

Behavioral Finance: A Survey of the Literature and Recent Development

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Abstract

This paper summarizes recent studies in behavioral finance—particularly regarding market anomalies and investor behavior—that are not reconciled with the traditional finance paradigms. This paper differs from previous survey literature in several aspects. We introduce more recent papers in the field, more literature on behavioral corporate finance, and provide statistics on the recent trends that are explored in behavioral finance papers. We expand the research scope to studies on Korean financial markets, introduce specific funds using behavioral finance techniques, and discuss the challenges facing behavioral finance.

Keywords: Behavioral finance, Market anomalies, Market efficiency, Survey of literature

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INTRODUCTION

Although Modern Portfolio Theory (MPT) and the Efficient Market Hypothesis (EMH), which represent standard finance, are successful, the alternative approach of behavioral finance includes psychological and sociological issues when investigating market anomalies and individual investor behavior. In the financial markets, we often observe some phenomena which cannot be explained rationally. For example, we do not have any logical evidences on random walk in the stock price movement while many fund managers use several behavioral concepts in their investment strategy. In corporate perspectives, company owners and managers do not rely only on logical elements to make critical decisions on mergers and acquisitions and new investment.

Two of the key topics discussed in behavioral finance are the behavioral finance macro, which recognizes “anomalies” in the EMH that behavioral models can explain, and the behavioral finance micro, which recognizes individual investor behavior, or biases that are not explained by the traditional models incorporating rational behavior. In particular, we employ the behavioral finance micro because it explains a number of important financing and investment patterns by using a behavioral approach, which expands on the research in the behavioral corporate finance field. This paper summarizes these two major topics in behavioral finance, which include behavioral corporate finance, and introduces evidence that adopts behavioral concepts in the actual financial market. It also describes challenges to behavioral finance by reviewing recent studies and surveys.

Recently acknowledged theories in academic finance are called standard or traditional finance theories. Based on the standard finance paradigm, scholars have sought to understand financial markets using models that presume that investors are rational. MPT and the EMH form the basis of traditional finance models¹⁾. How-

1) Harry Markowitz introduced MPT in 1952, and he illustrated relationships between portfolio choices and beliefs in terms of the “expected returns–variance of returns” rule. Ricciardi and Simon (2000) defined MPT as an expected return, while standard deviations of particular securities or portfolios are correlated with the other securities or mutual funds held within one portfolio. Another major concept is known as the EMH, which states that investors cannot consistently

ever, if researchers only use the MPT and EMH, individual investor behavior is not easily understood.

In contrast, behavioral finance is a relatively new concept in the financial markets, and is not employed within standard finance models; it replaces traditional finance models, and it offers a better model for human behavior. Although MPT and the EMH are considered as successful in financial market analysis, the behavioral finance model has been developed as one of the alternative theories for standard finance. Behavioral finance examines the impact of psychology on market participants' behavior and the resulting outcomes in markets, focusing on how individual investors make decisions: in particular, how they interpret and act on specific information. Investors do not always have rational and predictable reactions when examined through the lens of quantitative models, which means that investors' decision-making processes also include cognitive biases and affective (emotional) aspects. The behavioral finance model emphasizes investor behavior, leading to various market anomalies and inefficiencies. This new concept for finance explains individual behavior and group behavior by integrating the fields of sociology, psychology, and other behavioral sciences. It also predicts financial markets. Research in behavioral corporate finance studies highlights investors' and managers' irrationality, and shows nonstandard preferences, and judgmental biases in managerial decisions. Currently, many companies apply behavioral approaches to determine important finance and investment patterns.

Several theories under the banner of traditional finance develop specific models by assuming the EMH and they explain phenomena in markets; however, in the real financial market, many problems and cases cannot easily be explained via those standardized models. In the cases involving managers or investors, unbiased forecasts about future events need to be developed and used to make decisions that best serve their own interests. In this type of situation, we need to entertain more realistic behavioral aspects, as there is evidence for irrational behavior patterns that cannot be explained by the traditional or standard financial theories. To be specific, Shefrin (2009) pointed out that the root cause of the global

achieve an excessive return over market returns on a risk-adjusted basis because all publicly available information is already reflected in a security's market price, and the current security price is its fair value.

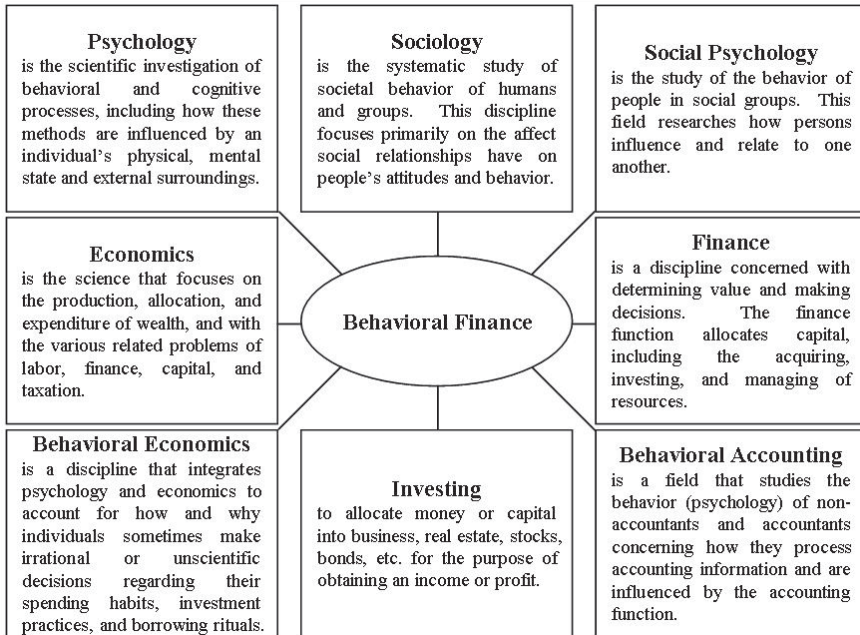
financial crisis of 2008 was a psychological, not fundamental phenomenon. Risk-seeking behaviors were evident in the loss-dominant markets, while excessive optimism and confirmation bias acted as driving factors behind the crisis, and not fundamental factors such as terrorism, skyrocketing oil prices, or disruptive changes in the weather. We can understand, identify, and address psychological distortions in judgments and decisions by considering behavioral concepts, and then we can integrate both traditional and behavioral factors to be better prepared for dealing with any psychological challenges. As mentioned, managerial decisions are strongly affected by cognitive biases and emotional aspects in real financial markets, as human beings are not machines. Additionally, evidence of mispricing and market anomalies that cannot be fully explained by traditional models, is prevalent.

Thus, we would like to propose behavioral finance in this paper to clearly explain a number of important financing and investment patterns, aiding investors in understanding several abnormal phenomena by integrating behavioral concepts with existing rationales within standard finance models.

Ricciardi and Simon (2000) defined behavioral finance in the following manner: "Behavioral finance attempts to explain and increase understanding of the reasoning patterns of investors, including the emotional processes involved and the degree to which they influence the decision-making process. Essentially, behavioral finance attempts to explain the what, why, and how of finance and investment, from a human perspective" (Page 2) (See figure 1). Shefrin (2000), however, mentioned the difference between cognitive and affective (emotional) factors: "cognitive aspects concern the way people organize their information, while the emotional aspects deal with the way people feel as they register information" (Page 29).

We understand that there are several survey literatures on behavioral finance. However, this paper differs from the literature in several aspects. We introduce more recent papers in the field and expand the research scope to studies on Korean financial markets. We introduce more literature on behavioral corporate finance, provide statistics on the recent trends that are evident in behavioral finance papers, introduce the specific funds that are using behavioral finance techniques, and discuss the challenges of the behavioral finance model.

This paper summarizes the recent studies in behavioral finance,



Source: Ricciardi and Simon (2000)

Figure 1. The Underpinning of Behavioral Finance

particularly regarding market anomalies and investor behavior, which cannot be explained by traditional finance paradigms. In section 2, we introduce two topics in behavioral finance: cognitive biases and the limits of arbitrage. In section 3, we summarize the research on behavioral corporate finance. In section 4, we examine behavioral applications via two routes: evidence from real investments and specific evidence from the Korean financial market. In section 5, we analyze the recent developments in behavioral finance publications. Section 6 discusses several challenges to behavioral finance and ends with suggestions for future research.

TWO TOPICS IN BEHAVIORAL FINANCE

Behavioral finance is a study that combines psychology and economics, and it tries to explain various events that take place in financial markets. For example, from the behavioral finance

perspective, some individuals' limitations and problems are shown in the expected utility theory and in arbitrage assumptions. In particular, there are two representative topics in behavioral finance: cognitive psychology and the limits of arbitrage.²⁾

Cognitive Biases

Under the traditional and standard financial theories, investors are viewed as being rational. Basically, a rational economic person is an individual who tries to achieve discretely specified goals in the most comprehensive and consistent way while minimizing any economic costs. A rational economic person's choices are determined by his or her utility function. In contrast, modern theory in behavioral finance suggests that investors' decisions are subject to several

Table 1. Behavioral Finance Topics

Anchoring	Financial Psychology	Cascades
Chaos Theory	Cognitive Dissonance	Fear
Cognitive Errors	Contrarian Investing	Crashes
Loss Aversion	Herd Behavior	Greed
Anomalies	Market Inefficiency	Fads
Over-reaction	Under-reaction	Framing
Mental Accounting	Irrational Behavior	Heuristics
Risk Perception	Behavioral Economics	Gender Bias
Overconfidence	Hindsight Bias	Preferences
Regret Theory	Economic Psychology	Manias
Groupthink Theory	Group Polarization	Risky Shift
Prospect Theory	Behavioral Economics	Panics
Affect (Emotions)	Behavioral Accounting	Issues of Trust
Illusions of Control	Cognitive Psychology	Issues of Knowledge
Downside Risk	Experimental Psychology	Familiarity Bias
Below Target Returns	View of Experts vs. Novices	Information Overload

Source: Ricciardi and Simon (2000)

2) Cognitive psychology is the scientific study of human beings' cognition or the mental processes considered to form human behavior. The perspectives on the limits of arbitrage predict the effectiveness of arbitrage forces under any circumstances. Behavioral finance finds that some individual investors are not completely rational due to specific preferences or mistaken beliefs, and that the EMH cannot explain all of these circumstances. Behavioral finance assumes that financial markets are not efficient in particular circumstances with regard to information and this inefficiency can be explained by the psychological biases of investors.

Table 2. SSRN Database Search Counts of Behavioral Finance Topics

Concept	SSRN Database Search Results
Anchoring	305
Chaos Theory	419
Cognitive Errors	89
Loss Aversion	528
Anomalies	971
Over-reaction	341
Mental Accounting	124
Risk Perception	550
Overconfidence	492
Regret Theory	236
Groupthink Theory	203
Prospect Theory	580
Affect (Emotions)	520
Illusions of Control	50
Downside Risk	446
Below Target Returns	44
Financial Psychology	207
Cognitive Dissonance	125
Contrarian Investing	76
Herd Behavior	316
Market Inefficiency	1,037
Under-reaction	216
Irrational Behavior	201
Behavioral Economics	1,192
Hindsight Bias	211
Economic Psychology	400
Group Polarization	100
Behavioral Economics	1,192
Behavioral Accounting	191
Cognitive Psychology	482
Experimental Psychology	206
View of Experts vs. Novices	176
Cascades	158
Fear	2,103
Crashes	714
Greed	185
Fads	72
Framing	1,324
Heuristics	779

Table 2. (continued)

Concept	SSRN Database Search Results
Gender Bias	414
Preferences	4,770
Manias	43
Risky Shift	696
Panics	342
Issues of Trust	526
Issues of Knowledge	1,422
Familiarity Bias	374
Information Overload	88

cognitive illusions. Scholars of contemporary behavioral finance feel that the field's most direct roots are founded in cognitive psychology.³⁾

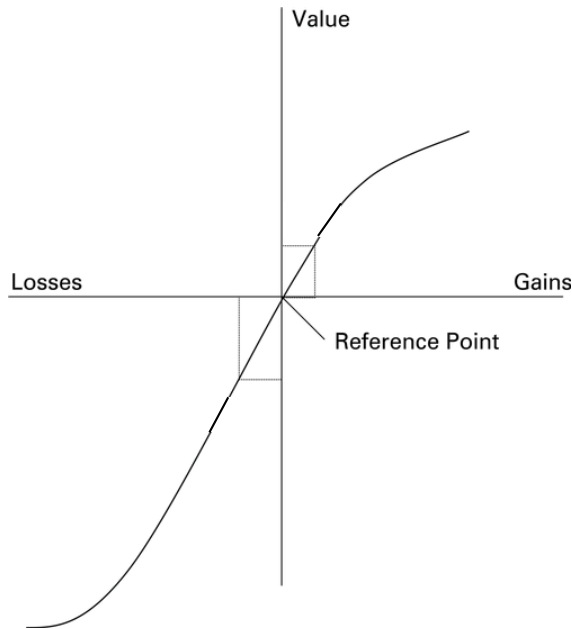
Many topics within the arena of behavioral finance relate to cognitive psychology, and Ricciardi and Simon (2000) introduced a checklist for behavioral finance topics (See table 1). These topics cover various aspects in the behavioral finance literature that have been studied over the past 30 years. The validity of these topics is, and will be continuously examined as behavioral finance scholars investigate and implement concepts, or as other practices start to diminish, or are discarded. The concepts included in the behavioral finance checklist have been actively studied in various articles, as shown in the Social Science research Network (SSRN) (See table 2).

Prospect Theory

One of the important concepts in behavioral finance that helps individual investors make decisions is prospect theory, as initiated by Kahneman and Tversky (1979).⁴⁾ Kahneman and Tversky's (1979)

3) Research in cognitive psychology investigates various topics such as perception, attention, creativity, memory, reasoning, knowledge representation, and problem solving. Cognitive psychology also explains human thought in terms of input, representation, processing, and output.

4) Prospect theory essentially describes the way individual investors assess gains and losses differently. A value function, passing over this reference point and assigning a "value" to each positive and negative result, shows an asymmetrical S-shaped curve (See figure 2). This curve reflects loss aversion, which is a tendency to assess the impact of losses much more heavily than that of gains in a domain-gains situation. This phenomenon can be considered as risk seeking in



Source: Kahneman and Tversky (1979)

Figure 2. S-shaped curve

experimental results showed evidence to explain people's behavior when this did not follow the assumptions and predictions of the expected utility theory. Markowitz (1952) first proposed that individuals are affected by changes more easily in terms of asset values than in net asset levels, and in gains and losses from a reference point, rather than from levels of wealth and welfare. Tversky and Kahneman (1991) cited the dependence on a reference as the key analytic assumption in prospect theory. It shows the opposite side of individuals' expected utility function, which commonly defines asset levels. Prospect theory also analyzes how individuals often mentally "frame" the predicted results in very subjective terms, which affects the expected utility accordingly. Tversky and Kahneman (1991) asserted that the reference point is generally consistent with the current position of the decision maker, but they acknowledge that this is not always the case. The framing of the reference point can also

terms of domain losses, which is named the reflection effect.

be influenced by the following concepts: aspirations, expectations, social comparisons, and social norms.

Barberis and Thaler (2003) considered this theory as the most successful tool in capturing experimental results. They argued that prospect theory should not be considered as a normative theory in finance: It only tentatively seeks to capture people's behavior in preferring risky gambles. Mullainathan and Thaler (2000) also regarded prospect theory as an excellent example of a behavioral economic theory because it integrates the theoretical components of finance with several important psychological features. They also recommended three key concepts of the prospect theory in terms of the following value functions: overconfidence, loss aversion, and mental accounting.

Limits of Arbitrage

The traditional finance theories assume that market prices are correct in that they reflect the fair value of the security, and that arbitrageurs are successful in exploiting any free-lunch opportunities when the prices deviate from the fair values. The EMH is established based on these assumptions, and accordingly, it does not allow for the limits of arbitrage that are widely observed in the real world.

Mispricing and Arbitrage Opportunities

According to one of the major principles of the EMH, prices are correct in the sense that asset prices reflect the fair value of the security. In a rational and efficient market, individuals are not granted a free lunch, so no investment strategy can make excessive risk-adjusted average returns.

Behavior finance, however, argues that many deviations in asset prices exist, and these deviations are brought about by irrational investors. According to Friedman (1953), there are two common situations in a financial market. First, when there is a mispricing and the current asset price deviates from the fundamental value, the opportunity for arbitrage is created as an attractive investment opportunity. Second, rational investors will immediately seize this opportunity, and then the mispricing will be corrected.

Behavioral finance criticizes the second step. Even if attractive

opportunities become revealed to, and recognized by traders, these opportunities may well not be exploited immediately; as a result, the mispricing can remain unchanged. During the first step, an arbitrage opportunity is often considered to be a riskless strategy. However, behavioral finance argues that this is very risky, and investors are considered not as arbitrageurs, but as noise traders. Another well-known example is the case of the same stock being traded in two different places, as described by Froot and Dabora (1999). In this instance, the two shares have the same characteristics and should be traded in a certain ratio in line with a concept that assumes a rational model. However, in reality, they are not: the actual price level deviates from the expected price by more than 35%. This case demonstrated that prices can deviate from the intrinsic value due to the limits of arbitrage. Malkiel (2003) also introduced evidence indicating that investors cannot create a portfolio trading opportunity by making extraordinarily excessive risk-adjusted returns, even in anomalous stock market environments.

Lamont and Thaler (2003) also observed violations of the law of one price in US technology stocks. They proved that arbitrage does not always enforce rational pricing due to its inability and unwillingness to carry out arbitrage in real markets. Fedenia and Hirschey (2009) explained how the law of one price is repeatedly violated in the price-trading history of a recent equity carve-out. They showed that economically equivalent assets continue to remain mispriced for significant periods of time and the degree of such mispricing can actually increase over time. They saw the apparent mispricing in two different types of common shares within the context of prior research on equity carve-outs, and documented how this finding is inconsistent with various EMHs.

Unpredictability and Random Walk

The other principle of the EMH is unpredictability. The EMH is related to the idea of a “random walk,” which explains an aspect of price movement: subsequent prices deviate from previous ones as a random movement. As any publicly-available information is already reflected in securities’ prices, today’s price changes will be influenced only by today’s news, and will not be affected by the price movements of yesterday. Even when prices show extremely volatile movement, they are brought back to equilibrium by the mean-

regression model.

Since the start of the 21st century, however, the dominant trend of the EMH has become far less common. Many financial economists believe that securities' prices are not fully predictable, but they are at least partially foreseeable. Those researchers apply psychological and sociological factors to determine stock price. They believe that price movements are not random at all, and that future stock prices are predictable on the basis of historical price patterns. They also insist that many investors will be able to make excessive returns by considering such aspects. A study conducted by De Bondt and Thaler (1985) introduced the Investor Over-reaction Hypothesis, as opposed to the EMH. Individual investors tend to over-react to new information and devalue prior information when incorporating new data. They referred to representativeness heuristics, which means that investors are unduly optimistic about recent winner stocks, while simultaneously being extremely pessimistic about recent loser stocks; most investors tend to over-react to both good and bad news. Over-reaction also makes the previous loser stocks become undervalued, which leads the previous winner stocks becoming overvalued; from this, these theorists can thus derive a prediction about future returns: past loser stocks should under-perform, while past winner stocks should outperform the market (De Bondt and Thaler 1985).

However, other recent studies find cases of unpredictability that show the opposite pattern from that of over-reaction introduced by De Bondt and Thaler (1985), known as under-reaction. According to Shleifer (2000), an initial price jump in stocks can occur on the day of a specific announcement, which can influence the fundamental value via large earnings changes, dividend payout plans, share repurchases, splits, and seasoned equity offerings, followed by a slow drift in the same direction for a certain period of time. Over short periods of time, less than a year, stocks also show display momentum—the stocks that go up the fastest over the course of six months try to keep going up. These findings regarding under-reaction are a further challenge to the EMH.

Both over- and under-reaction rely on psychological evidence, and they all explain market anomalies by highlighting different time horizons between under-reaction and over-reaction; under-reaction continues for a short period of time, while over-reaction appears for longer. These trends are currently changing the nature of finance.

Examples of Arbitrages: Costs and Limitations

The traditional concept of arbitrage in theoretical rational financial markets requires neither capital, nor any financial risks. However, in reality, almost all arbitrage requires capital, which entails risk in a real financial market. Shleifer and Vishny (1997) thus introduced professional arbitrage, which is conducted by a relatively small number of highly specialized investors using other people's money. In particular, many researchers consider arbitrage, which requires additional risky capital, to be a very important issue in the agency problem. Without the agency problem, arbitrageurs are often more aggressive when prices deviate further from fundamental values. Shleifer and Vishny (1997) gave an example involving Bunds.⁵⁾ In their Bund example, an arbitrageur would generally increase positions as long as s/he has the capital if contract prices between London and Frankfurt move further from their fundamental value. However, when an arbitrageur manages other people's capital, and customers do not have any idea how this arbitrageur operates, or exactly what the manager is doing, they can only observe that the arbitrageur is losing money when futures prices in London vary from those in Frankfurt. They often refuse to provide more capital, or withdraw money, even when the expected return on the funds is increasing. In this article, Shleifer and Vishny (1997) argued that investors cannot use arbitrage opportunities effectively to achieve market efficiency. They also analyzed which markets attract arbitrage and why some markets are more attractive for arbitrage than others. Consequently, high volatility makes arbitrage less attractive if the expected return does not increase identically with volatility; in particular, this is true when fundamental risk is a substantial part of volatility.⁶⁾ Finally, such arbitrage activities are not effective in bringing the securities price back to the fundamental

5) Shleifer and Vishny (1997) consider the simple case of two Bund futures contracts to deliver DM250,000 in face value of German bonds at time T: one traded in London on LIFFE and the other in Frankfurt on DTB.

6) Fundamental risk is defined as an exposure to loss from a situation affecting a large group of people or firms, and caused by natural or social phenomenon such as earthquake, war, inflation, unemployment, etc. Unlike this risk, idiosyncratic risk is considered as the risk of price change due to the unique circumstances of a specific security, as opposed to the overall market. This risk can be virtually eliminated from a portfolio through diversification.

value, especially in extreme circumstances.

Pontiff (1996) identified significant arbitrage costs and showed that these costs are related to large deviations in prices from fundamental values. When costs make arbitrage unprofitable, mispricing is not fully eliminated. He considered four factors that affect arbitrage profitability in a costly arbitrage framework: systematic risk, which refers to the security's fundamental risk that cannot be diversifiable; a smaller dividends payout; lower market value with higher transaction costs; and a higher interest rate. He found that the fundamental risk that cannot be hedged lowers arbitrage profits because arbitrage is a risk-averse activity. Dividends increase arbitrage profits since they reduce holding costs. Bid-ask spreads, commissions, and market impact are transaction costs that the arbitrageur makes in initiating and closing the arbitrage position. Interest rates are an opportunity cost, since arbitrageurs do not receive the full amount of interest when executing short-sale transactions. Consequently, the existence of complicated traders does not guarantee that prices reflect fundamental values because costs may hinder profitable arbitrage, and in particular, closed-end fund discounts appear to be the result of mispricing. This study showed that closed-end funds are subject to greater arbitrage pressure than typical securities, since the risk associated with a corrective trade of a closed-end fund is easier to hedge. If the magnitude of other arbitrage costs is similar, mispricing would be larger for typical common stocks. In addition, the market value of a closed-end fund is more likely to deviate from the value of its assets for funds with portfolios that are difficult to replicate, to pay out smaller dividends, and to have larger relative bid-ask spreads, while mispricing is greater over time when interest rates are high. Both the cross-sectional and time-series results are specifically related to the magnitude of the deviation, as opposed to its direction.

Gromb and Vayanos (2010) surveyed past studies regarding the limits of arbitrage, explained market anomalies, and introduced welfare, and policy debates into financial markets by using a rational framework. Indeed, this paper's meaningful outcomes were partly generated by their study on the limits of arbitrage from welfare and public-policy perspectives. They emphasized the role of financial institutions and agencies in asset pricing. Their study tried to explain market anomalies in a completely rational

framework and to provide a useful foundation for designing and evaluating public policy. Gromb and Vayanos also stressed the role of specialized institutions as liquidity providers in financial markets. We can design and assess public policy by understanding the trading decisions of financial institutions and by checking the validity of these decisions to determine whether they are socially optimal and whether they affect the institutions' financial health. Although many researchers recognize the relationship between market anomalies and asset markets, they are still in the beginning stages of analyzing asset markets with limited arbitrage. Gromb and Vayanos rearranged the existing studies and emphasized what they saw as the main topics, issues, challenges, and promises involved.

BEHAVIORAL CORPORATE FINANCE

Behavioral finance has important implications in practical corporate finance. All market participants face several decisions in their financial activities regarding such aspects as investments and funding (for capital structure). Behavioral corporate finance has also developed in line with framing, decision-making, and the perception of many corporate issues. In particular, financial decision-making is one of the central aspects to behavioral corporate finance. According to Baker, Ruback, and Wurgler (2004), behavioral corporate finance separates the roles of investors and managers, and describes each decision regarding financing and investment patterns.

Investors' Perspectives

Baker, Ruback, and Wurgler (2004) assumed that there are both rational managers and irrational investors in any given financial market. They considered two things: one, irrational investors can influence securities prices, which results in mispricing; and two, managers should be smart enough to distinguish market prices and securities' fundamental values. They thought corporate managers were smart enough to identify mispricing due to information asymmetry. Baker, Ruback, and Wurgler also introduced a theoretical framework regarding mispricing and the ability of "smart" managers, and they applied it to practical examples.

In real investments, mispricing can affect financial decision-

making in two different ways. First, investors might overestimate the result of a certain investment when they do not know that the price of that company is overvalued (value-destruction investment). On the other hand, financially constrained firms might be forced to give up valuable investment opportunities. That is, investors may make value-destruction investments while denying value-added investments.

Irrational investors' perspectives can also be applied to mergers and acquisitions (M&A) cases. Shleifer and Vishny (2003) suggested a market timing model for acquisitions. They assumed that a company that attempts to buy another one is overvalued, and that the purpose of acquisitions is not to enhance business synergy, but to preserve some of its temporary overvaluation for long-term shareholders. Thus, the acquirer can gain a long-term cushion effect, while offering a larger premium to the target company. The model also predicts that acquisitions completed with cash can expect positive long-run returns, while acquisitions completed with stock can expect negative long-run returns. Dong, Hirshleifer, Richardson, and Teoh (2003), and Ang and Chang (2003) introduced recent evidence of market-timing M&A. They found that mispricing is positively correlated with the volume of the merger and acquirers tend to be more overpriced than target companies.

There are several other cases regarding financial policy that can be found in irrational investors' approaches such as equity issues and repurchases, debt issues, cross-border issues, and capital structure. We can also consider corporate decisions such as dividend policy, firm name changes, earnings management, and executive compensation.

Managers' Perspectives

Baker, Ruback, and Wurgler (2004) also assumed the opposite case of the investors' perspectives. There are irrational managers in an efficient capital market, and they influence numerous decisions. Corporate governance might not exist or might be limited, as irrational managers need to affect the market. Managers overestimate their abilities and tend to assume that they maximize firm value. Baker, Ruback, and Wurgler built a theoretical framework to analyze irrational managers' approaches. If there is no optimal capital structure, managers will not do anything. Further,

optimistic managers tend to overinvest due to the absence of an upper boundary in the debt class, and the level of overinvestment declines when managers need equity to invest.

In real investments, we can consider “startup” investments. Most entrepreneurs establish companies with overconfidence and optimism. Cooper, Woo, and Dunkelberg (1998) found that 68% of entrepreneurs think that their startup companies are more likely to be successful than comparable rivals, while only 5% believe that their odds are worse, and a third of entrepreneurs view their success as essentially guaranteed. However, the actual performance of startup investments is weaker than expected.

Optimism and overconfidence patterns also exist in M&A cases. Successful acquirers might be optimistic and overconfident when they assess an M&A deal value and its synergies, and they sometimes fail to consider the winner’s curse. Malmendier and Tate (2003) studied CEOs’ optimism through this argument. First, optimistic CEOs execute more mergers for managerial diversification than do pessimistic CEOs. Second, optimism has its biggest effect among the least equity-dependent firms. Third, investors are more skeptical about bid announcements when they are made by optimistic CEOs.

There are several other cases regarding financial policy and behavioral patterns from irrational managers’ perspectives: capital structure, financial contracting, bounded rationality, and reference-point preferences in prospect theory.

APPLICATIONS

Evidence from Real Investment Tools

Behavioral finance is applicable to the real financial world as one of the key investment strategies. Both behavioral funds and other financial products can be related to behavioral finance theories.

Behavioral Funds

The history of behavioral funds started in the early 1990s when JP Morgan, LVS Asset Management, and two representative scholars in the behavioral finance field, Fuller and Thaler, started the JP Mor-

Table 3. Marketable Funds Using Behavioral Finance

Fund Name	Fund Type	Fund Objective	Asset Allocation
JP Morgan Undiscovered Value Fund	The first investment fund using behavioral finance theory by Russell Fuller and Richard Thaler.	To recognize irrational investors' behavior and to use it to earn excess profits in the markets.	Not specified.
Aktiv Constant Profit GLB-I	Open-ended investment fund incorporated in Germany. The fund uses technical and fundamental analysis, as well as behavioral finance when selecting the asset mix.	To seek long-term growth.	The fund invests at least 51% of assets in a mix of various sub-funds. The asset allocation remains flexible, depending on market conditions.
Conquest Behavioral Finance AMI	Open-ended investment fund incorporated in Germany.	To achieve an absolute return with a long/short strategy.	The exact asset allocation is determined by a proprietary analysis and selection tool based on behavioral finance theory.
Aktiv Trend Global AMI-P	Open-ended investment fund incorporated in Germany.	To seek long-term capital appreciation.	The fund invests in a globally diversified portfolio of equities, bonds, and equity sub-funds. The fund uses a combination of technical and fundamental indicators, as well as behavioral finance when selecting investments. The asset mix remains flexible.

Table 3. (continued)

Fund Name	Fund Type	Fund Objective	Asset Allocation
Deka-BF Eurorenten Total Return-S A	Open-ended investment fund incorporated in Luxembourg. The fund manager applies a behavioral finance approach.	To focus on total return.	The fund invests mainly in European government bonds and mortgage bonds. Additionally, the fund can invest in other fixed and variable rate securities, CDs, money market instruments, and derivatives.
Deka-Institutionell Protect A	Open-ended investment fund incorporated in Germany. The fund manager applies a “protect strategy” based on a behavioral finance approach.	To produce yields that are higher than comparable money market rates.	The fund invests mainly in investment grade bonds and European equities.
Fund Advisors Cayman SPC – Klio Fund	Alternative investments hedge fund.	To achieve an absolute return with a long/short strategy.	The fund invests in liquid US equities both on the long and the short side. The stock selection is based on a top-down multi-factor sector rotation model, which builds both on behavioral finance and fundamental stock analysis.
Dog Fund	Open-ended and long-only fund incorporated in the Cayman Islands. The fund uses behavioral finance theories to exploit market irrationalities.	To seek long-term capital growth.	The fund typically invests into previously badly performing equities in the US S&P500 Index.

Table 3. (continued)

Fund Name	Fund Type	Fund Objective	Asset Allocation
LGT Global Active Timer Fund (USD & EUR)	Open-ended investment fund incorporated in Liechtenstein. The investment process is based on a behavioral finance investment philosophy.	To strive for a dynamic market participation that increases equity exposure when bull markets are expected while decreasing equity exposure in a bear market.	Not specified.
Multi-Axxion Stockpicker	Open-ended investment fund incorporated in Luxembourg.	To outperform a portfolio consisting of international equities using a behavioral finance approach.	The fund invests primarily in equities, equity-related securities, fixed income, and up to 5% in money market-, fixed income-, and equity-funds.
HSH Strategy Sentiment LS	Open-ended investment fund incorporated in Germany. The fund follows a conservative, quantitative investment approach based on behavioral finance aspects.	To seek absolute return.	The fund invests mainly in futures contracts on the European bond and stock market, and money market instruments.
Maestro-SICAV Lux – TBIC Global Equity Index Strategy Fund	Open-ended investment fund incorporated in Luxembourg. The investment decisions are based on behavioral finance-driven factors.	To achieve the highest possible return in the reference currency.	The fund invests in the equity markets through the use of derivatives.

Table 3. (continued)

Fund Name	Fund Type	Fund Objective	Asset Allocation
Peccata Global	Open-ended investment fund incorporated in Germany. The approach is based on behavioral finance theory.	To seek mid- to long-term returns and growth.	The fund invests globally in a wide array of stocks selected by a quantitative model regardless of the political correctness of the stock selection.

Source: Bloomberg

gan Undiscovered Value Fund (UBVLX). Since the launch of UBVLX, several other investment funds have emerged in the market. According to Bloomberg, 13 funds employ the key concepts of behavioral finance, as follows (See table 3).

From performance perspectives, investment funds based on behavioral finance theory have under-performed or have been on a par with benchmarks compared to other actively managed funds. According to Santoni and Kelshiker (2010), there is no clear evidence that behavioral mutual funds outperform their benchmarks, and behavioral funds actually have limited performance consistency.⁷⁾ They also noted that behavioral funds do not have the capacity to forecast market turning points. However, they also presented the positive side to behavioral funds. Behavioral funds have lower price volatility than their benchmarks, and we can therefore apply some common behavioral biases to the market such as the January effect.

Behavioral Products in JP Morgan⁸⁾

Baker and Sesia (2007) introduced investment strategies using behavioral finance concepts in JP Morgan.⁹⁾ The behavioral finance

7) For example, only one fund in three (1/3) outperformed independent bull markets and only 30% of funds outperformed in two out of three (2/3) bull markets.

8) Behavioral finance strategies in JP Morgan were developed by Andrew Spencer and started in 1992 in London. At the end of 2006, two-thirds of the US\$76bn AUM in behavioral finance products was in non-US stocks. JP Morgan started its behavioral finance product with a fund called Premier Equity Growth, and it surpassed the benchmark for nine of its first ten years. After that, JP Morgan introduced two new behavioral funds: UK Strategic Value and UK Dynamic.

9) JP Morgan is a part of JP Morgan Chase & Co.; it is a leading global financial

team in JP Morgan believes that irrational investor behavior exists in the market, which creates market anomalies. JP Morgan's starting point is empirical evidence from both academic and practitioner studies that stocks with specific characteristics consistently outperform others. JP Morgan states that fund outperformance cannot be explained by risk, but can be justified by human psychological biases. They emphasize two representative behavioral biases: overconfidence and loss aversion, which have the most powerful effects on stock prices. JP Morgan argues that cheap stocks have outperformed expensive stocks over the last 55 years (up until 2005) and that the best recent performers outperformed the worst recent performers. The company assumes that human behavioral biases explain why value and momentum stocks have outperformed others. The tendencies of overconfidence and loss aversion have not changed, and JP Morgan is sure that it can outperform in the next 50 years without changing its investment strategies for overconfidence and loss aversion.

JP Morgan implements its investment strategies in three ways: stock selection, portfolio construction, and execution. Stock selection identifies securities with good value and momentum characteristics. The behavioral finance team employs minimal computing power, choosing as many stocks as possible by hand to determine which has the best combination of value and momentum. Nowadays, they use a quantitative stock selection model to rank stocks based on behavioral characteristics, but they still have enough manpower to analyze qualitative data. The process is called industrialized common sense. After stock selection, the behavioral finance team designs portfolios and executes plans. They construct portfolios by maximizing exposure to stocks with value and momentum, while controlling other risk components such as overall risk, sector exposures, the total number of securities, and the size or style classification of the particular fund with an optimization process. JP Morgan affirms that portfolio construction cannot be underestimated, as portfolio managers rely on portfolio construction to recognize and understand all possible risks. In JP Morgan's behavioral products portfolio, stocks are systematically combined to make a barbell portfolio, which is undervalued, and has positive momentum in a market called "super stock."

services firm with assets of \$2.3tn and operations in more than 100 countries.

JP Morgan has been selling its behavioral funds Intrepid International Funds worldwide since 1995. The fund invests primarily in equities of companies from the USA, Europe, or other developed countries, and retail customers as well as institutional investors can invest in these funds. JP Morgan Private Bank also invests heavily in behavioral finance products on behalf of its high-net-worth, international clientele. JP Morgan still seeks opportunities to develop new behavioral finance products, especially for Asian securities.

Evidence from the Korean Financial Market

The Asian financial markets can be a useful testing arena for behavioral finance researchers. Kim and Nofsinger (2008) investigated reasons why scholars study behavioral finance in Asia, and they consider this study an important and worthy topic because there are empirical and theoretical reasons as to why Asians often suffer significantly more due to cognitive biases than individuals from other cultures. Asia is an interesting place to study behavioral finance because of the different levels of capitalism and the experiences that many participants face in the financial market. We have also found behavioral evidence in the Korean financial market.

The first memorable paper to analyze the Korean market using behavioral finance perspectives was by Byun, Kim, and Choi (2005); they examined individual investors' personalities and investment behavior. They analyzed real investors' data from October 2003 to June 2004 and found correlations between an individual's behavior and their personality factors. Investors' characteristics are partially related to their personality variables and the degree of confidence. Investment behavior was negatively correlated to investment performance: the higher the turnover ratio, the lower the return on investment. According to previous papers, overconfidence leads to excessive trading and this higher turnover ratio results in lower returns. However, in Byun, Kim, and Choi's paper, this relationship was not statistically significant because excessive trading was explained by personality factors. Investors who were cautious, anxious, open-minded, or extroverted tended to trade more frequently. However, they emphasized that frequent trading would under-perform its benchmark in any scenario.

Additionally, Kim and Byun (2009) performed research regarding investor sentiment and stock splits. In 2010, they also analyzed

investor sentiment and stock repurchases. Kim and Byun examined whether the investors' sentiment affects the market response to a stock-split announcement and whether the investors' emotion impacts the market response, which reverses during the 12 subsequent months following a stock split. By using stock-split cases from 1999 to 2006, they reported three major empirical results. First, the market response to a stock-split announcement is positively related to investors' sentiment. Second, the market response is stronger, especially for small, young, and highly volatile stocks, and market participants are highly likely to be subjective when evaluating the stocks, and that these stocks are difficult to arbitrage. Third, they found a negative long-term performance of split stocks, consistent with Byun and Jo's (2007) empirical evidence. Moreover, long-term performance is positively correlated with firm size, while it is negatively correlated with investors' sentiment, controlling for the business cycle prior to the stock-split announcement. This result implies that the initial market response over-reacts to the stock-split announcement, depending on firm size and the investors' sentiment. On the contrary, the long-term performance of split stocks is not negatively correlated to sentiment without controlling for the business cycle at a 10% significance level, and the long-term market response is not stronger for small, young, and highly volatile stocks. Additionally, Byun and Kim (2010) analyzed investor sentiment and market timing by using 835 disclosure samples about stock repurchases from 1999 to 2007. This paper, in particular, held implications for the study of behavioral corporate finance, which has rarely been referred to in the Korean financial field. Furthermore, Byun and Kim offered proven facts on the timing of decision-making on capital funding by using samples of stock repurchases. Lastly, this paper highlighted the importance of market timing—which is different due to the characteristics of each corporation—since the impact of sentiment in the overall financial market does not equally affect all companies. This paper has four major findings. First, researchers found that there were positive market responses to stock repurchase disclosures, which is consistent with previous studies. Second, the long-term performance—12 months after stock repurchase—shows positive results, and this phenomenon is also consistent with previous studies because it could be evidence of market under-reaction. Third, stock repurchase occurs more frequently in the cold investor sentiment period. Fourth, according to the results of regression

analysis for short- and long-term performance, long-term performance is higher in the positive investor sentiment period, and, in particular, during the cold investor sentiment period. Long-term performance is higher during periods with stronger degrees of cold sentiment.

Byun and Kim (2005) also explained the relationship between information value and market efficiency. In this paper, information means “daily” recommended stock lists released by securities firms¹⁰⁾. The first result is that initial market response is positively related to information when it is recommended, but there is no excessive holding period return. When securities firms announce their recommended stock lists, market participants recognize this information as a valuable source and respond, but it is reflected in stock prices on the day of recommendation because there is no excessive return. In other words, this result is in line with a semi-strong form of market efficiency, since there are initial market responses but no excessive return. The second result is that in the case of stocks recommended by the large major securities firms, higher market responses to smaller volume, and a lower book-to-market ratio of recommended stocks are observed. The third result is that since no investor can obtain an excessive holding period return, information regarding the stock recommendations of securities firms is considered worthless after investment information is announced.

Yoo and Hwang (2010) applied the disposition effect¹¹⁾ to fund performance in the Korean market. According to the disposition effect, a fund manager might sell stocks when the timing is inappropriate, and this quick selling of winners and late selling of losers has a negative impact on fund performance, until the momentum effect acts in the opposite way. Yoo and Hwang analyzed the relationship among turnover ratio, fund performance, and fund capital flow of individual investors for the active stock fund, and they referred to the previous methodology of Cici (2005) and Xu (2007). The results regarding the existence of the disposition effect in fund investors’ turnover are as follows. The average turnover ratio between funds

10) They analyzed 7,544 recommended stock lists of 19 securities firms from April 2000 to December 2002, and examined characteristics of lists, and whether this information was in accordance with the EMH.

11) The disposition effect means that investors tend to sell winner stocks while they tend to hold loser stocks, and this significantly affects fund performance, as the disposition effect influences the fund manager’s trading activities.

with unrealized gains and funds with unrealized losses are similar to one other, and no tendency for the disposition effect can be found in Korean fund investments. However, as the turnover ratio of institutional investors is higher than that of individual investors, the research finds a shorter trend of a holding pattern and a higher turnover ratio when compared to institutional investors' investment.

We find more detailed studies of group investment patterns in Chae and Lewellen's (2005) paper. They divided investors into three groups: individuals, institutions, and foreign investors, and studied the trading behavior of each group within the Korean Stock Exchange (KSE). They collected data for almost all stocks in the KSE from 1995 to 2000, and they identified the transaction volume of three investor groups on a monthly basis. They found that individuals follow contrarian strategies and buy when stock prices fall. On the other hand, institutions and foreign investors follow the opposite route, which is a positive-feedback strategy. All investors in the three groups tend to show herding and persistent behavior when making trading decisions. In the case of foreign investors in particular, they use a stock-picking ability, even though contrarian strategies are profitable. Interestingly, Chae and Lewellen's results are inconsistent with the view that an individual's behavior confuses the market and exacerbates price movements. Their evidence is useful when evaluating the disposition effect because the disposition effect espouses that individuals tend to follow contrarian strategies. Their findings also suggest broader and common conclusions for behavioral finance, regardless of the particular financial model. First, they conclude that there is no supporting evidence that individual investors cause price destabilization. According to Lee, Shleifer, and Thaler (1991), and Barberis and Huang (2001), behavioral finance states that an individual's trade behavior stems from irrationality, and individuals cause the price to move away from the fundamental value (i.e. mispricing). However, Chae and Lewellen did not find any data supporting this concept. Moreover, individual investors trade against price movements when they buy stocks when the prices fall. If this is mispricing, it could reduce price movements and lead the momentum in returns. Nonetheless, prices in the KSE actually move in the opposite direction. This reversed movement is not explained by the positive-feedback trade pattern of institutions and foreign investors. If their trading behavior brings about reversals, then the net purchases of foreign and institutional investors would be negatively

correlated with future returns. In addition, investors' predictive power in their trading behavior is likely to be stronger than that for past prices. Nevertheless, institutions and foreign investors' higher net purchases show stronger predictive power in future returns; net purchases are positively correlated with future returns. For the stock-picking ability of foreign investors, net purchases of foreigners are positively auto-correlated and tend to lead the net selling by individuals. Lastly, researchers are interested in the result that the positive-feedback trading of institutions and foreign investors in the KSE tends to lower their performance. Prior research in the USA finds that institutional investors also follow positive-feedback strategies, but this seems rational, because prices show strong momentum. However, prices in the KSE move in a reverse manner, and even institutional investors follow the same route of a positive-feedback strategy. This investigation finds that institute investors follow the positive-feedback strategies rather than following the momentum in returns.

Kim and Lee (2009) suggested a model that finds and evaluates the signs of anchoring and weak disposition effects. They focused on results when the asset return was affected differently by psychological effects, as a signal of lagged asset returns such as in the anchoring and adjustment effect, and the disposition effect. They checked whether these effects existed in the Korean market as well, and they applied one specific method to the Korean stock and housing markets. They found that the anchoring and adjustment effect, and the weak form of disposition effect, and, in particular, stock returns were influenced by the volatility of the previous 2 or 3 years.

Ko and Moon (2010) dealt with FOREX risk related to KIKO (Knock-In, Knock-Out) forward contracts in Korea using behavioral economics and a law perspective. They argued that the thoughts investors or bankers had when making contracts might be caused by psychological biases and cognitive limitations such as information cascades, herd behavior, optimism, and investor myopia. They tried to understand exporting companies' failure to predict potential KIKO contract risks in terms of behavioral law and economics. In particular, they investigated whether the companies were irrational, excessively myopic, and optimistic when they made decisions to enter into KIKO contracts. Contracting parties can make sub-optimal decisions under these psychological factors, and making unbiased decisions should be considered as an important policy goal in financial con-

tracts. The results showed that human nature and constraints in organizational resources caused systematic imperfections. Principal-agent problems also played an important role in creating incentive structures for contracting parties. They also challenged the existing research, which overlooks organizational resource limitations and heuristic biases that bring disorder to many small and mid-sized organizations.

RECENT DEVELOPMENTS IN BEHAVIORAL FINANCE

Researchers have been introducing new concepts and conducting studies on behavioral finance over the last 20 years. Although behavioral finance is a recent concept, behavioral finance is no longer a controversial topic, and it has revolutionized finance in a way that makes it undeniable. Financial economists have acknowledged that human behavior plays an important role in finance and they understand that these human elements enrich knowledge in finance research. We find that in seven premier finance journals for the time period 1990–2010, 8% of the total papers examine behavioral finance (See table 4).¹²⁾

Studies in behavioral finance emerged from the 1950s with reviews of market efficiency, and there has been a significant development in the behavioral financial research area from 2000, when several review papers on behavioral finance were actively released (See table 5). Researchers study not only individual behavior, by referring to several psychological concepts, but also market inefficiency, by considering the limits of arbitrage.

Bloomfield (2006) stated that no behavioral alternative would ever rival the coherence and power of the traditional efficient market theory because psychological forces were too complex. Therefore, he emphasized that behavioral researchers should devote themselves to the standard science suggested by their new paradigm and perspective. For example, behavioral researchers can document and refine the understanding of how psychological forces influence individuals' behavior in financial settings, and how those patterns of behavior

12) The seven premier journals are based on Chan, Chang and Chen (2011). They are the *Journal of Finance*, *Journal of Financial Economics*, *Review of Financial Studies*, *Journal of Financial and Quantitative Analysis*, *Journal of Business*, *Financial Management*, and *Journal of Banking and Finance*.

Table 4. Number of Articles in Seven Premier Finance Journals during 1990-2010

Journal	Subject Area	Number of Researches
Journal of Finance	Economics	17
	Finance	221
	Behavioral Finance	79
Journal of Financial Economics	Economics	1,412
	Finance	1,182
	Behavioral Finance	180
Review of Financial Studies	Economics	634
	Finance	704
	Behavioral Finance	123
Journal of Financial and Quantitative Analysis	Economics	163
	Finance	115
	Behavioral Finance	172
Journal of Business	Economics	836
	Finance	512
	Behavioral Finance	155
Financial Management	Economics	193
	Finance	213
	Behavioral Finance	31
Journal of Banking and Finance	Economics	2,141
	Finance	2,629
	Behavioral Finance	214

Note: We sort researches by subject area for the time period from 1990-2010.

affect the market.

Zaleskiewicz (2006) focused on normal investment behavior, introducing important concepts from these two growing fields of research: behavioral finance and the psychology of investing. He discussed three major topics in his essay: investors' errors from cognitive psychology, emotions in individual investors' behavior, and investors' preferences toward risk and ambiguity. He also admitted that behavioral finance has become more a norm than an extravagance, meaning that the difference between the terms finance and behavioral finance will ultimately disappear.

Two major topics are discussed in behavioral finance: the behavioral finance macro, which represents the limits of arbitrage, and the behavioral finance micro, which represents cognitive biases,

Table 5. Major Articles on Behavioral Finance

Year	Authors	Title	Topic	Number of Citations
1952	Markowitz	Portfolio Selection	Modern Portfolio Theory (MPT)	209
1953	Friedman	The Case for Flexible Exchange Rates	Mispricing, Limits of Arbitrage	2,016
1974	Kahneman and Tversky	Judgment under Uncertainty: Heuristics and Biases	Heuristics	13,401
1979	Kahneman and Tversky	Prospect Theory: An Analysis of Decision under Risk	Prospect Theory	21,144
1985	De Bondt and Thaler	Does the Stock Market Overreact?	Over-reaction	3,871
1986	Harris and Gurel	Price and Volume Effects Associated with Changes in the S&P 500 List: New Evidence for the Existence of Price Pressures	Mispricing and Arbitrage Opportunities	650
1986	Shleifer	Do Demand Curves for Stocks Slope Down?	Mispricing and Arbitrage Opportunities	907
1988	Cooper, Woo, and Dunkelberg	Entrepreneurs' Perceived Chances for Success	Behavioral Corporate Finance	716
1991	Lee, Shleifer, and Thaler	Investor Sentiment and the Closed-end Fund Puzzle	Investor Sentiment	1,098
1996	Pontiff	Costly Arbitrage: Evidence from Closed-End Funds	Limits of Arbitrage	399
1997	Shleifer and Vishny	The Limits of Arbitrage	Limits of Arbitrage	1,995
1998	Fama	Market Efficiency, Long-term Returns, and Behavioral Finance	Market Efficiency	2,965
1998	Odean	Are Investors Reluctant to Realize Their Losses?	Loss Aversion	1,774
1999	Froot and Dabora	How Are Stock Prices Affected by the Location of Trade?	Mispricing and Arbitrage Opportunities	359

Table 5. (continued)

Year	Authors	Title	Topic	Number of Citations
1999	Thaler	Mental Accounting Matters	Mental Accounting	1,149
1999	Thaler	The End of Behavioral Finance	Behavioral Finance (Summary)	282
2000	Mullainathan and Thaler	Behavioral Economics	Behavioral Finance (Summary)	342
2000	Ricciardi and Simon	What is Behavioral Finance?	Behavioral Finance (Summary)	33
2000	Shefrin	Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing	Behavioral Finance (Summary)	798
2000	Shleifer	Inefficient Markets: An Introduction to Behavioral Finance	Behavioral Finance (Summary)	1,796
2001	Barberis and Huang	Mental Accounting, Loss Aversion, and Individual Stock Returns	Mental Accounting, Loss Aversion	450
2002	Wurgler and Zhuravskaya	Does Arbitrage Flatten Demand Curves for Stocks?	Limits of Arbitrage	455
2003	Ang and Chung	Direct Evidence on the Market-driven Acquisitions Theory	Behavioral Corporate Finance	151
2003	Barberis and Thaler	A Survey of Behavioral Finance	Behavioral Finance (Summary)	1,473
2003	Dong, Hirshleifer, Richardson, and Teoh	Does Investor Misvaluation Drive the Takeover Market?	Behavioral Corporate Finance	387
2003	Malkiel	The Efficient Market Hypothesis and Its Critics	Efficient Market Hypothesis	766

Table 5. (continued)

Year	Authors	Title	Topic	Number of Citations
2003	Shleifer and Vishny	Stock Market Driven Acquisitions	Behavioral Corporate Finance	985
2006	Bloomfield	Behavioral Finance	Behavioral Finance (Summary)	5
2006	Pompian	Behavioral Finance and Wealth Management	Behavioral Finance (Summary)	24
2006	Zaleskiewicz	Behavioral Finance	Behavioral Finance (Summary)	5
2007	Baker, Ruback, and Wurgler	Behavioral Corporate Finance: a Survey	Behavioral Corporate Finance	305
2008	Byrne and Brooks	Behavioral Finance: Theories and Evidence	Behavioral Finance (Summary)	9
2010	Gromb and Vayanos	Limits of Arbitrage: The State of the Theory	Limits of Arbitrage	34

Note: The number of citations is on the basis of Google Scholar.

and many review papers on behavioral finance deal with those two major pillars. In particular, Byrne and Brooks (2008) reviewed and rearranged several papers in behavioral finance. They note that behavioral finance is founded in the assumption that cognitive biases influence individual investors, which means that their financial decisions are not completely rational. They also showed some evidence that behavioral biases¹³⁾ stem from cognitive psychology and that

13) The following topics are examples of biases: 1) Overconfidence and optimism—investors overestimate their ability and the accuracy of the information they have; 2) Representativeness—investors assess situations based on superficial characteristics rather than on underlying probabilities; 3) Conservatism—forecasters cling to prior beliefs in the face of new information; 4) Availability bias—investors overstate the probabilities of recently observed or experienced events because their memory is fresh; 5) Frame dependence and anchoring—the form of presenting information can affect the decision made; 6) Mental

Table 6. Korean Cases in Behavioral Finance Articles

Year	Authors	Title	Subject	Journal
1991	Lee, Shleifer, and Thaler	Investor Sentiment and the Closed-end Fund Puzzle	Investor Sentiment	Journal of Finance
2001	Barberis and Huang	Mental Accounting, Loss Aversion, and Individual Stock Returns	Mental Accounting, Loss Aversion	Journal of Finance
2005	Byun and Kim	Information Contents in Securities Companies' Daily Recommendations	Information Asymmetry, Perception	Journal of Korean Securities Association
2005	Byun, Kim, and Choi	Personalities and Investment Behavior of Individual Investors	Personalities, Individual Behavior	Working Paper for Korean Academic Society of Business Administration
2005	Chae and Lewellen	Herding, Feedback Trading, and Stock Returns: Evidence from Korea	Herding, Investment Pattern	Working Paper for Dartmouth College
2005	Cici	The Relation of the Disposition Effect to Mutual Fund Trades and Performance	Disposition Effect	Working Paper for University of Michigan
2007	Xu	Selling Winners, Holding Losers: Effect on Mutual Fund Performance and Flows	Disposition Effect	Ph. D Dissertation for Virginia Polytechnic Institute and State University
2008	Kim and Nofsinger	Behavioral Finance in Asia	Behavioral Finance (Summary)	Pacific-Basin Finance Journal

accounting—individuals allocate wealth to separate mental compartments and ignore fungibility and correlation effects; and 7) Regret aversion—individuals make decisions in a way that allows them to avoid feeling emotional pain in the event of an adverse outcome.

Table 6. (continued)

Year	Authors	Title	Subject	Journal
2009	Kim and Byun	Effect of Investor Sentiment on Market Response to Stock Splits	Investor Sentiment	Working Paper for Korea Securities Association
2009	Kim and Lee	Dynamics of Asset Returns Considering Investors' Asymmetric Risk Preferences: Evidences from Korean Asset Markets	Disposition Effect, Risk Perception	Working Paper for Korea Securities Association and Bank of Korea
2010	Byun and Kim	Investor Sentiment and Market Timing of Stock Repurchase	Investor Sentiment	Journal of the Korean Academic Association of Business Administration
2010	Ko and Moon	How Koreans Deal With Foreign Exchange Rate Risk: A Behavioral Law and Economics Perspective on the KIKO Forward Contract	Behavioral Corporate Finance	Working Paper
2010	Yoo and Hwang	The Disposition Effect to Fund Flow and Performance in the Korean Mutual Fund Marketplace	Disposition Effect	Journal of the Korean Academic Association of Business Administration

they were applied in several financial fields.

Byrne and Brooks (2008) also applied the behavioral finance concept to key areas in the financial field such as limits of arbitrage, behavioral asset pricing theory, behavioral corporate finance, evidence of individual investor behavior, and behavioral portfolio theory.

We also rearrange historical research in behavioral corporate finance by introducing two different perspectives: irrational investors' and managers' points of view. We find that many companies apply behavioral components and patterns to their real investments or corporate strategies, and that these components and patterns

emerge from theoretical concepts and experimental results. In particular, some investment products consider behavioral components in asset allocation, risk analysis, and valuation.

This paper reviews several factors in behavioral finance, including anomalies and cognitive biases, and, in particular, it introduces examples found in the Korean financial market. There are still only some empirical studies for Korean cases from behavioral perspectives, but we recognize that researchers and investors should consider human elements in the Korean financial market, and they should conduct insightful studies about behavioral finance within that market (See table 6).

Researchers who believe in the EMH assert that some arguments or opinions in behavioral finance are interesting, but they are not related to traditional financial theories. They say that we do not need to seriously consider the assumption that all investors are rational, but we just need a few rational market participants. In addition, scholars in standard finance argue that over-reaction and under-reaction, two major phenomena in behavioral finance, can be offset by one another, and empirical results explaining anomalies in behavioral finance cannot be considered as general and consistent theories because they are affected by methods which measure excessive returns.

We find it difficult to suggest general theories and models in behavioral finance, and we also have limited evidence to conduct unbiased studies combining psychological factors or human elements with economics and finance. Moreover, behavioral phenomena cannot be easily applied to general or standard circumstances, as psychology is a complicated concept, not easily applied. However, advances have been made in studies regarding behavioral finance over the last 20 years, and researchers have considered behavioral finance as one of the important alternative fields. In practice, research and opinions in behavioral finance are used to make investment decisions and are applied to corporate finance in developed markets such as the UA. Therefore, behavioral finance methods can enrich the Korean financial market through conducting several empirical studies that are further specialized for Korean circumstances.

CHALLENGES TO BEHAVIORAL FINANCE

Some challenges to behavioral finance methods exist. However, an important critic explains both over-reaction and under-reaction in choosing one psychological bias and applies this to the real market. According to Fama (1998), a frequency of obvious over-reaction to information is similar to that of under-reaction in terms of EMH by considering anomalies as chance results. Abnormal returns that occurred previously persist after a certain event, and this phenomenon appears in post-event reversal as well. In other words, we can find stories *ex post* that explain abnormal situation anomalies. In addition, market efficiency should not be abandoned. Through several event studies, Fama showed that long-term return anomalies exist, they do not last, and they tend to disappear when any reasonable changes appear, and when the measurement technique is amended. In addition, researchers in traditional finance argue that behavioral finance does not have any theories or models to integrate and explain abnormal situations in general. Although research in behavioral finance has developed some models, as discussed in this article so far, the models also have limitations, and should not be considered as general theories.

Behavioral finance argues that the rational market hypothesis has been discredited, but Rubinstein (2001) paused, and recounted the considerable number of reasons as to why this hypothesis was so generally acknowledged in mainstream finance, at least in academic circles. In standard finance, we do not seriously consider the assumption that all investors are rational. The rational market is based on the assumption that rational investors set prices. Although the market is not rational, there is no abnormal profit opportunity. At this point, we can say that the market is not irrational, but minimally rational. Market rationality is considered a valid concept when investors do not recognize much about other investors' characteristics. In addition, Rubinstein argued that investor irrationality is driven by overconfidence and that it creates a hyper-rational market. Rubinstein reexamined market efficiency through several historical lenses. He explained six major anomalies¹⁴⁾ in terms of

14) The six major anomalies Rubinstein mentioned are as follows: 1) Excessive volatility, 2) Risk premium puzzle, 3) Book-to-market ratio (value vs. growth

the EMH, he claimed that many anomalies were just empirical illusions, and he showed that investors did not enjoy excessive ex ante expected returns. He also emphasized that several psychological assumptions and phenomena were considered in the EMH.

The financial market has many characteristics that strengthen market efficiency against opinions that individual investors' irrationality determines price. Research in standard finance insists that it is too rash to abandon the EMH, and this opinion is considered a persuasive theory in the market.

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securities), 4) Closed-end fund discount, 5) Calendar effects, and 6) Stock market crash.

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