

EKONOMSKA FAKULTETA
UNIVERZA V LJUBLJANI

BACHELOR THESIS

**THE POSSIBILITY OF SIGNIFICANT CHANGE IN FINANCIAL
THEORY**

Ljubljana, February 2004

GABRIELA HROMIŠ

DECLARATION

I, _____, hereby declare that I am the author of this thesis, which I have written under the supervision of _____, and I give my permission for this text to be published on university's web pages.

IN LJUBLJANA, _____

SIGNATURE:

TABLE OF CONTENTS

INTRODUCTION.....	1
1. GENESIS OF FINANCIAL THEORY DEVELOPMENT	3
2. FOUNDATIONS OF THE EMH	4
3. EFFICIENT MARKET HYPOTHESIS.....	4
3.1. PRICES EQUAL VALUE	5
3.2. PRICE PREDICTABILITY	6
3.3. LIMITS TO ARBITRAGE.....	6
3.4. IS THE MARKET RATIONAL.....	7
3.5. ALTERNATIVE MODEL TO EMH	8
4. CAPITAL ASSET PRICING MODEL AND ANOMALIES	9
4.1. ANOMALIES.....	9
4.1.1. <i>Dividend Puzzle</i>	9
4.1.2. <i>Volume</i>	9
4.1.3. <i>Excess volatility puzzle</i>	10
4.1.4. <i>The equity premium puzzle</i>	10
4.1.5. <i>Long-term reversals</i>	11
4.1.6. <i>The predictive power of scaled-price ratios</i>	11
4.1.7. <i>Momentum</i>	12
4.1.8. <i>Event studies of earnings announcements</i>	12
4.1.9. <i>Event studies of dividend initiations and omissions</i>	12
4.1.10. <i>Event studies of stock repurchases</i>	13
4.1.11. <i>Event studies of primary and secondary offerings</i>	13
4.2. DO ANOMALIES DISAPPEAR IN THE REPEATED MARKETS.....	13
5. HOMO ECONOMICUS	14
5.1. HEURISTIC SIMPLIFICATION	15
5.2. SELF- DECEPTION	18
5.3. EMOTIONS AND SELF-CONTROL	19
6. EXPECTED UTILITY THEORY	19
7. ALTERNATIVE THEORIES	22
7.1. PROSPECT THEORY	22
7.2. FEEDBACK MODELS	23
7.3. BELIEF-BASED MODEL WITH PUBLIC INFORMATION	24
7.4. BELIEF-BASED MODEL WITH PRIVATE INFORMATION	25
7.5. BELIEF-BASED MODELS WITH INSTITUTIONAL FRICTIONS.....	25
8. IMPLICATION OF BEHAVIORAL FINANCE ON INVESTOR BEHAVIOR	26
8.1. INSUFFICIENT DIVERSIFICATION.....	26
8.2. NAÏVE DIVERSIFICATION	27
8.3. EXCESSIVE TRADING	27
8.4. THE SELLING DECISION.....	28
8.5. THE BUYING DECISION	28
9. IMPLICATIONS OF BEHAVIORAL FINANCE ON CORPORATE FINANCE.....	29
9.1. SECURITY ISSUANCE, CAPITAL STRUCTURE AND INVESTMENT.....	29
9.2. DIVIDENDS.....	30
9.3. MANAGERIAL IRRATIONALITY	30
10. CRITIQUES OF BF	30
10.1. MARKET EFFICIENCY	30
10.2. RATIONALITY	31

11. SCIENTIFIC REVOLUTION.....	32
CONCLUSION	34
REFERENCES.....	36

INTRODUCTION

Although modern finance has been clearly established in mainstream finance since the 1950s, there is a growing body of evidence about its shortcomings. In this article I try to examine this evidence and assess the possibilities of significant change in financial theory.

In the first chapter I briefly describe the development of financial theory through two distinct phases. Traditional financial theory is a loose collection of rules and recommendations for the practitioners. It was descriptive and non-mathematical. Modern financial theory is normative and mathematical. It assumes rational behavior, and it is founded on expected utility theory, efficient market hypothesis and capital asset pricing model.

The second and third chapter discuss the efficient market hypothesis. The basic premise of the efficient market hypothesis is that markets are rational, i.e. all information about assets is reflected in the price of that asset. Implications of this theory are that price equals value, and that prices are unpredictable. The implicit assumption is that any irrationality is arbitrated away by rational subjects. I present evidence that contradicts this view and a possible alternative model.

In the fourth chapter I present the capital asset pricing model and numerous deviations from it, that have become known as “anomalies”. I also discuss whether anomalies might disappear in the repeated markets.

In the fifth chapter I turn to the notion of homo economicus. Modern theory assumption is that economic agents are capable of correctly identifying and maximizing their utility functions. However, there is a large body of evidence that suggests otherwise. These lapses in rationality are divided into three categories: heuristic simplification, self-deception and emotions and self-control.

In the sixth chapter I briefly describe the assumptions of the expected utility theory, followed with the descriptions of observed violations of these assumptions and an introduction to the alternative theories.

In the seventh chapter I proceed to describe alternative theories to the expected utility theory. Most famous among those is the prospect theory. I also briefly discuss feedback models, belief-based model with public information, belief-based model with private information and belief-based models with institutional frictions.

In the eighth chapter I discuss the implications of behavioral finance on investor behavior. They include insufficient diversification - investors diversify their portfolio holdings much less than recommended by normative models of portfolio choice, and when they do diversify, they do so in a naïve fashion. Another implication is a much higher volume of trading than EMH would imply. I also briefly discuss the behavioral view on selling and buying the decisions of investors.

In the ninth chapter I discuss the implications of behavioral finance on corporate finance. I discuss how irrational investors affect security issuance, capital structure and investment decisions of firms, and also dividend policy and implications of managerial irrationality.

In the tenth chapter I present critiques of behavioral finance regarding its view on market efficiency and rationality.

And in the last chapter I discuss the possibility of paradigm change in the mainstream finance, and what it would take for such a revolution to happen.

1. GENESIS OF FINANCIAL THEORY DEVELOPMENT

Financial theory in its genesis has gone through two distinct phases and may be on the verge of another paradigm change.

Traditional theory has dominated the academic research and practice from the 1930s to 1950s. Traditional researchers relied on experiences from practice in their study. Financial theory was more of a collection of rules used by investors and managers in the decision-making process than a consistent and complete explanation of reasons and consequences of the financial decisions (Mramor, Loncarski, 2002). People were normal, rather than rational. Investment rules were simple. One should buy under-priced assets and sell over-priced, which implied that shares themselves had some intrinsic value, which could be different from their market values. Researchers did not claim that their findings were universally applicable, but subject to change, with changing market conditions. They were based on the actual behavior of investors and managers.

1950s marked the beginning of the second phase of the development of financial theory. Modern financial theory is based on the neoclassical economic theory and a heavy use of mathematical models. Human beings are rational. Financial markets are efficient, and all financial assets are perfect substitutes. Their prices are dependant solely on the expected returns and risks.

Modern financial theory is based on the arbitrage principles of Miller and Modigliani, the portfolio theory of Markowitz, CAPM of Sharpe, Lintner and Black, expected utility maximization of Von Neumann and Morgenstern and the option pricing theory of Black, Scholes, and Merton (Mramor, Loncarski, 2002).

Modern financial theory has dominated the field in the last half a century, despite its shortcomings. The cornerstone of its paradigm is efficient market theory, which reached its peak in the academic circles in the 1970s. The theory stated that the prices of the securities reflect all available information about them. This has two implications; investors cannot systematically beat the market and security prices are rational. Economic agents in this world make decisions according to the axioms of expected utility theory and they make unbiased forecasts about the future. However, the real world seems at odds with this theory in a number of ways.

Starting with the 1960s, the findings of psychology began finding its way into the analysis of investment behavior. The goal of BF is to make economic models better at explaining systematic investor decisions, taking into consideration their emotions and cognitive errors and how these influence decision making. Important groundwork for the development of BF was prospect theory of Kahneman and Tversky (1979), in which they showed how judgment under uncertainty systematically departs from the assumption of rationality as assumed by modern financial theory. Another two important studies are: De Bondt and Thaler (1985) in which they present Investor Overreaction Hypothesis as opposed to Efficient Markets Hypothesis and Shefrin and Stetman (1985).

2. FOUNDATIONS OF THE EMH

The theoretical foundations of the EMH were laid by Paul Samuelson and Benoit Mandelbrot (Cunningham, 2001). They assumed that investors act rationally in making the investment decisions that result in stock price changes. The consequences were equivalence between price and value and a random element to the process of price formation that rendered impossible the predictions of future price movements and a systematic earning of higher than normal returns.

Eugene Fama laid the empirical foundations of EMH. He hypothesized that an investor cannot use information such as past prices, public disclosures, and maybe even privileged data to earn abnormal returns in the stock market. Such information is instantly absorbed into the price by traders who get the information first and act on it, so knowing it thereafter gives an investor no advantage. Returns that are earned precisely compensate for the risk of investing. Risk was adjusted using the capital asset pricing model, which specified the risk associated with each stock.

Rationality did not have to be complete, however, and the model allowed for the participation of nonrational or irrational persons. Their contributions would have the tendency to push prices away from values, but those deviations would not persist due to arbitrage by the rational participants, whose trading would restore the price-value identity and reinforce the basic conclusions of the model.

3. EFFICIENT MARKET HYPOTHESIS

The efficient markets model can be stated as asserting that the price P_t of a share (or of a portfolio of shares representing an index) equals the mathematical expectation, conditional on

all information available at the time, of the present value P_t^* of actual subsequent dividends accruing to that share (or portfolio of shares). P_t^* is not known at time t , and has to be forecasted. Efficient markets hypothesis says that price equals the optimal forecast of it (Shiller, 2002).

Thus, the basic premise of EMH is that prices of securities always reflect all available information about them. The term “market efficiency” has two meanings: one is that security prices are rational (i.e. reflect only “fundamental” or “utilitarian” characteristics, such as risk, but not “psychological” or “value-expressive” characteristics, such as sentiment) and the other is that an investor cannot systematically beat the market (Statman, 1999).

Both classes of predictions (that price equals value, and that prices are unpredictable) can be tested. The first prediction can be tested by comparing prices of the same asset that is traded in different places. Most famous examples of such price deviations are those of Royal Dutch Shell and of closed-end mutual funds.

3.1. PRICES EQUAL VALUE

Royal Dutch Shell emerged from an alliance between Royal Dutch and Shell Transport in which they agreed to merge their interests on a 60:40 basis, while remaining separate entities. Shares of Royal Dutch are primarily traded in the USA and the Netherlands and the company receives 60% of the total cash flow of the two companies, while Shell trades in UK and receives the remaining 40%. According to EMH shares of these two companies should trade in a ratio of 60:40, but the actual price has deviated from expected by more than 35%. The discrepancy is too large to be explained by EMH, even when adjusted for the difference in taxes and transaction costs.

Another example is that of closed-end mutual funds. The closed-end mutual fund puzzle is the empirical finding that closed-end fund shares typically sell at prices not equal to the per share market value of the assets that the fund holds. It usually sells at the discount of 10 to 20 percent. Lee, Shleifer and Thaler (1991) find that the changing sentiment of individual investors toward closed-end funds and other securities explains the fluctuations of prices and discounts on closed-end funds. In this theory discounts are high when investors are pessimistic about future returns and low when investors are optimistic. As such, closed-end fund discounts are a measure of the sentiment of individual investors. That sentiment is sufficiently widespread to affect the prices of closed-end funds in the same way that it influences the prices of smaller stocks. Since the same investor sentiment affects the smaller stocks and so makes them riskier, smaller stocks must also be underpriced relative to their fundamentals. The result that small firms appear to earn excess returns is well known in

finance as the small firm effect. In the same way changing investor sentiment makes funds riskier than the portfolios they hold and so causes underpricing of funds relative to fundamentals.

Another evidence to the limits of arbitrage is index inclusions. It has been shown that when a stock is added to the index, it increases in price by an average of 3.5%, and much of this increase is permanent. One example of this phenomenon is that, when Yahoo was added to the S&P index, its shares jumped by 24% in a single day (Barberis, Thaler, 2003). The fact that a stock jumps in value upon inclusion is once again clear evidence of mispricing: the price of the share changes even though its fundamental value does not.

3.2. PRICE PREDICTABILITY

The second prediction of the efficient market hypothesis is that it is not possible to predict future stock price movements based on publicly available information. Some of the deviations from this principle were found to be behaviorally motivated. One such finding is that individuals tend to overreact to the news. An implication about future returns is that past “winners” should underperform, while past “losers” should overperform in the market. This was confirmed by DeBondt and Thaler (1985). Using data on stocks traded on NYSE, they found that the 35 stocks that performed the worst over previous five years outperformed the market over next five years, and 35 stocks that performed the best over previous five years, subsequently underperformed.

More recent studies have found evidence of underreaction as well. Behavioral finance literature offers explanations that rely on psychological evidence, noting that underreactions appear at short horizons and overreactions at long horizons. There is also evidence of abnormal returns subsequent to the event date.

3.3. LIMITS TO ARBITRAGE

Modern theory predicts that if irrational traders misprice the asset, rational traders will arbitrage away this deviation from the asset’s fundamental value. Arbitrage, by definition, means riskless profit opportunity. But, in fact, correcting mispricing is connected with risks and costs. Apart from the transaction costs and the cost of finding mispriced assets, it also entails the risk that noise traders would drive the price further away from its fundamental value.

Shleifer and Vishny (1995) examine the logic of the arbitrage activity in the agency context. In traditional models arbitrage is performed by a large number of investors taking small positions against the mispricing. Shleifer and Vishny assume a more realistic situation in which arbitrage is conducted by a small number of highly specialized investors who take large positions using other people's money. They want to examine how effective professional arbitrage is in extreme circumstances, when prices are far away from fundamental values. The separation of knowledge and resources has three crucial implications for the workings of arbitrage. First, because outside investors are ignorant about the markets that arbitrageurs invest in and cannot tell good arbitrageurs from bad, the resources they supply to the arbitrage activity are limited. The capacity of arbitrageurs to borrow funds is also limited. Second, because they are poorly informed, outside investors rationally use past performance of the arbitrageurs in deciding to whom to give their money to manage. A good track record brings in more funds, and a bad track record causes a withdrawal of funds. Third, because arbitrageurs' knowledge is highly specialized, arbitrage markets are segmented. Only a relatively small number of experts, with a good track record, can attract outside funds to engage in arbitrage in a given market. Shleifer and Vishny show that in this context arbitrage can be very ineffective in returning prices to fundamental values.

Their model also offers a solution to excess return anomaly. Because the assumption of large number of highly diversified investors does not hold, funds that are employed in arbitrage care about total risk, and not just systematic risk. As a result, arbitrageurs may avoid extremely volatile arbitrage positions.

3.4. IS THE MARKET RATIONAL

Mainstream finance theorists do not contend that every agent always behaves rationally, but they maintain that the market functions as if all agents were fully rational, which means that markets are efficient. However, if systematic departures from rationality exist, the question is: do the anomalies create arbitrage opportunities, through the mispricing of the financial assets?

In 1985 De Bondt and Thaler published the paper in which they showed that the stock market displays a systematic tendency to overreact to news. Nevertheless, in subsequent years several instances of market under-reaction were also detected. This led Fama (1998) to claim that over and under-reaction anomalies are simply due to chance and that market efficiency prevails on average (thus, no *ex ante* exploitable excess profit opportunity exists). Moreover, Fama (*ibid.*) stressed that most anomalies are fragile and do not withstand a closer scrutiny and / or a reasonable change in the statistical methodology. Today, there almost seems to be a consensus that the market is most of the times rational in this beat-the-market sense. The most

solid proof of this is that portfolio managers, and, in general, active investment strategies, do not outperform passive investment strategies.

Another aspect to consider is the definition of the market rationality itself. Stracca (2002) defines two types of rationality: exogenous and endogenous. He defines exogenous rationality as a situation in which the market price optimally reflects some exogenous objective quantity (e.g., the profitability of the U.S. corporate sector), i.e. the pricing bias e should be zero. Endogenous rationality is a situation in which each market participant possesses an unbiased estimate of the future market price, even if such a market price is completely detached from the fundamentals (for example, there is a bubble in equity prices and everybody acknowledges this, but each market participant expects the bubble to continue, which further increases the probability that the bubble continues). In this sense “herd” behavior is not necessarily inconsistent with rationality.

3.5. ALTERNATIVE MODEL TO EMH

Cunningham (2001) describes an alternative model that incorporates behavioral phenomena. Basic outline of the model is as follows. Investors start by holding some views about the world and the markets and particular industries and companies. Some news is released affecting a particular company; for example, the release of its earnings for a single quarter. The tendency of investors is not to react to this news by reevaluating those prior views as rationality would prescribe but instead to exhibit conservatism. This means investors tend to update their views about the company, and the context in which it operates, with delay. They retain the status quo, and are slow to revise their position when confronted with single bits of news. The result is under-reaction of prices to earnings news. In contrast, when investors repeatedly receive similar types of news over a period of time, for example, a series of quarterly earnings surprises for a particular company in the same direction, they tend to revise their prior views rather quickly. This phenomenon is called the representativeness heuristic, and describes the mental strategy of viewing events as typical or representative of some specific class when statistically they are not. So while a single earnings news has modest or no impact, once a whole slew of similar sorts of reports emerges, a backlash comes. This can be true equally of news releases about a single company or about lots of different companies during the same quarter or other reporting period. The result is an overreaction in price changes to the various elements of news.

4. CAPITAL ASSET PRICING MODEL AND ANOMALIES

The capital asset pricing model is the second cornerstone of modern finance. CAPM, as developed by Sharpe and Linter, provides investors with a guideline to the allocation of the resources to achieve maximum return based upon any given risk expectation. Differences between the portfolios chosen by investors will reflect each individual's degree of risk aversion as displayed by the portion of the portfolio dedicated to "risk-free" assets, and those assigned to the risky classes (Mramor and Loncarski, 2002).

Empirical studies, however, have established a number of facts that do not confirm to CAPM. These facts have come to be known as "anomalies".

4.1. ANOMALIES

4.1.1. Dividend Puzzle

Modigliani and Miller (1961) showed that in an efficient market with no taxes or transaction costs dividend policy is irrelevant. Since rational agents are concerned with the total rate of return, the actual components of return are irrelevant - dividends, interest payments, and capital appreciation in the underlying securities should all be treated equally. If there are taxes, and dividends are taxed at a higher rate, investors are better off when companies refrain from paying dividends. But, in reality, companies pay dividends and investors prefer companies that pay dividends.

4.1.2. Volume

Standard models predict that participants will trade very little. If all prices are rational, the only trading will be primarily for liquidity and rebalancing needs. There is evidence that all new information about assets is fully incorporated into the price within 30 seconds of its arrival (Landsburg, 1993). So why are hundreds of millions of shares traded on NYSE every day?

4.1.3. Excess volatility puzzle

If markets are efficient, prices change only when news about them arrives. Because prices equal values, prices can be measured by present value of future dividends. Shiller (1981) found that stock market movements are too volatile to be justified by subsequent changes in dividends.

Behavioral approach to the volatility puzzle is based on beliefs and preferences. According to the law of small numbers, it is argued that investors believe that the mean dividend growth rate is more variable than it actually is. When they see a surge in dividends, they are too quick to believe that the mean dividend growth rate has increased. Their exuberance pushes prices up relative to dividends, adding to the volatility of returns. Price–dividend ratios and returns might also be excessively volatile because investors extrapolate past returns too far into the future when forming expectations about the future returns (Barberis, Thaler, 2003).

4.1.4. The equity premium puzzle

Historically, equity premiums have been too high to be explained by risk alone. However, it is not quite clear whether risk premiums are high, or whether returns on fixed income are too low. Siegel (1992) investigated historic risk premiums for the period from 1802. He divided the whole period into three sub periods: 1802-1871, 1872-1925 and post 1925. He found that real returns on short-term fixed income securities have fallen from 5.4 percent in the first period to 3.3 percent in the second and 0.7 in the third. The returns on equity have remained constant throughout the period. The reason for the fall in returns in short term fixed income markets is unclear. In the early period it might be in greater perceived default risk, and in the post WWII period due to the unexpected inflation (Siegel, Thaler 1997).

One of the explanations for the equity premium puzzle is that investors are worried that some kind of an economic catastrophe, although it did not, might have occurred (Reitz, 1988). Value function in prospect theory allows for this, by attributing disproportional weights to very low probabilities. However, when such events actually did occur throughout the world, it turned out that bondholders were more exposed, as in the cases of hyperinflations in Germany in the 1920s and post-World War II hyperinflation in Japan, which wiped out bondholders altogether. Since in long term, fixed income securities are even riskier in real terms, so equity premiums should be negative!

An alternative view is that investors really are extremely risk averse. Fama (1991) argues that a large equity premium is not necessarily a puzzle; high risk aversion (or low intertemporal elasticity of substitution for consumption) may be a fact. Roughly speaking, a large equity

premium says that consumers are extremely averse to small negative consumption shocks. This is in line with the perception that consumers live in great fear of recessions even though, at least in the post war period, recessions are associated with small changes in consumption.

In the myopic loss aversion investors are making a mistake of failing to aggregate over time periods. Instead of focusing on their lifetime utility and noting that over the long-term equity is the most profitable investment by a wide margin, agents frame their investment decision more narrowly to a horizon of approximately one year, at which the risk that stocks underperforms bonds, is indeed high. But, even if loss aversion is real, investors should realize that they should care about the retirement consumption, not returns along the way (Siegel, Thaler 1997).

4.1.5. Long-term reversals

De Bondt and Thaler (1985) computed three year cumulative returns for all the stocks traded on NYSE, for the period from 1926 to 1982, and formed two portfolios: a “winner” portfolio of the 35 stocks with the best prior record and a “loser” portfolio of the 35 worst performers. They then measured the average returns of these two portfolios over the three years subsequent to their formation. They find that over the whole sample period, the average annual return of the loser portfolio is higher than the average return of the winner portfolio by almost 8% per year.

4.1.6. The predictive power of scaled-price ratios

Stocks with high M/B (market-to-book) and P/E (price-to-earnings) ratios underperform those with high ratios. Fama and French (1992) group all stocks traded on the NYSE, AMEX and NASDAQ (for the period from 1963 to 1990) into deciles based on their book-to-market ratio, and measure the average return of each decile over the next year. They find that the average return of the highest B/M-ratio decile, containing the so called “value” stocks, is 1.53% per month higher than the average return on the lowest-B/M-ratio decile, a difference much higher than can be explained through differences in betas between the two portfolios. Repeating the calculations with the earnings–price ratio produces a difference of 0.68% per month between the lowest and highest decile, again an anomalous result.

4.1.7. Momentum

Jegadeesh and Titman (1993) did the same thing as De Bondt and Thaler (above), but for six month periods, and they found that the decile of the biggest prior winners outperforms the decile of the biggest prior losers by an average of 10% on an annual basis. Here, the crucial role is played by the length of the prior ranking period. In one case, prior winners continue to win; in the other, they perform poorly. It is yet to be explained why extending the formation period switches the result in this way. One of the explanations offered is that tax-loss selling effect creates seasonal variation in the momentum effect. Stocks with poor performance during the year may later be subject to selling by investors keen to realize losses that can offset capital gains elsewhere. This selling pressure means that prior losers continue to lose, enhancing the momentum effect. At the turn of the year, though, the selling pressure eases off, allowing prior losers to rebound, thus weakening the momentum effect.

4.1.8. Event studies of earnings announcements

A number of studies have examined stock returns following earnings announcements. Bernard and Thomas (1989) grouped all stocks traded on the NYSE and AMEX into deciles based on the size of the surprise in their most recent earnings announcement. “Surprise” is measured relative to a simple random walk model of earnings. They found that on average, over the 60 days after the earnings announcement, the decile of stocks with surprisingly good news outperformed the decile with surprisingly bad news by an average of about 4%, a phenomenon known as post-earnings announcement drift. This difference in returns cannot be explained by differences in betas between the two portfolios. Later studies measured surprise in other ways – relative to analyst expectations, and by the stock price reaction to the news – and obtained similar results.

4.1.9. Event studies of dividend initiations and omissions

Michaely, Thaler and Womack (1995) study firms which announced initiation or omission of a dividend payment between 1964 and 1988. They find that on average the shares of firms initiating (omitting) dividends significantly outperform (underperform) the market portfolio over the year after the announcement.

4.1.10. Event studies of stock repurchases

Ikenberry, Lakonishok and Vermaelen (1995) look at firms which announced a share repurchase between 1980 and 1990, while Mitchell and Stafford (2001) study firms which did either self-tenders or share repurchases between 1960 and 1993. The latter study finds that, on average, the shares of these firms outperform a control group matched on size and book-to-market by a substantial margin over the four year period following the event.

4.1.11. Event studies of primary and secondary offerings

Loughran and Ritter (1995) study firms which undertook primary or secondary equity offerings between 1970 and 1990. They find that the average return of shares of these firms over the five-year period after the issuance is markedly below the average return of shares of non-issuing firms matched to the issuing firms by size.

4.2. DO ANOMALIES DISAPPEAR IN THE REPEATED MARKETS

Loomes, Starmer and Sugden (2001) consider three alternative hypotheses about how people learn in the repeated markets.

The refining hypothesis states that market experience helps individuals to make decisions that more accurately reflect their preferences. If preferences satisfy standard consistency requirements and anomalies result from errors, the refining hypothesis predicts a tendency for anomalies to become less frequent as market experience accumulates. Individuals refine their decision making ability through repetition, feedback and incentives. Repetition allows subjects to become more familiar with decision tasks and the objects of choice; feedback allows subjects to experience the consequences of particular choices; incentives provide a general motivation to attend to tasks carefully.

The market discipline hypothesis assumes that agents have stable underlying preferences, and that they may commit errors when attempting to act on those preferences within a market institution. However, the market discipline hypothesis distinguishes between two types of errors: those which, ex post, are costly to the agent once the market outcome is known, and those which are not. The hypothesis is that agents adjust their behavior to correct errors if and only if those errors have proved costly.

The shaping hypothesis states that, in repeated market environments, there is a tendency for agents to adjust their bids towards the price observed in the previous market period.

In the experiment, subjects took part in a series of repeated auctions. All of the auctions were median price auctions which operated as follows. Each auction involved an odd number of participants, and a computer program elicited a bid from each subject equal to the price at which they were just not willing to trade. The median bid was then computed and announced as the market price. The program implemented all trades consistent with subjects' bids at the market price. So, in buying auctions, only subjects with bids above the market price bought; in selling auctions, only subjects with asks below the market price sold. The mechanism was a sealed bid, but subjects learned the market price, whether they had bought or sold, immediately at the end of each auction round. Their findings were consistent with the shaping hypothesis. The authors conclude: "The discovery of a shaping effect has potentially far-reaching theoretical consequences. For example, claims concerning the efficiency of competitive markets typically assume that preferences are independent of market activity. If it were the case that values are 'contaminated' by price feedback through market participation that would warrant serious reconsideration of the foundations of standard economic theory."

5. HOMO ECONOMICUS

Standard economic theory relies on expected utility maximization, which implies that economic agents are capable of correctly identifying and maximizing their utility functions. It also assumes unlimited information processing capabilities. In other words, economic agents are rational and their choices are rational. That only rational agents survive is ensured by a combination of market forces (competition and arbitrage) and evolution (Shiller, 1999).

Mullainathan and Thaler (2000) argue that markets per se do not necessarily wipe out irrationality, and that the working of arbitrage is limited. They also argue that evolution does not necessarily favor rationality. The final argument is that individuals who systematically and consistently make the same mistake will eventually learn from their mistakes. Counter argument to this is two-fold. First, it has been shown that there can be a complete lack of learning even in infinite horizons, and secondly, certain decisions offer only a few chances for learning (for example, the number of times one gets to learn from one's retirement decisions).

In the last thirty years many studies have offered evidence of systematic biases in reasoning that oppose the classical view of homo economicus. Hirshleifer (2001) divides lapses in rationality into three categories: heuristic simplification, self-deception, and emotional loss of control.

5.1. HEURISTIC SIMPLIFICATION

Heuristic¹ simplification stems from limited attention, memory and processing capacities, and also from unconscious association. It also includes narrow framing - analyzing problems in a too isolated fashion.

Selective triggering of associations causes salience and availability effects. An information signal is salient if it has characteristics that are good at capturing our attention or at creating associations that facilitate recall. Availability bias is the tendency to base decisions on the most readily available information, resulting in disproportionately high weight assigned to easily remembered information (Tversky and Kahneman, 1973).

The halo effect causes people to misrepresent one characteristic of a person or a thing for another. This effect could cause stock market mispricing. In an efficient market, a stock being good in terms of growth prospects says nothing about its prospects for future risk-adjusted returns. If people misattribute stocks earnings prospect for its return prospects, growth stocks will be overpriced.

The illusion of truth is the finding that people are more inclined to accept the truth of a statement that is easy to process. People also tend to choose friends that are just like them. According to evolutionary psychology, people prefer familiar and similar individuals because these were indicators of genetic relatedness. These biases suggest a tendency to prefer local investments.

Magical thinking is the belief in relations between causally unrelated actions or events. A type of magical thinking called the illusion of control consists of the belief that a person can favorably influence unrelated chance events.

In narrow framing problems are analyzed in a too isolated fashion, and in context effect the presence of an unselected choice alternative affects which alternative is selected. Mental accounting is a kind of narrow framing that involves keeping track of gains and losses related to decisions in separate mental accounts. It can explain why some people have low paying investments and high interest debt at the same time.

Disposition effect is a tendency to hold on to securities that have declined in value and to sell winners. Related is the self-deception theory in which the self-deceiver avoids recognizing

¹ Heuristics is a method of solving problems by evaluating past experiences and moving by trial and error to a solution

losses and regret aversion. According to expected utility theory, utility derives solely from the probability distribution of payoffs resulting from a choice. However, people seem to be regret averse in their choices. They seem to be concerned not just that a choice may lead to low consumption, but that consumption may be lower than the outcome provided by an alternative choice. Regret is stronger for decisions that involve action rather than passivity, an effect sometimes called the omission bias. Regret aversion can explain the endowment effect, a preference for people to hold on to what they have rather than exchange for a better alternative, as with the refusal of individuals to swap a lottery ticket for an equivalent one plus cash. The status quo bias involves preferring the choice designated as the default or status quo among a list of alternatives.

Loss aversion bias suggests that people are more averse to small losses, relative to a reference level, than attracted to the gains of the same size (about twice as much).

Anchoring is the phenomenon that people tend to be overly influenced in their assessment of some quantity by arbitrary quantities mentioned in the statement of the problem, even when the quantities are uninformative. It means that when estimate is made in the presence of a potential anchor, it tends to be too close to the anchor. Anchoring phenomenon has been confirmed in many experiments, and from them it can be extracted that many economic phenomena are influenced by anchoring, especially valuations in the markets that are inherently ambiguous, such as stock markets. If people form judgments about investments interdependently and are overconfident, their noise trading will cause speculative prices to deviate from their true values.

Representativeness involves assessing the probability of a state of the world based on the degree to which the evidence is perceived as similar to or typical of the state of the world (Hirshleifer, 2001). Kahneman and Tversky (1974) give interesting illustration of this bias. To subjects they presented this description of a person named Linda:

“Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.”

When asked which of “Linda is a bank teller” (statement A) and “Linda is a bank teller and is active in the feminist movement” (statement B) is more likely, subjects typically assign greater probability to B. Of course, joint probability of these two statements cannot be greater than probability of any one of those statements. Representativeness provides a simple explanation. The description of Linda sounds like the description of a feminist – it is representative of the feminist–leading subjects to pick B.

Gambler's fallacy is the belief that in an independent sample the recent occurrence of one outcome increases the odds that the next outcome will differ. For example, when coin is tossed, people tend to think if the toss one was heads, the next one has above the average chance to be tail.

Clustering illusion appears when people perceive random clusters as reflecting a causal pattern. People mistakenly believe in 'hot hands' in basketball, even though empirically the actual performance of the players is very close to serially independent. Similarly, they tend to believe that, if a money manager has above the average performance for two years in a row, he has above the average capabilities. There is also evidence that real estate and stock market investors extrapolate trends in forecasting price movements.

Conservatism appears when in the face of new evidence individuals do not change their beliefs as much as would be rational. Actually, the more useful the evidence, bigger the gap between actual updating and rational updating appears to be. One explanation for conservatism is that processing new information and updating beliefs is costly. There is evidence that information that is presented in a cognitively costly form (information that is abstract and statistical, for example) is weighed less. On the other hand, people may overreact to information that is easily processed (such as scenarios and concrete examples).

Modern finance theory assumes that agents have predetermined well defined preferences. Number of experiments has shown the existence of preference reversals. There is also evidence that preferences depend on a way they are presented to the agents. Preference reversals imply the violation of transitivity (x is preferred to y and y is preferred to z , but z is preferred to x). These findings can be applied in the market context. For instance, the idea that the market allocates resources to their best possible use would be undermined if agents' preferences are affected by the market mechanism itself.

The disjunction effect is a tendency for people to want to wait to make decisions until information is revealed, even if the information is not really important for the decision, and even if they would make the same decision regardless of the information. Shiller (1999) argues that the disjunction effect might help explain changes in the volatility of speculative asset prices or changes in the volume of trade of speculative asset prices at times when information is revealed. Thus, for example, the disjunction effect can in principle explain why there is sometimes low volatility and low volume of trade just before an important announcement is made, and higher volatility or volume of trade after the announcement is made.

5.2. SELF-DECEPTION

Self-deception biases are also forms of failure of rationality, which stems from failure to accurately assess one's internal states. People simply tend to deceive themselves.

Overconfidence bias leads people to believe that their knowledge is more accurate than it really is. For example, it has been documented that people tend to assign high probabilities to the events they think will occur, and low probabilities to the events they think will not occur. Also, they are too optimistic in assigning confidence intervals to the probabilities (e.g. 98% confidence intervals contain the true quantity only 60% of the time). Overconfidence is closely connected to overoptimism about an individual's ability to succeed.

If people are overconfident, it means that they fail more often than they expect to. Rational learning over time should eliminate overconfidence, which does not always happen due to self-attribution bias. People tend to attribute good outcomes to their own abilities, and bad outcomes to external circumstances. Self-attribution causes individuals to continue to be overconfident rather than converge to an accurate self-assessment.

Cognitive dissonance is the mental conflict that people experience when they are presented with evidence that their beliefs or assumptions are wrong. It asserts that there is a tendency for people to take actions to reduce cognitive dissonance that would not normally be considered fully rational: the person may avoid the new information or develop contorted arguments to maintain the beliefs or assumptions (Shiller, 1999). For example, in one study, it was shown that people after buying a car avoided reading advertisements for cars they did not choose, but were attracted to advertisements for cars they did choose.

Sunk cost effect is a tendency to be excessively attached to activities for which one has expended resources. This effect may contribute to the tendency of investors to hold on to shares that are losing value for too long.

Similar reasoning can explain hindsight bias, when people think they 'knew it all along', and the phenomenon of rationalization - constructing a plausible ex post rationale for past choices helps an individual feel better about his decision making skills.

People tend to interpret ambiguous evidence in such way as to be consistent with their own prior beliefs. They give careful scrutiny to inconsistent facts and explain them as due to luck or faulty data-gathering. This confirmatory bias can help maintain self-esteem, consistent with self-deception. Exposure to evidence should tend to cause rational agents with differing beliefs to converge, whereas the attitudes of experimental subjects exposed to mixed evidence tend to become more polarized. Confirmatory bias may cause some investors to stick to unsuccessful trading strategies, causing mispricing to persist.

5.3. EMOTIONS AND SELF-CONTROL

The third category of biases includes emotions and self-control problems that seem to keep people from rational considerations in their utility maximization efforts.

Ambiguity aversion causes people to make irrational choices. It may increase risk premium over the prediction of CAPM model, when new financial markets are introduced, because of the increased uncertainty about the new economic environment and about resulting outcomes.

Moods and emotions also affect people's propensity to risk. For example, sales of State of Ohio lottery tickets were found to increase in the days following a football victory by Ohio State University. More generally, people who are in good moods are more optimistic in their choices and judgments than those in bad moods. Feelings affect people's perceptions of and choices with respect to risk. Bad moods are associated with more detailed and critical strategies of evaluating information.

Conformity effect is a tendency to conform to the judgments and behaviors of others. Related to it, is the false consensus effect - mistaken belief that others share one's belief more than they really do. Self-deception may encourage this phenomenon by making the individual reluctant to consider the possibility that he is making an error. False consensus may also result from availability (since like-minded people tend to associate together). The curse of knowledge is a tendency to think that others who are less informed are more similar in their beliefs to the observer than they really are.

The fundamental attribution error is the tendency of individuals to underestimate the importance of external circumstances and overestimate the importance of disposition in determining the behavior of others. In a financial context, such bias might cause observers of a repurchase to conclude that the CEO dislikes holding excess cash rather than that the CEO is responding to market undervaluation of the stock. This would suggest market underreaction to corporate events (Hirshleifer, 2001).

6. EXPECTED UTILITY THEORY

Expected utility theory had dominated finance since early 1950s. Most of the development of expected utility theory is contributed to John von Neumann and Oskar Morgenstern. This

model of human behavior is derived from six axioms of preference (Frankfurter and Mcgoun, 2001):

1. Comparability. For any pair of investment opportunities, A and B, one of the following must be true: the investor prefers A to B, B to A, or is indifferent between A and B.
2. Transitivity. If A is preferred to B, and B is preferred to C, than A is preferred to C.
3. Continuity. If investment outcome A is preferred to B, and B to C, then there is some probability P such that the investor would be indifferent between the certain event B and the uncertain event $P \cdot A + (1-P) \cdot C$.
4. Independence. If an investor is indifferent between the certain outcomes A and B, and C is any other certain outcome, then he is also indifferent between the uncertain events $\{P \cdot A + (1-P) \cdot C\}$ and $\{P \cdot B + (1-P) \cdot C\}$.
5. Interchangeability. If an investor is indifferent between two uncorrelated risky income streams, then the securities that produce them are interchangeable in any investment strategy-simple or complex.
6. Risk Aversion. If securities A and B offer the same positive rate of return, $R = X$, with probabilities P_a and P_b , respectively, and otherwise $R = 0$ with probabilities $(1-P_a)$ and $(1-P_b)$, respectively, then A is preferred to B if $P_a > P_b$. Moreover, one's relative preference for A in this case is a (possibly complex) monotonic function of the relative certainty coefficient P_a/P_b .

Since then, numerous alternative sets of axioms have been developed. As long as those axioms can be justified as sound principles of rational choice, they provide grounds for interpreting EUT normatively (as a model of how people ought to choose) and prescriptively (as a practical aid to choice). However, evidence relating to actual behavior show that people's actual choices do not confirm with prior notions of rationality.

Empirical studies dating from the early 1950s have revealed a variety of patterns in choice behavior that appear inconsistent with EUT (Starmer, 2000). Violations seem to be of two kinds: those that can be explained and standardized within the theory and those that cannot. The former category consists primarily of a series of observed violations of the independence axiom of EUT; the latter of evidence that seems to challenge the assumption that choices derive from well defined preferences.

One of the first examples of the independence axiom violations is the famous “Allais paradox”, discovered in 1953 by Maurice Allais, which was nicely illustrated in the experiment by Kahneman and Tversky (1979). They found that many individuals prefer a certain gain of 3,000 dollars to a lottery giving 4,000 dollars with 80% probability and 0 otherwise. However, some of these same individuals also prefer winning 4,000 dollars with 20% probability to winning 3,000 dollars with 25% probability, even though the probabilities for the gains were scaled down by the same factor, 0.25, in both alternatives. Allais paradox illustrates what is called a “certainty effect”, a preference for certain outcomes.

As evidence against the independence axiom accumulated, it also became evident that there is more to the EUT failure than violations of independence. Two assumptions implicit in any conventional theory are procedure invariance (preferences over prospects are independent of the method used to elicit them) and description invariance (preferences over prospects are purely a function of the probability distributions of consequences implied by prospects and do not depend on how those given distributions are described).

One well known example of the failure of procedure invariance is preference reversal. The classic preference reversal experiment requires individuals to carry out two distinct tasks (usually separated by some other intervening tasks). The first task requires the subject to choose between two prospects: one prospect (called the \$-bet) offers a small chance of winning a “good” prize; the other (the “P-bet”) offers a larger chance of winning a smaller prize. The second task requires the subject to assign monetary values—usually minimum selling prices to the two prospects. Repeated studies have revealed a tendency for individuals to choose the P-bet while placing a higher value on the \$-bet. This is the so-called preference reversal phenomenon. It presents a puzzle for economics because, viewed from the standard theoretical perspective, both tasks constitute ways of asking essentially the same question, that is, “which of these two prospects do you prefer?” In these experiments, however, the ordering revealed appears to depend upon the elicitation procedure.

One explanation for preference reversal suggests that choice and valuation tasks may invoke different mental processes which in turn generate different orderings of a given pair of prospects. Consequently, the rankings observed in choice and valuation tasks cannot be explained with reference to a single preference ordering. An alternative interpretation explains preference reversal as a failure of transitivity.

The conventional way to address these deviations in expected utility theory would be to modify the conventional theory of preference in order to explain the known violations of independence axiom. Other way is to develop non-expected utility theory. Since 1970s there have been developed dozens of such theories. Although they are rather heterogenic, they have

in common that none of them can be reduced to single preference function defined over individual prospects.

These models assume that agents draw on decision heuristics or rules of one kind or another when making their choices. The problem is then to identify the set of decision heuristics the agent may draw on, and to specify the conditions under which particular rules will be followed. The agents are boundedly rational - with limited computational ability and imperfectly defined objectives. Their selection of decision rule does involve optimization but with some constraints (e.g. information processing capacity). The most famous of these models is Kahneman and Tversky's prospect theory.

7. ALTERNATIVE THEORIES

7.1. PROSPECT THEORY

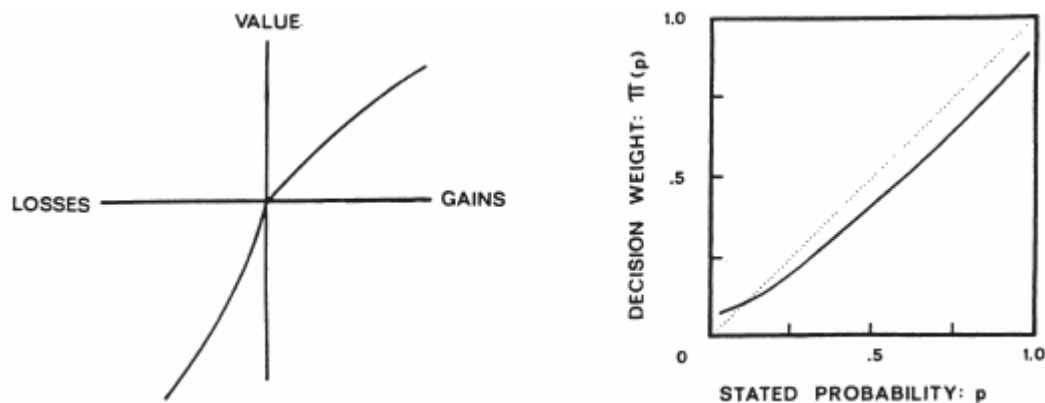
Kahneman and Tversky proposed an alternative theory to expected utility maximization in which they tried to capture the results of experimental research. While expected utility theory is axiomatic, their prospect theory is descriptive, developed in an inductive way from empirical observations. In prospect theory individuals maximize weighted sum of utilities, which are determined by what Kahneman and Tversky call "value function". There are three main differences between value function and utility function in expected utility theory. First, in prospect theory, the decision maker is not concerned with final values of wealth per se, but with changes in wealth, relative to some reference point. This reference point is often the decision-maker's current level of wealth, so that gains and losses are defined relative to the status quo. But the reference level can also be some aspiration level: a wealth level the subject strives to acquire, given his or her current wealth and expectations.

The second difference relative to expected-utility theory concerns the value function. In addition to being defined over changes in wealth, this function is S-shaped. Thus it is concave for gains and convex for losses, displaying diminishing sensitivity to change in both directions. Furthermore, it has a kink at zero, being steeper for small losses than for small gains. Utility function in expected-utility theory, by contrast, is usually taken to be smooth and concave everywhere.

The third difference is in weights that are not same as probabilities, but are determined by a function of true probabilities which gives zero weight to extremely low probabilities and a

weight of one to extremely high probabilities. That is, people behave as if they regard extremely improbable events as impossible and extremely probable events as certain. However, events that are just very improbable (not extremely improbable) are given too much weight; people behave as if they exaggerate the probability. Events that are very probable (not extremely probable) are given too little weight; people behave as if they underestimate the probability (Shiller, 1999). These differences make prospect theory consistent with the experimental evidence.

Figure 1. Kahneman and Tversky's (1979) proposed value function v and probability weighting function p .



It is also argued (Benartzi and Thaler, 1995) that this theory can resolve the equity premium puzzle. If people use a one-year horizon to evaluate investments in the stock market, then the high equity premium is explained by short-term (myopic) loss aversion.

Benartzi and Thaler (1995) showed experimentally that people frame stock market returns as short term. They have asked subjects to allocate their defined contribution pension plans between stocks and fixed incomes, their responses differed sharply depending on how historical returns were presented to them. If they were shown 30 one-year returns, their median allocation to stocks was 40%, but if they were shown 30-year returns their median allocation to stocks was 90%.

7.2. FEEDBACK MODELS

Feedback model was first described in seventeenth century describing tulip mania in Holland. Since then it has been appearing in popular press, coupled with new era theories. The theory asserts that when speculative prices go up, apparent success of some investor creates enthusiasm that drives the demand and prices further up. Then “new era” theories appear to

justify the price increase. This creates more investor demand and creates new round of price increases. This spiral produces a speculative bubble which eventually bursts. Since the demand was based on expectation of future price increases, the bubble and eventually crash do not have to be related to any news about fundamentals. Shiller (2002) argues that feedback like that occurred in the stock market bubble in 2000. He further asserts that it happens at much smaller scale in everyday workings of the market. It has been backed up with the experimental evidence where researchers have been able to create such markets. Model is also supported by research in cognitive psychology. Representativeness bias (described earlier) would lead people to match stock price patterns into salient categories such as dramatic and persistent price trends, thus leading to feedback dynamics, even if these categories may be rarely seen in fundamental underlying factors (Shiller, 2002). Self-attribution bias (described earlier) can also contribute to feedback models by leading people to believe that they can attribute to themselves the success of their investments. Anecdotal evidence that support feedback model includes Ponzi schemes. Typical for Ponzi schemes is weak initial response, but after the initial investor starts generating high returns, it generates excitement and it catches on. Explanation in Ponzi schemes, about how money is made for the investor, resembles “new era” theories that feed feedback models. So, we can think of Ponzi schemes as analogous to speculative bubbles.

7.3. BELIEF-BASED MODEL WITH PUBLIC INFORMATION

Barberis, Shleifer and Vishny (1998) argue that most of the anomalies result from systematic errors that investors make when they use public information to form expectations about future cash flows. They build a model that incorporates conservatism, the tendency to underweight new information relative to prior; and representativeness (in particular the version of representativeness known as the law of small numbers, whereby people expect even short samples to reflect the properties of the general population). When a company announces surprisingly good earnings, conservatism means that investors react insufficiently, pushing the price up too little. Since the price is too low, subsequent returns will be higher on average, thereby generating both post-earnings announcement drift and momentum. After a series of good earnings announcements, representativeness causes people to overreact and push the price up too high. The reason is that after a few periods of good earnings, the law of small numbers leads investors to believe that this is a firm with particularly high earnings growth, and hence to forecast high earnings in the future. Since the price is now too high, subsequent returns are too low on average, thereby generating long-term reversals.

To capture these ideas mathematically, they consider a model with a representative risk-neutral investor in which the true earnings process for all assets is a random walk. Investors, however, do not use the random-walk model to forecast future earnings. They think that at

any time, earnings are being generated by one of two regimes: a “mean-reverting” regime, in which earnings are more mean-reverting than in reality, and a “trending” regime in which earnings trend more than in reality. The investor believes that the regime generating earnings changes exogenously over time and sees his task as trying to figure out which of the two regimes is currently generating earnings. This framework offers one way of modeling the updating biases described above. Including a “trending” regime in the model captures the effect of representativeness by allowing investors to put more weight on trends than they should. Conservatism suggests that people may put too little weight on the latest piece of earnings news relative to their prior beliefs. In other words, when they get a good piece of earnings news, they effectively act as if part of the shock will be reversed in the next period, in other words, as if they believe in a “mean-reverting” regime. It was confirmed that for a wide range of parameter values, this model does indeed generate post-earnings announcement drift, momentum and long-term reversals (Barberis and Thaler, 2003).

7.4. BELIEF-BASED MODEL WITH PRIVATE INFORMATION

Daniel, Hirshleifer and Subrahmanyam (1998, 2001) stress biases in the interpretation of private, rather than public information. The model assumes that the investor is overconfident about his own research; in particular, they argue that investors are more likely to be overconfident about private information they have worked hard to generate than about public information. If the private information is positive, overconfidence means that investors will push prices up too far relative to fundamentals. Future public information will slowly pull prices back to their correct value, thus generating long-term reversals and a scaled-price effect. To get momentum and a post-earnings announcement effect, the model assumes that the public information alters the investor’s confidence in his original private information in an asymmetric fashion, a phenomenon known as self-attribution bias: public news which confirms the investor’s research strongly increases the confidence he has in that research. Disconfirming public news, though, is given less attention and the investor’s confidence in the private information remains unchanged. This asymmetric response means that initial overconfidence is on average followed by even greater overconfidence, generating momentum.

7.5. BELIEF-BASED MODELS WITH INSTITUTIONAL FRICTIONS

These models combine assumptions about investor rationality with institutional frictions. The institutional friction that has attracted the most attention is short-sale constraints, which can be thought of as anything that makes investors less willing to establish a short position than a

long one. They include the direct cost of shorting, namely the lending fee; the risk that the loan is recalled by the lender at an inopportune moment; as well as legal restrictions: a large fraction of mutual funds are not allowed to short stocks. Short-sale constraints, coupled with differences in investor opinions can generate P/E ratios that are too high (Barberis and Thaler, 2003).

Miller (1977) notes that when investors hold different views about a stock, those with bullish opinions will take long positions. Bearish investors, on the other hand, want to short the stock, but being unable to do so, they sit out of the market. Stock prices therefore reflect only the opinions of the most optimistic investors which, in turn, means that they are too high and that they will be followed by lower returns.

Harrison and Kreps (1978) and Scheinkman and Xiong (2003) argue that in a dynamic setting, a second, speculation-based mechanism arises. They show that when there are differences in beliefs, investors will be happy to buy a stock for more than its fundamental value in anticipation of being able to sell it later to other investors even more optimistic than themselves. Short-sale constraints are essential to this story: in their absence, an investor can profit from another's greater optimism by simply shorting the stock. With short-sale constraints, the only way to do so is to buy the stock first, and then sell it later.

Both types of models predict that stocks the investors disagree about will have higher price–earnings ratios and lower subsequent returns. Several studies have confirmed this prediction.

8. IMPLICATION OF BEHAVIORAL FINANCE ON INVESTOR BEHAVIOR

Barberis and Thaler (2003) mention following implications:

8.1. INSUFFICIENT DIVERSIFICATION

Investors diversify their portfolio holdings much less than is recommended by normative models of portfolio choice. Investors exhibit “home bias”- they concentrate their holdings on domestic (or regional) holdings. French and Poterba (1991) report that investors in the USA, Japan and the UK allocate 94%, 98%, and 82% of their overall equity investment respectively, to domestic equities. Grinblatt and Keloharju (2001) show that investors are more likely to hold the stocks of Finnish firms that are located close to them, that

communicate in investor's native tongue, and that have chief executives of the same cultural background. Also, studies found strong bias toward holding own company stock in both 401(k) plans and by individual investors.

This occurrence can be explained with ambiguity and familiarity. There is evidence showing that people dislike ambiguous situations, where they feel unable to specify a gamble's probability distribution, but show an excessive liking for familiar situations. Ambiguity and familiarity offer a simple way of understanding the different examples of insufficient diversification. Investors may find their national stock markets more familiar – or less ambiguous – than foreign stock indices; they may find firms situated close to them geographically more familiar than those located further away; and they may find their employer's stock more familiar than other stocks. Since familiar assets are attractive, people invest heavily in those, and invest little or nothing at all in ambiguous assets. Their portfolios therefore appear undiversified relative to the predictions of standard model that ignores the investor's degree of confidence in the probability distribution of a gamble.

Of course, ambiguity/familiarity effect needs to be distinguished from the instances when investors choose familiar stocks because they are better informed about them, or because information about them is less costly to come by.

8.2. NAÏVE DIVERSIFICATION

Benartzi and Thaler (2001) find that when people do diversify, they do so in a naïve fashion. In particular, they provide evidence that in 401(k) plans, many people seem to use strategies as simple as allocating $1/n$ of their savings to each of the n available investment options, whatever those options are. Some evidence that people think in this way comes from the laboratory. Benartzi and Thaler asked subjects to make an allocation decision in each of the following three conditions: first, between a stock fund and a bond fund; next, between a stock fund and a balanced fund, which invests 50% in stocks and 50% in bonds; and finally, between a bond fund and a balanced fund. They find that in all three cases, a 50:50 split across the two funds is a popular choice, although it leads to very different effective choices between stocks and bonds: the average allocation to stocks in the three conditions was 54%, 73% and 35%, respectively.

8.3. EXCESSIVE TRADING

The volume of trading in the world stock markets is much higher than the efficient market hypothesis would imply. The most prominent behavioral explanation of such excessive

trading is overconfidence: people believe that they have information strong enough to justify a trade, whereas in fact the information is too weak to warrant any action. This hypothesis predicts that people who are more overconfident will trade more and, because of transaction costs, earn lower returns. Consistent with this, Barber and Odean (2000) show that the investors in their sample who trade the most earn by far the lowest average returns. Building on evidence that men are more overconfident than women, and using the same data as in their earlier study, Barber and Odean (2001) predict and confirm that men trade more and earn lower returns on average. Working with the same data again, Barber and Odean (2002) study the subsample of individual investors who switch from phone-based to online trading. They argue that for a number of reasons, the switch should be accompanied by an increase in overconfidence. First, better access to information and a greater degree of control – both features of an online trading environment – have been shown to increase overconfidence. Secondly, the investors who switch have often earned high returns prior to switching, which may only increase their overconfidence further. If this is indeed the case, they should trade more actively after switching and perform worse. Barber and Odean confirm these predictions.

8.4. THE SELLING DECISION

Consequence of disposition effect (an excessive propensity to hold on to securities that have declined in value and to sell winners) is that individuals are reluctant to sell assets trading at a loss relative to the price at which they were purchased, although tax deductions should lead people to sell losers, not winners. They also tend to oversell stocks, whose price has gone up. Several studies have found that the average performance of stocks that people sell is better than that of stocks they hold on to.

8.5. THE BUYING DECISION

People buy stocks that are both prior winners and prior losers. But they buy extremes, those stocks that were prior winners were big winners, and those that were prior losers were big losers. Odean (1999) argues that the results for stock purchases are in part due to an attention effect. People buy shares that are most talked about, and those are usually the shares whose performance is extreme.

9. IMPLICATIONS OF BEHAVIORAL FINANCE ON CORPORATE FINANCE

9.1. SECURITY ISSUANCE, CAPITAL STRUCTURE AND INVESTMENT

One strand of research in behavioral finance asks whether irrational investors affect the financing and investment decisions of firms. If the market is inefficient, then the rational manager should issue new shares when the stock price is too high, as to take advantage of this mispricing. Conversely, when the price is too low, the manager should repurchase shares. Empirical evidence is consistent with this “market timing” view on both, aggregate and individual firm level. First, at the aggregate level, the share of new equity issues among total new issues is higher when the overall stock market is more highly valued. Second, firms with high valuations issue more equity while those with low valuations repurchase their shares.

Now, if a stock overvaluation lead the rational manager to issue more shares, the next question is what he should do with fresh capital, i.e. how does investor misevaluation affect investment decisions? As Stein (1996) shows, he should not channel the fresh capital into any actual new investment, but instead keep it in cash or in another fairly priced capital market security. While investors’ exuberance means that, in their view, the firm has many positive net present value (NPV) projects it could undertake, the rational manager knows that these projects are not, in fact, positive NPV and that in the interest of true firm value, they should be avoided. Conversely, if the manager thinks that her firm’s stock price is irrationally low; she should repurchase shares at the advantageously low price but not scale back actual investment. In short, irrational investors may affect the timing of security issuance, but they should not affect the firm’s investment plans.

Of course, this only holds true for the firms that do not need equity markets capital to finance their new investments. For the firms that do need equity capital excessive investor pessimism may force them to forgo attractive investment opportunities because it is too costly to finance them with undervalued equity. There are also other reasons why investment decisions can be distorted. For example, manager may not choose to maximize firm’s value, or he may fail to be rational. Some studies confirm this investment distortion effect (see Barberis, Thaler, 2003).

9.2. DIVIDENDS

Studies have shown that people prefer receiving dividends. Since dividends are taxed more heavily than capital gains such preference is unusual. Some of the behavioral explanations are found in Frankfurter and Wood (2002). They cite managerial surveys that found that managers believe that stable dividends lessen negative investor reaction. In Feldstein and Green (1983) model dividend policy is a consequence of investor consumption needs. The tax liabilities from dividend payment are less than the transaction costs of selling shares to provide income if earnings are retained. Shefrin and Statman (1984) propose theory of self-control. People like dividends because dividends help them surmount self-control problems through the creation of simple rules, such as spending the dividends and holding on to portfolio capital, thus preventing overconsumption. Regret theory contends that, since losses are more significant than gains, selling shares causes more investor regret and anxiety than spending the dividend payments. A subsequent price rise in shares causes even more regret.

9.3. MANAGERIAL IRRATIONALITY

If investors can be irrational, we can reasonably expect that managers can be, too. To explain why there is so much takeover activity, even though the share price of takeover firms typically falls, Roll (1986) argues that much of the evidence on takeover activity is consistent with an economy in which there are no overall gains to takeovers, but in which managers are overconfident. If managers are overconfident about the accuracy of their analysis, they will be too quick to launch a bid when their valuation exceeds the market price of the target. Just as overconfidence among individual investors may lead to excessive trading, so overconfidence among managers may lead to excessive takeover activity.

10. CRITIQUES OF BF

10.1. MARKET EFFICIENCY

One of the fiercest critics of behavioral finance literature Eugene Fama (1998) contends that “market efficiency survives the challenge from the literature on long-term return anomalies”. Consistent with the market efficiency hypothesis that the anomalies are chance results, he claims, is that apparent overreaction to information is about as common as underreaction, and post-event continuation of pre-event abnormal returns is about as frequent as post-event reversal. Most important, consistent with the market efficiency prediction that apparent

anomalies can be due to methodology, most long-term return anomalies tend to disappear with reasonable changes in technique.

This leads me back to the definition of market efficiency. For Statman (1999) market efficiency has two meanings, one of which is that investors cannot systematically beat the market. The other is that security prices are rational. Rational prices reflect only utilitarian characteristics, such as risk, not value-expressive characteristics, such as sentiment. He suggests the acceptance of the market efficiency in the beat-the market sense but rejects it in the rational-prices sense.

From this view of market efficiency stems behavioral asset pricing theory (BAPM). BAPM features the market interaction of two groups of traders, namely, information traders and noise traders. Information traders are the ones who decide in accordance with standard CAPM; they are free of cognitive errors and have mean–variance preferences. Noise traders live outside the CAPM, commit cognitive errors, and do not have strict mean–variance preferences.

But, on the other hand, one more piece of evidence that supports efficiency theory is the performance of active fund managers. Many studies have documented the underperformance of mutual fund managers and pension fund managers relative to passive investment strategies. Furthermore, good performance in one year fails to predict good performance the following year, which goes to show, that even investment professional cannot systematically beat the market.

10.2. RATIONALITY

Critics of behavioral finance argue that it does not matter even if some agents in the economy are not rational as long as the “marginal investor,” that is, the investor who is making the specific investment decision at hand, is rational. However, Thaler (1999) argues that the argument has two fundamental problems. First, even if asset prices were set only by rational investors in the aggregate, knowing what individual investors are doing might still be of interest. Second, although the argument is intuitively appealing the evidence points to different reality. Thaler considers a model in which there are two kinds of investors: rational investors (rationals), who behave like agents in economics textbooks, and quasi-rational investors (quasi’s), people who are trying as hard as they can to make good investment decisions but make predictable mistakes. He also assumes two markets, X and Y, which are objectively worth the same amount but cannot be transformed from one into the other. He also assumes that the quasi’s think X is worth more than Y, an opinion that can change in time, while the rationals know that X and Y are worth the same. What conditions are necessary to

assure that the prices of X and Y will be the same, as they would be in a world with only rational investors?

For a market that consists of rational and quasi-rational investors to be efficient following conditions need to be met: first, in dollar-weighted terms, such a market cannot have too many quasi's (in order for the rational investors to be marginal). Second, the market must allow costless short selling (so that if prices get too high, the rationals can drive them down). Third, only rational investors can sell short; otherwise, the quasi's will short Y when the two prices are the same because they believe X is worth more than Y. The result would be no equilibrium. Fourth, at some date T, the true relationship between X and Y must become clear to all investors. Fifth, the rationals must have long horizons, long enough to include date T. That these conditions are tough to meet is clear from the evidence of Royal Dutch/Shell Group and unsuccessful attempt of LTCM to arbitrage away this disparity.

11. SCIENTIFIC REVOLUTION

Kuhn (1962) defines normal science as research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice. Normal science requires the existence of a paradigm. He defines paradigm as some accepted examples of actual scientific practice, examples which include law, theory, application and instrumentation together, which provides models from which spring particular coherent traditions of scientific research. To be accepted as paradigm, a theory must seem better than its competitors, but it does not need to explain all the facts with which it can be confronted. New discoveries lead to paradigm change, but scientists never reject an old paradigm without coming up with a replacement; an alternative must exist for a revolution to take place. When new paradigm attracts most of the next generation of researchers the older school gradually disappears, and, according to Kuhn, researchers who cling to the older view are squeezed out of mainstream science and their work is ignored thereafter.

If we apply Kuhn's view of scientific progress to finance, we would conclude that we could have some of the ingredients needed for scientific revolution. The alternative to the old paradigm exists, a large body of scientists that work in the field of behavioral science also exists. All we need is the modern financial theory to become obsolete. Problem is that the findings of behavioral theory appear to be sensitive to methodology and time-frames. Also, it is not that there is one new theory waiting to replace the old one, rather there is a good number of competing theories, none of which seems to be superior to the others.

In Caldwell (1994) we can find critiques of this Kuhnian linear view. Karl Popper argues that normal research is not prevalent in science, but gradual shifts in paradigms. He rejects the idea that science can be characterized by long periods in which only one paradigm is dominant. He believes that Kuhn errs in claiming that competing paradigms are incommensurable, since that would prohibit rational debate during periods of extraordinary science.

Stephen Toulmin (ibid.) argues that no revolution can be accurately characterized in such a dichotomous manner: continuities always exist. No conceptual change in science is ever absolute, there are only greater or lesser conceptual modifications.

According to this view, we are in the state of two competing paradigms, and the result could be a gradual relaxation of some of the assumptions of modern theory, which would reconcile the existing paradigm with the apparent anomalies, rather than a scientific revolution and a complete disappearance of the 'old school'.

CONCLUSION

In this text I tried to examine the two confronting views on finance. Modern financial theory that represents today's mainstream finance is derived from neoclassical economic theory. It is normative and mathematical. It assumes that people are rational and capable of correctly identifying and maximizing their utility function. It is founded on efficient market hypothesis, capital asset pricing model and expected utility theory.

The main premise of efficient market hypothesis is that prices of securities always reflect all available information about them. The consequence of the market efficiency is that prices of the assets are rational and that they are unpredictable. If the asset is mispriced, rational traders will arbitrage away any deviation from its fundamental value. Capital asset pricing model provides the structure of the ideal portfolio, the one that maximizes returns, for any given risk expectation. Expected utility theory models human behavior from six axioms of preference.

Behavioral finance is critical to many notions of modern theory. It was developed from empirical findings that contradict the prediction of modern theory. This evidence includes obvious mispricing of certain assets. From these findings, models that assume limits to arbitrage were developed. And, since there is overwhelming evidence of mispricing, models alternative to efficient market hypothesis have been developed.

Empirical studies have also established a number of facts that do not conform to the capital asset pricing model. These facts are called anomalies, and since they appear to be the consequence of market irrationality, it is important to establish whether they disappear in the repeated markets. The conclusion of different findings is that although people are capable of learning and do learn, it is not enough for the anomalies to disappear.

Behavioral economists' view of homo economicus is also somewhat different to the classical view. They offer evidence of systematic lapses in rationality. These deviations from rationality stem from limited attention, memory and processing capacities, unconscious association as well as from a tendency to deceive one selves and a lack of self control. A number of non-expected utility theories have been built around these biases. These theories differ from the expected utility theory in that they are descriptive and developed in an inductive way from empirical observations.

Behavioral finance has several crucial implications on investor behavior. Implications include insufficient and naïve diversification of portfolio holdings, excessive trading and errors in selling and buying decisions.

Implications of behavioral finance on corporate finance include decisions about security insurance, capital structure and about investments and dividend payments. The problem of irrationality is assumed to be present with the managers as well.

A battle between “rationalists” and “behavioralists” is fought on two fronts, the battle on market efficiency and the battle on rationality. Strong arguments and counter arguments are found on both sides, and the battle seems to be going towards a compromise, which could include relaxation of some assumptions that are proven to be too stringent, and adoption of some notions of behavioral finance into mainstream theory.

REFERENCES

1. Barber B., Odean T.: Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment. *Quarterly Journal of Economics*, 141 (2001), pp. 261–292.
2. Barber B., Odean T.: Online Investors: Do the Slow Die First?. *Review of Financial Studies*, 15 (2002), pp. 455–487.
3. Barber B., Odean T.: Trading Is Hazardous To Your Wealth: The Common Stock Performance of Individual Investors. *Journal of Finance* 55 (2000), pp. 773–806.
4. Barberis N., Shleifer A., Vishny R.: A Model of Investor Sentiment. *Journal of Financial Economics*, 49 (1998), pp. 307–345.
5. Benartzi S., Thaler R.: Myopic Loss Aversion and the Equity Premium Puzzle. *Quarterly Journal of Economics*, 110(1) (1995), pp. 73–92.
6. Benartzi S., Thaler R.: Naïve Diversification Strategies in Defined Contribution Savings Plans. *American Economic Review*, 91 (2001), pp. 79–98.
7. Bernard V., Thomas J.: Post-earnings announcement drift: delayed price response or risk premium?. *Journal of Accounting Research (Supplement)* (1989), pp. 1–36.
8. Caldwell Bruce: *Beyond Positivism: Economic Methodology in the Twentieth Century*, Routledge, 1994. 279 pages
9. Constantinides G., Harris M., Stulz R. (editors): *Handbook of the Economics of Finance*, Elsevier Science B.V., 2003. 1216 pages
10. Cunningham Lawrence: *Behavioral Finance and Investor Governance*, Social Science Research Network Electronic Paper Collection: Working Paper Series No. 32. (2001) [URL:[http:// law.wlu.edu/clinics/lawreview/issues/ 59-3/Adjusted%20Cunningham2.pdf](http://law.wlu.edu/clinics/lawreview/issues/59-3/Adjusted%20Cunningham2.pdf)] 2.1.2004.
11. Daniel K., Hirshleifer D., Subrahmanyam A.: Investor Psychology and Security Market Under- and Overreactions. *Journal of Finance* 53 (1998), pp. 1839–1885.
12. Daniel K., Hirshleifer D., Subrahmanyam A.: Overconfidence, Arbitrage and Equilibrium Asset Pricing, *Journal of Finance*. 56 (2001), pp. 921–965.
13. De Bondt W., Thaler R.: Does the stock market overreact?. *Journal of Finance*, 40 (1985), pp. 793–808.
14. Fama E., French K.: The Cross-Section of Expected Stock Returns. *Journal of Finance*, 47 (1992), pp. 427–465.
15. Fama E.: Market Efficiency, Long-Term Returns, and Behavioral Finance. *Journal of Financial Economics*, 49 (1998), pp. 283–306.
16. Fama Eugene: *Efficient Capital Markets: II*. *Journal of Finance*, 46:3 (1991), pp.1575-617.
17. Feldstein M., Green J.: Why Do Companies Pay Dividends?. *The American Economic Review*, 73 (1983), pp. 17-30.

18. Frankfurter G., McGoun E.: Anomalies in Finance: What Are They and What Are They Good For?. *International Review of Financial Analysis*, Volume 10 (2001), pp. 407-429.
19. Frankfurter G., Wood B.: Dividend Policy Theories and Their Empirical Tests, *Proceedings of the 6th Conference on Alternative Perspectives on Finance*, Hamburg, 2002, pp. 1- 44.
[URL:<http://www.departments.bucknell.edu/management/apfa/hamburg%20papers.htm>], 15.9.2002.
20. French K., Poterba J.: Investor Diversification and International Equity Markets. *American Economic Review*, 81 (1991), pp. 222–226.
21. Grinblatt M., Keloharju M.: How Distance, Language, and Culture Influence Stockholdings and Trades. *Journal of Finance*, 56 (2001), pp. 1053–1073.
22. Harrison J.M., Kreps D.: Speculative Investor Behavior in a Stock Market with Heterogeneous Expectations. *Quarterly Journal of Economics*, 92 (1978), pp. 323–336.
23. Hirshleifer D.: Investor Psychology and Asset Pricing. *The Journal of Finance*, vol. LVI, NO. 4 (2001), pp. 1533-1597.
24. Ikenberry D., Lakonishok J., Vermaelen T.: Market Underreaction to Open Market Share Repurchases. *Journal of Financial Economics*, 39 (1995), pp. 181-208.
25. Jegadeesh N., Titman S.: Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *Journal of Finance*, 48 (1993), pp. 65-91.
26. Kahneman D., Tversky A.: Judgment Under Uncertainty: Heuristics and Biases. *Science*, 185 (1974), pp. 1124–1131.
27. Kahneman D., Tversky A.: Prospect Theory: An Analysis of Decision Under Risk. *Econometrica*, 47 (1979), pp. 263–291.
28. Kuhn T. S.: *The Structure of Scientific Revolutions*. Chicago: The University of Chicago Press, 1970. 212 pages
29. Landsburg Stephen: *The Armchair Economist*. New York: The Free Press, 1993. 241 pages
30. Lee C., Shleifer A., Thaler R.: Investor Sentiment and the Closed-End Fund Puzzle, NBER Working Paper No.w3465. [www.nber.org/papers/w3465] 2.1.2004
31. Loomes G., Starmer C., Sugden R.: Do Anomalies Disappear in Repeated Markets?, (URL:http://econpapers.hhs.se/article/ejconj/v_3A113_3Ay_3A2003_3Ai_3A486_3Ap_3Ac153-c166.htm), 2.2.2004.
32. Loughran T., Ritter J.: The New Issues Puzzle. *Journal of Finance*, 50 (1995), pp. 23–50.
33. Michaely R., Thaler R., Womack K.: Price Reactions to Dividend Initiations and Omissions: Overreaction or Drift?. *Journal of Finance*, 50 (1995), pp. 573-608.
34. Miller E.: Risk, Uncertainty and Divergence of Opinion. *Journal of Finance*, 32 (1977), pp. 1151–1168.
35. Mitchell M., Stafford E.: Managerial Decisions and Long-Term Stock Price Performance. *Journal of Business*, 73 (2001), pp. 287–329.

36. Miller M., Modigliani F.: Dividend Policy, Growth, and the Valuation of Shares. *Journal of Business*, 34 (1961), pp. 411-33.
37. Mramor D., Lončarski I.: Traditional, Modern and New Approach to Finance, *Proceedings of the 6th Conference on Alternative Perspectives on Finance*, Hamburg, 2002, pp. 1-18.
[URL:<http://www.departments.bucknell.edu/management/apfa/hamburg%20papers.htm>], 15.9.2002.
38. Mullainathan S., Thaler R.: Behavioral Economics, NBER Working Paper Series, Working paper 7948, 2000. [URL: <http://www.nber.org/papers/w7948.html>], 15.8.2003.
39. Odean T.: Do Investors Trade Too Much?. *American Economic Review*, 89 (1999), pp. 1279–1298.
40. Reitz Thomas: The Equity Risk Premium: A Solution, *Journal of Monetary Economics*, 22 (1988), pp. 117-31.
41. Roll R.: The Hubris Hypothesis of Corporate Takeovers. *Journal of Business*, 59(2) (1986), pp. 541–566.
42. Scheinkman J., Xiong W.: Overconfidence and Speculative Bubbles. *Journal of Political Economy*, 111 (2003), pp. 1183-1220.
43. Shefrin H., Statman M.: Explaining Investor Preference for Cash Dividends. *Journal of Financial Economics*, 13 (1984), pp. 253–282.
44. Shefrin H., Statman M.: The Disposition to Sell Winners Too Early and Ride Losers Too Long. *Journal of Finance*, 40 (1985), pp. 777–790.
45. Shiller, R.: Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends?. *American Economic Review*, 71 (1981) 3, pp. 421–436.
46. Shiller R.: From Efficient Market Theory to Behavioral Finance, Cowles Foundation Discussion Paper No. 1385 (2001), pp. 1-43.
47. Shiller Robert: Human Behavior and the Efficiency of the Financial System, *Handbook of Macroeconomics* (John B. Taylor and Michael Woodford, Editors), North-Holland, 1999, 588 pages
48. Shleifer A., Vishny R.: The Limits to Arbitrage, NBER Working Paper 5167, 1995, [URL: <http://papers.nber.org/papers/W5167>], 2.1.2004.
49. Siegel J., Thaler R.: Anomalies, the Equity Premium Puzzle. *Journal of Economic Perspectives*, 11, (1997) 1, pp. 191-200.
50. Siegel J.: The Equity Premium: Stock and Bond Returns Since 1802. *Financial Analysts Journal*, 48 (1992) 1, pp. 28-38.
51. Starmer Chris: Developments in Non-Expected Utility Theory: The Hunt for a Descriptive Theory of Choice under Risk. *Journal of Economic Literature*, XXXVIII (2000) pp. 332–382.
52. Statman M.: Behavioral Finance: Past Battles and Future Engagements. *Financial Analysts Journal*, 2000, pp. 11-27.

53. Stein J.: Rational capital budgeting in an irrational world. *Journal of Business*, 69 (1996), pp. 429–455.
54. Stracca Livo: Behavioural Finance And Aggregate Market Behaviour: Where Do We Stand?, European Central Bank working paper n.129 (2002) [URL:<http://www.le.ac.uk/economics/research/RePEc/lec/leecon/econ02-10.pdf>], 2.1.2004
55. Thaler R.: The End of Behavioral Finance, Association for Investment Management and Research, (1999), pp. 12-17 [URL:<http://bwww.uchicago.edu/fac/richard.thaler/research/end.pdf>], 2.1.2004.
56. Tversky A., Kahneman D.: Availability: A Heuristic For Judging Frequency and Probability. *Cognitive Psychology* 5 (1973), pp. 207-232.

POVZETEK DIPLOMSKEGA DELA

V razvoju finančne teorije ločimo tri faze: tradicionalno finančno teorijo, sodobno finančno teorijo in bihevioristične finance, pri čemer sodobna finančna teorija še vedno prevladuje v "mainstream" financah. V diplomski nalogi primerjam dve teoriji; sodobno in bihevioristično in poskušam ugotoviti, kakšne so možnosti da pride do spremembe prevladajoče paradigme.

Eden od temeljev sodobne finančne teorije je hipoteza o učinkovitem trgu. Glavna predpostavka teorije je, da cene vrednostnih papirjev vedno odražajo vse dostopne informacije o teh papirjih. Iz te predpostavke izhaja, da so cene enake vrednostim, oziroma da ne obstajajo precenjeni in podcenjeni papirji in da so cene nepredvidljive oziroma da ni mogoče predvideti prihodnja gibanja cen na podlagi javno dostopnih informacij.

Moderna finančna teorija predvideva da v primeru napačnih cenitev vrednostih papirjev, racionalni agenti z arbitražo znižajo cene na temeljno vrednost. Obstaja več člankov, ki dokazujejo meje arbitraže in trdijo, da trg ni učinkovit. Na podlagi teh dokazov so razviti modeli, ki vključujejo bihevioristične fenomene kot alternativo hipotezi o učinkovitem trgu.

Drugi temelj sodobne finančne teorije je CAPM model ceno vrednostnih papirjev. CAPM omogoča vlagateljem alokacijo resursov, s katero maksimizirajo donose pri dani stopnji tveganja. Razlike med portfelji posameznih vlagateljev odražajo različne stopnje averzije do tveganja, z različnim deleži netveganih vrednostnih papirjev. Po drugi strani so empirične študije odkrile veliko število dejstev, ki se ne skladajo s CAPM modelom. Ta dejstva imenujemo anomalije.

Pri anomalijah se postavlja vprašanje, ali te s časom izginejo, glede na čedalje večje znanje udeležencev na danem trgu. Loomes, Starmer in Sugden (2001) ugotavljajo, da agenti na ponavljajočih se dražbah prilagajajo svoje ponudbe glede na cene v predhodnih obdobjih oziroma da so njihove preference odvisne od tržnih aktivnosti.

Standardna ekonomska teorija predpostavlja, da so ekonomski agenti sposobni korektno identificirati in maksimizirati svoje funkcije koristnosti in da imajo neomejene zmožnosti procesiranja informacij.

V zadnjih tridesetih letih so se pojavili mnogi dokazi sistematične pristranskosti v sklepanju ljudi, ki nasprotujejo klasičnemu videnju "homo economicus". Hirshleifer je razdelil te spodrsaljake v sklepanju v tri kategorije: heuristično poenostavljenje, samoiluzijo in čustveno izgubo kontrole. Heuristično poenostavljenje je posledica omejene pozornosti ter omejenega

spomina in zmogljivosti za obdelavo informacij. Samoiluzija je posledica napačne ocenitve lastnega notranjega stanja. Tretja kategorija je posledica čustev in težav s samokontrolo, ki omejujejo racionalnost ljudi.

Teorija pričakovane koristnosti je prevladovala v finančni teoriji v zadnjih petdesetih letih. Model človekovega vedenja je izveden iz šestih aksiomov o preferencah. Mnoge empirične študije so v zadnjih petdesetih letih odkrile veliko število modelov obnašanja, ki so neskladni s teorijo pričakovane koristnosti.

Najbolj znana od alternativnih teorij je teorija vidikov (prospect theory). Poleg tega so razviti še "feedback" modeli in modeli, ki temeljijo na prepričanju (belief-based models), v različicah z javnimi in zasebnimi informacijami in institucionalnimi trenji.

Posledice biheviorističnega pogleda na obnašanje vlagateljev je nezadostna in naivna diverzifikacija ter pretirano trgovanje in napačne odločitve o prodaji in nakupih vrednostnih papirjev.

Posledice na poslovne finance predvidevajo, da bi menedžerji izdajali delnice, ko so te precenjene in jih kupovali, ko so podcenjene. Empirični dokazi potrjujejo tak pogled. Ker so študije pokazale, da imajo ljudje raje dividende kot kapitalske dobičke, bi pričakovali tudi menedžerske preference za dividendami. Študije kažejo, da menedžerji res verjamejo, da stabilne dividende zmanjšujejo negativne reakcije investorjev. In ne nazadnje, lahko pričakujemo, da če so vlagatelji neracionalni, so lahko tudi menadžerji takšni. Z menedžersko neracionalnostjo se pogosto razlagajo prevzemi podjetij.

Na drugi strani so številni kritiki biheviorističnih financ. Eugene Fama (1998) meni, da je tržna učinkovitost preživela izziv literature o anomalijah. Svojo trditev utemeljuje z dejstvom, da je pojav anomalij posledica metodologije obdelave podatkov ter da anomalije izginejo, če se spremeni metodeologija.

Zaključimo lahko da boj med predstavniki sodobne in bihevioristične finančne teorije poteka na dveh področjih; boj za tržno učinkovitost in boj za racionalnost. Močni argumenti in protiargumenti obstajajo na obeh straneh in zdi se, da se bo končalo s kompromisom, ki bi lahko pomenil sprostitev nekaterih predpostavk sodobne finančne teorije, ki so dokazano pretirano stroge, in sprejemanje nekaterih idej biheviorističnih financ.