

THEMATIC RESEARCH OF FINANCIAL RATIOS AND RISK ASSESSMENT BASED ON BIBLIOMETRIC ANALYSIS

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Abstract:

The main objective of this paper is to conduct a fundamental thematic research on financial ratios and risk assessment. As research methods, a systematic review of the field of knowledge in this domain was used, as well as a bibliometric analysis – the cluster method – carried out on a scientific material comprising 209 articles extracted from the academic Web of Science platform, using the Bibliometrix software. The review of the literature revealed that there is no consensus on how to use financial indicators in risk analysis, dichotomic approaches being identified for specific situations, depending on the purpose of research and on the methodological tools used. The main results of the bibliometric analysis reflect that research on risk assessment through the use of financial ratios has significantly increased in volume as a result of the global economic and financial crisis. The most popular topics according to the results obtained are focused on predictive risk analyzes, the use of financial rates in the performance analysis of economic entities, but also in the assessment of financial risk, insolvency or fraud risks, the use of econometric models in carrying out risk analysis and the use of statistical analyzes in risk assessment activities..

Key words: Bibliometric Analysis; Bibliometrix; Financial Ratios; Risk Analysis; Risk Assessment.

JEL classification: D81, H26

1. INTRODUCTION

This research's main aim is to conduct a systematic thematic review of the literature through a meta-analysis of the most relevant scientific papers, on themes related to financial rates, risk assessment and risk analysis, in conjunction with an in-depth bibliometric analysis of a body of scientific documents extracted from the academic platform Web of Science, by reference to the field of interest and analyzed through the Bibliometrix software.

The main objectives of the fundamental and bibliometric research are: O1 – determining the current state of knowledge in the field of financial rates and risk analysis; O2 – the systematic review of the most relevant scientific papers on *financial ratios* and *risk assessment* through a meta-analysis; O3 – making a bibliometric analysis of the relevant works from the International Web of Science database on the topic of *financial ratios* and *risk assessment*.

The motivation for this scientific endeavor consists in:

- identifying the frequency and efficiency of the use of financial rates in the risk assessment analysis;
- establishing research trends in these areas, enabling the identification of areas of research that have not yet been addressed or for which it would be justified to carry out broader and more in-depth research in the future;
- identifying the most influential scientific papers that take into account the topic of financial rates and risk assessment;
- analysis of the temporal evolution and spatial dispersion of existing scientific publications on these topics.

2. LITERATURE REVIEW

The use of financial ratios in carrying out vertical or horizontal analyzes of balance sheet indicators is a frequent method of assessing the relative performance and financial position of

economic entities in terms of liquidity, profitability, solvency, operations, profitability, indebtedness, financial stability, structure and rotation of assets and liabilities, efficiency of activities and more, being a critical tool of business strategy and decision-making policy of all categories of stakeholders.

From an informational perspective, financial indicators play a vital role in any efficient capital market (Arkan, 2016). This has motivated the growth of scientific production in this field, with researchers paying special attention and studying financial rates for almost a century. From the review of the field of knowledge, Kendall (1953) was identified as one of the first authors to attempt to explain changes in share prices using an analysis of the financial situation, thus being the pioneer in the field of using the analysis of financial indicators rates.

According to Kieso et al. (2013) an indicator expresses the mathematical relationship between one quantity and another and covers two financial or patrimonial values, which help to benchmark the performance of an entity with another entity.

However, financial indicators have gone beyond their traditional role of comparing and predicting the performance of an economic entity in order to invest (Ak et al., 2013). Currently, these indicators are used by a wide range of stakeholders, including: credit institutions, management, auditors, the state and even the general public. Credit institutions often use financial indicators to reduce and manage operating risk (Nadar and Wadha, 2019). Also, auditors and public authorities use these indicators to identify fraud and other irregularities in the economic entities (Izzalqurny et al., 2019; Rudkhani and Jabbari, 2014; Amaechi and Nnanyereugo, 2013). However, not all researchers are convinced of the effectiveness of financial indicators in fraud detection and risk reduction, with Kaminski (2004) providing empirical evidence of the limited capacity of financial indicators to detect and/or anticipate fraudulent financial reporting. However, the role of financial indicators is even more comprehensive, as they are also used in the macroeconomic analysis of periods marked by financial crises (Constâncio, 2014), and more recently by the health and economic crisis situation generated by the Covid 19 pandemic (Akhtaruzzaman et al., 2021), decisions being made based on them, on how to restore the economy.

In addition, financial indicators are intended to help users of the data and information contained in the financial statements and other categories of stakeholders to identify areas of vulnerability with regard to liquidity, profitability, solvency, operations, financial position, the debt or financial performance of an entity, to make predictions and to substantiate the decision-making process. From this comparative analysis and assessment of an entity's performance, financial indicators help assess the entity's overall risk (CICA, 1993). However, financial indicators are not standardized. Consequently, different authors and institutions use an arbitrary list of indicators according to their own criteria and objectives (Lucic, 2014). Moreover, certain indicators that are calculated and published by a number of entities are not calculated in accordance with the methods of the International Accounting Standards Board (IASB). Overall, according to Risk Management Association USA (2019), we can classify these indicators into 4 large groups: profitability indicators, liquidity indicators, debt indicators and operational/efficiency indicators.

3. RESEARCH METHODOLOGY

The methodology of the in-depth bibliometric research, involved the collection of data and information to be analyzed and interpreted, by accessing the scientific platform Web of Science, by applying thematic filters aimed at financial rates and risk assessment and analysis, selection of research areas, by narrowing the field only to *Business*, *Economics*, *Enterprise Finance* and *Management* and extracting the resulting body of scientific documents, comprising of 209 results, into a single database, as can be seen in (table no. 1).

Table no.1. Methodology of data collection

Database: ISI Web of Science	
Search initiated: („financial ratios”) AND („risk assessment”)	
Inclusion criteria: research areas: Business Finance, Business, Economics and Management.	
Results	
No exclusion criteria	593
With exclusion criteria	209
Date of access	12.04.2022
Selected articles	209
Link WOS: https://www.webofscience.com/wos/woscc/summary/774b2020-6187-4dbd-9123-b5bf41210df6-3059d3cd/relevance/1	

Source: Author's own processing

Subsequently, the body of scientific documents selected in the previous stage was processed in the Bibliometrix program, with the main purpose of identifying the main thematic clusters based on deductive context reasoning, and afterwards the obtained results were analyzed and discussed.

4. RESULTS AND DISCUSSIONS

The in-depth bibliometric analysis carried out used a methodological algorithm consisting of several stages of analysis as follows: the analysis of the temporal evolution of scientific production, the analysis of general trends regarding the research directions of selected scientific publications and the analysis of clusters and themes identified after the processing of the scientific material in the Bibliometrix program.

From the point of view of the evolution of the number of publications, following the processing of the analyzed data resulted (figure no. 1), presented below.

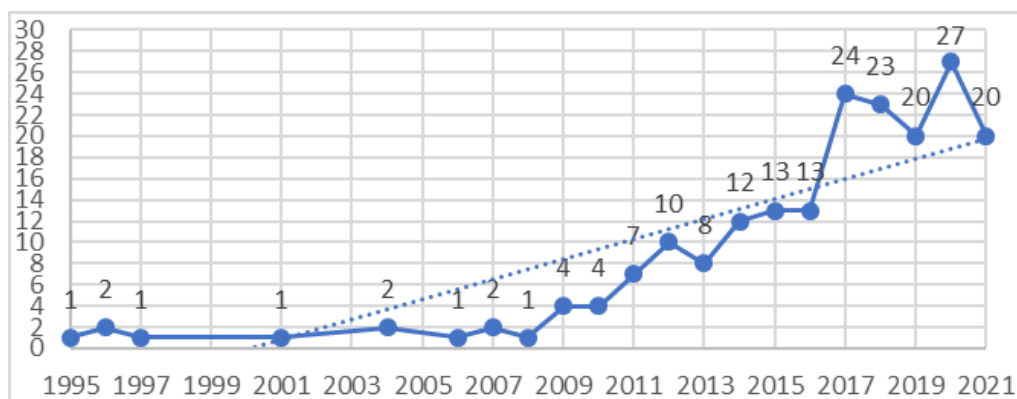


Figure no.1. Evolution of the number of publications on the topics of financial ratios and risk assessment

Source: Author's own processing

(Figure no. 1) shows the evolution of researchers' interest in research topics related to financial rates and risk assessment, by reference to different time frames. Thus, through analysis, it is found that there is a direct correlation between the evolution of the number of scientific publications and the cycles of the economy, respectively the significant increase of production in the periods marked by the emergence and manifestation of the global economic and financial crises. This is due to the fact that more and more researchers recognize the need for risk assessment as a method of monitoring, forecasting, and controlling activities that are vulnerable to financial risk, especially after the financial crisis of 2008.

In terms of the number of scientific publications by country of origin of publications, the top countries with the highest production of scientific publications are the United States with 66

publications, followed by China with 60 publications and the United Kingdom with 42. Thus, there is a high interest in financial indicators and risk assessment from the world's major powers, but also from developing countries located in Eastern Europe.

The analysis of the most common keywords used in the scientific material studied, grouped critically by thematic clusters and countries, showed that the most popular research topics concern forecast risk analyzes, the use of financial rates in analyzes of the performance of economic entities, but also in the assessment of financial risk, insolvency or fraud, the use of econometric models in carrying out risk analysis, the use of statistical analyzes, mainly discriminatory analysis in the framework of risk assessment, as well as research on stakeholder theory in the context of financial risk assessment and management. Thus, the most common words used in the research conducted in the field were identified as being: risk, prediction, rates, financial rates, management, models, insolvency, discriminatory analysis and performance.

The geographic structure of the research revealed that China took the first place in terms of the use of the most common keywords, followed by the United States and the United Kingdom. Therefore, given the fact that the United States is first in the ranking of publications production, but second in place, after China when considering the use of the most popular keywords, it can be inferred that authors from the United States focus on less popular themes compared to the rest of the countries in the analyzed ranking.

Following the processing of the scientific publications base extracted from the Web of Science platform, with the topic of financial rates and risk assessment, 1080 keywords were identified, of which 49 meet the minimum set criterion of 5 appearances.

The keyword association network reveals that there are 5 thematic clusters, each represented by a different color. The first cluster in size is red and consists of 15 keywords, the theme being centered on risk, especially credit risk, stability and impact. The keywords in this cluster have many external links with other clusters, especially in terms of risk-related words, which indicates that the other clusters are subsumed to the risk assessment and analysis theme. The next cluster in size is represented by the color green and has 12 keywords in its composition. This cluster has financial rates as its main theme, and contains significant links with the other identified clusters. Thus, it can be noted that there is an increased interest on the part of researchers in the classification of financial indicators and their role in the assessment of the risk of bankruptcy. The blue cluster has 10 keywords in its composition, and the main theme is the risk assessment. It includes keywords related to performance, efficiency, information and banks. The yellow cluster consists of 10 keywords and indicates an interest from researchers in carrying out predictive analyzes based on the evolution of financial indicators and their use in risk assessment and monitoring. The last cluster consists of only 2 words and has a purple color, the theme being that of credit score.

Therefore, based on the analyzed clusters, we can conclude that the main research trends are related to the use of financial rates to monitor and assess the risks related to the activities of economic entities. As regards the specific nature of the term risk, it is noted that it mainly concerns financial risk, assimilated to the activity of obtaining credit and financing of operating activities, and in the alternative there are also research topics related to the monitoring and evaluation of the risk of bankruptcy, as well as mapping the exposure on the tax risk, fraud and error range.

Thematic mapping of the body of selected scientific material from the Web of Science platform was carried out through the Bibliometrix program, the results being showed in (figure no. 2).

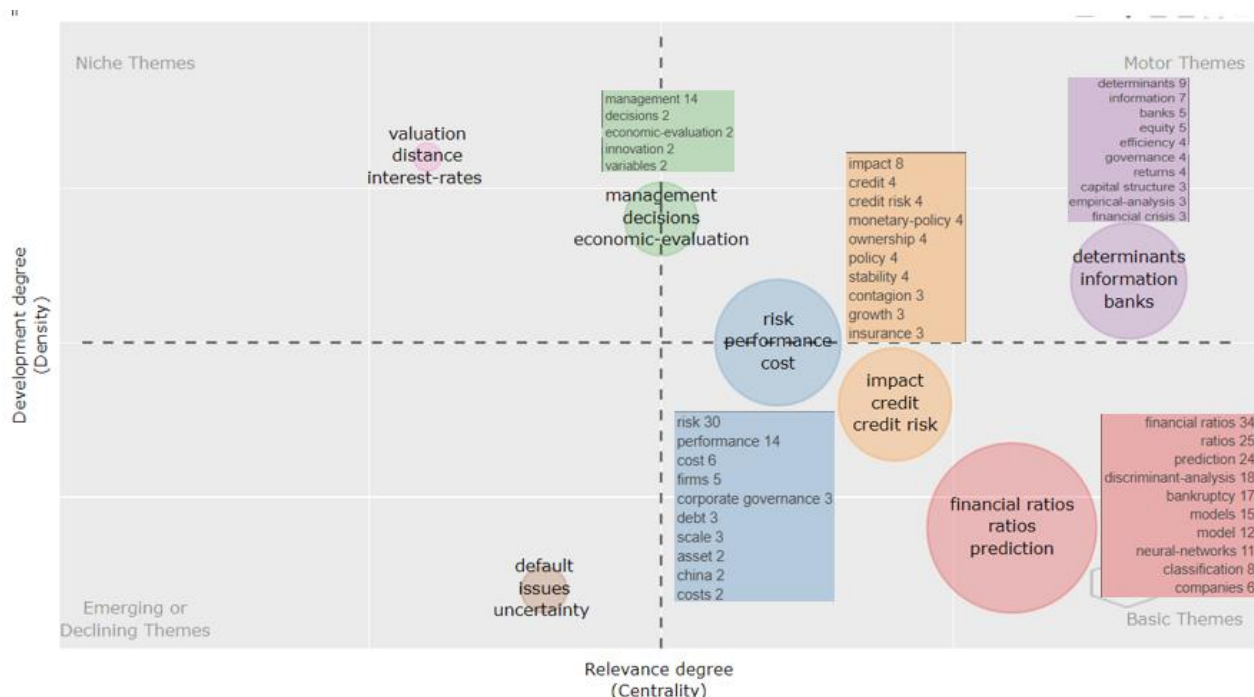


Figure no. 2. Thematic mapping of the body of selected scientific material from the Web of Science

Source: Author's own processing

Thematic mapping based on keyword density and centrality allows a view of topics of interest in research on the use of financial rates in complex risk assessment activities. Thus, it is noted that there are 7 thematic areas, presented in the structure by reference to the specific characteristics of centrality and density.

The first thematic area (Red Zone) refers to forecast analyzes based on financial rates and by reference to the most commonly used terms in the scientific material studied, indicates the use of methods, analyzes and statistical tools in conducting research, respectively discriminatory analyzes, econometric models, classification trees and neural networks, with impact at the level of economic entity.

The second thematic area (Orange Zone) focuses on assessing credit risk and the impact of elements relating to financial stability, entity growth policies and strategies and capital ownership structure on attracting sources of finance. Sub-themes related to the impact factors on monetary and macroeconomic policy indicators are also considered.

The third thematic area (Purple Zone) is focused on capitalizing on and using information in the context of the need to ensure the obtaining of credit and financing of activities from banking institutions. The main keywords grouped within the area are: determinants, information, banks, equity, efficiency, governance, capital structure, returns, empirical analysis and financial crises.

The fourth thematic area (Blue Zone) is aimed at carrying out risk analysis and measuring financial performance, cost and debt policy and corporate governance.

The fifth thematic area (Green Zone) aims to substantiate management decisions by conducting economic cost-effectiveness analysis and also contains terms as innovation and variables.

The last two thematic areas contain substantially limited clusters, which consist of three words, namely *uncertainty*, *lack* and *problem* in the case of the brown area and *valuation*, *distance* and *interest rates* in the case of the pink area.

The analysis shows a clutter of themes in the area of basic themes, which are frequently researched, where the themes of predictive analyzes based on financial rates are located, using methods, statistical analyzes and instruments and those aimed at carrying out risk analysis and measuring financial performance, cost and debt policy and corporate governance.

The current and increased interest themes are those in the purple and orange areas, namely the exploitation and use of information in the context of the need to ensure the obtaining of credit and financing of activities, and the assessment of credit risk and the impact of elements relating to financial stability, to policies and strategies for the growth of entities and capital ownership structure, on attracting sources of finance.

The quadrant of the topics less addressed in the research refers to the substantiation of management decisions by carrying out analyzes of economic profitability and to the anchor concepts in the pink area, namely *valuation*, *distance* and *interest rates*.

The last quadrant is polarized on the specifics of topics that are in decline or barely addressed by researchers and contains the brown thematic area, centered on the keywords: *uncertainty*, *lack* and *problem*.

5. CONCLUSIONS

The purpose of this research, namely to carry out a systematic thematic review of the literature through a meta-analysis of the most relevant scientific papers, subsumed to the topics related to financial rates and risk assessment and analysis, corroborated with a thorough bibliometric analysis of a body of scientific documents extracted from the academic platform Web of Science, by reference to the field of interest and analyzed through the Bibliometrix program, was achieved through the main objectives formulated.

Thus, the current state of knowledge in the field of financial rates and risk analysis has been determined, the results of the research indicating that the main research areas concern financial risk, assimilated to the activity of obtaining credit and financing economic activities, in the alternative, there are also research topics related to the monitoring and assessment of bankruptcy risk, as well as mapping the exposure on the tax risk, fraud and error profiles.

As regards the efficiency of the use of financial rates in the risk assessment analysis, it was concluded from the documentary material analyzed that there is no consensus in this direction, as there is no standardization, with dichotomist approaches in specific situations, depending on the purpose pursued and the methodological tool used.

The in-depth bibliometric analysis carried out revealed that the volume of scientific publications in the field of risk assessment, through the use of financial rates, has been on an upward trend in the last 15 years, with peak points being recorded in the periods marked by the emergence and manifestation of global economic and financial crises, researchers exploring various ways to assess, predict and reduce certain risks that are inherent in economic activities.

From the point of view of territorial dispersion, it was found that the United States of America had the largest production of scientific publications, followed by China and Great Britain. From the analysis of the frequency of the topics addressed, it was concluded that scientific publications in the United States of America deal with topics less addressed by researchers and those in China, with frequently researched and for which there is an increased interest in the field of research.

The thematic mapping of keywords in the literature revealed that the most popular research topics concern predictive risk analyzes, the use of financial rates in analyzes of the performance of economic entities, but also the assessment of financial risk, insolvency or fraud, the use of econometric models in the conduct of risk analysis, the use of statistical analyzes, mainly of discriminatory analysis in the framework of risk assessment, as well as research on stakeholder theory in the context of financial risk assessment and management.

The thematic area less addressed in research in the field of financial rates and risk analysis, refers to the substantiation of management decisions by carrying out analyzes to assess economic profitability.

As regards the limits of the research carried out, they relate mainly to the limited scientific material analyzed, composed of a body of only 209 scientific publications analyzed, which were

extracted only from a database, without containing other publications of interest in the field published and indexed in other international databases.

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