlled)	Viewers	Ave Time to 1st View (sec)	Ave Time Viewed (sec)	Ave Time Viewed (%)	Ave Fixations
Emotional	80	15	1.523	2.542	5.055	764
Logical	80	15	1.843	3.713	7.849	1112

According the variance analysis by MINITAB software, this difference is also quantitatively approved (in graph 7-4, P VALUE < 0.5 shows the difference).

Diagram 1: Result of ANOVA



**Analysis of Variance**

Source	DF	SS	MS	F	P
Regression	2	132.077	66.038	271.92	0.000
Residual Error	14	3.400	0.243		
Total	16	135.477			

**CONCLUSIONS**

Condition of the Heat map, attention points' map and saccade indexes in the scenarios, by considering the text elements, the emotional people pay more attention to the understandable elements, but the logical people pay more attention to the capital cognitive elements. The Heat map which shows the attention focus with a definite range was not on an especial point for the emotional people, but in the logical ones we had Heat map according to the importance of the elements. Saccade map showed that logical people have paved an exact visual path without repeated visit, but such an order and rhythm would not be seen in the emotional people and the baseless and repeated visits are orderly repeated. Ethology through the eye tracking helps us to recognize the behavioral finance and comply a strategy for it. Investments with low engagement would be considered as a high consuming product which are more in relation to emotional elements, but the investments with complicated elements are not for the attention of this group.

**REFERENCES**

- Abarbanell, J.S., 1991. Do analysts' earnings forecasts incorporate information in prior stockprice changes? *Journal of Accounting and Economics* 14, 147–165.
- Solnais, C., Andreu-Perez, J., Sánchez-Fernández, J., & Andréu-Abela, J. (2013). The contribution of neuroscience to consumer research: A conceptual framework and empirical review. *Journal of Economic Psychology*, 36, 68-81. <http://dx.doi.org/10.1016/j.joep.2013.02.011>
- Martinez, P. (2011). *The consumer mind: Brand perception and the implication for marketers*. London, United Kingdom: Kogan Page.
- Reimann, M., Schilke, O., Neuhaus, C., Weber, B., & Zaichkowsky, J. (2011). Functional magnetic resonance imaging in consumer research: A review and application. *Psychology & Marketing*, 28, 608-637. <http://dx.doi.org/10.1108/13522750710740817>
- Zurawicki, L. (2010). *Neuromarketing: Exploring the brain of the consumer*. Boston, MA: Springer.
- Duchowski, A. T. (2003). *Eye tracking methodology: Theory and practice*. New York, NY: Springer.
- Kandel, Eric R. Schwartz, James H. Jessell, Thomas M. Siegelbaum, Steven A. Hudspeth, A. J. Hudspeth (2012) *Principles of Neural Science*, McGraw-Hill Professional; 5th Ed, USA.
- Hans-Werner Hunziker, (2006) *Im Auge des Lesers: foveale und periphere Wahrnehmung - vom Buchstabieren zur Lesefreude [In the eye of the reader: foveal and peripheral perception - from letter recognition to the joy of reading]* T
- Schacter, D. L., Gilbert, D. L. & Wegner, D. M. (2009). *Psychology*. (2nd ed.). New Work (NY): Worth Publishers.