



A literature review on

Behavioral biases in corporate financial decision making

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Chapter 1 Introduction

Since the past two decades, researchers have found some financial market phenomena that cannot be explained by traditional finance. After that, the validity of traditional finance started to be questioned. In traditional finance, three basic models are 1. Behaviors are assumed rational, 2. Capital asset pricing model shows the way how the price is set, and 3. Capital market is efficient. Price is the sign which reflects all the information needed in the market. This is also known as efficient market hypothesis (EMH) in literature. However, empirical evidences prove that these models are simplest and incomplete. In Shleifer and Summers's (1990) paper, the noise trader approach to finance, shows that noise trader can get incomplete information and act on it, and it will cause prices and their equilibrium value have some difference, which proves irrational behaviors do exist in the market. The paper also argues that security prices do not merely respond to information but also to "*changes in expectation or sentiments that are not fully justified by information*" (p. 23), which asserts that EMH is not realistic. Market anomalies and volatility of market price take the traditional finance into the dilemma. The main reason of these "Gordian knots" can be imputed to that behavioral biases are not taken into consideration in the traditional finance.

Behavioral Finance, a new paradigm in finance field, explains financial problems from psychology perspective. In psychology, human behavior has some deviation in judgment under a particular situation, especially when the condition is uncertain. The patterns of deviation are known as behavioral biases. Economic researches believe that behavioral biases can affect investors' decision making in corporate finance. In Rabin's (1996) paper, Psychology and Economics, he discusses a selection of psychological findings relevant to economics. The paper studies biases in judgment when the situation is uncertain, since people may make systematic errors in attempts to maximize their reference under the impact of biases. Shefrin (2001) defines behavioral finance is "*the study of how psychology affects financial decision making and financial market*". In the research of Barber and Odean (1999), The Courage of Misguided Convictions, they go a step further to expound the relationship between behavioral biases and financial decision making. They claim that "*behavioral finance relaxes the traditional assumptions of financial economics by incorporating these observable, systematic, and very*

human departures from rationality into standard models of financial market” (p. 1). These papers are the sign that behavioral finance plays a major role in contemporary finance.

Behavioral biases can be expressed in various forms: overconfidence, loss aversion, familiarity, etc. Every behavioral bias has a different effect on corporate financial decision making. Researchers in behavioral finance have made much effort to study how these biases affect financial decision making. Baker and Wurgler (2006) study the impact of behavioral biases on the stock market. Barberis (2003) uses behavioral finance to explain the equity premium puzzle and the volatility puzzle. However, most publications focus on the specific financial problem.

The purpose of this thesis is to answer the question: how do behavioral biases affect the corporate financial decision making? The thesis will study all the most important behavioral biases in the financial market, and show how these biases affect the financial decision making from the different category. For investors (employer), studying the main question of this paper will help them to understand what common mistakes they can make when dealing with the risky situation. For corporations, they can monitor their employees well and maximize the profit of the company. Also for the market, the development tendency can be easily forecasted.

The thesis is constructed in the following manner. In the chapter 2, the thesis is going to discuss the behavioral biases. The main point is focused on types of behavioral biases and their form of presentation. After that, the thesis will emphasize on the chapter 3, which is about the effect of these biases on the corporate financial decision making. This part will be divided into three categories: investors, corporation and market. These different aspects will summarize all the effect of behavioral biases on the financial market. In the chapter 4, the thesis is searching for the potential solution for these behavioral biases. In the last chapter, chapter 5, the conclusion will be drawn.

Chapter 2: Behavioral biases

Economics paradigm in the traditional finance assumes that individual is rational. They have stable preference and always try to maximize their profit. However, the fact is not. Some evidences show that people sometimes behaved irrationally, which is the result of behavioral biases. Before studying how behavioral biases affect individual on corporate financial decision making, we first look at the behavioral biases in detail.

In psychology, behavioral biases are the pattern of deviation in judgment which occurs in a particular situation, especially when the condition is uncertain. In other words, behavioral biases are a tendency that a human would make some systematic error in a certain circumstance based on cognitive factor rather than evidence. Biases can result from many perspectives. Rabin. M (1996) attributes biases to *“a person’s preferences which are determined by changes in outcomes relative to her reference level, and not merely by absolute levels of outcomes. In particular, relative to their status quo, people dislike losses significantly more than they like.”* (p. 1)

Behavioral biases can be divided into two main categories: cognitive biases and emotional biases. Both of them have the similar effect, but emotional biases cause the distortion in decision making due to emotional factors, such as fear, worried, etc. behavioral biases takes many patterns, each form has their own representative and effect on financial decision making. Some of these patterns are mentioned below:

Heuristics

Heuristic, as known as a rule of thumb, is a way refers to problem solving, learning and discovery. Heuristics used by most managers because they speed up the process to find a solution when situation is extremely complicated. Schwartz mentions that *“heuristics are shortcuts that simplify the complex methods of assessing the probabilities and values ordinarily required to make judgments, and eliminate the need for extensive calculation”* (2010, p.57)

Heuristics can make the decision-making much easier. There are many situations that investors would like using heuristic to solve problems. For example: firstly, when an investor is unaware of the optional method for the problem, even though the ideal solution does exist. Moreover, the

investor does not have a resource to get help from others or it is too costly to get help from others. Secondly, it is hard for investors to obtain sufficient information for solving the problem, or maybe the time is limited for investors to make a decision. Thirdly, an investor may be not familiar with programs to process the data. Moreover, the emotional features of the decision might be overwhelming.

Heuristic sometimes can be a powerful tool to find the solution. However, when it was used in the wrong situation, it may cause investors to make systematic mental mistakes (Fuller, 2000).

Overconfidence

Overconfidence is the tendency that people overestimate their ability. Shefrin (2007) mentions overconfidence “*pertains to how well people understand their own abilities and limits of their knowledge*” (p.6). In general, people always place too much weight on their efforts, knowledge and skills, especially when the confidence level is very high.

There are several ways for overconfidence to manifest itself. One example mentioned in the Shefrin’s work is that there are above 65 and 80 percent people rate themselves above average (defines as the median) when they were asked the question “relative to all the people you work with, how you would rate yourself as a driver?” This implies that “*when it comes to difficult and challenging tasks, most people are overconfidence about their own ability and their own knowledge*” (2001, p. 3).

Overconfidence level can change by gender as well. Barber and Odean (2001) test this prediction by partitioning investors on gender. They use account data from a large discount brokerage and analyze the activities of men and women in these investments from February 1991 through January 1997. The result shows that in the finance area, men tend to be more overconfidence than women.

Familiarity bias

Familiarity is the tendency that people believe in and prefer things that they are familiar with. Familiarity bias in the study of Shefrin (2007) suggests that “*People’s ability to see events as*

likely to happen depend on how they recall specific past information associated with that event' (Chira, Adams and Thornton, 2008, p.13). Imagine that you are asked to buy stocks of a company you know well, and you worked there or you are a long-term customer, or choose to purchase a company's stock you never heard of or located in another country. Most investors would like to invest their money in the familiar company, because they think of the companies they are not familiar are riskier. Simply speaking, investors like to invest something they know. However, the market does not reward investors with risk premium for "loyalty" or "familiarity".

Loss aversion

Loss aversion, which is also known as prospect theory, is the tendency that an individual has stronger desire to avoid losses than experience comparable gains (Tversky and Kahneman, 1979a). Loss aversion implies how investors make their choices between two alternatives involve risk. Empirical evidence suggests that, for investors, loss weighted almost about twice as heavily as gains.

Decision making can also be sensitive to the way how alternatives expressed. Usually, investors could try to avoid negative choice. For example, if an investor has to make a decision between a sure loss of 7500 and a 75 percent chance of losing 10,000 and 25 percent chance of losing anything. Most investors will choose the latter one. *"Because investors hate to lose, the uncertain choice holds out the hope that they will not have to lose"* (Shefrin, 2001, p.115).

Hindsight bias

In looking backward at the market loss, investors can exhibit what would be called selective recall. With the benefit of the selective recall, past event seems obvious. Investors generally forgot all of thoughts and feelings at that time, and only focused on the few things that eventually matter. In this way, investors feel that past events seem extremely easy to predict than it were. This is what we called hindsight bias. Hindsight bias may damage people's foresight, because it makes people wrongly expect that the future can be predict easily too.

In the research of Nester and Egloff (2009), they claim that hindsight bias is consisted by three components: impressions of inevitability, impression of foresee ability, and memory distortion.

The first component happens in when people is able to identify apparent causes of the event's occurrence. If the causes are easily explained, the likelihood of hindsight bias will increase. The second component engages that the future is foreseeable if there is no surprise associated with the event that occurred. Otherwise, the hindsight bias will be avoided if the event is surprising and forecaster finds no apparent clauses for it. The third process, memory distortion, is people forgot what their original forecast was and assumed their forecast was almost right than in actuality (Goodwin, 2010).

Confirmation bias

Confirmation bias is the tendency that investor prefer to interpret the information in the way that confirms their preconceptions and try to avoid the interpretation that contradict their beliefs (Shefrin, 2007). As a result, investor recalls the information selectively from their memory and use information to interpret evidences in a biased way.

Confirmation biases can be specified to three types: biased search for information, biased interpretation and biased memory. All three types of biases have a similar effect: trying to find the evidence to confirm their original beliefs. Nickerson (1998) states in his research that *“beyond seeking information that is supportive of an existing hypothesis or belief, it appears that people of then tend to seek only, or primarily, information that will support that hypothesis or belief in a particular way”* (p. 3).

Many empirical evidences suggest that confirmation biases affect people's decision making extensively. In investing, investors would like to look for the information that confirm their original idea and avoid the opposite information. However, this one-side information can only let investor see a small part of the whole situation in the market, and lead to a wrong decision making.

Anchoring

“In many situations, people make their estimates by starting from an initial value that is adjusted to yield the final answer. The initial value may be suggested by the formulation of the problem or the result of a partial computation. That is, different starting points yield different estimates,

which are biases toward the initial value. We call this the phenomenon anchoring” (Tversky and Kahneman, 1974, p.1129).

Many studies show that anchoring has an extensive impact on people’s decision making process, and the domain it affects is so broad, such as probability estimates, legal judgment, valuations, purchasing decision and etc. McElory and Dowd (2007) make the research estimate the length of the Mississippi river; Plous (1989)’s likelihood estimates of nuclear war. These research findings show anchoring effect is really strong.

The types of anchors can be diversified. Different context can generate different anchoring effect. The research finding of Epley and Gilovich (2001, 2005) demonstrates that the adjustment process plays a role when the anchor values are self-generated. Where participants adjust from the value they know to the right answer. Some other empirical findings show informational relevance can also play a role in affecting people’s susceptibility to the anchoring effect. For example, in the legal domain, higher damage awards are obtained when higher compensations are questions are required in court (Hastie et al., 1999; Marti and Wissler, 2000). However, some research has found out anchor values also yield an effect in judgmental decision. For example, the anchoring-and- judgment was first introduced by Tversky and Kahneman (1974). Mussweiler and Strack demonstrate that difference between high and low anchors occurred only with anchor values within the range of plausible answer but not for the implausible or extreme ones. Wegner et al (2001) propose a new perspective on anchoring based on the process of attitude change. We can see from the above that when the mechanism or context changed, the anchoring can be changed as well. (Furnham and Boo, 2011)

Mental accounting

Some literatures demonstrate that *“people use “mental account” in multi-attribute decision situations, wherein individuals form separate, psychological accounts and use them to evaluate events or options”* (Moon, et al, 1997, p.145). This is what we called mental accounting bias.

Many researchers try to prove the impact of mental accounting on decision making. Tversky and Kahneman (1981)’s experimental evidence, which is about purchase of a jacket and a calculator

at the same store, with discount on calculate at alternative store, exhibits that people make their purchasing decision not only focus how much absolute money they can save, but also the saving money related to the original price of the specific item. Later, the result from experiments of Mowen and Mowen (1986), Ranyard and Abde-Nabi (1993) all show that people's decision can be affected strongly by mental accounting.

There is no exemption for people to make a decision in finance filed. Mental accounting can be the explanation of some "anomalies" in the capital market. We will explore this in detail in chapter 3.

Regret avoidance

We can hear investors always say they have learnt from their mistakes all the time. By making decisions based on speculation, investors are setting themselves up from regret and biases are trying to avoid whatever causes those regrets. Regret avoidance is based on the idea counterfactual thoughts that lead to regret. For example, "If only I had not made the decision to buy that stock or fund when it went down" this is a counterfactual, because literally it counter the fact.

With regret avoidance, people tend to focus on the poor outcome and blame the decision that guides them there. A bad decision is driving too fast. Bad outcome for investor sometime means the loss in their stock portfolio, but that does not mean the decision drive the stock itself is necessarily bad, because sometime investor can avoid bad decisions but they may realize they cannot avoid bad outcome. If investors can analyze the market situation careful, adjust their portfolio and never make decisions based on speculation, they may eliminate the effect of regret.

Besides the biases we talked above, there are still many behavioral biases affect investors' decision making. Only when investors know well what kind of mistake they may make during the decision making process, they can make a better decision for the result. In the next chapter, we are going to explore how these behavioral biases affect investors' financial decision making by examples.

Chapter 3 the effect of behavioral biases in financial decision making

Many researches of behavioral finance show that behavioral biases affect investors when they make financial decisions. These effects affect not only small investors, but also for those experts who study finance for a long time. Market “anomalies”, which cannot be explained by traditional finance, seem find their reasonable explanations from the perspective of behavioral finance. In this chapter, we are going to look at the effect of behavioral biases from several categories: Investors, corporation and market.

Investors

Most finance economists think there are two types of investors in the market: arbitrageurs and noise trader. Arbitrageurs are assumed to be fully rational, but noise traders are defined investors who are subjected to systematical biases. De Long (1989) talks that noise trader usually do not take economics’ suggestion to buy or hold the market portfolio. Instead, they would like to pick stock through their own research. However, they fail to diversify their portfolio finally, because irrational act or biases can have an impact on their decision making procedure. The following is going to show some examples that how the behavioral biases affect investors.

Overconfidence is a main factor that affects investors’ financial decision making. The main performance of overconfidence is that investors are overconfident about their ability, knowledge and under estimate risks. In the research of Kyle and Wang (1997), they find out that *“overconfident traders might earn higher expected profits or have higher expected utility than rational traders as overconfidence works like a commitment device to aggressive trading”*(Baker and Nofsinger, 2010, p.250). However, the advantage of high profit of overconfidence investor can be attributed to the first mover. The trading volume in the market is predicted to be high when there are many overconfident investors.

Base on the rational portfolio theory, investor should pay more attention to the expected utility of a portfolio rather than a specific component in the portfolio (Von Neumann and Morgenstern, 1947 and Savage, 1954). However, there is a tendency that investor split up their investment into safe account, which is used to guarantee their lowest wealth level. Investors who make a decision in this way mostly are affected by mental accounting. This can also explain why there are some

mutual fund companies recommend constructing portfolio that contains “*cash in the bottom layer, bonds in the middle layer, and stock in the top layer*” (Rockenbach, 2002, p.514).

Some researches show that investor pay attention to a specific price. Benartzi and Thaler (1995) argue that this specific price is the price that investors compare to the current stock price. Most investors prefer to take the purchase price of security as their specific price, which is known as a reference point. Investors usually wait until the price of stock arrives at the reference point, then they can start to trade. This kind of investors is affected by the anchoring bias (Baker and Nofsinger, 2002).

Investor is not the only one that suffers the impact of behavioral bias since they are the main component of the market. The whole capital market will be affected by the behavioral bias when most investors in the capital market cannot make rational financial decision. The example will be given in the later section.

Corporation

Behavioral biases affect not only investors’ decisions, but also the decision of a corporation. Corporation is a type of organization, which is defined by March and Simon (1993) as a “*system of coordinated action among individuals and groups whose preferences, information, interests or knowledge differ*” (p.2). In corporations, firstly, managers play an important role. They organize the business run into the right track. So how managers make their financial decision can affect the development of the corporation directly. Secondly, shareholder’s profit is important, how a corporation set their financial decision can always affect shareholders’ welfare. On the contrast, shareholder, bondholders, management, suppliers, customers, etc are a part of corporation, how they behave can also affect company’s decision making.

Managers

As a manager in a corporation, the financial decision they made must be best for the firm to grow. However, even for those managers who are experts in the decision making and afford the responsibility for the development of a corporation, the effect of behavioral biases still is inevitable. Managers’ decision making procedure still can be influenced by their behavioral biases. We called it managerial biases when this situation happens. In the study of Malmendier

and Tate (2002), They use the data form Forbes 500 companies to test the overconfidence CEO hypothesis and they find out that most CEOs are suffered from overconfidence, and this is strongly affected the decision of corporate investment. The paper explains the relationship between *“investment level and cash flow levels is the tension between the overconfidence of the CEO and market valuation”* (p.2). After three main steps test, they concluded that *“overconfidence has high explanatory power for the sensitivity of investment to cash flow”* (p. 35). The following two examples also demonstrate that managers’ decisions are affected by the behavioral biases. Both of them are from the research of Shefrin (2001).

In March 1961, Masaru Ibuka and Akil Morita, the founders of Sony, attended a trade show in New York. While there, they saw a television screen with the special sharp and brightest image that they had never seen. The color tube was called the Chromatron. This screen was belonged to Autometric Laboratory, small subsidiary of Paramount Pictures. Sony Company wanted to introduce this technology into its product. Morita negotiated a technical license to make this product, color tube. Ibuka lead to develop a prototype. By September 1964 Ibuka’s team had a satisfactory result in the prototype but not in the commercially viable manufacture process.

Ibuka had both the optimistic and confidence. At that time, he had the product announced and invested in a new facility to house the Chromatron assembly. He thought Chromatron could be their top priority, so he place 150 people on the product line.

The cost of the Chromatron color television was more than double the retail price of the product. The sharp difference makes Morita wanted to terminate the product project. However, Ibuka refused. In November 1966, finance manager of Sony announced that Sony was “close to ruin”. Then Ibuka agreed to stop the project.

There are at least two-overconfidence and loss aversion behavioral biases that affect Ibuka such expert when he made his decision. Overconfidence made him stick to his belief that Chromatron color television would be a success at the end. So he started to invest many labor and finance resource. Loss aversion bias drove him to keep the project even if the cost was much higher than the price.

Another case is about Syntex Corporation, a pharmaceutical corporation registered in Panama in 1944. In 1977, Gabriel Garay, a senior Syntex researcher, created a team to make new drug,

Enprostil. The drug was used to turn off stomach acid and thereby heal stomach ulcers. In 1978, Syntex won a patent on the compound.

The potential market for enprostil was large. The products help company to yield billions in sales. In the 1980s, it took the company eight years to bring the new drug from a chemist's bench to a pharmacist's shelf. After the company had invested in the research of enprostil, evidence began to show the side-effect of the enprostil. An internal Syntex memo warned that the enprostil may provoke fatal. The former executives of Syntex stated, the result was that the company "*failed to pull the plug early enough on weak products, for example, it poured more than 100 dollar million into the anti-ulcer drug enprostil in the late 1980s before shelving it*" (Shefrin, 2001, p. 8).

From this case, it is reasonable to speculate that loss aversion is the reason why Gabriel Garary did not want to terminate the project. However, this is not the truth. The person who should be responsible to terminate the project was John Fried, who was the vice chairman of the corporation and the president of Syntex research division. The initial memo from the laboratory had ordered to be rewritten by him.

In 1985, Syntex had a new drug application for enprostil pending with the food and drug administration. The company had invested a lot in enprostil and it continued to do so. In 1987, the enprostil was reported that the mechanism was discovered in the drug. This mechanism can cause some serious problems in veins and arteries, so it may cause heart attack to patients. In court, Fried admitted that the project did not make any progress; instead, the project was going around in the circle.

Fried repeatedly dismissed unfavorable study report on enprostil is a performance of confirmation bias. He looked for the information that can confirm his belief that their project would be success finally, and was trying to avoid the information opposite. Overconfidence and loss aversion also play a role in his decision making process. He over believe that the project would be a success and scared to loss what they had, these biases lead him go to the failure.

Dividend policy

In the Modigliani-Miller (MM) theory, the starting point in the traditional finance, states that corporation structure and dividend policy are not affected by the corporation's operation or its market value under the condition that no transaction cost, tax or other frictions. However, the assumption of MM theory is not realistic. In practice, taxes, transaction cost and other friction do exist, so they can affect the financial decision of the corporation. Besides, shareholders have different preference of the dividend distribution; their preference can influence the policy. From the behavioral biases perspective, it may explain the "dividend puzzle" (De Bondt and Thaler, 1995).

In the early paper of Black (1976), he uses the term "dividend puzzle" to show the poor understanding of dividend policy. Theoretically, shareholders are supposed to have no cash dividends when dividends are taxed at a higher rate than capital gain. Instead, in reality, shareholders complained a lot when dividends are cut. Concerned about this puzzle, there are some economists try to give a rational explanation. In the book of Baker and Nofsinger (2010), it mentions "*dividend may be an optimal way to reduce transaction costs to shareholders in managing their funds*" and "*distributing dividends might be an appropriate way to encourage investment*" (p.437). It is still under discussion that whether rational theories can explain this puzzle.

Shefrin and Stateman (1984) offer a new explanation from behavioral biases perspective. They believe that mental accounting and self-control is the reasonable explanation for this puzzle. Mental accounting can be explained that "*dividends can be saved as a separated gain when the stock price rises and used as a silver lining if the price drops*" (De Bondt and Thaler, 1995, p.16). Self-control can be explained that investors want the dividends. They would like to control their own money and resist dipping into capital. By adding the human psychology into consideration, dividend puzzle seems find its reasonable reason. It demonstrated that a corporation should pay careful attention on human behavior.

Mergers & Acquisitions

Theoretically, a merger between an acquiring firm and a target firm is to achieve the synergies. So when the synergy is positive, acquiring firm could go for it. Moreover, in the tradition principles of Mergers and acquisitions, prices in the market are efficient. There is no difference for a corporation to use cash or stock for acquisition.

However, some evidences in fact show that managers in corporation do suffer the effect of biases. Most of them are overconfidence or optimistic about the decision they make. Shefrin (2007) also mentions that *“firms whose executives qualify as excessively optimistic and overconfident are 65% more likely to have completed an acquisition than firm whose executives do not so qualify. Overconfidence executives press on with an acquisition, even when the reaction in the market is negative”* (p.162).

McKinsey and Co (2005) find that there is 70% of the cases that managers intend to acquire corporation operating in different industry since they are overconfident about the synergy from the diversifying mergers. The poor assumptions that managers could make and too optimism about the opportunity on cross-selling are also the reason that managers overestimate the synergy, McKinsey pointed. (Shefrin, 2007)

Shefrin (2007) claims that the heuristic influence managers when they are making a decision of M&A. *“Some managers base their acquisition decision on intuitive judgment; try to do some particular deals no matter what. These managers either fail to undertake formal valuations or else weak the numbers to support the decision that they wish to make”* (p.164)

Paying by cash or stock could be matter when managers are excessive optimism and overconfident. Shefrin (2007) analyzes this case in the situation when the manager of the acquiring firm is overconfident, but the manager of the target firm is rational. He finds out that the value of the acquiring firm and the amount of synergy will be overestimated since the manager is overconfident. As a result of that, they will overpay for an acquisition. During this process, there might be a dilution cost appear. What the overconfident manager has to concern is the synergy is excess the dilution cost. Otherwise, the acquisition may not occur. Meanwhile, if the payment is by cash, overconfident managers perceive no dilution cost, they do if the payment is stock.

Capital budgeting

Capital budgeting can be an important step in the success of a project of a corporation since it helps the corporation to decide a new investment is worth. During the capital budgeting process, the set and size of a corporation's real asset is relevant, the cash flow it generated can determine the profit and value of the project.

There are several methods for a manager to use in capital budgeting. Such as profitability index, accounting rate of rate. However, the most common method is Net Present Value (NPV). No matter which methods corporations take, their investments decision should get benefit for their shareholders.

In Net Present Value method, manager can assess the expected value they get from the project. Generally, managers would accept the positive result and reject the negative result. However, this process greatly affected by the expectation of future cash flow, so having a correct future cash flow expectation is critical to making the right decision. Expectation of future cash flow is very subjective process since it comes from manager's prediction. The behavioral biases effect is inevitable.

Overconfidence can be the main effect in this process. Studies find that individuals are overconfidence that they tend to overestimate the precision of their ability and information (Fischhoff, Slovic, and Lichtenstein, 1977; Alpert and Raiffa, 1982). In fact, research of Russo and Schoemaker (1992) shows that manager tends to have deeply rooted overconfidence in their beliefs and practices. In their paper, they also explore the cognitive factors that cause overconfidence. The main reason is that it is difficult for people to image all the ways that events can unfold. This is called availability bias. *"Because we fail to envision important pathways in the complex net of future events, we become unduly confident about predictions bases on the fewer pathways we actually do consider"*(p.11). Second factor is anchoring bias, which can be explained that we give our best guess before we give a ballpark range or confidence interval. Third factor is confirmation bias. Manager always look for the information to support their idea, unfortunately, when the condition is uncertain and decision is more complex, it is easier to find one side support.

From the perspective of capital budgeting, there are some ways to explain why the manager to be overconfidence in general. In the study of Gervais (2009), he claimed first, capital budgeting is complex process and condition in the process is uncertain. Second, “*capital budgeting decisions are not well suited for learning*” (p. 2). Third, “*unsuccessful managers are less likely to retain their jobs and be promoted; those who succeeded may become overconfident because of a self-attribution bias*” (p. 2).

There are still some corporation situation that cannot be explained by traditional finance, for instance, dividend smoothing, stock dividend, and so on. However, if taking human behavioral biases into consideration, it can help economist to find a reasonable explanation.

Market

The appearance of market anomalies starts to shake the position of Efficient Market Hypothesis. The market is not efficient as economists used to think in the traditional finance. Investors' irrational financial decision can change situation of the whole capital market that it is supposed to have in EMH. In this section, the paper is going to talk about some applications of behavioral finance on the capital market.

Capital structure

Capital structure has been a controversial problem in finance recently. There are many approaches that comprised the theory of capital structure. Nevertheless, in practice, some phenomenon cannot be explained by theories. Those theories mostly are based on the traditional classical theory, which is rational assumption. Anomaly leads some researchers start to find other solution, and they found that the human factor maybe the way to solve those issues.

Baker, Ruback and Wurgler (2004) claim their research on behavioral finance can be divided into two approaches: the irrational investors and irrational managers. The first state of approach is irrational investors and rational manager. Irrational investors make the wrong decisions which can affect the securities' price. However, rational manager can recognize the mispricing and take advantage of irrational investors. Since manager gets more information than investors does, it is easy for managers to identify the mispricing. We can attribute this to asymmetry information. The determinant of capital structure (market timing) can be the application of this state. Since the

rational managers have sufficient information, when the price much higher than it is true value, manager can take the opportunity to issues new stocks. (Vasiliou and Daskalakis)

The second approach is irrational manager and rational investors. Within this stage, managers are assumed to be overconfidence. They are over optimism about the firm's asset and investment opportunity. Baker, Ruback and Wurgler (2004) assert that overconfidence manager would never issue new stock since the investors are rational and the capital market is efficient. The capital structure decision will focus on the internal fund and debt. (Vasiliou and Daskalakis)

Baker and Wurgler (2002) state that market timing can be the determinant of capital structure. In the finance, market timing *"refers to the practice of issuing shares at high prices and repurchasing at low price"* (p. 5). In other word, market timing is to buy or sell the financial asset at a favorable time. Barberis and Thaler (2002) also study market timing in their behavioral finance research. They conclude that the success framework on market timing may be the basis of a successful theory of capital structure. Their paper also shows that irrational investors do affect financing decision.

The useful of market timing does support that the market is not efficient. It also threatens to the traditional finance theory. When investors make irrational decisions, it can lead the anomalies appeared in the capital market. Capital structure could be a good example. Accumulate anomalies which caused by many irrational investors, lead the researches start to looking for the solution from human factors.

Initial Public Offering

Initial public offering is a crucial step for a company especially for those small young companies. It is companies start to offer stocks or bond to the public to expand their capital finance. However, there are some evidences show that the share price of IPO firms is under priced at the first day, which means there is a significant difference between the offer price and price sold at the closing-end market. Under-pricing of IPO has been seen as an anomaly and studied by a large of economists for many years.

Underpricing of IPO happened *"when companies is going to public the shares they tend to sell is underpriced, in that the share price jumps substantially on the first day of trading"*(Ljungqvist,

2006, p. 1). As a result, it is quite costly to the owners of IPO Company since *“shares sold for personal accounts are sold at too low a price, while the value of shares retained after the IPO is diluted”* (Ljungqvist, 2006, p. 1). It causes a situation that *“money left on the table”* for IPO company.

Many economists try to explain the situation in a reasonable way. Some researchers doubt about the information asymmetry, some researchers studied from the perspective of risk of lawsuits, some stand at the ownership and control's point to observe the whole case. As a consequence, some researchers suggest that behavioral biases might be the better explanation for the IPO under-pricing. From the behavioral explanations' perspective, many economists assume that *“either the appearance of irrational investors who bid up the price of IPO shares beyond true value, or that issuers are subject to behavioral biases and fail to put pressure on the underwriting banks have under-pricing reduced”*. (p. 57).

Ljungqvist, Nanda, and Sing (2004) think that investors are not rational. They assume that some investors overoptimistic about the future prospects of the IPO companies. However, from the issuers' perspective, why do those issuers never mind putting their money on the table? Loughran and Ritter study the puzzle in 2000. They propose the prospect theory (Loss aversion) to explain the situation. In their paper, why issuers do not get upset about leaving money on the table in IPO, it remarks: *“the theory assumes that issuers care about the change of their wealth, rather than the level of wealth”* (p.2). So in the case of under pricing of IPO, the theory can help to predict that *“issuers will sum the wealth loss from leaving money on the table with the large wealth gain from a price jump, producing a net increase in wealth for pre-issued shareholders”*(Lijungqvist,2006, p. 2).

According to the paper of Loughran and Ritter (2000), underwriters would like to choose a lower offer price because the investment bankers can get some benefits: they can find buyer for IPO easier, and it reduces the marketing cost; investors can improve their priority for being allocated in hot IPO by engaging in rent-seeking behavior.

Most “Gordian Knot” that cannot be explained by traditional finance, as we can see from the examples above, have their reasonable explanation in the view of behavioral finance. They also show that the effect of behavioral biases exist not only on the individual investor but also on the whole capital market. As Baker and Nofsinger (2010) mention in their textbook, it is always hard to prove that people are entirely rational no matter from theoretical or empirical perspective, especially when the condition is uncertain. However, does it mean that there is no way to deal with or reduce the effect of behavioral biases? We are going to study it in the next chapter.

Chapter 4 the solution of behavioral biases

People all have their own behavior and that can affect how they trade. From the previous chapter we can see that the effect of behavioral biases in financial decision making can have some consequences: first, it is very costly for an investor or a corporation if they make an irrational decision. Second, anomalies disturb the development of the capital market, market is inefficient. Third, theoretically, it repudiates the traditional finance. Maybe you are wondering is there any solution to overcome these behavioral biases. That is the main question we are going to explore in this chapter.

Generally speaking, there is no one specific solution to cure all the behavioral biases at the same time, since each behavioral bias has its own characteristic and representative. However, we can learn the method from some specific bias, in order to deal with the biases when the similar situation occurs in the future. Following are some recommendation that researchers gave on behavioral biases.

In the procedure of trying to reduce the effect of hindsight biases, Goodwill (2010) cites that *“there are some evidences shows that the hindsight biases can be reduced if an individual can explain how events, which did not actually occur, could have occurred”* (p. 7). Wallace, Change, and Carroll (2009) also find out that hindsight bias can be reduced if people work hard to gain the new knowledge, and it can cause them to reduce their perception of the level of past knowledge. Through learning the new knowledge, people will not think that they “know it all along”.

In the reality, people like to use *“‘reference point’ view of mergers which holds salient but largely irrelevant reference point stock price of the target help to explain mergers and acquisitions”* (Baker, Pan and Wurgler, 2009, p.2). This way is always affected by the individual’s psychology. Baker and Xuan (2009) also find out that managers prefer to use the price when they entered the company as a fundamental reference point. They claim *“managers see the firm through the lens of their experience. In the case of raising capital, the share price at the arrival of the manager serves as an important referent point”* (p.1). Trying to reduce the biases in mergers and acquisitions, Dessint claims that the fairness opinion might be helpful to reduce the behavioral bias in Mergers and Acquisitions. According to his paper, fairness opinions are

“third-party assessments, usually performed by an investment bank, on the fairness of the financial terms of a mergers or acquisitions, especially with regard to price” (p. 5). In his research, the author thinks since the fairness opinion is expressed by the finance experts, it should help companies to reduce *“the psychological influence of the target 1-year high price as a salient reference point on the financial terms of M&A transaction”*(p. 4). The result showed that the fairness opinion is reliable and can reduce behavioral biases when *“there are at least two opinions, one used by the target company and the other one used by the acquiring firm, respectively issued by an external expert who does not act as financial advisor on the transaction”*(p. 4)

Besides the methods mentioned above in the specific situation, Kahneman, Tversky, and Flyvbjerg develop a method, which is called Reference class forecasting, to eliminate or reduce the behavioral bias on decision making.

Reference class forecasting method can help the decision to be more precise in projections by *“basing on the actual performance in a reference class of comparable actions”* (Flyvbjerg, 2008, p. 1). Reference class forecasting is based on the Daniel Kahneman and Amos Tvesky’s (1979a, 1979b; Kahneman, 1994) theories of planning and decision-making under uncertainty. In Kahneman and Tvesky’s theory work, they find a systematic fallacy in the procedure of decision making, which is that people in general is too optimistic about their judgment due to overconfidence and take insufficient information into the consideration about the outcome. *“They underestimate the costs, completion times, and the risk of planned actions, whereas they overestimate the benefit of the same action”* (Flyvbjerg, 2008, p. 2). Kahneman argues that this fallacy caused from *“actors focus on the constituents of the specific planned action rather than on the outcomes of similar actions already complete”* (Flyvbjerg, 2008, p. 2). He recommends a cure for the fallacy by using the distributed information from previous, similar ventures. They suggest that forecasters *“should therefore make every effort to the forecasting problem so as to facilitate utilizing all the distributional information that is available”* (Kahneman and Tversky 1979b, p. 316).

Based on the theory of Kahneman and Tversky, Flyvbjerg develops the method of reference class forecasting to use in the practice. When it comes to a specific project, the following three steps are involved:

1. *Identify the relevant reference class of past, similar project. The class must be broad enough to be statistically meaningful but narrow enough to be truly comparable with the specific project.*
2. *Establishing a probability distribution for the selected reference class. This requires access to credible, empirical data for a sufficient number of projects within the reference class to make statistically meaningful conclusions*
3. *Comparing the specific project with the reference class distribution, in order to establish the most likely outcome for the specific project. (Flyvbjerg, 2008, p. 8)*

Let us apply the method into a simple case. A manager at a chemical company is considering a new investment to introduce the new technology to their plant. According to the reference class forecasting, the first step the manager should do is to identify the relevant factors of past, similar project. In this case, the investment will be made depends on whether the general outcome of the company can be increased or not. The manager should look at other chemical plants build with the new technologies, because technology has a strong influence on the outcome of an industry (Lovallo and Kahneman, 2003).

After they have identified their relevant reference class, they should focus on the distribution for the elected reference class. The chemical manager should study the income distribution of plants with new technology. For those plants with new technologies, how much they gain on average, the extreme and the median income (Lovallo and Kahneman, 2003).

Based on the study the manager has, the third step is to compare the project with the reference class distribution. The manager should understand the data they have, analyze their specific situation, and predict where they could fall on the distribution. In order to make sure the result is more accurate, the manager can estimate the correlation between forecast and actual result based on the historical precedent, and improve their forecast (Lovallo and Kahneman, 2003).

Preference class forecasting has also been recommended by American Planning Association (APA) in order to improve the quality of forecast and accuracy.

Trying to overcome the effect of behavioral bias in financial decision making is a not easy. The wise way is to keep learning and to know you better. Collect information sufficiently and analyze the market objectively, it may help you to reduce the effect of biases.

Chapter 5 Conclusion

The paper starts from suspecting the validity of traditional finance theory, especially about people's rationality and efficiency of the capital market two perspectives, and goes to the main topic: behavioral finance.

Behavioral finance involved psychology science to study finance. It explains that human biases can affect people's financial decision making. The paper studied several behavioral biases that investors usually make, such as heuristics, overconfidence, mental accounting, and loss aversion, etc. each of them shows their own representation and the way they affect the human decision making.

Effect of behavioral biases is broad. Not only do investors suffer it, corporation and the capital market are not exemption. Investors may be affected by any kind of behavioral biases. The irrational decisions can cause the profit loss or portfolio failed. Paper shows an example of overconfidence, mental accounting and anchoring. For a corporation, it means when investors are managers of a corporation or they are shareholders of a corporation. The behavioral they have not only affect their own decision, it concerns to the whole corporation. Paper uses two cases, Sony and Syntex corporations, to show that biases that managers have, mostly overconfidence and loss aversion, could affect the whole project. Finance policies of a corporation are influenced by behavioral biases. How shareholders behave can affect the decision of dividend policy, how managers behave can affect the decision of mergers and acquisition. When take all investors and corporation as a group, we come to the capital market. Irrational decisions of investors cause anomalies appear which threaten to the traditional finance theory. It is hard for these anomalies to find their explanations in the traditional finance, but it seems every anomaly is so natural when it connects with the behavioral finance. Paper explains this section by capital structure, equity premium puzzle and IPO three cases.

It seems the effect of behavioral biases in financial decision making is common, but it is difficult to find a solution to overcome biases. Paper shows some solutions to reduce biases in specific cases. Knowing the situation well may reduce the hindsight bias, fairness opinion may reduce the biases in Mergers and Acquisition, and reference class forecasting that Kahneman, Tversky, and Flyvbjerg developed. These methods might only give readers some insights. Keep in mind that

everyone has their own characteristic of behavior. Investors should know themselves well, analyze the situation objectively and use the information sufficiently, and then behavioral biases may have less influence on them.

To sum up, this paper depicts a general picture of behavioral finance from different views of point. Hope the paper can give readers some insights, especially for those who study behavioral finance at the first time.

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