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The Evolution of Efficient Market Hypothesis: A Systematic Literature Review with Bibliometric and Thematic Analysis

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ABSTRACT

The Efficient Market Hypothesis (EMH) has experienced a tremendous transformation since the classical canons to modern versions based on the behavioral knowledge, and technological development. In this study, we have offered a Systematic Literature Review (SLR) based on bibliometric, keyword co-occurrence, and thematic analysis to follow this intellectual evolution. The results show five significant thematic shifts, which are foundational EMH theories, classical versions of market efficiency, adaptive and behavioral, EMH in FinTech and cryptocurrency markets, and EMH in the context of a crisis. The performance analyses of the countries and journals also show the dominance of the USA, UK, and South Africa, and thematic mapping divides the themes into motor, emerging, declining, and basic clusters. The paper also constructs an AIME conceptual framework (Adaptive Informational Market Efficiency) to reconcile the anomalies in EMH with real-life anomalies. The given paper contributes to the theoretical knowledge, outlines the existing gaps especially during times of crisis, institutional design, and AI-oriented market and suggests future prospects of a more resilient and humanistic model of market efficiency.

JEL Classification: G14; G41; G21; G23; O33; C83; B40; B49

Keywords: Efficient Market Hypothesis, Adaptive Market Hypothesis, Behavioral Finance, Bibliometric Analysis, FinTech, AIME Framework

Introduction

The Efficient Market Hypothesis (EMH) is not a new and it is the cornerstone of the contemporary asset pricing theories. Louis Bachelier (1900) originally conceived it and it was formalized by Eugene Fama in his seminal work (1970). Fama argues that EMH has three forms - weak, semi-strong and strong form depending on the inclusion of information on the price of assets which include historical prices to information available publicly and finally, to information available to insiders. According to EMH, when market is efficient in all its forms no investor can out-perform the market under the risk-adjusted basis. The 1970s and 1980s researchers started empirical testing of the EMH by autocorrelation, run-tests and variance-ratio tests in developed markets (Uri & Jones, 1990). Majority of these research works supported the market efficiency in weak form, but findings on semi-strong and strong form are inconclusive.

But by the middle of 1970s and 1980s a number of anomalies like January effect, week day effect turns of the month effect etc. emerge to start doubting the EMH as a universal financial theory in the real-life scenarios (Vergin, 1998). The empirical evidences of underreaction and overreaction which indicate that the market sentiments are subject to the influence of the factors of investor behaviour have been presented by Shiller (1981), De Bont and Thaler (1985) in their groundbreaking scholarly works.

The existing body of academic literature in the field of EMH has certainly undergone through significant expansion and covers multiple aspects such as the development of the theoretical underpinning it, classical EMH, AMH as an extension of EMH, Fintech & Crypto, behavioural biases and EMH under AI and technological advances (Bowman & Buchanan, 1995). Much of the prior literature on EMH was developed in relative isolation and there is a lack of literature on EMH in integrated framework with the behavioural, crisis, tech and AI. There is still a need to do more research to understand the problems of behavioural biases induced inefficiency and application of tech and AI within the framework of EMH information modelling (Gupta & Saxena, 2019). Therefore, we propose that there is a definite need to shift focus on the re-evaluation of EMH as a theory of finance and its

uses within the framework of AI, crisis and behavioural bias regulated complex modern finance landscape.

Through this study firstly, we attempted to draw a connection between the application of EMH as a financial market theory and behavioural, crisis and tech and AI by defining the various themes in the informational efficiency. Second, most of the existing literature on EMH researches it as a single stock market theory and does not examine it an overall asset market theory that moves the prices based on the information; however, we have tried to research on EMH across five interdisciplinary themes to assess its development, evolution and future research directions of EMH. Third, we have systematically reviewed the literature and given a conceptual framework i.e. Adaptive Informational Market Efficiency (AIME) for application of EMH among different disciplines. A far wider scope of literature has been discussed in our paper and this applies to the application of EMH in the asset market.

Therefore, this study does a systematic literature review to understand the application of EMH in the asset market in general. To do the review, we performed a Boolean-based search in the Scopus database and found 298 records, which we analyzed Bibliometric with the help of the bibliometrix package in R. In addition, we sampled the studies obtained after Bibliometric analysis of the papers and reviewed them manually in order to develop a more comprehensive understanding of published literature on the study problem.

Based on provided methodology of systematic literature review and Bibliometric analysis, this article seeks to provide answers to the following research questions (RQ)

RQ1: To investigate the affiliated countries, the leading journals, and authors actively publishing in the domain of EMH and its applications in the financial market.

RQ2: How the concept of EMH has evolved in the extant of literature, and what key themes have shaped its development with behavioural, crisis, tech & AI.

***RQ3*:** To identify future research agendas from current research trends and develop a conceptual framework to understand the evolution of EMH as financial market theory.

The rest of the paper is structured as follows. The next section comprehends the review strategy. The third section highlights the performance analysis including bibliometric insights and country collaboration map. The fourth section explains thematic discussion integrating with keyword analysis. The fifth section derived conceptual framework through identified themes and inductive analysis. The sixth section draws reflections on the directions for future research and the last section concludes.

Research methodology

The study design applied in this paper is a combination of a bibliometric analysis and a detailed literature review that will provide the overall picture of the evolution of the research on EMH and the ways of its application in various domains. After the inductive analysis our proposed framework is based on first-order concepts, second-order themes, and aggregate dimensions. They are based on the similarities that have been discovered in the course of analysing the descriptive and conceptual structure of the existing literature, which is also underpinned by the rigorous inductive analysis in line with the recommendation of Gioia data structure (see Fig. 4).

Data collection protocol

The PRISMA (Preferred Reporting Items to Systematic Reviews and Meta-Analyses) guidelines were used to present and conduct our study. We conducted an advanced search by using Scopus on the keywords regarding Efficient Market Hypothesis (EMH) and found 1489 documents. Following the filtering by the subject areas of interest- Economics, Finance, Business, Management, and Accounting, 775 documents were left. The number was narrowed down to 490 by restricting the results to English-language journal and review articles. Studies associating EMH with crisis, behavioural finance, technology, and AI were filtered to 405 by screening them manually. Lastly, 298 articles were chosen as a result of the selection of high- quality ABDC (A or above) and ABS (3 or above) journals, and analyzed with Bibliometrix R.

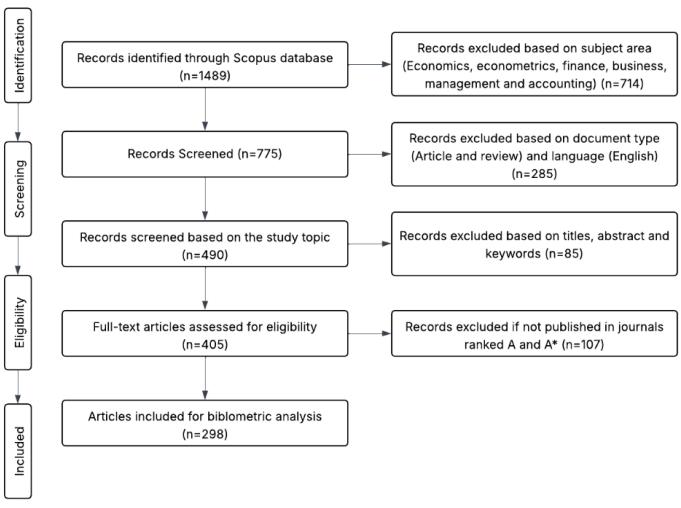

Fig. 1. Study flow diagram

Data analysis techniques

Bibliometric analysis is a holistic approach that is applied to determine and analyse huge amounts of scientific texts. In this study, it assists in tracking the new tendencies in EMH studies and its incorporation into the sphere of behavioural finance, crises, and artificial intelligence. With the help of the Bibliometrix R-tool, we have analysed the productive authors, journals, and patterns of publications, to derive valuable insights. The review procedure was carried out by examining performance measures, classifying the literature into major themes and carrying out an inductive analysis to extract more profound links (Fig. 5). The ultimate result of the formalized process is the formation of conceptual structure, which is shown in Fig.6.

Performance analysis

Performance analysis inquires the contributions of the components of research to a particular topic. Various performance measures are also explained such as country collaboration, citation per publication, and h-index which combine publications and citations to determine the success of research items. This section based on the initial stage of data analysis that includes country collaboration, influence of authors and source impact that will assist in addressing RQ1.

Country collaboration map

Fig. 2 depicts the international cooperation network whereby the co-authorship relationship between countries is mapped, reflecting the research organization of the global level of EMH. Every connecting line denotes cooperation, and the thickness represents the number of articles that they have published together. The most effective cooperation is the one between the United State and the United Kingdom (8 publications) especially in the research of equity and bond markets efficiency pronounced. This is accompanied by South Africa Ukraine (7), India-Bahrain (6) and USA-Canada (6). The significant Ukrainian-South African cooperation is a pointer to increased academic focus on EMH in the emerging/frontier markets, where liquidity shortages, market structure and regulatory disparities are more pronounced.

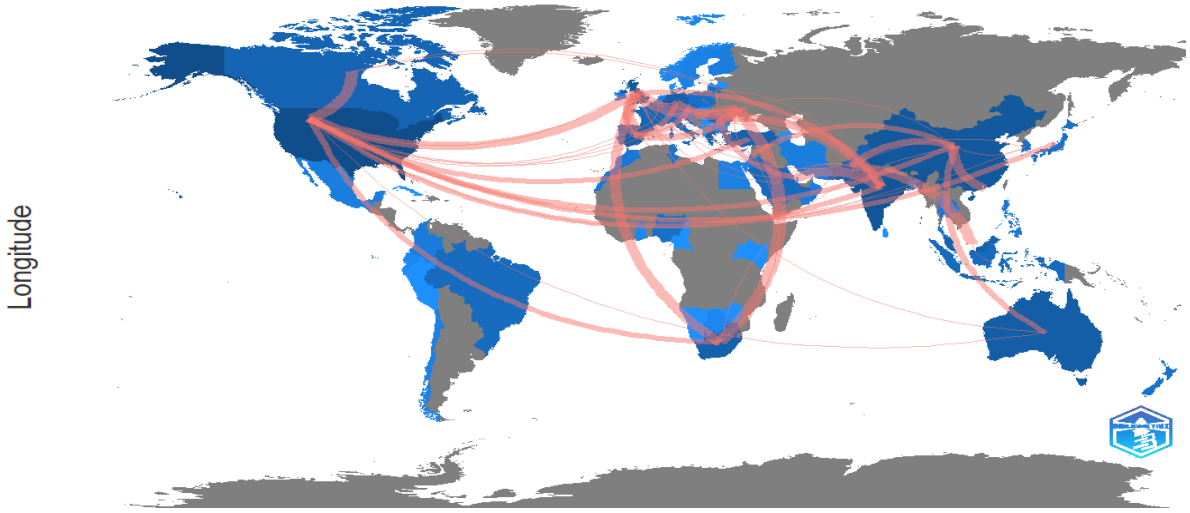

Fig. 2. EMH and finance research country collaboration map. Note. These collaborations are presented in the form of lines, and the degree of the thickness of the line indicates the amount of article contributed by a country.

Top 10 productive authors

In this section, the authors of the most impactful works on EMH have been summarised in terms of the number of publications and the impact of information. Table 1 (at the end of reference section) is a list of researchers who had four or more publications on EMH. Andriy Plastun (Sumy State University, Ukraine) has 22 papers, 412 citations and the h-index of 12 and is the highest ranked author in terms of market efficiency, anomalies, cryptocurrencies and commodities (Plastun et al., 2019). The next contributor is Rangan Gupta (University of Pretoria), who does work in behavioural finance and macro-financial forecasting. In general, studies have been moving towards behavioural influences on share prices like sentiment, biases and market irregularities.

Source impact

Table 2 (at the end of reference section)is a list of the top ten journals writing on EMH and market efficiency, along their h, g and m indices, which are research productivity and impact. The first one is the Journal of Applied Financial Economics having 20 publications and 382 citations. It puts much emphasis on empirical research of EMH, particularly weak-form efficiency and predictability of returns in both the developed and emerging markets (Pernagallo & Torrisi, 2022). In second place with 20 publications and 1007 citations, yet discussing more modern issues like cryptocurrency market efficiency and behavioural effects in EMH testing, is the finance Research Letters, which combines classical and adaptive views (Bouri et al., 2021).

Thematic structure

The thematic structure contributes to co-occurrence of key words and thematic map that display new trends in the area of EMH and possibilities of the future studies in the EMH as an asset pricing model. This part is based on our data analysis i.e. key word co-occurrence and thematic map. Next stage will include inductive analysis and conceptual framework that serve to cater the third research question of our study. It answers RQ2.

Keywords analysis map

Keywords analysis refer to the relevant terms applied in the publications and their analysis can help illuminate the major issues and research trends within the sphere of EMH and its development (Jurevičiene & Gausiene, 2010). The keyword analysis map was retrieved with the help of bibliometrix R-tool software and is depicted in Fig. 3 with two clusters.

The first cluster (blue) is based on the adaptive market hypothesis and tied to the ideas of market efficiency, equilibrium theory, decision-making, crude oil, and financial markets, where the adaptive and dynamic understandings of efficiency are shifted to (Hoelscher & Meek, 2025). The second cluster (red) focuses on the stock market and financial markets where it is closely associated with price volatility, strong-form efficiency, investor sentiment, social media, big data, high-frequency trading, and terms related to the crisis such as COVID-19 (Emenike, 2017).

Foundational and Adaptive Theories

The initial cluster blue contains approximately 6-7 keywords that centre on the foundational and adaptive aspects of EMH such as efficient market hypothesis, adaptive market hypothesis, financial markets, equilibrium theory, and market efficiency (Khanh & Dat, 2020). As observed in the literature, the traditional EMH was envisaged to give theoretical foundation but anomalies and irregularities in the market have necessitated the application of frameworks such as the Adaptive market hypothesis (AMH) (Lo, 2004). Therefore, this cluster highlights the concept of the intellectual development of EMH within a paradigm of non-adaptive to adaptive.

Fig. 3. Keyword analysis map EMH illustrates two general categories trades of traditional and adaptive theory vs. behavioural and technology-driven themes, which display the development of EMH as a classical efficiency to adaptive, behavioural and technology-based approaches.

Stock Market and Volatility

The second cluster red has10 to12 keywords with anchor words stock market, financial market and price volatility. This cluster can be seen as empirical testing of EMH by using predictability of returns, event studies and volatility modelling (Janse van Rensburg & Van Zyl, 2025). Applied econometric methods to test the hypothesis of price movements have included GARCH models, variance ratio tests and time series analysis to determine the degree to which price changes agree with the random walk hypothesis. The presence of the strong form efficiency in this cluster illustrates the on-going controversies regarding the level of insider information being captured in the prices (Alekneviciene et al., 2018). It has been argued in the literature that weak-form and semi-strong efficiency may tend to be the state of affairs in developed markets, volatility shocks and crises tend to expose failures to adhere to strong-form efficiency.

Themes and thematic discussion

Thematic map provides an overview of pertinent themes of a conceptual framework on a cartesian plane. The strategic diagram separates the subjects into the two categories of centrality and density with the former being a quantitative measure of the extent to which the subjects are connected to each other and the latter being a quantitative measure of the strength of the internal connections within a subject.

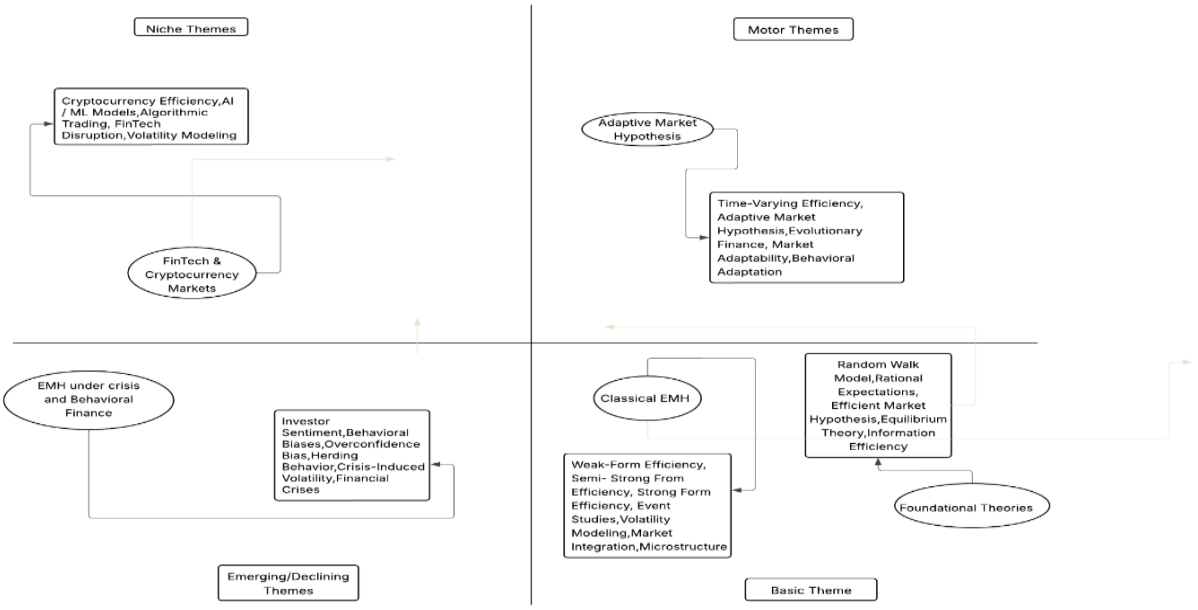

Fig.4. The thematic map (Fig. 4) of the EMH, behavioural, technology and AI research depicts the development of themes based on the centrality and density of Callon. It categorizes themes into four quadrants as motor, niche, emerging/ declining and basic but underdeveloped themes.

Foundational Theories and Seminal Contributions

The theoretical origin of the Efficient Market Hypothesis (EMH) can be found in the first thematic cluster. The former of these, especially the random walk theory of Bachelier (1900) and the rational expectations model of Samuelson fixed the idea that asset prices incorporate available information resembling it were a stochastic process. These insights were formalized by Fama, (1970), in his seminal work, and presented in three different forms weak, semi-strong and strong, giving a testable structure that dominated financial economics over decades.

In general, empirical tests run in the 1970s and 1980s also confirm this notion, especially in developed equity markets, by noticing little evidence of predictable price behavior (Dragota et al., 2019). Information efficiency emerged as a standard in terms of which deviation was researched. However, early studies often to be abstracted out of psychological biases, institutional conflicts, and heterogeneity of investors, which produces an ideal picture of markets.

The discontinuity created was two-fold; first, the initial models did not take into account anomalies like momentum, size effects; second, the impact of crisis and external shocks that disrupt efficiency was underestimated.

Classical EMH Applications Across Markets

The second theme focus on empirical testing of the classical EMH model in world markets. Studies have been broadly divided into weak-form, semi-strong and strong-form efficiency tests (Caporale et al., 2018). Weak-form studies use statistical tests including autocorrelation, tests of variance ratios, GARCH models and analysis of the Hurst exponent to test whether past prices are predictive of future returns. Whereas, developed markets tended to exhibit weak-form efficiency, emerging markets delivered mixed outcomes because of the thin trading, regulatory gaps, and institutional inefficiency (Caporale et al., 2019).

Event-study methods have been commonly applied in semi-strong form studies to determine how markets receive dividend-related, merger-related, or policy-related information. Although results on semi-strong efficiency were mostly favourable in the US and European markets (Borges, 2010), research in Asia, Africa and Latin America revealed slower price changes. Strong-form efficiency, by contrast, has not been widely proved, in part because insider trading and information asymmetry still exist across markets.

In spite of the improvements in the methods, a common gap that has remained is the ability to reconcile the conflicting results in different markets. Additionally, the classical EMH cannot be universally effective because of the continued presence of anomalies such as the momentum, overreaction and calendar effects.

Adaptive Market Hypothesis (AMH)

The third theme is the paradigm shift in efficiency studies with the Adaptive Market Hypothesis (AMH) suggesting efficiency to be dynamic and to change with market environments. Grounding on evolutionary biology, AMH posits that investor behaviour evolves in a manner that is reflective of changing competition, regulation and innovation, just as biological organisms evolve to survive (Ashraf & Baig, 2019).

Frequently used empirical approaches include rolling-window tests of variance ratios, Markov-switching models, and time-varying autoregression, in order to capture the changes in efficiency between various regimes. The results are always in line with this; the markets fluctuate between efficiency and inefficiency based on liquidity, volatility and the shocks occurring outside the market.

The most important advancement of AMH literature is that it provides a way to reconcile EMH to anomalies

by conceptualizing efficiency as a continuum, and not a dichotomy. Nevertheless, there are still gaps i.e. absence of standardized empirical tests of AMH and comparative studies of EMH and AMH in different markets.

FinTech and Cryptocurrency Markets

The fourth theme highlights the fact that the advent of financial technologies and digital assets has presented fresh testing challenges to the EMH. Sub-themes are cryptocurrency efficiency, AI/ML models, algorithmic trading, FinTech disruption and volatility modelling. Studies have established that Bitcoin and other cryptocurrencies exhibit characteristics of efficiency and inefficiency based on time and method of operation (Lupu & Popa, 2024). Results have shown that cryptocurrencies are quite dynamic, and they do not to follow classical EMH assumptions because of speculative trading, less regulation and excessive volatility.

Another sub-theme is algorithmic trading and AI/ML models, and researchers use neural networks, deep learning, and natural language processing to evaluate market efficiency. Such models tend to do better than conventional econometric techniques in forecasting inefficiencies in the short term, leading the question of whether it is technological advancements that create new types of informational asymmetry.

This theme reveals how studies of EMH have been evolved to new types of assets, where technological and structural shocks require new models in place of classical models.

EMH under Crises and Behavioral Finance

The fifth theme combines two highly important strands of literature how EMH works in times of crisis and the way behavioral finance questions its assumptions. Sub-themes are investor sentiment, behavioral biases, overconfidence, herding behavior, crisis induced volatility as well as financial crises (Yamani, 2021). The research on the 2008 Global Financial Crisis and the COVID-19 pandemic showed that the market efficiency tends to be impaired in the context of extreme stress levels and there are predictable pattern of panic selling, contagion effects, and delayed reactions of the asset prices. These results point to the inefficiency of EMH to fully explain crisis related inefficiencies. Overconfidence bias tends to increase volatility with investors overestimating their skill to predict market trends and herding accelerates cross-sector and cross-country contagion (Dissanaike, 1997).

This theme shows that the history of the development of EMH cannot be explained without considering the contribution of human actions and systemic shocks, which constantly demonstrate the vulnerability of the informational efficiency.

Conceptual Framework and Inductive Analysis

Fig.5. shows the visualization of the concepts, themes, and aggregate dimensions (ADs) of the Efficient Market Hypothesis (EMH) research area, where the concepts are formed on the grounds of the sub-themes of the thematic map, and the themes are formed based on the most co-occurring keywords or the clusters formed during bibliometric analysis. The conceptualization of the ADs occurs on the basis of the key-words analysis, the thematic analysis, and the extensive examination of 290 or more studies. This section answers RQ3.

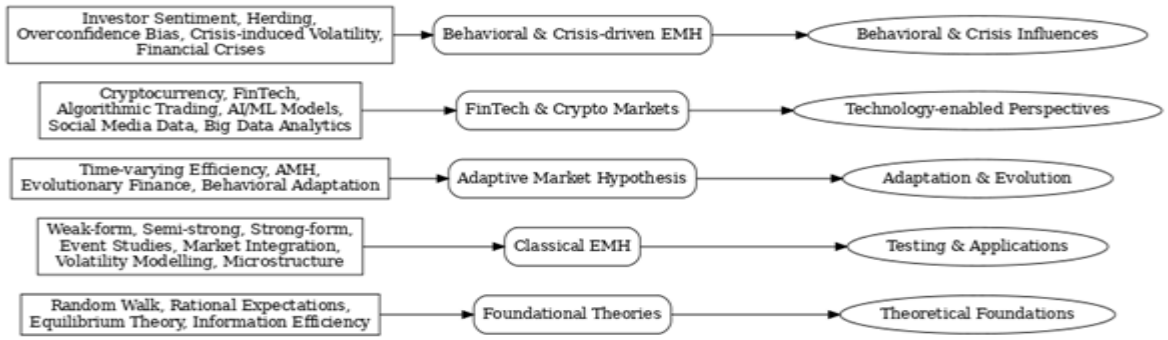

Fig.5. Concepts, themes, aggregate dimensions of evolution of EMH research. Note: Describes the data model of concepts, themes, and aggregate dimensions based on manual examination of the study samples. Finally, aggregated dimensions are created then by the combination of various second-order clustering themes.

The evolution of the Efficient Market Hypothesis (EMH) mirrors the development of modern financial economics. Following Bachelier's (1900) random walk theory and Fama's (1970) formalisation of EMH, financial thought was shaped by rational expectations and equilibrium models, forming the foundation of informational efficiency.

The first phase Foundational Development centred on random walks, rational expectations, and early efficiency tests, primarily in developed markets like the US and UK. While largely supportive of EMH, initial market anomalies began to appear. The second phase Classical Applications expanded EMH testing globally using event studies, volatility models, and microstructure analysis. While developed markets often showed weak-form efficiency, emerging markets displayed mixed results due to regulatory and structural challenges.

The third phase introduced the Adaptive Market Hypothesis (Lo, 2004) and behavioural perspectives, emphasising that efficiency varies over time with market conditions, crises, and investor psychology. Biases such as overconfidence and herding were seen as drivers of inefficiency.

The fourth phase Technological Disruption involved cryptocurrencies, AI, and high-frequency trading, reshaping EMH testing. The fifth phase highlighted sector-specific evidence, especially in commodities like oil, demonstrating that EMH is highly context-dependent.

Against this background of the developing discourse on the Efficient Market Hypothesis (EMH), this review suggests the Adaptive Informational Market Efficiency (AIME) conceptual framework (see Fig. 6) as a broad conceptualization that reflects the theoretical and empirical inconsistencies found within five major thematic domains.

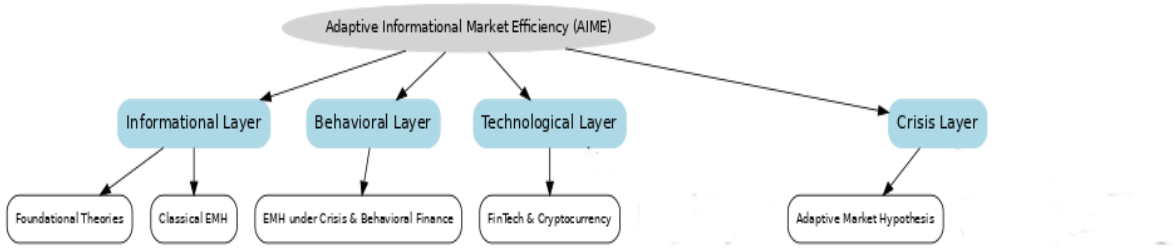

Fig.6. Conceptual framework of EMH and finance research. Note: Presents a theoretical design relying on the Thematic Map (Fig. 4) and Inductive Analysis (Fig. 5).

Informational Layer: The Classical Foundation of EMH

The Informational Layer, the foundation of the AIME framework, is grounded in classical Efficient Market Hypothesis (EMH) theory, which assumes that prices instantly reflect all public and private information. It corresponds to EMH concepts like weak-, semi-strong and strong-form efficiency and uses methods such as event studies, volatility models and market microstructure analysis (Schwartz, 2021). These approaches assume rational investors and equal information access. However, this study shows efficiency varies across time, markets and asset types, especially during events like OPEC announcements or corporate disclosures. Thus, while essential, this layer alone cannot explain anomalies and serves as a base for more realistic extensions in AIME.

Behavioral Layer: Human Bias and Market Deviations

Building on the shortcomings of informational perspective, the AIME framework Behavioral Layer absorbs the knowledge of behavioral finance and the Adaptive Market Hypothesis (AMH). This is the layer that is very essential in understanding of why despite the availability of all information, markets can still remain inefficient because of human psychology. Research in this theme shows that behavioral patterns may result in continued mispricing particularly when there are uncertainty or speculative bubbles (Peláez, 2012). As an example, investor irrational behaviour during the COVID-19 pandemic or other times of crisis tended to deviate against EMH expectations, which points out the influence of sentiment-related volatility.

This behavioral layer enables the AIME framework to be adaptable to changes in investor cognition and decision-making in a more realistic way to explain both the existence of anomalies in traditional equity markets as well as in alternative assets such as cryptocurrencies.

Contextual and Technological Layer: Crisis, Complexity, and AI Integration

The third and last part of the AIME is the Contextual and Technological Layer which further broadens its analysis to take into consideration the external shocks and technological changes that affect market operation. This study found that issues of crisis induced volatility like the 2008 global financial crisis and pandemic shocks, highly question the EMH premises of stability and rationality (Ali et al., 2023). Also, this layer adds the emergence of FinTech, algorithmic trading, artificial intelligence (AI) and social media sentiment, which have transformed the concept of information in financial markets. Unstructured data, high-frequency trading systems, and machine learning algorithms have increased the speed of information, yet also provided additional levels of secrecy, bias of models, and systemic risk (Kovalenko et al., 2023). This additional layer enables AIME to capture the functioning of EMH in more complex and adaptive settings, which makes it a more robust and future-oriented theoretical framework.

Future Research Directions

The development of the Efficient Market Hypothesis (EMH) requires proactive research to capture the ever-increasing complexity of financial markets. The next generation of theoretical work will provide better insights into the context of classical EMH and behavioral finance, adaptive mechanisms, and technological innovations should focus on the implementation of hybrid theoretical schemes. Specifically, additional empirical research required to explain the gap between theory and empirical market behavior and empirically validate the Adaptive Market Hypothesis (AMH) by incorporating time-varying models, regime-switching methods, and non-linear analytics. In the light of the emergence of FinTech, AI, and algorithmic trading, future research must also investigate how machine learning models, social media sentiment and big data analytics add to or interfere with

informational efficiency. Researchers are forced to evaluate whether the traditional ways of market efficiency continue to be applicable or need to be redefined in the new asset classes like cryptocurrencies and carbon markets. Lastly, the ability to develop explainable, real-time EMH-testing models and their application across global markets, asset classes and crisis timelines will be of policy-relevant and practical use to both academics and policy-makers in comprehending the dynamics of informational efficiency under structural, behavioral and systemic stress.

Conclusion

Key Takeaways

The purpose of this research is to conduct an integrated evaluation of the evolution of research on the Efficient Market Hypothesis (EMH) and suggest its development in the future by addressing its limitations, using the behavioral and adaptive approaches. A systematic review and bibliometric analysis of the literature resulted in the creation of a country collaboration map, a thematic map, and a keyword analysis map. Besides this we have indicated and mapped out the flow of EMH research through foundational, classical, adaptive, technological and crisis driven dimensions. Findings show that Applied financial Economics and Finance Research Letters are some of the most productive journals that produce quality research in this field. Famous authors are Plastun, Gupta and Corbet, who have contributed to efficiency testing and their behavioral and adaptive extensions.

The thematic map demonstrates the knowledge base of the existing literature and reveals how EMH has developed over the past years, shifting to applications across asset classes and focusing more on behavioral, technological, and crisis-related variables. The change of the keywords to behavioral finance, cryptocurrency, machine learning, and market adaptability is also indicated by a keyword analysis that shows the transition of the previously used keywords into random walk and rational expectations. Conceptual framework of Adaptive Informational Market Efficiency (AIME) incorporates these advances into the model and balances rationalist EMH with behavioral biases, crises, and technological change.

Study Implications

A number of theoretical and practical implications of this study to the further development of EMH research are presented. To begin with, it assists the scholars and practitioners to understand the constraints and scope of the current research, especially the excessive use of rational expectations, which overlook the power of behavioral and contextual factors.

Second, defining powerful authors and journals can be taken as a guideline to researchers who want to enter this field. Bibliometric results point to the place of cross-country partnerships in the progress of EMH research, particularly in the emerging market, where efficiency patterns are debated.

Third, the thematic clusters that came out through key word analysis and co-occurrence maps offer a systematic picture of how EMH research has transformed, at least in terms of its classical testing to the crisis driven and technology enabled approach.

Fourth, the review proposes a research agenda that would combine behavioral finance and EMH, investigate time-varying efficiency, and examine the contribution of social media and big data to information dispersion. Last, methodologically, this review highlights the importance of more advanced econometrics, machine learning, and hybrid methods that are able to learn non-linear and adaptive characteristics of financial markets.

Limitations

In spite of the contributions, this study has some limitations. First, the bibliometric analysis has been based on using mostly the Scopus database, which, despite its extensive list of studies, does not include some studies listed in the Web of Science or published in books and conference proceedings. The reviews at a later time may follow a multi-database approach in order to have a wider coverage.

Second, the range of the present study was limited to peer-reviewed scholarly articles, and it did not include practitioner-focused reports or regulatory reports that could have provided empirical knowledge on the use of EMH.

Third, bibliometric and thematic analysis give a systematic picture of trends and clusters, but cannot replace more comprehensive meta-analyses and empirical syntheses of the findings across studies.

Lastly, the AIME model suggested herein is still theoretical and must be empirically tested in various markets, crisis, and in various asset schemes. These constraints notwithstanding, this research can be described as a systematic and coherent synthesis of the evolution of EMH that can be used as the basis of future studies incorporating rationalist, behavioral, technological and contextual facets.

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Table 1 Author impact

Rank	Element	h_index	g_index	m_index	TC
1	PLASTUN A	12	20	0.923	412
2	GUPTA R	8	10	0.533	228
3	CAPORALE GM	7	10	0.538	237
4	SENSOY A	6	6	0.667	411
5	POWER DM	5	5	0.2	199
6	VASILEIOU E	5	8	0.556	112
7	WOHAR ME	5	6	0.625	110
8	BOURI E	4	4	0.444	67

9	CHAKRABORTY M	4	4	0.2	38
10	GROENEWOLD N	4	4	0.121	101

Table 2 Source impact

Element	**h_index**	**g_index**	**m_index**	**TC**	**NP**
Applied Financial Economics	13	19	0.394	382	20
Finance Research Letters	12	20	1.091	1007	20
International Review of Financial Analysis	11	14	0.44	712	14
Applied Economics	10	16	0.238	282	19
Applied Economics Letters	10	16	0.333	301	28
Research In International Business and Finance	10	15	0.625	287	15
International Journal of Finance and Economics	9	11	0.31	233	11
Economics Letters	8	13	0.195	703	13
Quarterly Review of Economics and Finance	7	9	0.241	188	9
Cogent Economics and Finance	6	8	0.667	69	13