

The Dynamic Interplay of Market Forces and Human Behavior: A Critical Review of Efficient Market Hypothesis and Behavioral Finance

Gaoyuan Gu^{1,a,*}

¹New York University Shanghai, Shanghai 200126, China

a. gg2614@nyu.edu

*corresponding author

Abstract: This literature review offers a comprehensive examination of the Efficient Market Hypothesis (EMH) and Behavioral Finance, as well as their respective implementations in the realm of stock markets. The EMH asserts that financial markets are efficient and that prices accurately reflect all available information. On the other hand, Behavioral Finance recognizes that individuals often make irrational investment decisions based on cognitive biases and emotions. This article explores the interplay between these theories in different applications, including information and communication technology, the stock market's efficiency and anomalies, and the Adaptive Markets Hypothesis (AMH). This review suggests that while EMH provides a theoretical framework for understanding the efficiency of financial markets, Behavioral Finance offers valuable perspectives on the constraints of logical decision-making and the impact of human behavior on market results. The Adaptive Market Hypothesis provides a third choice balancing the EMH and Behavior Finance. Overall, the article the paper presents a thorough examination of the EMH, Behavioral Finance, and the AMH, along with their respective implementations in stock markets. It highlights the importance of understanding the interplay between these theories to gain a better understanding of financial markets and make informed investment decisions.

Keywords: EMH, behavioral finance, stock market, AMH

1. Introduction

The EMH and behavioral finance are two competing theories aimed at elucidating the operation of financial markets and investors' behavior. The EMH posits that markets are efficient and investors are rational, while behavioral finance relaxes these assumptions and incorporates insights from psychology.

In the early 20th century, a French mathematician, Louis Bachelier proposed that stock prices are random and unpredictable [1]. Paul Samuelson introduced the concept of "random walk" in stock prices, stating that price changes are unpredictable and independent, and investors cannot exploit any patterns or trends in the market. Samuelson also demonstrated that a random walk implies a martingale property for stock prices, meaning that the current price is the most accurate predictor of future prices. The EMH was subsequently introduced by Eugene Fama in his influential 1970 paper, entitled "Efficient Capital Markets: A Review of Theory and Empirical Work". Economists

developed the theory of EMH, providing an interpretation for the random walk [2]. The EMH has significant implications for investors and financial practitioners. It suggests that active portfolio management, involving selecting individual stocks or timing the market based on research and analysis, is futile and costly. Instead, it advocates for passive portfolio management, holding a diversified portfolio of securities that mimics a market index or benchmark. It also implies that markets are rational and efficient in processing information and adjusting prices accordingly.

Behavioral Finance came to the fore in reaction to the limitation of conventional finance theory, which assumes that investors are rational, self-interested, and possess perfect information. Behavioral finance traces back to the 18th century when Adam Smith and Jeremy Bentham recognized the role of emotions and morality in economic behavior. However, it was not until the 20th century that behavioral finance gained momentum. Scholars challenged the assumptions of standard expected utility theory and introduced concepts such as bounded rationality, cognitive dissonance, and risk aversion.

Behavioral finance peaked in the late 1970s and early 1980s, after psychologists Daniel Kahneman and Amos Tversky introduced prospect theory, which outlines how individuals make decisions in the face of uncertainty. Their research showed that individuals are more responsive to losses than gains and tend to employ heuristics and cognitive shortcuts to simplify intricate issues. Their work inspired other researchers to apply behavioral insights to explain market anomalies such as bubbles, crashes, excess volatility, and mispricing [3].

EMH and behavioral finance have contributed significantly to understanding financial markets and investor behavior. However, they also have their limitations and controversies. For example, some critics argue that EMH is too unrealistic or extreme in its assumptions, while others contend that behavioral finance is too ad hoc or vague in its explanations. Moreover, some empirical studies have found mixed or contradictory evidence for both paradigms. Therefore, viewing them as complementary rather than opposing perspectives may be more fruitful, as they can offer different insights into different aspects of financial phenomena.

2. The Market Efficiency and Its Failure

The EMH is a crucial concept in finance that seeks to explain the ability of stock markets to price assets accurately. The EMH postulates an ideal assumption that a market where prices act as precise indicators for resource allocation. The theory suggests that in a market that is efficient, the prices of assets incorporate relevant information. The driving force for investors to trade is the potential profits from undervalued and overvalued stocks, which leads to price adjustments that bring stock prices closer to their future cash flow values. As new information is inherently unpredictable, stock price fluctuations in an efficient market should also be unpredictable, resulting in what is known as the "random walk" phenomenon. As a result, in an efficient market where prices reflect the intrinsic value, investors should not anticipate above-average risk-adjusted returns, and there will be very few opportunities for arbitrage.

Fama proposed three forms of market efficiency by differentiating market information: weak, semi-strong, and strong [2, 4]. Weak form EMH suggests that asset prices reflect all past trading information, which is public and easily accessible, such as historical prices and volume. Semi-strong form EMH defines available information beyond the information in the stock market. Under semi-strong form EMH, available information includes past trading and publicly available information, such as earnings reports, news events, and economic data. Strong form EMH suggests that asset prices reflect all public or private information. Sin

According to the EMH, stock markets efficiently incorporate all available information into asset prices, and consistently surpassing the market is an unattainable objective. The empirical evidence supporting EMH is extensive and varied. Sharpe asserted that market efficiency is a necessary

assumption for the CAPM to hold [5]. CAPM is a widely used model for measuring risk and return and relies on historical market data. Jensen et al. found evidence consistent with the CAPM, supporting the market efficiency hypothesis [6]. Fama and French further corroborated this by finding evidence that market efficiency is consistent with the CAPM and that the empirical evidence supports market efficiency in the U.S. and international markets [7].

Critics have presented empirical evidence that contradicts this theory. For instance, Jensen found that mutual fund managers could consistently achieve returns that outperformed the market, challenging the EMH [8]. Other critiques have also emerged. Grossman argued that markets could not be informationally efficient because information asymmetry creates market inefficiencies [9]. Stout contended that the EMH is flawed because it does not account for uncertainty and disagreement among investors [10]. When investors lack consensus about a particular stock, CAPM and the EMH may lead to an undervaluation. Further research is necessary to fully comprehend the implications of these findings for the EMH and investment management more broadly.

Proponents of the EMH have responded to some of these critiques. Fama introduced the concept of the joint hypothesis problem, which asserts that testing the EMH necessitates testing related theories like the CAPM [11]. Keiber suggested that informationally efficient markets are possible in some circumstances, despite the presence of noise traders, and challenged Grossman's claim that informationally efficient markets are impossible. He argued that the nature and amount of available information are critical factors in determining market efficiency [9, 12].

The EMH, as a critical concept in financial economics, postulates that stock prices promptly assimilate all available information in an efficient market. The EMH delineates three levels of market efficiency corresponding to the extent of public information. Empirical research has yielded mixed results, with some studies corroborating particular aspects of the EMH while others have demonstrated notable anomalies. This divergence has resulted in extensive academic discourse surrounding the veracity of the EMH. While the EMH has received criticism and has some limitations, it continues to be a fundamental principle in finance that informs investment strategies and decision-making.

3. Behavioral Finance: Understanding Market Anomalies and Investor Behavior

Despite being a widely acknowledged theory that has proven effective in certain instances, the EMH is observed to fall short in elucidating certain market anomalies. As such, the field of Behavioral Finance has emerged as an area of academic inquiry that proffers potential explanations for these anomalies. Behavioral Finance theory posits that human emotions and biases can influence investment decisions, resulting in market inefficiencies and anomalies that cannot be accounted for by the EMH.

According to Behavioral Finance theory, the decision-making process of investors may not always be rational, as cognitive biases and heuristics can influence it. This may result in overreactions or underreactions to market news, creating market inefficiencies and anomalies. One of these anomalies is known as the momentum effect, whereby stocks that have demonstrated strong performance in the past tend to continue performing well in the immediate future. The momentum effect is observed and documented [8]. It can be attributed to investors' behavioral biases, such as overconfidence and herding behavior, which cause them to overreact to positive or negative news, resulting in an overestimation of the value of previous winners and an underestimation of the value of prior losers [3].

An instance of Behavioral Finance is evident in the notion of asymmetrical information. Grossman's discourse challenges the supposition of the EMH that presupposes equal access to all available information among market participants [9]. It posits that the uninformed behavior of some participants can cause market inefficiencies and create profit opportunities. Furthermore, the article

titled “The Limits of Arbitrage” by Shleifer and Vishny elucidates that rational arbitrageurs might be unable to rectify mispricing, even with the possession of necessary information, due to different constraints. This suggests that the mere possession of information may not suffice to correct market inefficiencies [13]. Thus, understanding the constraints that impede investors’ capacity to act upon the information is crucial for comprehending market dynamics.

Behavioral Finance theory has made significant strides in explaining market anomalies that cannot be accounted for by the EMH. The theory recognizes that human behavior and biases can significantly shape market outcomes, impacting investment decisions. While Behavioral Finance has contributed valuable insights into the psychological biases that can affect investment decisions, it may not be entirely satisfactory in explaining market anomalies since it focuses more on identifying them rather than explaining how they emerge. Behavioral finance subverts its fundamental goal of augmenting comprehension of financial markets and investor conduct. Studies argue that Behavioral Finance fails to explain larger economic trends and systemic issues. It is also noted that Behavioral Finance studies suffer from a lack of empirical rigor. Although Behavioral Finance can provide valuable insights into individual decision-making, it should be complemented by broader economic analysis and consideration of institutional factors to explain financial outcomes fully.

The presence of market anomalies that the EMH cannot account for has prompted the development of Behavioral Finance, which recognizes that human emotions and biases can affect investment decisions, leading to market inefficiencies and anomalies. Despite the challenges it poses to the EMH, some scholars argue that the EMH remains a valuable framework for understanding financial markets and that attempts to beat the market through active investing are unlikely to be successful in the long term [14]. Therefore, Behavioral Finance should be complemented by broader economic analysis and consideration of institutional factors to explain financial outcomes fully.

4. The Adaptive Markets Hypothesis: A Compromise Theory

The Adaptive Markets Hypothesis (AMH) presents a viable alternative to the EMH, which acknowledges that markets are not always efficient and investors can exhibit rational and irrational behavior. The AMH attempts to reconcile the opposing theories of the EMH and Behavioral Finance, proposing a more realistic view of financial markets. According to the AMH, financial markets adapt to changing circumstances and can display short-term inefficiencies while remaining efficient in the long run.

Lo proposed the AMH to reconcile the seemingly conflicting perspectives of the EMH and Behavioral Finance. He argued that financial markets exhibit both efficiency and inefficiency, depending on the context, and that investors’ behavior is rational and adaptive. Lo extended this idea, proposing that the AMH could explain various market phenomena that the EMH and Behavioral Finance could not independently account for [15]. He suggested that the market is evolutionary, behavioral, structural, and functional: the evolutionary trait implies that financial markets evolve and adapt over time, while the behavioral trait acknowledges that investors are not always rational and can exhibit behavioral biases. The structural trait suggests that market structures can affect the behavior of market participants, while the functional trait highlights the significance of competition in driving market efficiency. In Lo’s description of the AMH, the different groups of market participants who behave similarly are like different species in the environment of financial markets. The market will be highly efficient if the “species” compete in a specific market. For instance, the long-term U.S. Treasury note market promptly incorporates the most pertinent information. If a few species compete for a lower frequency, the market will be less efficient, further arguing that market efficiency cannot be evaluated in isolation. This suggests that evaluating market efficiency in isolation is inadequate, as it hinges on dynamic and context-specific variables that characterize market

ecology. Such variables comprise the number of market competitors, the size of potential profit opportunities, and the adaptability of market participants.

Urquhart et al. provide empirical evidence supporting the AMH by analyzing historical data from major stock markets. Their investigation suggests that financial markets can exhibit adaptive behavior and are not always efficient. A study investigated stock markets in the U.S., U.K., and Japan from 1693 to 2010, finding evidence of market inefficiencies in the short term and also discovered that major stock markets have become more adaptive over time, suggesting that investors are becoming more efficient at processing information and adapting to new market conditions [16]. The AMH offers a more comprehensive depiction of stock return behaviors than the Efficient Market Hypothesis. Another investigation examined the primary stock markets and discovered that return predictability in each market fluctuates over time. The study found that each return series undergoes periods with high predictability and periods with little to no predictability [17]. Additionally, the study reveals the existence of the AMH in all markets, albeit they should be examined separately due to the variable predictability and market conditions.

The AMH presents an alternative to the EMH that reconciles it with Behavioral Finance. The hypothesis acknowledges that financial markets are not always efficient and can display adaptive behavior in response to changing circumstances. Based on empirical evidence, financial markets may demonstrate inefficiencies in the short term, but they tend to remain efficient in the long run. The AMH presents a more realistic view of financial markets, recognizing the presence of market inefficiencies and the influence of behavioral biases on investor decision-making.

5. Conclusion

The Efficient Market Hypothesis and Behavioral Finance theories have provided valuable insights into the functioning of financial markets. The EMH posits that financial markets are efficient, with prices reflecting all available information, while Behavioral Finance recognizes the role of human behavior and cognitive biases in shaping market outcomes. The interplay between these theories has been explored in various applications, including stock market efficiency, anomalies, and the Adaptive Markets Hypothesis. While the EMH provides a theoretical framework for understanding market efficiency, Behavioral Finance highlights rational decision-making limitations and human behavior's impact on market outcomes. The Adaptive Markets Hypothesis offers a third option that balances EMH and Behavioral Finance. Although the empirical evidence supports and challenges the EMH, it remains a fundamental concept in finance that guides investment strategies and decision-making.

References

- [1] Bachelier, L.: *Théorie de la spéculation. Annales Scientifiques de l'Ecole Normale Supérieure. Quatrième Serie*, 17, 21–86 (1900).
- [2] Fama, E. F.: *Efficient Capital Markets: A Review of Theory and Empirical Work. The Journal of Finance*, 25(2), 383 (1970).
- [3] Daniel, K., Hirshleifer, D., & Subrahmanyam, A.: *Investor Psychology and Security Market Under- and Overreactions. The Journal of Finance*, 53(6), 1839–1885 (1998).
- [4] Fama, E. F.: *Efficient Capital Markets: II. The Journal of Finance*, 46(5), 1575–1617 (1991).
- [5] Sharpe, W. F.: *Efficient Capital Markets: A Review of Theory and Empirical Work: Discussion. The Journal of Finance*, 25(2), 418 (1970).
- [6] Jensen, M. C., Black, F., & Scholes, M. S.: *The Capital Asset Pricing Model: Some Empirical Tests. SSRN Electronic Journal* (1972).
- [7] Fama, E. F., & French, K. R.: *The Capital Asset Pricing Model: Theory and Evidence. The Journal of Economic Perspectives: A Journal of the American Economic Association*, 18(3), 25–46 (2004).
- [8] Jensen, M. C.: *Some anomalous evidence regarding market efficiency. Journal of Financial Economics*, 6(2–3), 95–101 (1978).
- [9] Grossman, S. J.: *On the Impossibility of Informationally Efficient Markets. SSRN Electronic Journal* (1980).

- [10] Stout, L. A.: *How Efficient Markets Undervalue Stocks: CAPM and Ecmh Under Conditions of Uncertainty and Disagreement*. SSRN Electronic Journal (1997).
- [11] Fama, E. F.: *Market efficiency, long-term returns, and behavioral finance*. *Journal of Financial Economics*, 49(3), 283–306 (1998).
- [12] Keiber, K. L.: *Reconsidering the impossibility of informationally efficient markets*. *Applied Financial Economics*, 17(14), 1113–1122 (2007).
- [13] Shleifer, A., & Vishny, R. W.: *The limits of arbitrage*. *The Journal of Finance*, 52(1), 35–55 (1997).
- [14] Malkiel, B. G.: *Reflections on the efficient market hypothesis: 30 years later*. *Financial Review*, 40(1), 1–9 (2005).
- [15] Lo, A. W.: *The adaptive markets hypothesis*. *The Journal of Portfolio Management*, 30(5), 15–29 (2004).
- [16] Urquhart, A., & Hudson, R.: *Efficient or adaptive markets? Evidence from major stock markets using very long run historic data*. *International Review of Financial Analysis*, 28, 130–142 (2013).
- [17] Urquhart, A., & McGroarty, F.: *Are stock markets really efficient? Evidence of the adaptive market hypothesis*. *International Review of Financial Analysis*, 47, 39–49 (2016).