MARKET EFFICIENCY VS. BEHAVIORAL FINANCE

Sami FAKHOURY

EDBA, Université Saint-Joseph de Beyrouth
Université Paris Dauphine, France
Sami.fakhoury@gmail.com

ABSTRACT

This article discusses two of the most important theories in modern finance, the Efficient Market Theory and the Behavioral Finance Theory. The understanding of those theories will help shape each investor's investment strategy. It concludes that a paradigm shift is actually happening. Both traditional and behavioral elements will be combined in order to better understand the way markets function and the nature of its actors.

Keywords: Market Efficiency, Behavioral Finance, Efficient Market Hypothesis, Efficient Market anomalies, Efficient Market limitations, Rational investors, Bounded rationality, Investment philosophy.

INTRODUCTION

Whether markets are efficient or not along with the understanding of the Efficient Market Theory are the main criteria that will help shape an investor's own investment philosophy.

If markets are efficient, no one would try then to time the market or even try to pick undervalued stocks as investors are rational and always know the true value of all assets. In this case, the best investment strategy would simply be to buy and hold a well-diversified stock index. Whereas, if markets are inefficient, it would be then interesting to detect the reasons behind those inefficiencies and try to beat the market by exploiting them.

1. EFFICIENT MARKET THEORY

The efficient market hypothesis (EMH) is one of the most important theories in financial economics. It was first introduced by (Markowitz, 1952), although some other sources date its roots back to the French Mathematician Louis Bachelier's Ph.D. thesis "Théorie de la spéculation" in 1900 where he discussed the idea of random walk.

Later on, (Fama, 1965) discussed the random walk hypothesis and (Samuelson, 1965) proved that prices will follow a random walk behavior in an efficient market. But the efficient market theory was not clearly defined until the work of Eugene Fama in 1970. According to (Fama, 1970), "A market in which prices always fully reflect available information is called efficient". This hypothesis advocates that any type of information that might affect equity prices have already been known by investors who make their assumptions on the basis of such information and therefore the market price is an unbiased estimation of the true value of an asset. In that perspective, stock prices should follow a random walk and there is no possible way of predicting the market. Finally, in efficient markets, there is no capability for investors to create a trading strategy that consistently outperforms the market (Malkiel, 2003). (Fama and French, 2010) show that the distribution of abnormal returns of US mutual funds is very similar to what would be expected if no fund managers had any skill, therefore any consistent outperformance is mainly due to hazard and pure luck.

Following are the main assumptions for market efficiency:

- A large number of rational and profit-maximizing investors are always trying to find bargains and beat the market, each by maximizing their subjective utility function. Those investors are able to value rationally securities for their fundamental values. Therefore market prices fully reflect all available information.
- Information is costless, widely available and is generated in a random fashion.
- Stock prices adjust quickly and fully to new information.

Market efficiency allows for the possibility that the market price is not equal to the true value at every point in time. It is also allowed that some investors may over or under react to certain news, hence, prices can be higher or lower than true value for individual stocks as long as these deviations are random. In other words, there is an equal chance that stocks are under or over valued at any point in time. The importance is that those deviations are not related to any specific variable. For instance, in an efficient market, stocks with lower PE ratios should have the same probability of being undervalued as stocks with higher PE ratios.

Since the deviations of market price from true value are random, we should therefore conclude that no group of investors should be able to consistently find under or over-valued stocks using any investment strategy.

1.1. LEVELS OF MARKET EFFICIENCY AND ANOMALIES

(Fama, 1970) states that if all information were reflected in market prices it would be very difficult for the hypothesis to be true and practically tested. Therefore, he developed three levels of market efficiency depending on what information is reflected in prices, hence allowing the testability of the hypothesis:

- **Weak Form Efficiency**

It states that it is impossible to predict future stock prices by analyzing prices and returns from the past. In other words, the current stock price fully reflects any information contained in the past series of stock prices. Therefore, charts and technical analysis applied on past prices alone cannot be used to predict and beat the market.

Tests

Some studies presented strong evidence against the weak form market efficiency by showing that stock markets tend to follow a certain trend for periods of weeks or longer (Saad et al., 1998). (Jegadeesh and Titman, 1993) and (Jegadeesh and Titman, 2001) studied the importance of the momentum effect stating that the stocks that performed relatively well (or bad) in the past 3 to 12 months will most probably continue to do well (or bad) in the next 3 to 12 months. This anomaly is known as the **price momentum.** Finally, (Fama and French, 1996) and (Fama and French, 2008), admitted that momentum is one important anomaly of the EMH.

The overreaction hypothesis studied in (De Bondt and Thaler, 1985) and the mispricing correction hypothesis studied in (Dreman and Berry, 1995) state that when investors overreact to unexpected news, those extreme prices are due for a reversal. These findings along with the results of (Chopra et al., 1985) contradict the weak-form market efficiency.

- **Semi Strong Form Efficiency**

It states that not only past information but all public information (including financial statements, news reports, economic reports, brokerage firm recommendations, investment advisory letters etc.) are reflected into a stock's current share price. Meaning that neither fundamental nor technical analysis can be used to beat the market and investors acting on new public information after its announcement are not able to earn above-average risk-adjusted returns.

Tests

Event Studies are mainly used to test the semi-strong form of market efficiency. These studies consist of observing the market or stock reaction before and after the announcement of a new information or event (earning surprise, stock splits, dividend increase, merger announcement etc.). Their findings

show contradictory results sometimes against and sometimes in favor of the semi-strong form efficiency. (Ball and Brown, 1968) found that when stocks had a positive/negative income surprise, the abnormal stock price returns for the event window were also likely to be positive/negative before and after the announcement date, hence contradicting both the strong (pre-announcement) and the semi-strong form efficiency (post-announcement). This anomaly is known as **earnings momentum,** it was also identified in more recent studies like (Bernar and Thomas, 1989 and 1990) and (Bartov et al., 2000). (Charest, 1978) show that trading after a stock split announcement, a dividend increase and, in particular, after a dividend decrease yields significant abnormal returns and therefore this study found market inefficiencies. On the other hand, (Cowles, 1933) found no evidence of value in analyst reports. (Firth, 1976) found support for semi strong market efficiency when he studied merger announcements events (Fama et al., 1969) and (Garcia de Andoain, 2009) found that the market is semi-strong efficient when studying the cumulative abnormal return post the announcement of a stock split event.

Finally, it is worth mentioning that the majority of academic research using event studies supports the Semi Strong Form Efficiency.

On the other hand, the track record of value investors such as Warren Buffet that deliver consistent outperformance should be studied further. Therefore **Portfolio Studies** are also used to test for semi strong market efficiency although (Fama, 1991) used it under the category of "Return Predictability" to test for weak form efficiency, I preferred to stick to the initial definition of the three forms of market efficiency in (Fama, 1970). Those studies consist of testing investment strategies that use specific characteristics or variables to detect undervalued stocks that are able to deliver excess return. Portfolios of firms having those characteristics are created at the beginning of a time period and then their performances are compared for excess return at the end of the studied period. Several studies have found variables that are able to achieve abnormal returns such as the book to market ratio (Rosenberg et al., 1985), the PE ratio (Basu et al., 1977), (Dreman and Berry, 1995) and (Shiller, 2005). Empirical evidence of EMH anomalies along with studies like (Gibbons et al, 1989) have led to the rejections of the CAPM as a model to test for market efficiency. The predictability power of the size (known as the **size effect anomaly) and book-to-market equity ratios (value anomaly or value investing) led to their incorporation in the (Fama and French, 1993) three-factor model as an alternative to the CAPM model. Whether it means that markets are inefficient or the model that is used to test for market efficiency is incorrect is still an ongoing debate. Hence tests of market efficiency run into this joint hypothesis problem (Fama, 1991).**

The three-factor model consists of taking long and short positions to capture the risk that a specific factor faces (i.e. the SMB: Small Minus Big market

capitalization factor and the HML or the Value Factor: High Minus Low book to market ratio). These risk factors are said to have some aspect of non diversifiable systematic risk which should be compensated with higher expected returns. Other studies highlighted several risk factors such as the momentum factor (Carhart, 1997), the liquidity factor (Amihud, 2002) and finally the profitability and investment factors or the Fama and French five factor model (Fama and French, 2015).

• Strong Form Efficiency
It claims that all information (public and private) are reflected in the current price and even investors who are using precise inside information are not able to beat the market.

Tests
Evidence against the Strong Form of Efficiency can be provided by several studies showing that insiders of a company who possess private information earn abnormal returns (Jaffe, 1974), (Finnerty, 1976), (Seyhun, 1986), (Rozeff and Zaman, 1998), (Jeng, Metrick, and Zeckhauser, 1999), (Lakonishok and Lee 2001), (Aboody, Hughes, and Liu, 2005), (Huddart and Ke, 2007), (Skaife, Veenman and Wangerin, 2013).

In addition to the anomalies and tests described above, below are another widely documented phenomena which are difficult to reconcile with the EMH:

• Price volatility that is not linked to news
According to (Cutler et al., 1991), equity prices experience their largest one day moves during periods that have "no" major news announcements. A famous example is the huge drop of the Dow Jones Industrial Average on the 19th of October 1987. According to (Roll, 1984 and 1988) there is systematic market volatility which is not related to news announcements.

• Calendar effects
Several studies like (Siegel, 1998), (Keim, 1983 and 1986), (Reinganum, 1983) and (Roll, 1983) have detected patterns in equity returns related to weekends, the turn of the month, and the turn of the year (January effect).

The fact that investors are constantly trying to maximize their gains by always implementing strategies that seek to beat the market is the main reason why markets become efficient. A paradox introduced in (Grosmann and Stiglitz, 1980) states that if the market is efficient and all information (including insider information) is reflected in the price then nobody will spend money to gather information for trading purposes. In that case, it is worth wondering how all information will be reflected in the price. Therefore markets cannot be efficient because agents who collect these information should realize profits. It makes sense then to think about an efficient market as a self-correcting

mechanism, where inefficiencies appear at regular intervals but disappear almost instantaneously as investors find them and trade on them. However, EMH proponents like (Elton et al., 1991) state that underperformance of mutual funds show that informed agents help reflecting all information into the market price without any return.

Finally, it is worth mentioning the interesting findings of the contrarian investor David Dreman, where he argues in his book[1] that the underperformance of professional money managers is better explained by the madness of crowds (psychological group-thinking) rather than by the efficient market hypothesis. After all, if EMH holds, a manager should beat the market only by chance, it also holds that he will consistently underperform the market only by chance (Cummin, 1977). Dreman criticized the claim that by quickly adjusting to new information, markets are being necessarily efficient, instead, he shows that the long term rather than the short term performance of a stock is a better indication related to those events.

1.2 LIMITATIONS OF THE EMH

One of the basic assumptions of the EMH is that investors are fully rational and they always seek to maximize their profit. Even when they are not rational, according to the EMH, investors' trading activity will either cancel out with one another or will be arbitraged away by other rational investors (Shleifer 2000).

Bounded Rationality
In reality and due to their cognitive limitations or knowledge limitations, investors tend to deviate from pure rationality when they face uncertainty and risk, this is what is called Bounded Rationality according to (Simon, 1982).

According to (Kahneman and Riepe, 1998) there is persistence deviation of investors' behavior from rationality and studies like (Haugen, 1999) where empirical findings link the abnormal return to variables such as earnings, book value and momentum show little support for investors' rationality.

In addition, several studies highlighted the cognitive, knowledge and computational limitations of investors that lead to their irrational behavior (Conlisk, 1996) and (Shiller, 2000).

Limited Arbitrage
In real world, arbitrage is risky and limited mainly due to its high cost and heavy capital requirements (Shleifer and Vishny, 1997), (Shleifer, 2000) and (Daniel et al., 2001).

Therefore, according to the Limited Arbitrage theory, when irrational investors cause price deviations from true value, rational investors will often be powerless.

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1. "Psychology and The Stock Market-Investment Strategy Beyond Random Walk".

Hence, irrationality can have a substantial and extended impact on prices (Hoje Jo and Dong Man Kim, 2008).

Limits of the subjective utility function and profit maximization
Investors systematically violate the utility theory simply because, as illustrated in the prospect theory, investors have preferences for certain outcomes (Kahneman and Tversky, 1979).

According to (Simon, 1982), the limits of human cognitive ability along with the limited time available for investors to find all alternatives, evaluate them, compare them and make choice among them will push the decision maker to settle for some satisfying strategy, not necessarily the best one to optimize his utility function and maximize his profit.

2. BEHAVIORAL FINANCE THEORY

"A full understanding of human limitations will ultimately benefit the decision-maker more than will naive faith in the infallibility of his intellect." (Slovic, 1972)

After exposing the EMH that eliminates the effect of human behavior in financial markets by assuming investors' rationality, this section will present, as an alternative, the Behavioral Finance Theory where market predictability and price divergence from fundamental values are due to speculative pricing, irrational investors' reaction, asset bubbles, etc. (Shiller, 2003).

Behavioral finance combines psychology and economics, it was first introduced in the work of (Kahneman and Tversky, 1979). It attributes the imperfections in financial markets to several human cognitive biases and various human errors in reasoning and information processing. According to (Barberis and Thaler, 2003) asset pricing cannot be modeled without understanding the behavior of the agents in the economy.

According to (De Bondt and Thaler, 1985), the behavioral finance literature focused on identifying the anomalies in the efficient market hypothesis that can be explained by behavioral models. In addition, it identified investors' biases that are inconsistent with rational behavior theories (Odean, 1999).

According to (De Bondt et al., 2008), behavioral finance is based on three main building blocks:

- Sentiment: It refers to the errors that originate at the investor's level but can also manifest themselves at the market level.
- Behavioral preferences: It captures investors' attitudes about risk and return that deviate from the principles of expected utility theory.
- Limits to arbitrage: It states that rational traders will exploit inefficiencies in prices which will lead prices to be efficient. But as seen above, there

are limits to arbitrage which lead prices to be inefficient according to proponents of behavioral finance.

2.1. Sentiment or Heuristic decision process

Since investors are human, therefore, it is logical that financial markets reflect human errors. The main reason behind those errors is the human cognitive limitation. According to (Brabazon, 2000), the heuristic decision process refers to rules of thumb which people use to make decisions in complex and uncertain environments. The below-described heuristics lead sometimes to systemic errors:

Anchoring and Belief Perseverance:
It is a form of bias where investors tend to rely heavily on one trait or one single information while making a decision. According to (Lord et al., 1979), this information is not sufficiently adjusted afterward which is known as Belief Perseverance where people are unlikely to change or update their opinions even when new information becomes available. According to (Barberis and Thaler, 2003), "At least two effects appear to be at work. First, people are reluctant to search for evidence that contradicts their beliefs. Second, even if they find such evidence, they treat it with excessive skepticism".

Representativeness bias
It can be defined as over relying on stereotypes. (Kahneman and Tversky, 1974) showed that people tend to categorize the events as representative of a well-known class. Investors who regard recent time series trends as representative of an underlying process or trend are vulnerable to extrapolation bias. For example, this heuristic can lead investors to be bullish on past winners and bearish on the past losers.

The "law of small numbers" is a related bias where people try to apply the statistical properties of small samples on large samples.

Availability bias
According to (Kahneman and Tversky, 1974), it leads people to overweight the events and information that are easily accessible, easily remembered or that corresponds to a future scenario that is easier to imagine.

According to (Barber and Odean, 2007), investors are likely to remember events that receive a lot of attention by the media and this influences their behavior.

Overconfidence and Self Attribution
It suggests that investors overvalue their knowledge or abilities. It has many harmful consequences, for instance, according to (Nevins, 2004), investors overestimate their ability to predict market events, leading them to take excessive risks without receiving appropriate returns. In other words, investors underestimate risk and overestimate their ability to beat the market.

According to (Daniel et al., 1998), (Daniel et al., 2001) and (Subrahmanyam, 2007), investors suffer from a combination of overconfidence and self attribution bias, whereby attributing success to their own skills and blame failure to bad luck.

(Daniel et al., 1998) and (Daniel et al., 2001), found that overconfidence about private signals causes overreaction and create phenomena like the book to market effect and others, whereas self attribution maintains overconfidence and allows prices to continue to overreact, creating therefore, the momentum effect. Finally, there will be the long run reversal effect whereby prices revert back to fundamentals.

According to (Barber and Odean, 2000), overconfidence leads to excessive trading and therefore leads to the underperformance of active traders due to high transaction costs.

(Montier, 2004) found that individuals seek always information that confirms and agree with their point of view which is also due to overconfidence.

On the other hand, (DeLong et al., 1991) argued that overconfident agents will take more risks and therefore their expected returns are higher on the long run.

Overreaction and Conservatism
(Kahneman and Riepe, 1998) described that "the human mind is a pattern-seeking device, and it is strongly biased to adopt the hypothesis that a causal factor is at work behind any notable sequence of events." Therefore, investors tend to over interpret patterns that are coincidental and unlikely to persist.

(Barberis *et al.,* 1998) states that extrapolation from random sequences, wherein agents expect patterns in small samples to continue, creates overreaction (and subsequent reversals), whereas conservatism, the opposite of extrapolation, creates momentum through under reaction.

"A conservatism bias means that investors are too slow (too conservative) in updating their beliefs in response to recent evidence. Such a bias would give rise to momentum in stock market returns" (Bodie et al., 2005).

According to (Ritter, 2003): "Conservatism suggests that when things change, people tend to be slow to pick up on the changes. In other words, they anchor on the ways things have normally been. When things change, people might under-react because of the conservatism bias. But if there is a long enough pattern, then they will adjust to it and possibly overreact, underweighting the long-term average."

Recency bias
Investors have a tendency to place greater importance on more recent data. (Kahneman and Tversky, 1973) find that people usually forecast future uncertain events by focusing on recent history and pay less attention to the possibility that such short history could be generated by chance.

Endowment effect
The endowment effect suggests that people place a higher value on things they already own than they would be ready to pay to purchase it. Therefore, investors tend to hold on their stocks way after they've exceeded their real and fair value which exposes them at risk for significant loss when the price correction occurs.

Disposition and reference price effect
(Shefrin and Statman, 1995) showed that investors have the disposition to sell their winning positions too early and to keep their losing position for too long.

According to (Ritter, 2003), the disposition effect manifests itself in lots of small gains being realized, and few small losses. According to (Odean, 1998), the disposition effect is consistent with the concept that realizing profits helps to maintain self-esteem whereas realizing losses causes one to admit a bad investment decision, hence it is usually avoided.

(Grinblatt and Keloharju, 2001) confirmed a disposition effect and found the existence of reference price effect where investors are more likely to sell if the stock price attains a past month high.

(De Bondt, 1993) and (Muradoglu and Onkal, 1994) showed that investor forecasts may anchor on the price at which they bought a security. It is considered as a proof of a reference price effect.

Herd Behavior
"A fundamental observation about the human society is that people who communicate regularly with one another think similarly." (Shiller, 2000)

Herd behavior results when investors prefer to mimic other investors' track rather than doing their own analysis (Sharma and Bikhchandani, 2000). According to (Aronson, 1991), people are influenced by their social environment and they often feel the pressure to conform. People are very sociable and have a natural instinct to be accepted by the group, therefore, following the group is the best way to become part of it. On the other hand, one can argue that a large group has a higher probability of being right than being wrong and that "they" probably know something that "you" don't (Shiller, 1995).

According to the **"informational cascade model"** of (Banerjee, 1992) and (Bikhchandani et al., 1992), people acquire information in sequence by observing the actions of others who preceded them in the sequence. Hence, creating a herd behavior by imitating others and concealing one's own information.

Although the convergence of the available information and media sites such as CNBC and Bloomberg seem to increase herd behavior. But according to (Hong et al., 2005), an important variable to herding is the word of mouth. People generally trust friends, relatives and colleagues more than they trust the media. It's therefore likely that news about a buying opportunity will rapidly spread.

(Shiller and Pound, 1986) show that even if people read a lot, their actions are more stimulated by interpersonal communications.

(Sharma and Bikhchandani, 2000), argue that for an investor who does not want to underperform the market, herd behavior may seem a rational choice. However, according to (Stein and Scharfstein, 1990) in that case, he will eliminate his chances to outperform the market and his peers. Even professionals tend to follow the crowds because if it works, the client will be satisfied, if not, they could simply justify their bad investment decision by comparing to others.

According to the EMH, prices reflect all available information, it also assumes that every market participant independently analyzes a stock, with the aggregate effect being that the stock price reflects the analysis from the entire market and therefore all available information. Therefore and according to (Stein and Scharfstein, 1990), with the increase of herding, investors are doing less research, hence markets are becoming less efficient.

(Boyer et al., 2006), found evidence of contagion and herd behavior in emerging market countries during periods of high volatility. In a much broader study that combines developed and non-developed countries, (Chiang and Zheng, 2010) confirmed the existence of herd behavior in 16 out of 18 studied countries during both upward and downward volatility periods.

2.2. Behavioral Preferences or Investors' Biases

Developed in (Kahneman and Tversky, 1979), the prospect theory describes best the investors' biases leading them to violate the rules of the expected utility theory.

Below the most important features of behavioral preferences:

Loss aversion
It describes the unwillingness of investors to realize losses. Behavioral finance considers that investors are not risk-averse but lose-averse. According to (Tversky and Kahneman, 1992), people weight losses twice as much as similar amount of gains. People may prefer to avoid risk in order to protect existing gain, whereas, they may take more risk in order to avoid a sure loss.

It is known that no one likes to admit that he is wrong. Therefore, investors tend to wait too much on a losing position hoping for a reversal and instead of realizing a small loss they end up realizing a bigger one.

Mental accounting
According to (Henderson and Peterson, 1992), mental accounting describes how people categorize and evaluate financial outcomes. (Shefrin and Thaler, 1988) assume that people categorize wealth in three mental accounts: current income, current wealth, and future income. People tend to use different accounts to

separate their money based on a variety of subjective criteria (i.e. the source of money and intent). (Statman, 2002) observes that people prefer to divide their money between a safe investment portfolio and a speculative portfolio. By doing so, they think that they can prevent the negative returns of the speculative portfolio to affect the return of the safer one. But what they do not realize is that their net wealth will not be different in case they held a single portfolio with the total positions.

Traditional investment theory suggests that the allocation and risk should be studied and managed for an investor's total portfolio, on the other hand, according to (Brunel, 2003), behavioral finance shows that each investment strategy is linked to a goal and therefore they should be managed each according to its appropriate risk measures.

Regret aversion
Selling a position and realizing a loss could create a sentiment of discomfort and regret (ex-post) especially if this position recovers after the selling has occurred. Therefore according to (Shefrin and Statman, 1985), investors will hold onto losing stocks and hope for a recovery in fear of regretting their selling decisions. (Koening, 1999) argues that investors will bet on good assets, in order to avoid regret, which in turn could possibly trigger some sort of herding behavior.

2.3. LIMITS TO ARBITRAGE
The effect of all the above mentioned behavioral biases would disappear if rational investors could fully profit from the mistakes of behavioral investors.

If prices diverge from true value, rational profit-maximizing traders will use arbitrage to reestablish proper pricing. However, according to (Delong et al., 1990) and (Shleifer and Vishny, 1997), in practice, several factors pose limits to arbitrage.

Fundamental Risk
Buying an underpriced stock may be an opportunity, but this opportunity is combined with a high level of risk since the price can go lower for an extended period of time (exceeding the arbitrageur's investment horizon) before it converges back to its intrinsic value. Hence, imposing capital shortfalls on traders and negatively affecting the performance of fund managers.

There is no doubt that the risk incurred while exploiting the arbitrage opportunity will limit both the activity and effectiveness of arbitrageurs.

Implementation Costs
Short selling an overpriced security is faced by several difficulties: by mandate, some fund managers are not allowed to short sell securities. If it is not the case, short sellers have to return the borrowed security on short notice, hence putting a restriction on the investment horizon.

Finally, it is worth mentioning that markets are not frictionless because of transaction costs, taxes, margin payments, etc.

Model Risk
One should definitely worry that an apparent opportunity is not always real. Perhaps the model that is used to value the securities is flawed and the actual price is the right one.

CONCLUSION

The Efficient Market Hypothesis states that prices are right and that there is no strategy that consistently beats the market. On the other hand, behavioral finance states that prices are not always right due to several human biases but it does not present clear and easy ways to beat the market. Nevertheless, the scarcity of trading strategies that are able to consistently beat the market does not imply that markets are efficient and prices are right.

There is no doubt that human behavior is not always rational, but is it fair to call those biases as irrationalities? Isn't it rational (or acceptable/understandable) for a normal human to experience sentiments of fear and panic (just naming a few) while exposed to certain extreme situations that might affect his savings and his direct wealth? The majority of the above-described biases reflects the usual and normal human thinking and is embedded in our human brains and cannot be easily eliminated. Therefore, it is interesting to mention a study made by (Baba et al., 2005) where they confronted a group of normal people with 15 individuals with normal IQs and reasoning skills but with damage to the portions of the brain that control emotions. The study found that the inability to feel emotions such as fear and anxiety made the brain-damaged individuals more willing to take risks with high payoffs and less likely to react emotionally to previous wins and losses. Overall, the brain-impaired participants finished with about 13 percent higher winnings than normal people who were offered the same gambles.

The proponents of the EMH and Behaviorists practically disagree on the concept or definition of rationality. (Fama, 2014) literally states: " Efficient market types (like me) judge that predictable variation in expected returns on stocks and bonds is rational, the result of variation in risk or willingness to bear risk. In contrast, behaviorists argue that much of the predictability is due to irrational swings of prices away from fundamental values." Isn't the ***"Willingness"*** to take risk subject to human frailties and subject to all the above-mentioned biases? Is it rational to be willing to bear risk one time and not willing at another? It seems that according to Fama, it is perfectly rational for an investor to suddenly panic and sell his positions! Clearly, the above speech delivered by Fama is a first step to fill in the gap between two camps who totally disagreed.

In addition, both camps agreed that markets exhibit some anomalies, one of the common examples is that, they both found that value stocks outperform on the

long run. But for the supporters of the EMH it is due to the imperfection in the asset pricing model (the CAPM), on the other hand, the Behaviorist argue that it is due to market inefficiency. This dilemma named "Joint Hypothesis" according to (Fama, 1991), is a subject of ongoing debate that is still actually unresolved.

Quoting from (Fama, 2014): "The evidence that the variation in expected returns is common to stocks and bonds and related to business conditions leads Fama and French (1989) to conclude that the resulting predictability of stock and bond returns is rational. Behaviorists can disagree. Animal spirits can roam across markets in a way that is related to business conditions. No available empirical evidence resolves this issue in a way that convinces both sides." Here as well, Fama exposed both point of views by stating that either rationally or irrationally, the variation of the expected returns is related to **"Business Conditions".** This statement is of extreme importance, first, it admits that variation in expected returns is related to the business cycle. Second, Fama admits that business conditions affect the expected returns of stocks and bonds. Therefore, according to Fama, any outperforming investment strategy using the business cycle as a trigger does not contradict the rules of market efficiency neither contradicts or confirms the rules of behavioral finance.

The above reasoning made the winning of the Nobel Prize in 2013 by both, Robert Shiller (proponent of Behavioral Finance) and Eugene Fama (father of the EMH) less controversy. It seems that both camps are trying to coexist in a market where theories of traditional finance are still widely used and theories of behavioral finance are not neglected anymore (avoiding to say widely used) by a lot of practitioners.

According to (De Bondt et al., 2008), a paradigm shift is actually happening and it will combine both traditional and behavioral elements. Asset pricing models should take into consideration behavioral factors to explain risk premiums. "It is clear that, if academicians are to succeed in understanding financial institutions and actors, and if the agents themselves, as well as policy-makers, want to make wise decisions, they must take into account the true nature of people, that is to say, their imperfections and bounded rationality." (De Bondt et al., 2008).

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