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REVIEW OF RESEARCH ON DETERMINANTS OF STOCK PROFITABILITY: A BIBLIOMETRIC ANALYSIS

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Abstract:

This paper examines the determinants of stock returns, a critical area for investors and scholars aiming to understand and predict stock market performance. Through analyzing emerging research trends, this study enriches academic discourse and offers practical insights for investors, enabling informed decision-making. Specifically, it qualitatively and quantitatively analyzes 1,756 articles published from 1986 to 2023, identifying key authors, journals, and studies that define the current knowledge landscape while also pinpointing research gaps and topics for future study. The study employs descriptive and network analysis, including bibliometric methods, to systematically assess publication trends and critically examine the literature on stock price determinants. These methods facilitate an objective overview of a substantial research corpus, addressing the primary aims of this work. By adopting a systematic bibliometric approach, this study offers a comprehensive evaluation of stock profitability determinants, shedding new light on key factors influencing stock returns. It highlights research quality, trends, significant contributors, and their geographical and institutional affiliations while mapping relationships across these factors. Moreover, it raises relevant questions and recommends directions for future research and cross-disciplinary collaboration, reinforcing the findings' validity and reliability. This research emphasizes interdisciplinary dialogue and highlights the importance of collaborative efforts to advance understanding of the determinants of stock returns.

Key words: *Bibliometric analysis; Network analysis; Determinants; Stock returns*

1. Introduction

The financial markets are crucial to the economies of families and countries, being one of the best indicators of economic status and a popular way of enriching investors, where historically investing in shares has proven to be the most profitable form of investment (Almeida, 2020).

In a business world that is increasingly competitive and attentive to market needs, business growth is essential for economic growth, as a poorly evaluated decision can drastically affect the value of any company and, consequently, of shares and investments. Financial analysis and evaluation, therefore, play a fundamental role in the decision-making process of companies and investors.

Knowing the determinants of stock returns is fundamental to obtaining the expected results and essential for effective investment decisions, risk management, and policy formulation (Bessembinder et al., 2023; Grobys et al., 2023; Joshipura & Wats, 2023).

In this sense, studying and understanding the determinants of stock returns is a crucial topic addressed by various evolved theories (Blay, 2024; Smith & Smith, 2023). This knowledge of the determinants of stock returns helps to test the efficiency of financial markets, apply pricing models, build diversified portfolios, and contribute to market stability and economic growth.

This study presents a bibliometric review of the determinants of stock returns between 1986 and 2023, which have served as a backdrop for various researchers and the formulation of different financial theories. Our work characterizes the literature on the subject using the primary laws of bibliometrics: Lotka's Law, which measures the productivity of authors according to a size-frequency distribution model; Zipf's Law, which measures the frequency of words in the various articles; and Bradford's Law, which allows the productivity of scientific journals on the subject to be measured (Aria & Cuccurullo, 2017; Kushairi & Ahmi, 2021).

This work contributes to the academic literature by identifying trends and the relevance of topics and work over the last 37 years under the aegis that continuous study of the capital market is crucial and contributes to economic growth. It provides insights into directions for future research and collaboration, both nationally and internationally. The conclusions highlight the topics covered the most, their evolution, and their trends, thus helping to define priorities and gaps in research. Using keyword clustering and temporal analysis techniques, the study explores dominant themes and suggests prospects for future research, providing a guide for further exploration in this area of inquiry. It also provides valuable insights for financial managers and policymakers into the determinants of stock returns and their relevance for future analysis and decision-making.

The paper is divided into six sections: the first is the introduction; the second gives a brief description, development, and justification of the relevance of the topic; the third section presents the research design with a presentation of the methodology adopted; the fourth section presents, and five discusses the results; the fifth section is reserved for the conclusions of the research.

2. Literature review

The determinants of stock returns are a crucial topic in financial theory, a topic of extreme relevance and importance in the field over time, addressed by various theories, and central to understanding the value of stocks. The study of determinants has been of great importance in the world of finance since the 1930s, with the work of John Burr

Williams, where the author supported the present value theory, arguing that the value of a share is equal to the present value of expected future cash flows, discounted at an appropriate rate, which is fundamental to the analysis of investments, providing a basis and highlighting the determinants of the intrinsic valuation of shares (Gant, 2023; Smith & Smith, 2023).

In the 1950s, Harry Markowitz developed the Modern Portfolio Theory (MPT), revolutionizing investment management by emphasizing diversification's importance in reducing risk (Markowitz, 1952). The theory uses concepts such as diversification, mean-variance, the efficient frontier, and correlation between assets to construct portfolios that maximize expected returns for a given level of risk. It served as the basis for the Capital Asset Pricing Model (CAPM) proposed by Sharpe (1964) and Lintner (1965) and was the first model for pricing risky assets.

This theory continues to be widely applied in managing portfolios and investment funds based on diversification and the efficient frontier to optimize risk-adjusted returns. Strategies supported by big data cover passive, active, and indexed fund approaches that seek to exploit market inefficiencies. Analyzing stock prices makes it possible to identify risk, liquidity, and volatility factors, which are essential for diversification and hedging strategies. These practices are fundamental for institutional investors and fund managers, promoting competitiveness and sustainability in asset management (Bodie et al., 2021; Fama & French, 1993; Malkiel, 2020).

This theory is linked to other theories, such as the efficient market theory and multifactorial models, which allow the impact of business decisions to be analyzed, pointing to factors such as financing, dividend policy, size, profitability, investment, and market factors, among others, as explanatory factors in the valuation of shares (Blay, 2024; Guerard, 2023; Mandal & Thakur, 2024).

In the 1960s, Eugene Fama proposed the efficient market theory, which suggests that stock prices reflect all available information (Fama, 1970, 1991). It can be divided into three forms: weak (prices reflect all past information), semi-strong (prices reflect all public information), and strong (prices reflect all information, public and private). This theory has had significant implications for stock valuation, suggesting that it is impossible to consistently achieve market-beating returns through technical or fundamental analysis, relying on determinants such as market or calendar anomalies, specific events, investor behavior, volume, and liquidity to explain stock valuation (Fama, 1998; Khursheed et al., 2020; Mensi et al., 2023; Nyakurukwa & Seetharam, 2023).

However, various evidence found in other studies has pointed to the existence of other determinants of asset prices, which has led to the development of multi-factor models, such as Liu's (2006) two-factor model, Fama and French's (1993) three-factor model, Carhart's (1997) four-factor model and Fama and French's (2015) five-factor model. These models incorporate determinants such as firm size, value, profitability, and investment strategy to provide a more comprehensive and accurate analysis of stock profitability. These models have been commonly tested in academic research, such as the studies by Fama and French (2017), Eyvazloo et al. (2021), and Haryanto (2024).

The literature points to other theories to explain and define the determinants of stock returns, such as the theory of dividends, as they represent a significant part of the total

return to shareholders (Baker & Wurgler, 2006; Lintner, 1965; Myers, 1984; Barros et al., 2020; Castro et al., 2021). Fama's theory of efficient markets underpins the adoption of passive strategies, such as index funds, which replicate market indices, based on the idea that share prices already reflect all available information.

Due to its low cost and competitive performance, this approach is widely adopted (Malkiel, 2020; Fama & French, 2015). In addition, multifactor models, such as those of Fama e French and Carhart, are crucial for analyzing funds, allowing an interpretation of the sources of profitability, and are often applied in portfolio evaluation (Haryanto, 2024; Gregoriou, 2016). Other theories commonly related to share value can be found in the financial literature, such as the agency theory described by Michael Jensen and William Meckling in 1976, which deals with conflicts of interest between owners (shareholders) and managers (agents).

One of the problems that best illustrates the concept of the agency relationship is the issue of ownership and control of the company, which can hurt the valuation of shares (Jensen & Meckling, 1976; McConnell & Servaes, 1990; Ross, 1973). State intervention in the organization's capital, together with internal and macroeconomic factors as explanations of share value, such as in the studies by Khan et al. (2022) or Laporšek et al. (2022), the independence of board members and the accumulation of positions by the CEO (Merendino & Melville, 2019) or gender diversity on boards (Đặng et al., 2020; Simionescu et al., 2021).

Another theory related to the value of shares is the capital structure theory, initiated by Modigliani and Miller in 1958, which examines how the combination of debt and equity affects the firm's value. Factors such as the tax advantages of debt, the form of debt, bankruptcy costs, and agency costs influence the ideal capital structure, which has a direct impact on the valuation of shares (Rashid & Bilal, 2020; Sikveland & Zhang, 2020; Sohrabi & Movaghari, 2020).

Authors such as Nowzohour and Stracca (2020) and Ilut and Saijo (2021) study excess volatility and confidence, while Jegadeesh and Titman (1993) study the momentum effect and biased self-attribution. Baker and Wurgler (2006) showed that sentiment affects stock prices, especially for smaller and more volatile firms, and found evidence that sentiment is globally contagious.

Although various financial theories and models have been developed over time that have examined and incorporated different determinants in explaining stock profitability, there is still no definitive consensus on a universally accepted model. This lack of unanimity reinforces the importance of knowing the past because it is by analyzing historical approaches and the factors that have shaped markets over time that researchers continue to seek a more complete and accurate understanding of the determinants of stock profitability, which is essential for anticipating and studying the financial future. In addition to theories, stock values are influenced by macroeconomic and external factors, as exemplified by the impact of macroeconomic and geopolitical factors on stock returns, which is highly relevant due to their significant influence on financial markets.

Political uncertainty, for instance, is one of the primary drivers of market volatility, as evidenced by Vancea, Aivaz, and Duhnea (2017), who examined its effects in Romania. Studies by Fry (2021) and Arouri et al. (2020) demonstrate how political instability induces

fluctuations in emerging market economies. Digital transformations, particularly the rise of crypto assets, present new challenges for financial markets, with Munteanu et al. (2023) highlighting the difficulties businesses face in adapting to these changes, a point also addressed by Yermack (2017) regarding the role of blockchain in creating more significant market uncertainty.

Furthermore, perceptions of corruption, as explored by Munteanu et al. (2024), have been shown to influence investor behavior, with higher levels of corruption reducing market stability. These factors underscore the necessity of integrating macroeconomic and geopolitical elements into stock return models to better understand market dynamics, particularly in globally interconnected markets.

These studies highlight the complexity of macroeconomic and geopolitical variables in determining stock returns and the necessity to analyze these factors in a global context thoroughly.

3. Methodology

Bibliometric analysis is a quantitative method that allows the review of a scientific topic by collecting and processing large amounts of data (Almeida & Vieira, 2023; Dhingra et al., 2024). This approach provides a comprehensive view of the field of study and identifies trends and relevance in research. This study focuses on the evolution of research on the determinants of stock market profitability between 1986 and 2023.

Khan et al. (2022). Paltrinieri et al. (2023) and Fayad et al. (2024) highlight the growing importance of bibliometrics in academia due to its ability to map topics and provide a reliable basis for future research. As Nasir et al. (2020) and Almeida and Vieira (2023) describe the relevance and importance of using statistical software such as 'Biblioshiny' to perform these analyses, segmenting data by authors, documents, and sources, we used the same software described above.

In order to understand the current dynamics of academic research, five research questions were formulated to guide the analysis of authors, journals, relevant works, keywords, and leading countries in research over the years. The research questions were as follows.

Q.1 What is the current dynamic and trend of academic research on the determinants of stock returns over time?

Q.2 What are the research's most prevalent topics, papers, and authors?

Q.3 What are the most relevant keywords or phrases over time?

Q.4 Which countries have contributed most to research on this topic over time?

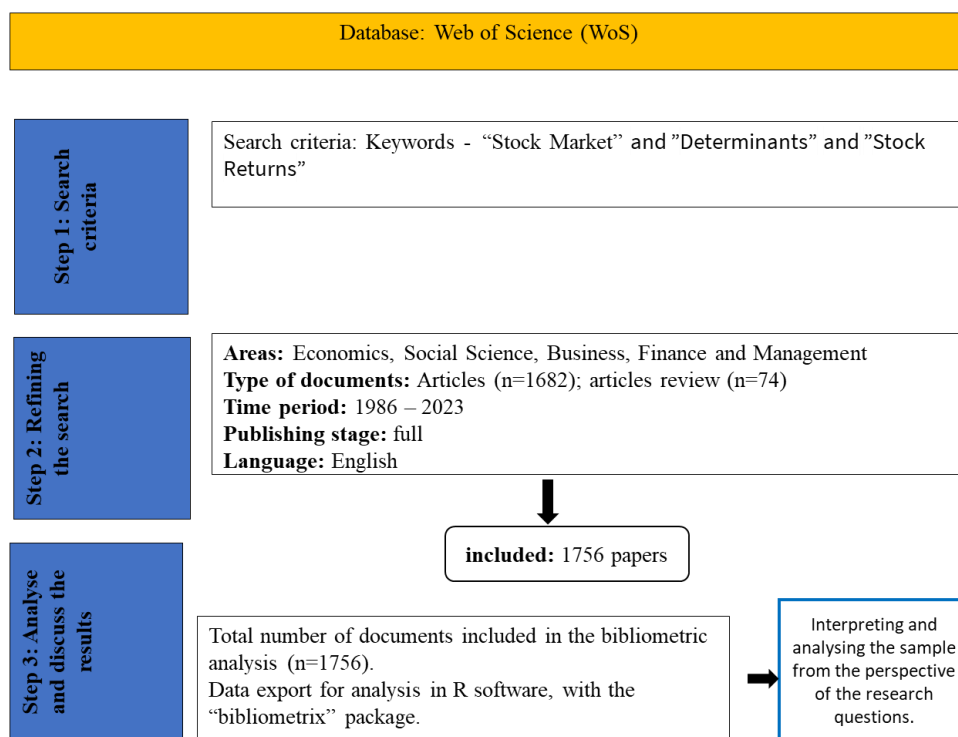
Figure 1 shows the protocol used to select the search terms and the sample taken from the Web of Science (WoS) database, one of the most prestigious sources of high-quality scientific articles (Khan et al., 2022; Nasir et al., 2020; Paule-Vianez et al., 2020). The selection of Web of Science (WoS) is based on its reputation as a high-impact database that ensures the quality of publications through a rigorous peer-review process, particularly excelling in fields such as social sciences and humanities (Almeida, 2023;

Khan et al., 2022). Compared to alternative sources, the authors consider Web of Science to offer detailed metrics on publication impact, enabling a more precise evaluation of relevant literature. This enhanced capability facilitates a more robust and accurate assessment of the academic relevance and influence of the studies retrieved. The search terms were selected based on keywords that align with the study's objectives, ensuring the effective retrieval of pertinent literature.

All types of publications were included for the entire database period, i.e. without any time restrictions. The main concepts studied are 'stock market,' 'determinants,' and 'stock returns,' so this search was formulated based on all the information collection fields of the database: 'stock market' AND 'determinants' AND 'stock returns.'

A total of 1756 papers were found. The system automatically chose this period since the first article in our sample was found in 1986, which extends to 2023 to have a whole year, which would not be the case if studies from 2024 onwards were included. We extracted the graphs for further analysis to answer the questions above.

Figure 1 - Research protocol



Source: own elaboration.

4. Analysis and discussion of the results

Table 1 below shows the main descriptive statistics of the results found.

Table 1 - Descriptive statistics of the sample.

Description	Results
Period	1986 - 2023
Sources (Magazines, Books, etc.)	523
Documents	1756
Annual growth rate %	3,72
Average number of citations per document	27,7
Authors	3782
Authors of individually signed documents	242
International co-authors %	31,09

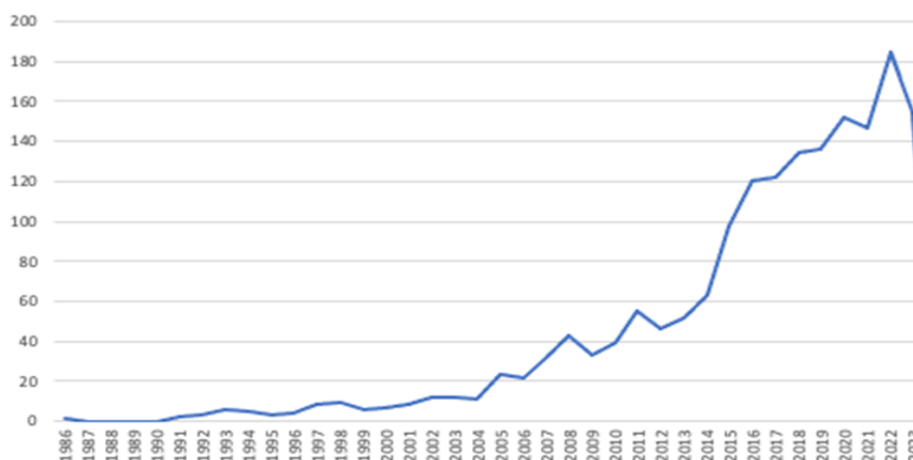
Source: own elaboration.

We analysed 1756 papers published in 523 different sources, with a growth rate of 3.72% per year and an average of 27.7 citations. These papers were contributed to by 3782 authors, giving a considerable range of authors and approaches present in our sample. The number of authors with individually signed papers is 242, and the percentage of collaborations between authors from different countries is 31.09%, demonstrating the importance of collaboration on the topic in different regions of the world.

4.1. Trend of academic research

In order to analyse the trend and relevance of the subject, Figure 2 shows the annual evolution of scientific production over the period under study.

Figure 2 - Articles published over time.



Source: own elaboration.

Over the period studied, there was an increase in annual scientific production, with a growing trend over the period analysed, which we divided and analysed into 3 different periods. The first, with slower growth, is the period between 1986 and 1999, when 47 papers were published, representing 2.67% of the total number of publications. After this period, there was a significant upward trend between 2000 and 2015, when 554 papers were published, representing 31.54% of the total number of publications, of which 17.5% were published in 2015. In the third subperiod, between 2016 and 2023, 1,155 articles were published (65.77 percent), with 2022 being the year with the highest number of publications (185), corresponding to approximately 10.54 percent of the total number of publications. This upward trend shows the topic's growing interest in and relevance for the scientific and academic community.

4.2. Most Relevant Sources

When analysing the most important sources, Table 2 describes the output of the 10 most important scientific journals in terms of number of publications, h-index, and g-index. Although productivity is a factor in assessing the impact of sources or authors, it is also crucial to consider usage and citations. The h-index, introduced by Hirsch (2005), measures the academic quality and productivity of a researcher or source by balancing publications and citations. The g-index, proposed by Egghe (2006), considers the largest number of publications with a total number of citations equal to or greater than g^2 .

Table 2 - Relevance of Sources.

Journal	h_index	g_index	TC	NP	PY_start
Journal of Financial Economics	27	36	8835	36	1996
Journal of Banking & Finance	24	44	2000	63	1986
Journal of Finance	22	23	6634	23	1992
International Review of Financial Analysis	19	34	1178	45	2012
Energy Economics	18	27	1359	27	1991
Economic Modelling	17	28	787	31	2011
Journal of Financial and Quantitative Analysis	16	19	965	19	2005
Journal of Corporate Finance	14	24	1005	24	2005
Review of Financial Studies	14	16	2743	16	2001
Accounting Review	13	17	2230	17	1993

Source: own elaboration.

When analyzing the most relevant sources for this topic, we highlight a group of three journals with an h-index above 20. The most relevant is the Journal of Financial Economics, which has an h-index of 27 and a g-index of 36 and published its first article in 1996. It is followed by the Journal of Banking & Finance, which has an h-index of 24 and the highest number of publications (63), having published its first paper in 1986. The

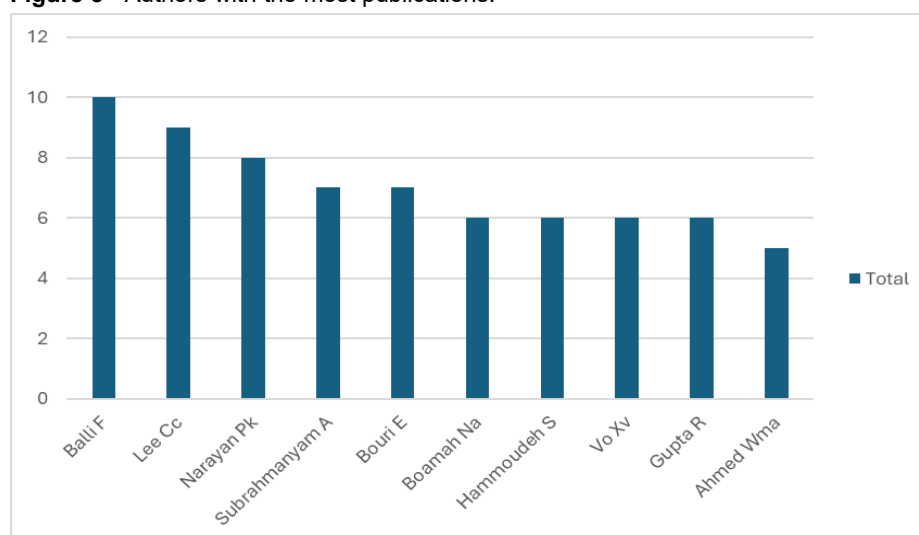
Journal of Finance completes this group with an h-index of 22, a g-index of 23, and 23 publications.

A second group of journals with an h-index between 11 and 19 includes the International Review of Financial Analysis, the second most published journal (45), which started publishing in 2012, 16 years after the first paper published by the most relevant journal and has an h-index of 19. The list ends with a group of four journals with an h-index of 10, with publications ranging from 14 (Journal of Real Estate Finance and Economics) to 21 (Journal of Business Finance & Accounting). Based on the annual scientific productivity, the publications by source, and the impact generated, it can be concluded that the relevance of the topic of the determinants of stock returns shows a growing dynamic, as evidenced by the increase in publications over the years, with an upward trend in recent years.

4.3. Most relevant authors and papers

As in the previous analysis, we have identified and analyzed the most relevant authors and papers that have contributed most to the dissemination of knowledge and the development of the determinants of stock returns. Figure 3 shows the 10 authors with the most publications from 1986 to 2023 for our data, and Figure 4 shows the most relevant authors as measured by the h-index and g-index.

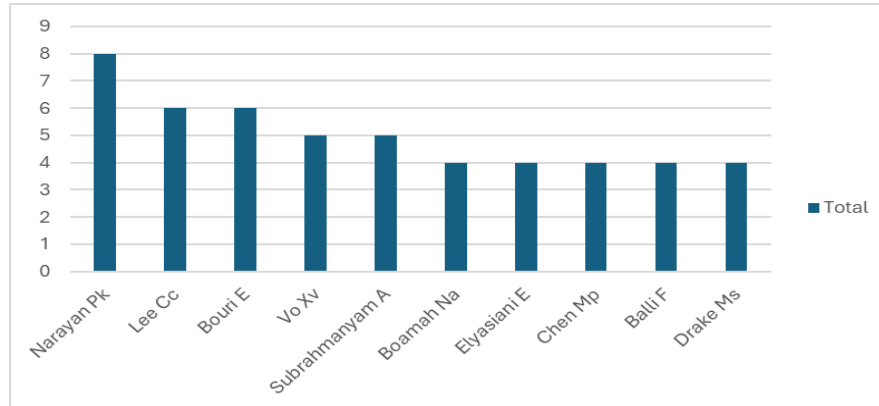
Figure 3 - Authors with the most publications.



Source: own elaboration.

Balli stands out with 10 publications, followed by Lee with 9 publications and Narayan with 8 publications, followed by Subrahmanyam and Bouri with 7 publications. At the bottom of the list is Ahmed with 5 publications. To complement the analysis of the relevance of authors, Figure 4 shows the most relevant authors as measured by the h-index.

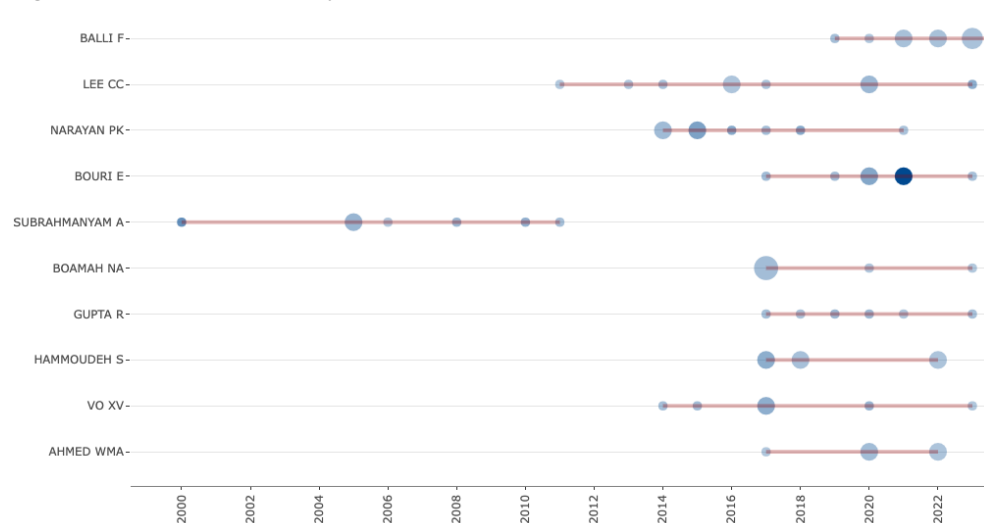
Figure 4 - Impact by author H-index.



Source: own elaboration.

It is possible to identify that Narayan had a higher impact when evaluated by the h-index, which is 8, showing that he is the most relevant, even though he is not the author with the most publications on the subject. In second place is the author Lee, with an h-index of 6, and Balli, with an h-index of 4. The distribution of statistics among the authors is homogeneous since half of the authors have an index of 4. Next, in Figure 5, we can analyse the productivity of the authors over time, from 2000 to 2023.

Figure 5 - Authors' productivity over time.



Source: own elaboration.

We can see that the vast majority of the identified authors, with the exception of Subrahmanyam, have published in the last 5 years. This concentration of articles is mainly visible in 2017, but also in 2020. According to Figure 5, around 8 authors published articles in 2017 and 7 authors in 2020. The authors who spent the most time on the topic between their first and last publication were Lee (12 years) and Subrahmanyam (11 years).

When analysing the most relevant papers, Table 3 shows the most cited articles during the study period. Analysing the most cited articles allows us to be more robust in future approaches. It gives the topic relevance due to the interest it has generated in the scientific community, allowing us to infer the main conclusions and where the research stands.

Table 3 - Most relevant articles.

Authors	Article Title	Source	N. of citations
Barberis <i>et. al.</i> (1998)	A model of investor sentiment.	Journal of Financial Economics	1983
Core <i>et. al.</i> (1999)	Corporate governance, chief executive officer compensation, and firm performance.	Journal of Financial Economics	1897
Campbell <i>et. al.</i> (2008)	In search of distress risk.	The Journal of Finance	889
Easley <i>et. al.</i> (2002)	Is information risk a determinant of asset returns?	The Journal of Finance	743
Faulkender & Wang (2006)	Corporate financial policy and the value of cash.	The Journal of Finance	728
Adams <i>et. al.</i> (2005)	Powerful CEOs and their impact on corporate performance.	The Review of Financial Studies	713
Deng <i>et. al.</i> (2013)	Corporate social responsibility and stakeholder value maximization: evidence from mergers.	Journal of Financial Economics	665
Chordia <i>et. al.</i> (2000)	Commonality in liquidity.	Journal of Financial Economics	642
Cooper <i>et. al.</i> (2008)	Asset growth and the cross-section of stock returns.	The Journal of Finance	599
Bae <i>et. al.</i> (2003)	A new approach to measuring financial contagion.	The Review of Financial Studies	566

Source: own elaboration.

The authors with more than 1000 citations are Barberis *et. al.* (1998), with 1983 citations, followed by Core *et. al.* (1999), with 1897 citations. There are between 900 and 700 citations for the following papers: Campbell *et. al.* (2008) 889, Easley *et. al.* (2002) 743, Faulkender and Wang (2006) 728, and Adams *et. al.* (2005) 713. In the range

between 700 and 500 citations, the articles by Deng et. al. (2013) with 665, Chordia et. al. (2000) with 642, Cooper et. al. (2008) with 599 and Bae et. al. (2003) with 566 citations stand out. The most relevant papers also make it possible to select the most interesting conclusions for the academic world.

Barberis et. al. (1998) conducted a study proposing a model of investor sentiment. The aim of this model was to identify how investors formulate their beliefs and expectations about future returns based on their reaction to certain news. The authors were able to formulate assumptions about the strength and weight of the news, which in turn allowed them to build an empirical model. The authors concluded that investor sentiment has an impact on share prices and, therefore, influences their value.

In their study, Core et. al. (1999) examined the relationship between good governance practices, CEO compensation and firm performance in 205 US-listed companies over a three-year period (1982-1984). The results indicate that a company with a poor governance structure compensates its CEO more and consequently generates a negative relationship with both operating performance and stock returns. In short, higher agency costs are detrimental to firm performance and reduce firm value.

Campbell et. al. (2008) examined the determinants of bankruptcy and stock prices of firms experiencing financial stress in a sample of US-listed companies for the period 1963 to 1998. According to the authors, companies with characteristics such as high leverage, low profitability, low market capitalisation, low past stock returns, and more volatile past returns are more likely to go bankrupt. In this way, they were able to conclude that the characteristics mentioned are important factors in determining the price of companies with increased financial difficulties and which could potentially go bankrupt.

Easley et al (2002) conducted a study whose main objective was to understand the influence of information on stock returns using high-frequency data from the New York Stock Exchange (NYSE). By assuming that the market constantly adapts to the information produced, they were able to conclude that information does indeed have a significant impact on stock returns, confirming the authors' hypothesis.

Adams et. al. (2005) conducted a study to understand the impact of CEOs with great influence and decision-making power on firm performance for a sample of 336 companies in the 1998 Fortune 500, from 1992 to 1999. According to the study, there is no evidence that CEOs with greater influence cause worse financial performance on average. On the other hand, the authors point out that companies with the most influential CEOs have both the worst and the best business performance.

To ensure that the topic is current and to analyse the most recent evidence, a literature review was conducted, focusing on the most cited articles from the last five years (2018 - 2023). Table 4 shows a compilation of the 10 most cited articles, followed by a review of the three most relevant articles. This compilation of articles aims to summarise the most important recent contributions to the field of research, highlighting current trends and their importance for the development and understanding of the determinants of stock returns.

Table 4 - Most cited articles in the last 5 years.

Authors	Article Title	Source	No. of citations
Wen <i>et. al.</i> (2019)	Retail investor attention and stock price crash risk: Evidence from China	International Review of Financial Analysis	200
Saeed <i>et. al.</i> (2021)	Extreme return connectedness and its determinants between clean/green and dirty energy investments	Energy Economics	173
Panagiotidis <i>et. al.</i> (2018)	On the determinants of bitcoin returns: A LASSO approach	Finance Research Letters	106
Devpura <i>et. al.</i> (2018)	Is stock return predictability time-varying?	Journal of International Financial Markets, Institutions and Money	90
Demers <i>et. al.</i> (2021)	ESG did not immunize stocks during the COVID-19 crisis, but investments in intangible assets did	Journal of Business Finance & Accounting	86
Tan <i>et. al.</i> (2020)	How connected is the carbon market to energy and financial markets? A systematic analysis of spillovers and dynamics	Energy Economics	85
Pillai & Al-Malkawi (2018)	On the relationship between corporate governance and firm performance: Evidence from GCC countries	Research in International Business and Finance	84
Javeed & Lefen (2019)	An Analysis of Corporate Social Responsibility and Firm Performance with Moderating Effects of CEO Power and Ownership Structure: A Case Study of the Manufacturing Sector of Pakistan	Sustainability	81
Wen <i>et. al.</i> (2020)	Asymmetric relationship between carbon emission trading market and stock market: Evidence from China	Energy Economics	78
Renneboog & Vansteenkiste (2019)	Failure and success in mergers and acquisitions	Journal of Corporate Finance	78

Source: own elaboration.

Wen *et al.* (2019) wrote that the most prominent article in the scientific community in recent years, as measured by the number of citations, was written with 200 citations. Saeed *et al.* (2021) take second place with 173 citations, and Panagiotidis *et al.* (2018) with 106 citations, with the two authors at the bottom of the list having 78 citations each.

This evidence is a new research direction on the chosen topic, so it serves as a basis for future developments and makes a relevant contribution to the scientific community, considering the studies mentioned above.

Wen *et. al.* (2019) investigated the effect of retail investor attention and crash risk on stock prices. They used a large sample of Chinese listed companies between 2007 and 2017 and concluded that companies with higher retail investor attention tend to have lower

crash risk in stock price. Thus, the authors concluded that retail investor attention is relevant in determining stock prices because the risk of a market crash is lower, according to the study results.

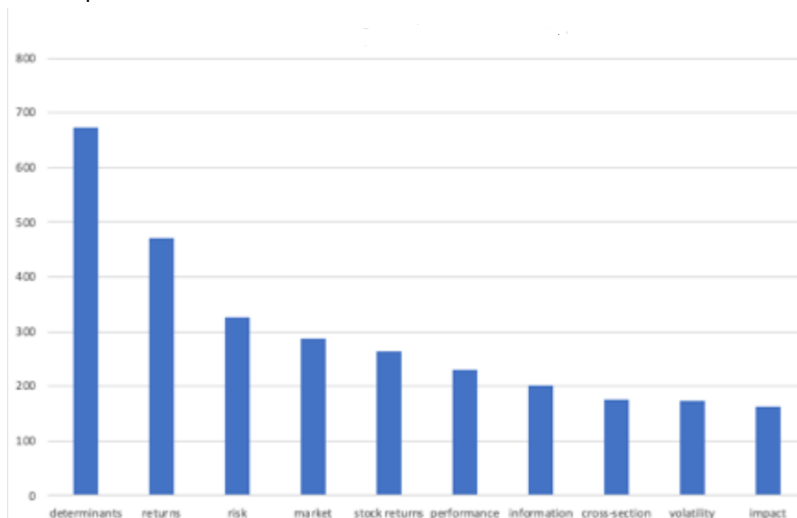
Saeed et. al. (2021) investigated the linkage of extreme returns and their determinants between green and brown energy investments. The authors found that average-based measures of association are not necessarily the same for extreme return events. Some factors driving these return linkages are related to macroeconomic factors (term spreads and interest rates), the US dollar, and uncertainty in the oil market.

The main studies on this topic aim to identify the factors most influential in explaining stock returns. These findings can be used to justify and guide future research. The following section analyses and presents the most used and relevant terms on the determinants of the profitability of listed shares.

4.4. Most relevant keywords

This section will aim to identify and categorize the words most used in the articles collected from the sample. This will allow us to understand which concepts are related to the chosen theme and relate them to the study, allowing us to create research protocols and determine directions for future research by relating terms. It also makes it possible to identify research gaps. The most relevant words are defined by their occurrences in the keywords plus field of the sample of publications, as shown in Figure 6.

Figure 6 - Most frequent words.



Source: own elaboration.

The keyword 'determinants' stands out, appearing in 674 published articles, followed by the word 'returns' in 471 articles and 'risk' in 326 articles. An analysis of Figure 6 shows that 6 words were present in more than 200 articles, and only 3 words were

present in more than 300 articles. It can, therefore, be concluded that the main objective of the observed studies is to identify the determinants of returns, in addition to studying the risk associated with the stock market. Analysing the word cloud in Figure 7, we can see the 150 most frequently used words in the publications in our sample.

Figure 7 - Word cloud.

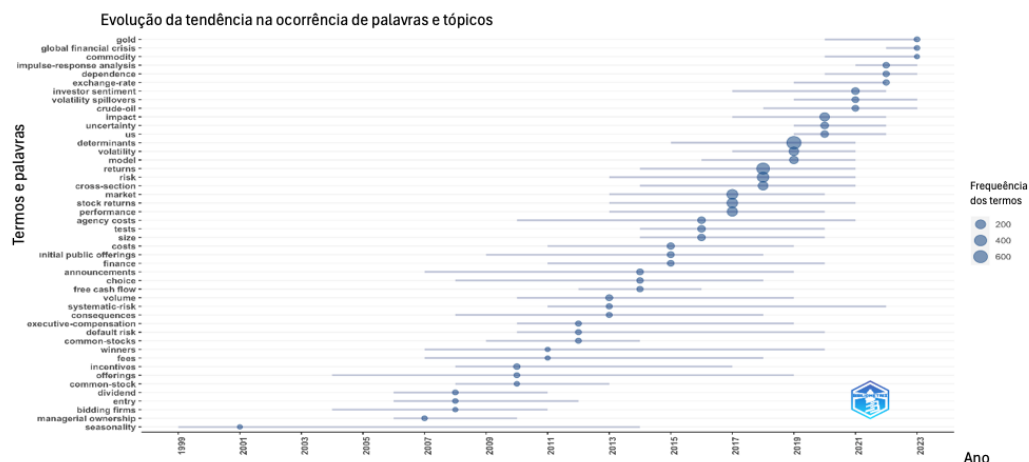


Source: own elaboration.

Figure 7 confirms the above evidence, as 'determinants' is in the center and highlighted, surrounded in turn by the words 'returns', 'risk', 'stock returns', 'market', 'performance', 'volatility', 'prices' and 'impact'. As mentioned above, this recurrence of words makes it possible to argue that these terms are of greater importance to the subject under study. Given the prominence of the words 'Determinants' and 'Returns', their relevance in the sample is crucial for identifying the theme under study and its evolution over time. Other relevant words, such as 'information', 'cross-sections', 'investment', 'model', 'returns' and 'liquidity' can also be found. On a smaller scale, we can also find 'agency costs', 'corporate governance' and 'capital structure', proving the existence of the study of these topics in the main theme. On the other hand, there is a lack of words related to sustainability, such as 'sustainability' or 'green finance'. Figure 8 shows a trend in the occurrence of words and specific themes over time.

It can be seen that at the beginning of the 21st century, seasonality was the most relevant topic. This may be related to the study of the financial crisis that affected the markets worldwide, especially the real estate market in 2008, as well as the sovereign debt crisis in the Eurozone that affected the following years.

In recent years, words such as "determinants", "volatility", "returns", "risk" and "impact" have appeared more frequently than in other years and have, therefore, taken on an essential role in academic research. In addition, in light of recent events such as the COVID-19 pandemic and the conflict between Russia and Ukraine, words such as 'gold,' 'investor sentiment', and 'crude oil' have become an important focus of study.

Figure 8 - Trend in the occurrence of words and themes

Source: own elaboration.

By analyzing keywords and their trends, we can identify patterns, interests, and changes in behavior in different contexts. We thus provide clarification for a better understanding of emerging issues and gaps in knowledge. In short, this analysis is critical to making informed decisions, identifying opportunities, and maintaining relevance in future research on the determinants of stock returns.

Thus, we could identify the relevance of these words in the articles in the sample. Over time, the stock market has been influenced by different factors, which proves the inclusion of different words with different trends in different periods. We will now look at the countries that have contributed most to the study of this topic.

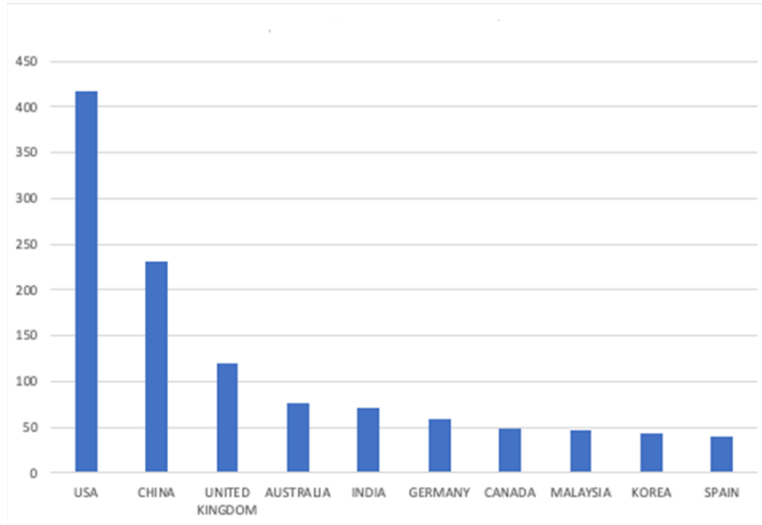
4.5. Countries that have contributed most to the development of the theme

In this segment, the main objective will be to identify which countries have contributed the most to research on the subject over time. In this way, we can understand the relationships between countries in the study of this topic and which ones have invested the most effort in clarifying this area of research.

Figure 9 shows the 10 countries that have contributed most to research in this sample.

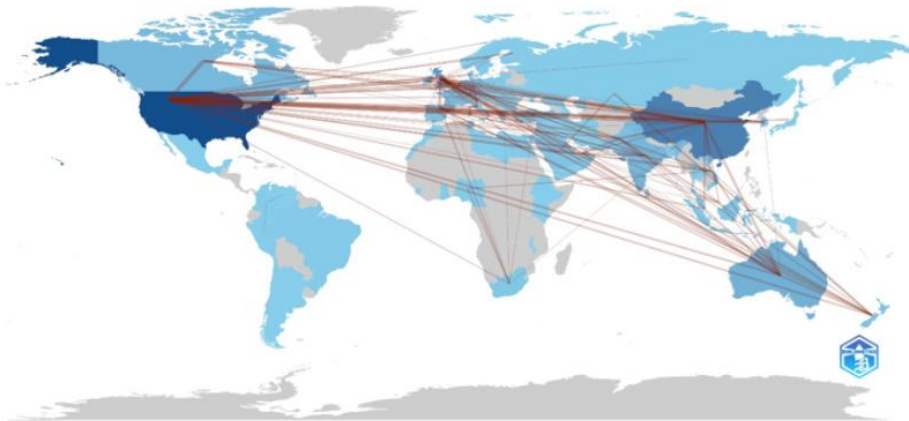
In the first instance, the United States of America has more than 400 publications and is the only country to have exceeded this target, followed by China with more than 200 and the United Kingdom with more than 100 publications. As for the other countries, only 3 have exceeded 50 publications (Australia, India, and Germany). The sum of publications between the United States of America and China is greater than the sum of publications from the following 8 countries that have published the most, demonstrating their enormous influence in the scientific community. Figure 10 shows the collaborations between the different countries.

Figure 9 - Publications by country of the 1st author.



Source: own elaboration.

Figure 10 - Collaborations between countries.



Source: own elaboration.

We quickly realised that the United States of America and China have a strong working relationship, as does the United Kingdom, which makes the sample relevant in terms of the universality of the issue. The global relevance of the issue is evident, confirming the importance mentioned above.

This analysis of countries and collaborations provides researchers and future researchers in the field with a clearer picture of possible collaborations that could contribute to the growth of knowledge. International collaborations allow the exchange of different levels of knowledge, cultures, and visions, promoting innovation and the development of new approaches. Academic networks promote the global dissemination of knowledge and, thus, the advancement of science on a global scale.

5. Discussion of the results

The bibliometric analysis of stock profitability determinants reveals a significant evolution in understanding the factors influencing stock performance. Classical models, such as Markowitz's (1952) efficient portfolio theory, Sharpe's (1964) Capital Asset Pricing Model (CAPM), and Fama and French's multifactor models (1993, 2015), have established a solid foundation for investigating stock returns. In particular, Fama and French's three- and five-factor models, which incorporate firm size, price-to-book ratio, profitability, and investment, have enhanced the comprehension of return sources.

However, contemporary literature has integrated new variables and approaches, reflecting the dynamics of global financial markets. Sustainability, particularly green finance and Environmental, Social, and Governance (ESG) criteria, has emerged as a critical factor in long-term performance (Bassen et al., 2023). Recent studies suggest sustainable practices improve return predictability and reduce volatility (Zhou & Zhou, 2022; Bae et al., 2021). Simultaneously, digitalization and technological innovation introduce new risks and opportunities, challenging traditional models (Munteanu et al., 2023).

Macroeconomic factors, including interest rates, inflation, and economic growth, also play a pivotal role. Zhang et al. (2023) analyzed the impact of interest rates on stock returns in emerging markets, concluding that interest rate increases negatively affect returns, particularly in capital-intensive sectors. Similarly, Amanda et al. (2023) demonstrated that high inflation adversely affects real returns, especially in industries highly sensitive to production costs. Furthermore, geopolitical instability has been linked to increased market volatility, with prolonged effects on emerging markets (Ahmed & Lee, 2024).

Additionally, corporate governance remains a fundamental determinant of stock returns. Core et al. (1999) highlighted the relationship between weak governance structures and lower stock valuation. Campbell et al. (2008) reinforced this link by identifying leverage and profitability as significant determinants of corporate solvency and stock price formation. In summary, research on stock profitability has evolved by integrating traditional financial models with emerging variables related to sustainability, digitalization, and macroeconomic factors. This adaptation of financial models to global dynamics constitutes a promising avenue for future research.

6. Conclusions

This study has analyzed research trends on the determinants of stock returns over the entire period this topic has been studied, using a bibliometric analysis of the WoS database. Considering the sample selection process, 1756 publications were considered. To the best of our knowledge, this is the first study to perform a bibliometric analysis on this topic.

We identified the most influential works, the countries of publication, the sources with the most published records, the authors, the keywords, and the citations. The increase in publications over the years reflects the recognition of the determinants of stock profitability as important for society to improve the well-being of society, the economy, and

stakeholders. Based on annual scientific productivity, the publications per source and the impact generated, we can conclude that the topic of the determinants of stock profitability has become increasingly relevant.

Research on this topic has grown steadily over the years, with a recent upward trend and increasing impact on the scientific community. The Journal of Banking & Finance is the academic source with the highest number of publications on the subject. At the same time, the Journal of Financial Economics stands out in terms of relevance, as measured by the h-index. This overview helps to identify the most influential sources.

The countries that have contributed most to the number of articles published are the United States of America (USA), China, and the United Kingdom. There is more research collaboration between the USA and China. As regards the most cited articles, Barberis et. al. (1998), followed by Core et. al. (1999), stand out with more than 1000 citations. When analysing the most recent papers, i.e., from the last five years, we find the article by Wen et. al. (2019) with over 200 citations.

Based on the findings of the most cited articles, the main conclusion is that the value of a stock is influenced by several determinants, including news and investor sentiment (Barberis et. al., 1998; Easley et. al., 2002), governance structure and governance practices (Adams et. al., 2005; Core et. al., 1999). Campbell et al. (2008) point to the determinants of bankruptcy, such as low profitability, leverage, and past returns, as relevant factors, along with Cooper et al. (2008). When we analyze more recent works, they point to investor attention and sentiment, as well as macroeconomic factors such as interest rates, oil market uncertainty, among others (Wen et al., 2019), and environmental sustainability, such as energy (Saeed et al., 2021). This evidence allows us to justify and point out avenues and directions for future research. International collaborations can be enhanced by identifying research gaps and emerging trends and fostering local knowledge and experience exchange. Participation in international consortia and conferences and publishing in high-impact journals are effective strategies to expand the reach of studies and strengthen global scientific partnerships.

This study is important for researchers and managers as it helps them to understand the consequences and evidence of determinants, which helps managers make more effective financial decisions. However, it is limited because it is a bibliometric analysis that only considers the WOS database, which may bias the sampling method. Therefore, using another bibliometric source, such as the Scopus database, would be of great value in the future.

This paper presents some conclusions that may lead researchers to new avenues for further research. Exploring the impact of corporate social responsibility and ESG characteristics on stock valuation can provide valuable insights into how companies can capitalize on their advantages to drive sustainable performance and growth in a constantly evolving business environment. Future directions for this study may focus on several key areas. First, explore integrating additional emerging factors, such as artificial intelligence, blockchain technology, and the growing importance of data privacy, into stock profitability models. Second, cross-country comparisons are conducted to assess how different regulatory environments and market structures influence stock returns, particularly in emerging markets. Third, the interaction between environmental, social, and governance

(ESG) factors and financial performance across different industries is investigated. Finally, further examines the impact of macroeconomic variables and geopolitical risks, especially in light of global crises such as the COVID-19 pandemic, armed conflicts, and climate change.

7. References

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