GESTÃO, FINANÇAS E CONTABILIDADE

BEHAVIORAL BIASES IN INVESTORS' DECISION: STUDIES REVIEW FROM 2006-2015

VIESES COMPORTAMENTAIS NA DECISÃO DE INVESTIDORES: REVISÃO DE ESTUDOS DE 2006-2015

SESGOS DE COMPORTAMIENTO EN LA DECISIÓN DEL INVERSOR: ESTUDIOS REVISIÓN 2006-2015

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ABSTRACT
The present study presents a survey of researches that, through the employment of theoretical precepts, laboratory tests or empiric studies, in the period from 2006 to 2015, related themselves to the examination of anomalies' incidences or irrational effects which affect people's choices on investment decisions. Despite the temporal delimitation, it was set about

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the seminal study of Kahneman and Tversky, published in 1979, which brings considerations about Perspective Theory, in opposite to Efficient Market Hypothesis (EMH). The used methodology is exploratory and bibliographic, employing a sample composed by international journals of Finances area, besides journals in Accounting and Management in Brazil. A subdivision in the format of findings presentation was carried out, separating those which treat theoretical precepts and laboratory tests, nevertheless linked to possible practical effects - depicted as studies of behavioral incidences, evidences and tendencies - from those which seek empirical evidences greatly related to market operations, identified as studies of behavioral precepts applied to market. In conclusion, it was possible to identify that international researches are more focused on the understanding of behavioral phenomena and their impacts in stock market, while Brazilian studies concentrate on replications of seminal study or identification of biases and specific samples, presenting low possibilities for results' generalization. This occurs due to the lack of deepening and narrow scope of the investigations. Therefore, it's open a great variety of possibilities for studies, notably in fields such as domestic finances, behavioral effects among Latin American countries, standardization of behavior inside organizations, correlation among several biases, identification of other behavioral effects which interfere financial and economic scenery, mainly if the researches involve real market data.
Keywords: Behavioral finances. Financial market. Review of studies.

RESUMO
O presente estudo traz um mapeamento de pesquisas que, por meio de preceitos teóricos, testes de laboratório ou estudos empíricos, no período de 2006 a 2015, relacionaram-se à averiguação da ocorrência de anomalias ou efeitos não racionais que afetam as escolhas dos indivíduos em decisões de investimento. Apesar da delimitação temporal, partiu-se do estudo seminal de Kahneman e Tversky, publicado em 1979, que traz considerações sobre a Teoria da Perspectiva, em contraponto à Hipótese de Mercados Eficientes. A metodologia utilizada é exploratória e bibliográfica, com uma amostra composta por revistas internacionais da área de finanças, além de periódicos da área de Contabilidade e Administração de Empresas no Brasil. Foi realizada uma subdivisão no formato de apresentação dos achados, separando-se aqueles que tratam de preceitos mais teóricos e testes de laboratório, porém ligados a possíveis efeitos práticos – caracterizados como estudos de incidências, evidências e tendências comportamentais – daqueles que procuram evidências empíricas mais relacionadas às operações de mercado, identificados como estudos de preceitos comportamentais aplicados ao mercado. Como conclusão foi possível identificar que as pesquisas internacionais são mais voltadas para o entendimento dos fenômenos comportamentais e seus impactos nos mercados de capitais, enquanto que os trabalhos brasileiros se concentram em replicações do estudo seminal ou identificação de vieses e amostras específicas, com poucas possibilidades de generalização dos resultados. Isto se dá em virtude da ausência de aprofundamento e pouca abrangência das investigações. Assim, descortina-se uma vasta gama de possibilidades de estudos, notadamente em campos como finanças domésticas, efeitos comportamentais entre países da América Latina, padronização de comportamentos em organizações, correlação entre diversos vieses, identificação de outros efeitos comportamentais que interferem no cenário econômico e financeiro, principalmente se as pesquisas envolverem dados reais do mercado.
Palavras-chave: Finanças comportamentais. Mercado financeiro. Revisão de estudos.

RESUMEN
El presente estudio describe un conjunto de investigaciones que, sustentadas en el empleo de preceptos teóricos; pruebas de laboratorios y estudios empíricos del período comprendido entre 2006-2015, evidencian anomalías o efectos irracionales que afectan las decisiones de inversión. A pesar de las limitaciones temporales se partió del estudio de Kahneman y Tversky, publicado en 1979, quienes consideraron el contraste entre la teoría de la perspectiva y la hipótesis de mercados eficientes. La metodología empleada fue la exploratoria y bibliográfica con una muestra compuesta por revistas internacionales del área de finanzas además de otras del área de contabilidad y administración publicadas en Brasil. Los hallazgos fueron divididos entre los que están relacionados mayormente con preceptos teóricos y pruebas de laboratorios ligados a efectos prácticos (identificados como estudios de evidencias y tendencias comportamentales) de aquellos que buscan evidencias más prácticas relacionadas con las operaciones de mercado (identificados como estudios de preceptos comportamentales aplicados al mercado). El estudio permitió concluir que las investigaciones internacionales están más direccionadas a la comprensión de los fenómenos comportamentales y su impacto en los mercados de capital, mientras que los trabajos publicados en Brasil centran su atención en replicar estudios de tipo seminales o identificación de sesgos y muestras específicas con poca posibilidad de generalización de los resultados. Esta situación acontece en virtud de la ausencia de profundidad y extensión de las investigaciones. Es así que se revela una gama de posibilidades de estudios en campos de las finanzas domésticas, efectos comportamentales entre países de América Latina, estándares de comportamientos de organizaciones, correlación entre diferentes sesgos e identificación de efectos comportamentales que intervienen en el escenario económico-financiero, principalmente si las investigaciones son basadas en datos reales del mercado.
Palabras clave: Comportamiento de finanzas. Mercado financiero. Revisión de estudios

1 INTRODUCTION

The study of behavioral aspects in finance has become a fertile and consistent strand of research in which psychological principles are sought to attempt to explain factors that interfere directly or indirectly in individual decisions and consequent allocations of financial resources that affect the economy in general.

The seminal study of Kahneman and Tversky (1979), which introduces the Prospect Theory, a counterpoint to the precepts of the Efficient Market Hypothesis – EMH, has inspired studies and discussions related to the interference of bias not rationality in decision making, notably regarding interference in the management of organizations and investment decisions.

The Efficient Market Hypothesis uses the studies of Fama (1970; 1991) as a reference point and defends the existence of rationality in human beings and their aptitude for rational information processing and consequent decision making, disregarding emotional factors or asymmetric information.The Prospect Theory presents the subjectivity of individual reactions, buoyed between emotions, beliefs, interpretations and based on perceptions of time, affinities, experiences, and others, that when combined, provide evidence that affects market efficiency and that is derived from the observation that people are not endowed with perfect rationality, and cannot dismiss their feelings. Kahneman and Tversky (1979) state that decision making can be seen as a choice between prospects and present behavioral factors such as the certainty effect, the reflection effect and the isolation effect, and discuss the function of value for individuals.

Several other studies corroborate the Prospect Theory. Most important among these are Bondt and Thaler (1985), Shefrin and Statman (1985), Conlisk (1996), Odean (1998), Thaler (1999), Shefrin and Statman (2000), Shiller (2000), Halfeld and Torres (2001), Kimura (2003), Lima (2003), Ferreira and Yu (2003), Yoshinaga et al (2008), that provide collaborations on theoretical improvements or empirical applications of the presented principles and that are discussed within the framework of behavioral finance.

In view of the fruitful field of research that is open to the study of psychological variables that can influence or even determine economic decision-making and that reject the Efficient Market Hypothesis and its implications of the "unrestricted" rationality of its agents, the following question arises: What kinds of occurrences have been observed in the literature, regarding the impact of psychological variables on decision making in finance? Based on this research question, the present study aims to present a survey of publications from 2006 to 2015 that discuss the influence of behavioral biases in investment decisions and consequences for the financial market.

Based on the considerations of Vosgerau and Romanowski (2004), we initially conducted a review to identify studies and classify them based on form and results. Thus, the survey compiles these studies while paying attention to the methodological procedure used in each.

Specifically, we sought to investigate the repercussions of non-rational choices on individual investment decisions, separating theoretical studies and laboratory tests where behavioral biases were investigated, discussing whether their theoretical precepts or market-based conditions applied to various people or groups, whether restricted or controlled, whether reviews of actual or empirical situations or assessments of actual occurrences in the financial market. This survey reveals new possibilities for research, particularly in regard to Brazil, or which may motivate master's theses or doctoral dissertations and thereby contribute to the advancement of literature on behavioral finance. The investigation and presentation of the behavioral decision making of investors are of great importance for understanding the non-rational aspects of individuals, and may lead to the establishment of criteria and factors that minimize distortions in assessment standards and propensity in stock investment. To reinforce this claim, the studies of Fenton-O 'Creavy (2011) and Baker and Ricciardi may be mentioned (2014), whose results indicate that investor emotion is a critical factor in investment decision making.

This study first presents a brief introduction to the current topic, highlighting methodological procedures and textual distributions, followed by the presentation and comments from related international studies. The final section presents general considerations on relevant aspects of the evaluated studies, with a parallel to international and national research and the likely gaps that can be investigated in future studies.

2 METHODOLOGY

Our exploratory and bibliographical study provides a map of contributions from Brazilian and international studies on the topic of behavioral finance. Specifically, we sought publications from January, 2006 to April, 2015 that report on behavioral bias in investor decision making and its consequences for the financial market.

We emphasized the mapping of studies that, by means of theoretical rules, laboratory testing, or empirical studies, related to the investigation of the occurrence of behavioral bias or irrational effects that affect individual investment decisions. Thus, our findings were divided between those that were more theoretical and laboratory tests, with a framework of theoretical discussions and experiments using situations or groups that were specific and controlled, but linked to possible practical effects of those seeking empirical evidence that is more related to market operations. Separating studies carried out with people who are not directly linked to the financial market from those that provide conclusions that come directly from the decisions of investors in the financial market, may reveal possible behavioral differences between these groups.

Despite the temporal boundaries of this study, the analysis of most of the publications related to the subject was conducted as a source for understanding subsequent discussions on past research.

Tables 1 and 2 show the Brazilian and international journals considered in this survey. In addition to the journals cited in the tables, other periodicals (Brazilian and international) were also consulted, but did not contain publications related to the subject of this survey. Although the journals listed in these tables are all highly influential and have received the prestigious Qualis/CAPES qualification, these indicators were not necessarily used as criteria for selection in our search for studies that examined the behavioral influences on decision making.

Instead, we searched Google Scholar with the keywords *finanças comportamentais* (in Portuguese) and behavioral finance and selected those articles that were published between 2006 and 2015. Next, we analyzed each of these articles and kept those that best fit the focus of this survey. The timeframe was chosen out of convenience and to not exceed a ten-year span.

Table 1 – Sources of international publications and quantities of articles per period

FONTES INTERNACIONAIS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Journal of Finance	1		2	1							4
Economic Journal				1							1
Economics Letter					1						1
Journal of Corporate Finance				1							1
American Economic Review		1									1
Journal of Empirical Finance	2	1					1	1			5
Global Journal of Finance and Management				1							1
Journal of Financial and Quantitative Analysis				1							1
Journal of Behavioral Finance	5	4	5	5							19
International Research Journal of Finance and Economics		1	2		1						4
Journal Applied Corporate Finance	1										1
Emerging Market Review					1						1
Estudos do Isca							1				1
Journal of Organizational Behavioral						1					1
Social and Psychological and Personality Science						1					1
Journal of Behavioral Decision Making		1			1						2
Journal of Banking and Finance						1					1
Journal of Scientific Research and Development										1	1
International Journal of Economics and Financial Issues									1		1
Masters International Journal of Management and Development									1		1
Strategic Management Journal										1	1
Journal of Multinational Financial Management									1		1
The European Journal of Finance									1		1
The European Financial Review									1		1
Outros				2							2
Total	9	8	9	12	4	3	2	1	5	2	55

Source: Prepared by authors

Table 2 - Sources of Brazilian publications and quantities of articles per period

FONTES NACIONAIS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
RAM - Revista de Administração Mackenzie					1						1
RAUSP - Revista de Administração da USP					1						1
RAE - Revista de Administração de Empresas	1		1								2
Revista Brasileira de Finanças				3							3
Revista de Gestão USP			1								1
READ - Revista Eletrônica de Administração	1										1
GEPROS - Gestão da Produção, Operações e Sistemas								1			1
Revista de Administração do USJ								1			1
Estratégia e Negócios						1					1
REUNIR - Revista de Administração, Contabilidade e Sustentabilidade							1	1	1		3
REPEC - Revista de Educação e Pesquisa em Contabilidade				1							1
Revista de Contabilidade e Controladoria								1			1
Revista de Gestão, Finanças e Contabilidade								1	1		2
RAC - Revista de Administração Contemporânea				2							2
REGE - Revista de Gestão			2								2
RBGN - Revista Brasileira de Gestão de Negócios				1					1		2
Revista de Administração Contemporânea				1							1
REGES - Revista Eletrônica de Gestão			1								1
Revista Eletrônica de Gestão Organizacional					1						1
RIC - Revista de Informação Contábil				1				1			2
Revista de Economia e Administração		1									1
FACES - Revista de Administração							1				1
Holos									1		1
E & G - Revista Economia e Gestão									1		1
Revista de Negócios									1		1
Revista Evidenciação Contábil e Finanças									1		1
RACEF - Revista de Administração, Contabilidade e Economia da FUNDACE									1		1
Revista Ciências da Administração									1		1
Revista Gestão Industrial								1			1
Total	2	1	5	9	3	1	2	7	9	0	39

Source: Prepared by authors

3 INTERNATIONAL STUDIES

3.1 Theoretical studies and experiments on behavioral impact, evidence and trends

Since the publication of the Kahneman and Tversky (1979), a study titled *Prospect Theory: An Analysis of Decision Under Risk*, international research on this subject has taken different paths,= that range from fact-specific behaviors to the investigation of these behaviors in the general market. This first part of the international studies section explores those items that do not directly involve the capital market, but cover the behavior of individuals.

Understanding how individuals think can provide competitive advantages that lead to specific strategies within a given market. Along these lines, Guiso, Sapienza and Zingales (2008) investigated factors related to a lack of confidence in the stock market, while Mitchell and Utkus (2006) conducted a study on attributes related to overconfidence, limited control, loss aversion, overvaluing the present and will power regarding investor decision-making in American retirement funds. Agarwal and Panwar (2014) evaluated the existence of a positive correlation between the majority of strategies of individual investors and behavioral theories on finance, while Breuer, Riesener and Salzmann (2014) conducted research related to risk aversion and country-specific cultural aspects. Blasco and Ferreruela (2008) and Bogan (2009) broadened behavioral influences to include the family.

Bogan (2009) used panel data on the National Longitudinal Survey of Youth, conducted in the United States since 1979, and obtained a sample of 12,686 men and women in 1994. The study examined a question linked to gender. Specifically, a hypothesis was tested that savings and investment are influenced by family in ways that depend on the gender of the children. The study noted that standard models that assume that individuals are endowed with a preference for stable risk may be incomplete, and identified gender risk as a factor previously omitted in the literature with respect to domestic portfolios.

In the same vein, Cheng, Lee and Lin (2013) undertook an analysis about how gender and other factors such as age may be related to the disposition effect of the Prospect Theory. The authors found that this is stronger in women and more mature investors, corroborating therefore the influence of demographic variables on decision making in the financial market.

Regarding corporate aspects, Hackbarth (2009) presented research on the impacts of conflicts among shareholders on finance and investment decisions while closely addressing managerial optimism and overconfidence, the latter already studied by Bhandari and Deaves (2006) Evans (2006), Cheng (2007), Gort (2009), Vieira Fernandes and Silva (2012), and Chung Hung and Yeh (2012). Using a real options model and mathematical simulations with differential equations, the study concluded that the most optimistic managers invest without worrying about debt, while more rational investors operate contrarily. The solutions proposed by the study included better selection of managers with less extreme behavioral profiles and creation of job scales that better segregate power and decision-making.

A similar analysis on the effects of "optimism" in investment decisions and financial management looked at two factors that, in a way, also culminate in an excess or lack of confidence in individuals: the ability to regulate emotions and mood.

Fenton-O' Creavy (2011) carried out a study on a sample of investors from London investment banks, and observed that effective regulation of emotions seems to be a critical success factor in investment decisions and negotiations, since the strategies for containing feelings adopted by experts and high-performance negotiators were qualitatively different from those adopted by employees with less expertise. In fact, agents of the first type are more inclined to track impressions by self-managing their attention and cognitive change, and may also be able to deal with negative feelings in ways that allow them to maintain objectivity and pursue long term goals. Baker and Ricciardi (2014) corroborated these findings by stating that success helped many experienced and mature investors to learn that success depends on controlling emotions and overcoming biases. This helped them avoid errors typical of new investors and related to overconfidence.

Vries (2010) used descriptive statistics, linear regression and quantitative analysis of data collected in a controlled study at Radboud University Nijmegen. This study replicated a scenario of game theory, and found that happier individuals were more likely to abandon logical rules and dominant strategies. Thus, research has shown that "state of mind" affects decisions, once again corroborating the argument that behavioral biases influence decision making in finance.

Another effect of non-rational factors, originating from the seminal study by Kahneman and Tversky (1979) and researched by Zhang (2006) using panel data, was the role of information uncertainty in pricing continuity, anomalies and transverse variations in stock returns in the United States from January 1983 to December 2001. The study concluded that investors tend to be more conservative when there is more ambiguity in information related to a company, and that greater uncertainty produces poorer returns in the short term but that good news leads to higher returns. Although the opposite may also be true, the effect of uncertainty was not verified in the cross-sectional study.

Vlaev, Chater and Stewart (2007) analyzed a range of information, options and contexts associated with risk assessments and uncertainty. They used experimental economic research from the University of Oxford and employed maximum likelihood estimations in statistical data processing. The authors found that when a person makes a financial decision, their final choice depends directly on what they have available at the moment. Furthermore, it was found that in general, the circumstances or scenarios provided by factors that are considered exclusive and concurrent affect savings and investment decisions, precisely because of the related perception of risks. These results are in line with the principle of prospect relativity.

The effect of belief on decisions related to portfolio diversification was investigated by Brunnermeier, Gollier and Parker (2007). Their specific goal was to find a model that could mitigate this influence. The authors employed literature surveys and mathematical formulations involving probability analysis and correlation of variables to present propositions and effects of belief on investment decisions, portfolio pricing and returns based on optimism.

Prather and Middleton (2006) applied selectivity and market timing tests to the skills of individual managers and teams regarding mutual funds. They used the least squares method and other statistical treatments to determine which performed best. They claimed, based on the precepts of classical theory, that regardless of whether a decision is made by a person or a group, the final choice for maximizing results should be the same. This position is challenged by the Behavioral Theory, which argues that a group tends to correct the errors of an individual in tasks that have greater complexity and a higher degree of uncertainty. Using parametric tests on secondary data from January 1992 to December 2001, they concluded that there is no basis for the arguments of the proponents of behavioral finance.

Feliner and Sutter (2009) took another approach by analyzing the causes, consequences and possible cures for risk aversion. They observed that risk aversion occurs because of the frequency of returns or the time horizons of investments. The authors concluded by means of an experiment with 444 individuals from Jena University, that handling returns and investment frequency and / or flexibility leads to different levels of investment, and that most prefer short-term investments even with lower returns. This conclusion appears to be associated with return and frequency.

Authors such as Jeffrey (2006) and Gwilym (2010) have attempted to combine various behaviors within a single model. Gwilym (2010) presented a model that claims to include all behavioral properties, not just individual treatments of anomalies. The study used derivations of statistical formulas, especially the Generalized Autoregressive Conditional Heterokedasticity Model – GARCH, applied to regressions of FSTE All-Share Index data, and produced a theoretically reliable statistical significance of 95%. The author points out that this model can be used in setting standards for decision-making based on historical data that encompass behavioral effects. Especially given that these two features, both for involving behavioral data and for suggesting strategies based on historical data, follow a different line from that proposed by Fama (1970 and 1991).

All of the studies presented thus far have been anchored in the Theory of Behavioral Finance. They have also provided significant advances that have contributed to a better understanding of this theory and some examples of concepts related to individual overconfidence, optimism, gender risk and mood. These variables were studied in ways that were either more objective or more generalized, producing models based on various factors.

3.2 Studies on the application of behavioral principles to the market

As a complement to, or rather, an advancement in the contributions to the area of Behavioral Finance, this section presents studies that involve direct applications of behavioral principles to the financial market. Behaviors that were previously presented as variables related to human behavior are hereafter tested to determine their economic effect.

The consequences of behaviors attributed to periods, phases, times or events of the year can bring significant behavioral swings to investment decisions. Yuan Zheng and Zhu (2006) investigated the relationship between lunar phases and stock market returns in 48 countries. They conducted nonparametric correlation and regression and found that returns are lower around the full moon than around the new moon. They believe that lunar phases are connected to investor mood, studied by Peterson (2007), and not the economic market, and that mood can affect people's ability to process information.

Anderson, Gerlach and DiTraglia (2007), Dellavigna and Pollet (2009) examined investor attention, similar to a study on the effect of the day of the week, and to some extent the January effect. Their investigation compared announcements from the financial market that occurred immediately before the end of the week (Friday) to announcements on other days of the week to determine whether the proximity of the weekend reduced the quality of decision making. Using North American data, a total of 228,651 ads from January 1984 to June 2006, they found greater delays in responses to announcements made on Friday (60%) than on other days (40%). This means that attention may be limited, which leads to conservatism regarding potential gains from information received just before the weekend.

While they did not carry out an empirical study with market analysis, as in other studies discussed in this section, the work of Kramer and Weber (2011) is similar to those reported in the above paragraphs, since it analyzes the effects of weather, and specifically season, on preferences for individual risk. They found that people are more risk averse during the fall and winter.

Griffin (2006) and Park (2009) showed that disasters or events that cause significant and sharp fluctuations in the economy can lead to behavioral abnormalities. Park examined the terrorist attacks on the World Trade Center in 2001 by investigating whether investors overreacted to the attack, specifically with regard to the actions of insurance companies and their returns. The author analyzed data from 82 insurers throughout 2001, and found evidence that investors overreacted to September 11, 2001, with negative returns on the first day of trading, and subsequent abnormally positive returns. This reaction was mainly for stocks with high information asymmetry, contrary to the market efficiency hypothesis.

Kumar (2009) sought to show another effect of uncertainty that is inherent to the Prospect Theory, by assessing the impact of overconfidence and the disposition effect. The disposition effect was also researched by Fogel and Berry (2006), Dacey and Zielonka (2008), Roger (2009) and Chong (2009). Kumar (2009) sought evidence that investors make larger investments with errors of judgment when uncertainty is greater and securities difficult to assess. Using data from January 1991 to November 1996, the author stated that investors have a greater disposition effect and overconfidence when stocks are more difficult to assess, which can be explained by familiarity, representation and limited attention. Kumar Dixit and Francis (2015) found that investors acquired increasingly more volatile stocks with increases in abnormal earnings, due to a prior acquisition announcement, and maintained this same approach as losses increased.

Aggarwal, Lucey and O'Connor (2014) attempted to determine if prices of gold futures could freely predict bias in the current price of gold. They concluded, in a survey conducted on Londoz Fixing pm Spot Gold Prices, that incorrect forecasts in the gold market generally suffer from overreaction to changes in the observed gold rate, thus confirming the existence of irrational behavioral effects in the gold futures market.

Behavioral effects have also been widely studied in economies outside the United States. Ramiah and Davidson (2007) studied aspects related to the Australian market; Grou and Tabak (2008) evaluated the effect of the illusion of control using the Brazilian market; Oehler, Rummer and Wendt (2008) investigated investment decisions in Germany; Gort, Wang and Siegrist (2008) examined trust fund managers in Switzerland; Al-Ajmi (2008) evaluated determinants in investor decisions in Bahrain; and many other studies, with special attention to the rapidly expanding Chinese market.

Seasholes and Wu (2007) studied the predictability of behaviors derived from stimulus using Shanghai investors; Li et al (2007) used public high-tech companies listed on the Taiwan Stock Exchange to investigate the importance of behavioral determinants for foreign companies making external financing decisions; Chafai and Medhioub (2014) investigated the influence of psychological and emotional factors on investor behavior in the Tunisian stock market, while Rostami and Dehaghani (2015) observed the main behavioral biases in the Tehran stock market.

Chou, Huang and Hsu (2010) also conducted studies in Taiwan in an attempt to establish a model that could assess risk attitudes towards financial products and estimate the importance of alternative sources of information, such as the degree of prevailing optimism towards economic outlook. The authors tested 6 hypotheses on investor behavior patterns using correlation and regression tests. They found that experienced investors are less likely to takes risks and have a greater perception of risk. The inverse was also true. However, they found no significant differences regarding gender.

Ditchl and Drobetz (2011) analyzed the conformity of the cumulative prospect theory of Tversky and Kahneman (1992) for the German stock market. Their results ran counter to the assumption of the Expected Utility Theory concerning Traditional Finance and its intersection with the Prospect Theory, and demonstrated that agents are more sensitive to losses than to gains. This confirmed the risk aversion assumption and the tendency to overestimate extreme but unlikely events, as attested to by strong preferences for portfolio insurance strategies. Thus, individuals seek strategies that limit potential losses while trying to preserve some potential profits.

Hachicha, Amirat and Bouri (2009) monitored the financial market and evaluated its effects on investor behavior. Lehenkari (2009) and Kaustia and Knupfer (2008) investigated the Finnish market in a similar way. The latter study explored a potential link between the tendency of investors to invest in initial public offerings (IPOs) and past returns on initial public offerings in Finland. In short, they assessed the period from January 1985 to December 2000 in order to determine the effects of using experience as a factor in decision making. They used correlation and regression to conclude that if investors obtain a positive return on their first purchases, there is a tendency to continue to perform this type of investment, thereby gaining experience on the functioning of the market. Contrast between the Modern Theory of Finance and Behavioral Finance has led to individualized studies, defenses for one or the other theory, and even attempts to integrate both theories. Vasiliou, Eritions and Papathanasiou (2008) looked for a way to integrate technical assessment and market evaluation methodologies with aspects of behavior by studying large capitalization companies on the Athens Stock Exchange. They generated 2,747 observations from 20 stocks with the largest capitalization on the Athens Stock Exchange. They claimed that an economy where rational investors interact with irrationality can have a substantial and lasting impact on prices, thus confirming the possibility of integrating rationality and irrationality. Vasiliou and Daskalakis (2009) also used the Greek market as a research sample to writee about contrasts between theories.

Individual analyses of countries and their economies are common, but some effects in behavioral finance tend to require more robust and diverse samples that provide more reliable results. For example, a discussion on cultural differences between countries and their repercussions in the financial market requires a broader assessment. Lucey and Zhang (2010) studied the effect of cultural distance on stock market returns and tested whether this cultural distance is helpful in explaining variations in the level of transactions between countries. To this end, they used questions related to belief, religion, individualism, masculinity, distance from power and uncertainty. The sample consisted of 23 developing countries and evaluated the period of 1995-2007. The authors used statistical analysis and correlation calculations between countries and the occurrence of behavioral aspects and found that cultural distance is an important factor that either facilitates or hinders relations between nations. Three main reasons were listed: investors only considered cost when making investments in emerging markets with which they were unfamiliar; the integration process is slow and gradual, and can take a long time; foreign investors, when unfamiliar with a new market, will use their own judgement standards that are probably in accordance with the beliefs, experiences and other factors from their country of origin.

4 BRAZILIAN STUDIES

4.1 Theoretical studies and experiments on behavioral impact, evidence and trends

Some Brazilian studies show a strong tendency to replicate the seminal study regarding experiments and investigations on the incidence and use of feelings in decision-making, especially related to students or individuals in general society. Such was the case of Ribeiro and Machado (2013) who analyzed the behavior of academics in a class called “company games” where the financial market simulator "Multinve$t" was used to map differences in behavior and strategies.

Gava and Vieira (2006), Walter, Frega and Silva (2010) and Basso and Kimura (2010) dealt with risk, but without emphasis on the financial market. Nevertheless, their findings may assist in understanding the behavior of individuals and their propensities in relation to risks and decision making.

While the following studies do not examine direct effects on the financial market, their results do highlight possible effects of the financial market on investor behavior and choice. Cavazotte, Dias Filho and Vilas Boas (2009), used an experiment to understand the endowment effect and identify moderating factors that enhance or reduce the difficulty of individuals to trade assets already incorporated into their patrimony. Mendes-da-Silva and Rocha (2009) conducted an empirical analysis to determine if there is an association between an individual’s sense of control and age.

Mendes-da-Silva and Yu (2009) also analyzed possible associations between age and feelings of control, which is relevant for a better understanding of cognitive biases such as overconfidence and procrastination in decision making. A quadratic relationship between age and a sense of control was found. The youngest and oldest individuals in the study had the lowest sense of control, while young adults and the middle-aged had the greatest sense of control. The authors explained that this trait reflects the degree to which subjects believe they have autonomy over facts and circumstances, which may lead to overconfidence in financial decision making.

Without the use of market data, but in order to understand individual behaviors regarding investment decisions, Silva and Serpa (2012) evaluated how the inclusion of new events in an investment portfolio can affect investor choice of investors. The study administered a structured questionnaire to 386 undergraduate Accounting students from five universities in the Federal District of Brazil and analyzed the results with the chi-square test and the Spearman correlation. They found that irrationality is present in investor decisions because changes in patterns of choice, what the authors call "the gimmick" have affected investor behavior.

Some authors have dedicated themselves to analyzing the framing effect, predicted by Kahneman and Tversky (1979), on the decisions of individuals in the financial market, where different presentations of alternatives cause agents to act against the principle of invariance, and experience changes within their own perceptions of risk, profit and loss. This was the subject of studies by Dantas and Macedo (2013), Barreto, Macedo and Alves (2013), Carvalho Junior, Rock and Bruni (2009), Silva et al (2010), Martins et al (2013), Barreto, Macedo and Alves (2014) and Pontes et al (2014).

Most of the aforementioned studies have found that positive information has greater impact than the equivalent negative message. This finding is in complete agreement with the value function of the Prospect Theory. Thus, feelings of loss are more important than feelings of gain. Most of these studies also found that when exposed to negative situations, agents are likely to take risks and, when confronted with positive situations, are averse to loss, thereby reflecting the influence of framing on investment decisions. Freitas and Wilhelm (2013) used quantitative and qualitative analysis on a case study to confirm the findings of the Prospect Theory. Specifically, they found that individuals tend to be risk averse for gains and prone to greater risk for losses - a fundamental concept of Behavioral Finance.

Cruz et al (2013) used hierarchical analysis of questionnaires to study the motivations that weigh most heavily on the purchase or sale of shares. The study confirmed the influence of behavioral effects on making investment decisions in the financial market.

The validation of a theory involves applying tests designed to assess whether the claims are supported by replication. Several studies have replicated Kahneman and Tversky (1979) in Brazil, especially Kimura, Basso and Krauter (2006), Rogers et al (2007), Marino et al (2009), Vasconcelos, Antunes and Silva (2014), Yoshinaga and Ramalho (2014), and Haubert, Lima and Lima (2014).

4.2 Studies on the application of behavioral principles to the market

Interest in conducting empirical studies that attribute validity and support theoretical rules, especially for foundations of behavioral finance in Brazil, has produced studies that greatly improve our understanding of phenomena that result from the irrationality of individuals, especially regarding aspects of decision making. The stock market has been a coveted object of research, especially because of its dynamism, high volatility and risk. These studies search for an understanding of behaviors and patterns that assist in creating strategies and acquiring more complete knowledge of the market.

Some studies have tried to observe behavioral biases in the organization and operation of the Brazilian capital market. Mussa et al (2008) investigated the possibility of abnormal gains in the Brazilian stock market by using the moment strategy; Cioffi, Famá and Coelho (2008) analyzed aspects of over-reactions and speculative bubbles; Silva et al (2014) analyzed the moment effect in changes between low and high efficiency in the capital markets, while Santana and Trovati (2014) studied the day effect day in periods of crisis and stability.

Silva Carvalho and Nunes (2013) investigated macroeconomic influences and especially the influence of news related to the economic policy environment and economic measures on investor confidence and risk assessment, and consequently, on stock price. Companies listed on the Bovespa index were quantitatively analyzed using the Kolmogorov-Smirnov (KS) test. The results showed that in the early years, internal economic factors predominated, whereas in recent years, external factors have predominated due to increases in foreign investment in the Brazilian stock market. The authors also noted that the sources of the biggest drops in the stock market were also the same as those justifying the greatest increases. According to the study, these moments produce significant "nervousness" in the market, leading to greater stock price volatility.

Martits and Eid Jr. (2009) compared decisions made by individual investors and those made by pension funds from 1997 to 2006. The authors analyzed the asymmetry created by preference in investor reactions to gains and losses. They found loss aversion, which implies that risks to investor sensitivity are also linked to the rejection of unsatisfactory returns. They claimed that pension funds can be more attractive if there is a reduction in the frequency of losses given that investors showed greater aversion to these types of scenarios. Conversely, these individual investors were also more flexible when faced with changes in expectations of market risks and risk premiums. Nunes et al (2010) studied the reflection effect and its impact on the experience of investors in making investment decisions involving risk. They limited their study to people who invest directly in the stock market and assigned a weight in years for experience: inexperienced for investors with less than 5 years of experience investing in the stock market and experienced for those with more than 5 years of experience. After conducting probability and correlation tests, the results showed that experienced investors were influenced less by the reflection effect and also had less consensus on investment decisions involving risk. The study was limited by the subjectivity of defining an investor as either experienced or inexperienced.

The anchoring effect was also studied. Reina et al (2009) used a quasi-experiment to show that the anchoring effect influenced the decision making of realtors in the northeast and east of Santa Catarina state in Brazil. Other studies on the capital market include Feitosa, Silva and Silva (2014), regarding decision-making in Brazilian civil construction; Quintanilha and Macedo (2013) regarding the behavior of future accountants when making decisions and Lucena et al (2014) on the factors that influence debt and defaults in real estate.

Aguiar, Sales and Sousa (2008) adapted Fuzzy set theory concepts to behavioral aspects in an attempt to identify the occurrence of under-reaction and over-reaction in the Brazilian stock market. The authors used stock information from the oil and petrochemical sector and the textile sector during 1994-2005. They found significant evidence of over-reaction and under-reaction in the Brazilian stock market due to informational inefficiency. The results also suggested a non-rational approach in the decision making process regarding representativeness and anchoring effects. The study was limited by the exclusion of transaction costs and the difficulty of generalization due to reduced and directed sample bias.

5 FINAL COMMENTS

In general, we found important developments arising from the study of Kahneman and Tversky (1979). Notable among these were results that strongly contradicted The Market Efficiency Hypothesis (Fama, 1970 and 1991), considered one of the pillars of the Modern Theory of Finance. Thus, these studies contributed to a better understanding of the factors related to irrationality in making financial decisions, whether related to investment, fundraising, business management, management of the financial market or relations between nations. Impacts from family influences, beliefs, emotions, trust, friendship, gender, optimism, astrology, superstitions, stimuli, cultural distance, perceptions of risk and loss, among many others, can lead to erroneous and harmful assessments for decision makers.

While international studies have shown concern about the direct impacts of behavioral phenomena on individuals making investment decisions and on financial market behavior, Brazilian research has been aimed at replicating the original study and mapping and identifying behavioral biases in highly specific conditions, without effectively translating these effects to the market, especially the capital market.

As demonstrated, there is a vast amount of literature on behavioral finance, which at the international level, has been mainly published in journals of Psychology, Organizational Behavior (OB), the Economy and Administration. In Brazil, these publications are most common in the areas of Administration, Accounting and Economics.

Most of the applied research focuses on the influence of behavioral biases in financial market decision making and especially in the stock market. In Brazil, for example, there is a range of studies which analyze and attempt to understand some index or security listed on the BM&FBOVESPA. Still, other studies involve the real estate market or civil construction as a whole. Additionally, there are international studies that make comparisons between countries, a topic that is not common in Brazilian publications, and therefore may present an interesting opportunity for further investigation.

In summary, our findings showed that active trading in the capital market is not executed entirely rationally and that factors such as gender and family issues cited by Bogan (2009), interfere in decision making. It was also identified that moon phases affect stock market returns (Yuan Zheng and Zhu, 2006). If gender results in different levels of risk aversion, considerations of linear behavior without the acceptance of this variable could be incorrect and lead to distorted findings. This in turn suggests more extreme questions about the applicability of the results of studies that have been done on the subject, but that have disregarded this information.

The findings of Bhandari and Deaves (2006) and Evans (2006) showed that even the outlook of managers - optimistic or pessimistic - influences their behavior in the market. The studies of Cheng (2007), Hackbarth (2009) and Gort (2009), which may lead to suggestions for future studies such as an analysis of the persistence of a manager's style over time and its effect on decision making, demonstrate the need for a qualitative approach, in which, for example, the shadowing technique might be applicable.

These studies, especially those from Brazil, are still quite targeted, preventing attempts to generalize their results without conducting deeper studies with greater scope. In addition, topics on domestic finance, behavioral effects on relations between Latin American countries, standardization of behaviors in organizations, correlations between different biases and the identification of other behaviors that interfere in the market could provide a basis for future investigations, especially if actual market data is used, resulting in more tangible contributions.

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