Future of Neurofinance and Behavioral Finance in Class Room

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Abstract

To access the future of behavioral finance and Neurofinance, it is necessary to determine the progress of these disciplines/paradigms in the class-room. In this paper, first, we will try to establish the status of behavioral finance and neurofinance. Then, we will try to determine the awareness about these fields in classes among students in general and among students majoring in finance in specific. From our study on limited sample, we found that behavioral finance and neurofinance are not at the state where we can classify them as new disciplines/paradigms. In order to assess awareness about these areas, we used a restrictive sample of students from the Gulf Cooperation Council countries. Our results show that students are not aware of anything regarding behavioral finance or neurofinance. In the next stage, we will replicate this study on a sample covering many countries and continents.

Introduction

Future of any discipline is dependent on two factors namely research and education. For a field of study to grow, and be useful it is necessary that it should answer questions, which are not being answered satisfactorily with existing body of knowledge. Rational behavior by all individual participants including institutions and markets is the fundamental assumption in traditional finance. Irrational behavior will be punished either losses or suboptimal outcomes. These undesirable outcomes will serve as a learning tool for market participants. But traditional finance is not in a position to answer many questions. May of the unexplainable behaviors is classified as market anomalies. Behavioral Finance and Neurofinance are quite successful in answering many of these questions. Research is being conducted at staggering pace in the area of Neurofinance and Behavioral Finance. This paper is an attempt to access the education part of Neurofinance and Behavioral Finance. For this analysis we used the data collected by a survey from institutions of higher learning in GCC countries.

Traditional Finance Defined

The literature distinguishes between the traditional finance and behavioral finance in various domains and fields. To explain the difference between traditional finance and behavioral finance Bloomfield (2010) used a three dimensional matrix given in Appendix A. He found that both perspectives (traditional and behavioral) use the same set of institutions for research e.g. banks, markets, and etc. Both perspectives use economic modeling and use econometric analysis on historic data. The main differences between the two research approaches are their "theoretical underpinnings". According to Bloomfield (2010) traditional finance usually does rarely include psychological elements whereas behavioral finance often does not base the research or, at least primarily, on economic theory. Campbell (2006) uses the term positive household finance for behavioral finance, describes what households actually do in contrast to what they should do as suggested by classical or traditional finance theory. Bloomfield used a quotation from a conference remarks by Richard Thaler, a founding father of behavioral finance, in National Bureau of Economic Research (NBER) conference to highlight the difference, Addressing the traditionalist Robert Barro Thaler said: "The difference between us is that you assume people are as smart as you are, while I assume people are as dumb as I am."

Assumptions of Traditional Finance and Market Anomalies

Based on the work on stock prices Fama (1965, 1965a) argued that the stock prices move randomly. Then in 1970 Fama presented his theory commonly known as the Efficient Market Hypothesis. One of the major assumptions of this theory is the rational behavior by all market participants. These market participants may be individuals and institutions.

When all market participants behave rationally the market will become efficient. Building on the work about diversification and modern portfolio theory of Harry Markowitz (1952, 1959) Treynor (1962), Sharpe (1964), Lintner (1965) and Mossin (1966) presented a model known as the Capital Asset Pricing Model. Using the Efficient Market Hypothesis and the Capital Asset Pricing Model, Fama (1969) showed how prices are affected by new information, in an event study, and concluded that security prices reflect all information. This relationship was contradicting to the Random Walk behavior expected by stock prices. Grossman and Stiglitz (1980) state the following two preconditions for this strong statement to be true: information is costless and simultaneously available to all participants, trading costs are zero.

Whereas the other assumptions about CAPM are all investors; (1) aim to maximize economic utilities, (2) are rational and risk-averse, (3) are broadly diversified across a range of investments, (4) are price takers, i.e., they cannot influence prices, (5) can lend and borrow unlimited amounts under the risk free rate of interest, (6) trade without transaction or taxation costs, (7) deal with securities that are all highly divisible into small parcels, and (8) assume all information is available at the same time to all investors.

Then Fama (1991) stated that the testing of Capital Asset Pricing Model has the problem of joint testing of market efficiency and the model. Fama (1993) presented three factor asset pricing model. Lot of empirical research has been done using these models. When these models did not work those cases were classified as market anomalies. Banz (1981) found that small firms yield abnormal higher returns on risk adjusted basis, commonly known as small firm effect. Abnormal returns for the month of January were named January effect; this anomaly was documented by Thaler (1987). Rozeff (1985) documented abnormal returns for the month of December were justified by the argument of tax loss selling or window dressing commonly known as December effect.

While these market anomalies prove that the assumption of efficient market does not hold. But traditionalists use the following justification like the three famous researchers:

- Paul Samuelson (1989) concludes that while a few geniuses can successfully exploit anomalies in the market, recognizing those individuals *ex ante* is difficult or impossible.

- Fisher Black (1993) states that the market anomalies are a result of data-mining, and the return from market anomaly is expected to be zero.

- Richard Roll (1994) stated the following about market anomalies "Over the past decade, I have attempted to exploit many of the seemingly most promising 'inefficiencies' by actually trading significant amounts of money… Many of these effects are surprisingly

strong in the reported empirical work, but I have never yet found one that worked in practice."

The existence of these well documented anomalies can be used as justification in favor of behavioral finance, as necessity for its use in finance. Using the argument by Kuhn (1962) the new paradigm of behavioral finance can be successful only if they can explain anomalies of sufficient quantity and importance in sufficient way.

Behavioral Finance Defined and its Evolution

Behavioral research first started in the field of Accounting. Dyckman (1964) conducted some experiments in financial reporting. Then Gonedes and Dopuch (1974) successfully diverted the behavioral research in accounting towards auditing instead of financial reporting. Two stock brokers and investors were studied for their decision making process by Slovic (1969, 1972). Decision making under uncertainty was studied by Tversky and Kahneman (1974) presented the argument for sampling basis. Kahneman and Tversky (1979) presented the prospect theory, heuristics and biases in the decision making. Kahneman's work on prospect theory earned him the Nobel Prize in Economics.

In prospect theory, investor behavior is observed as they make decisions according to the value of the game, like participants in a gamble. In this theory investors presented as risk seekers and risk averters at the same time. Because of this they buy bonds and shares both for their portfolios. Researchers found that losses cause more pain than the pleasure from gains. This extra pain results in the disposal of stocks quickly. These sales also results in sale of winning stocks too early and holding of losers too long. This behavior is coined as disposition effect by Shefrin and Statman (1985). Hence, investors chose stochastically dominated portfolios that lie below the efficient frontier. This loss aversion behavior explains why U.S. equities outperform U.S. bonds.

Kahneman and Tversky (1979) argued that the decision made by investors is also dependent on how these alternatives are presented and personal characteristics of the decision maker. They named it as Framing Effect. Another feature of behavioral finance is called heuristics and biases framework. These feature deals with individuals when faced with huge data for analysis to make an investment decision. These individuals incapable of analyzing rely on a limited number of cognitive strategies or heuristic that simplify the complex decisions and end up with suboptimal decisions.

Today, the amount of research and publishing being done in the area of behavioral finance seems staggering. Most of the research is to look into the reasons for the investor behavior especially irrational behavior. These irrational behaviors were clearly linked to feelings and emotions, something that has been difficult to quantify, or look at in the objective sense. Psychology has been used as a way of capturing these feelings in relation to financial and investment decisions, and that gave way to a new alternative for the orthodoxy of the rational markets: cognitive psychology that led to the discipline of behavioral finance. The problem with behavioral finance is that it still does not quantify emotions in direct measurements, nor does it look at the source of such emotions and feelings.

Is Behavioral Finance a New Paradigm?

Kuhn (1962) argues in his book *The Structure of Scientific Revolution* that science progresses through normal science and paradigm-shifting. A paradigm provides a theoretical frame work for research. Researchers test and improve or modify the paradigm; this process is called normal science. Hence, normal science establishes the validity of new paradigm and uncovers anomalies. New paradigms become successful only if these paradigms can explain many anomalies, and these anomalies should be important. If we use this criterion for evaluating behavioral finance, our judgment will against behavioral finance.

Evolution of Neurofinance

The fields of neuroeconomics and neurofinance are amalgams of neurobiology and economics and finance. Neurobiology is the scientific study of nerves system. Using pictures of specific parts of brain while a decision is being made, gives insight what is going on in the brain. Now powerful and widely used imaging techniques are available which include Electro-encephalogram (EEG), Positron Emission Topography (PET), and Functional Magnetic Resonance Imaging (fMRI). Using these imaging and measurement tools experiments can be conducted to determine how human cognition and emotion are mapped while decision making. Scientific advances in the field of electrophysiology, and human genetic analysis combined with sophisticated experimental techniques from cognitive psychology allows neuroscientists and psychologists to address abstract questions such as how human cognition and emotion are mapped to specific neural substrates. Scientist observes the fundamental biological and psychological mechanism that underlies the individual investor's behavior.

Researchers have identified medications that will change risk-return perceptions in the experiments. Roger, Lancaster, Wakeley, and Bhagwagar (2004) found that the high blood pressure medication substantially reduce the subject's discrimination of potential losses. Some of these experimentations were conducted using medication and placebos. This adds value to the results of experiment. So the medications and drug of abuse proved to be instrumental in altering the decision makers risk preferences. Kuhnen and Knutson (2005) found the two area of brain most active while risk/return decisions. By activating these areas shift in risk preferences is possible. Researchers conducted gambling situations, while the alternatives were framed differently. They found that decisions made by the subjects were dependent on the way the alternative outcomes were framed. Harbaugh, Krause, and Vesterlund (2002) found that the loss aversion is not dependent, which is against the commonly assumed in traditional finance. McClure, Laibson, Loewenstein, and Cohen (2004) and Ballard and Knutson (2009) did neurofinance research about inter-temporal and choice impulsivity. Issues' dealing with trust, altruism and morality was the subject of neurofinance researcher like Zak, Stanton, and Ahmadi (2007) and Barraza and Zak (2009) are a few from many. Using neuroimaging the issues of emotions and testosterone in the trading pit was subject of research of Lo and Repin (2002), Coates and Herbert (2008).

The Status of Behavioral Finance and Neurofinance

As we can see from the preceding discussion research in both behavioral finance and neurofinance is moving fast ahead. Two research paper "Behavioral Finance: Bounded Rationality, Neuro-Finance, and Traditional Finance" by K. C. Tseng (2006) and "Neurofinance: Bridging Psychology, Neurology, and Investor Behavior" by Stven G. Sapra and Paul J. Zak (2008) suggested that all these three "paradigms" are complimenting to each other. So all these three should be emphasized and worked on. The most important aspect of these new paradigms is the resolution of catch 22, in which our traditional finance was in. Where traditionalist knew that emotions effect the decisions, but emotions and feeling cannot be quantified. These three areas, traditional finance, behavioral finance, and neurofinance can measure emotions and feeling. These emotions and feeling are dependent on a specific region of human brain. By imaging the human brain it is possible to forecast the decisions expected by the individual. There are about thirty academic publications dealing with these subjects.

Research Objectives

When we compare the three i.e., traditional finance, behavioral finance, and Neurofinance we find that behavioral finance and neurofinance are important addition to the existing body of traditional finance. Yazdipour and Howard (2010) suggested that a course in the area of behavioral finance should be developed. This should be a highly interdisciplinary field of study. They developed a fourteen week course scheduled for this study, which is given in Appendix B. In this paper we will look at the in class teaching, discussion about behavioral finance and neurofinance. So the main research question is to find if behavioral finance and neurofinance is being covered in finance courses? Other research questions are at what level (graduate or undergraduate) these topics are being introduced.

To answer these questions an informal survey was conducted on students majoring in finance in the Gulf Cooperation Council. In this survey we asked questions to students about the topics related to behavioral finance and Neurofinance. This study to start with l covered colleges and universities in Gulf Cooperation Council countries and then later on the scope will be increased to other countries.

Conclusion

The result of the survey was surprising. We found that the students are not familiar with these topics at all. The same is the case for undergraduate and graduate students both. These students have been through different universities mostly in Middle East. These surprising results, makes us to take this research to the its next logical level by extending it to other countries. We are planning to conduct a survey in next Financial Management Association conference. In that forum we will be able to find information from most of the US universities.

Appendix A

Every research study in finance can be placed in a three dimensional matrix describing the institution being studied, the theory from which hypotheses are described, and the methods used to demonstrate results.
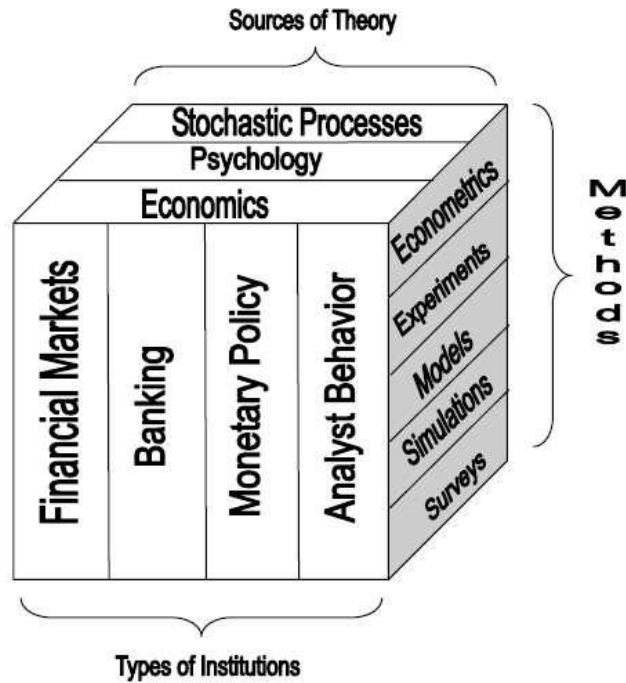
Note: Course schedule and assignments for a 14-week graduate behavioral finance class.

Topics and Readings	Deliverables	Resources/Links
Session 1. Behavioral Foundations of Finance Readings	Participate in discussions Psychological scenarios Form teams for case analyses	PowerPoints, web sites, lecture notes, videos if available
Session 2. Risk and Return: Psychological Considerations Readings	Homework problems Participate in discussions	
Session 3. Corporate Valuation Readings	Homework problems Participate in discussions	
Session 4. Capital Budgeting Readings	Homework problems Participate in discussions Conference discussions Group project 1 due (report and presentation/posting to public area)	
Session 5. Investing and Stock Valuation Readings	Homework problems Participate in discussions	
Session 6. Inefficient Markets and Corporate Decisions Readings	Homework problems Participate in discussions Mid-term examination	
Session 7. Capital Structure Readings	Homework problems Participate in discussions Group project 2 due (report and presentation/post to public area)	
Session 8. Dividend Policy Readings	Homework problems Participate in discussions	
Session 9. Agency Conflicts and Corporate Governance Readings	Homework problems Participate in discussions Short paper due (post for discussion)	
Session 10. Group Decision Making: Behavioral Pitfalls Readings	Homework problems Participate in discussions Group project 3 due (report and presentation/post to public area)	
Session 11. Mergers and Acquisitions Readings	Homework problems Participate in discussions	
Session 12. Capital Budgeting Readings	Homework problems Participate in discussions	
Session 13. Capital Structure Readings	Homework problems Participate in discussions	
Session 14. Corporate Finance Implications: Special Topics Criticisms of Behavioral Finance Readings	Homework problems Participate in discussions Final examination	

Reproduced Exhibit 3.4 from Behavioral Finance: Investors, Corporations, and Markets by H Kent Baker and John R. Nofsinger, John Wiley & Sons Inc. p 52

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