


BIBLIOMETRIC ANALYSIS OF BRAZILIAN SCIENTIFIC PRODUCTION ON DERIVATIVES

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ABSTRACT

After the 2008 American crisis, the topic of Derivatives gained prominence in the media and the financial market became the core of research mainly due to issues of sustainability of the world economy. This work aims to carry out a bibliometric research with an academic character on the theme Derivatives and Financial Market. As a result, it was possible to verify that there is a gap between 2000 and 2007, where there was no publication on this topic on the CAPES portal. It was also possible to make a comparison with the educational institutions (HEIs) that published the most on these topics and to classify the topics most addressed by the authors.

Keywords: Bibliometric Analysis. Derivatives. Financial market.

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INTRODUCTION

The global financial crisis of 2008 put the financial market and its instruments, especially derivatives, under the spotlight of the media and academia. Derivatives, once seen as sophisticated and specific tools for investors and companies, have come to be discussed in broader terms, due to their role in amplifying risks and in the fragility of the global economic system. In this context, the sustainability and stability of the financial market have become central research themes, raising questions about the use of these instruments in the financial environment.

This study aims to investigate the academic production related to derivatives and the financial market through a bibliometric analysis. Using data collected from the CAPES portal, it seeks to identify publication trends, time gaps and the most recurrent themes. The analysis also considers the higher education institutions (HEIs) most active in this area, allowing a comprehensive view of the panorama of Brazilian academic research in this field.

Throughout the study, important observations were revealed, such as the absence of significant publications between 2000 and 2007 on the subject of derivatives, as well as the identification of the HEIs that lead the publications. Thus, this work seeks to contribute to the understanding of the evolution of the academic debate on derivatives and its role in the financial market, in addition to providing subsidies for future research.

DERIVATIVES

The financial market is an extremely important area of knowledge for organizations, individuals and society in general. In recent times, topics such as financial education and the financial market have appeared in the search for knowledge constantly in academia and outside it.

For Gitman (2010), the study of finance seeks to understand the aspects of the management of financial resources in order to use them in the best way, always looking for opportunities and making decisions that may benefit investors in the future. The study of finance takes place in a dynamic way and tends to continuously adjust to the moments in which the economy finds itself (Assaf Neto, 2014).

Over the past few years, the basic interest rate (SELIC) has shown a decrease that ended up affecting fixed income funds in Brazil, since these funds are linked to this index. According to data from the Central Bank of Brazil (BACEN, 2019), the SELIC rate on

07/29/2015 was 14.25% per year and on 07/31/2019, four years later it went to 6% per year.

These data indicate that BACEN acts to reduce the basic interest rate as a matter of controlling inflation and heating up the economy, however, for investors looking for fixed profitability, this scenario becomes not so satisfactory.

The financial market is widely discussed in academia, and for this reason several definitions can be found, one of them, according to Brito (2013), is that the financial market can be defined as a set of institutions ranging from established banks to investment funds, as well as individuals with the intention of obtaining results and bodies that regulate the activity in Brazil. The one responsible for regulating stock activities is the Bolsa, Balcão, Brasil (B3), as well as there are economic agents to manage the national economy such as the Central Bank, which acts actively and can even intervene in the dollar exchange rate.

In the financial market, one of the main assets that are traded are shares, which according to Sandroni (2002) means "Document that indicates that its owner is the owner of a certain fraction of a certain company", but there are other assets such as commodities "a particular type of raw commodity or primary product of commercial importance, as is the case of coffee, of tea, wool, cotton, jute, tin, copper etc.", currencies that according to Castan (1985) represent a value and serve as an instrument of circulation, this value can be called backing, as in the USA where oil is used and in Brazil it is a dollar reserve, as this there are fluctuations in the real dollar relationship, and there where the negotiations are made, and finally the indexes, which can be representations of a country's top companies, such as the S&P 500 index that represents 500 major American companies.

Depending on these trades made, the loss can be gigantic, and to control these losses, sub-assets can be used, which are called derivatives that, according to the definition of Sandroni (2002), represent financial operations that have their value derived from other assets, and that is precisely why it is given this name.

Table 1: Assets and their respective derivatives

Actions	Options Market
Commodities	Futures Contracts
Coins	
Index	

Source: Authors

As previously stated, derivatives can be used as a *hedge*, as they have a direct correlation with their original asset, that is, it is possible to lock a loss by buying an asset and selling it proportionally in its respective derivative, until it is possible to unlock the operation.

Derivatives can also be traded individually, as in the options market that has gigantic variations, reaching more than 5,000%, as in the case of Petrobras options, operations in the dollar futures markets, among others.

Based on these facts, it is understood that such moments and transformations that occur in the Brazilian economy tend to influence the choice of texts that are published in scientific journals, since the theme is of common interest and needs to be explored of a scientific nature.

One of the most used and appropriate means to measure and analyze such evolution of research and scientific production in a specific area is the use of the bibliometric study, which study will be used in this work. For Macias-Chapula (1998), the bibliometric study is the "study of the quantitative aspects of the production, dissemination and use of recorded information". According to Macias-Chapula (1998) informs that bibliometrics includes a set of laws and empirical principles, this set helps and contributes to the establishment of the foundation of the theory and makes an expenditure of information for Science.

In this work, a bibliometric research was carried out on the keywords "Derivatives" and "Financial Market" where the objective was to observe how much these issues are discussed in the academic environment and their contributions.

METHODOLOGY

According to Macias-Chapula (1998), bibliometrics is an area of information science studies that aims to analyze scientific activity around a specific subject, using quantitative methods of publications made in congress periods and annals.

Bibliometric research contributes to the observation of the state of science and technology using all the scientific production recorded in a data repository. It can be presented as a method that will allow a given country or region to be situated in relation to

the world, the various institutions in relation to a country, and individual scientists in relation to the scientific communities themselves.

To carry out this research, a bibliographic research was carried out to obtain greater knowledge on the topics of assets, derivatives and financial market and the organization of its various themes of study, as well as on bibliometrics and its proper application to identify the main characteristics of the scientific works found.

The sample had 79 articles that were identified through the portal of the Coordination for the Improvement of Higher Education Personnel (Capes) using the first keyword "Derivatives" and the second "Financial Market". A filter was performed for only articles published and reviewed in periods and in this filter 14 that appeared on the portal but were published in journals that were not academic were excluded. The sample also presented 2 articles that were repeated and were also excluded, leaving the sample with 63 articles to carry out the bibliometric study.

It was decided to cut 20 years in order to consider the analyzed period satisfactory and to obtain more information and current characteristics of the scientific production on the subject of Derivatives published in periodicals.

For information about the authors and their respective universities of origin, the date on which the articles were published was used as a reference. After collecting the data from the scientific articles via the Capes portal, they were analyzed, structured and categorized with some indicators such as region, journal, year and theme using the Microsoft Excel software.

RESULTS AND DISCUSSION

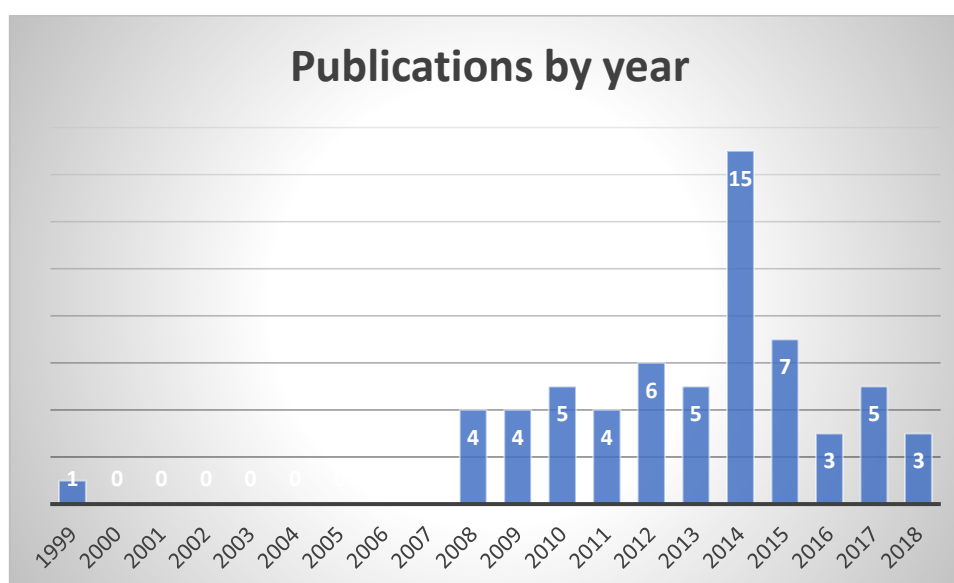
Data collection for bibliometric analysis was carried out in August 2019, resulting in 79 articles, published from 1999 to 2018, which were carefully analyzed in this study.

Of the 79 articles analyzed, it was found that 16 articles were impertinent, which were selected by the search tool because these articles were published in journals that were not academic and/or were repeated, in this case, 63 articles were considered in the bibliometric study.

The first article published and available on the CAPES Journal Portal was from 1999, authored by Carvalho (1999), a professor at the School of Economics and Administration at USP. The article is entitled "Disclosure of Derivatives", and was published in the journal Caderno de Estudos da FIPECAFI. A detail that draws attention is that in the period from

1999 to 2007 there was no publication with this theme. Between 2008 and 2013 there was a small number of publications, but from 2014 onwards there was a significant growth in publications. The data can be seen in Figure 1.

Figure 1 – Absolute frequency of the evolution of Brazilian scientific production on Derivatives between 1999 and 2018

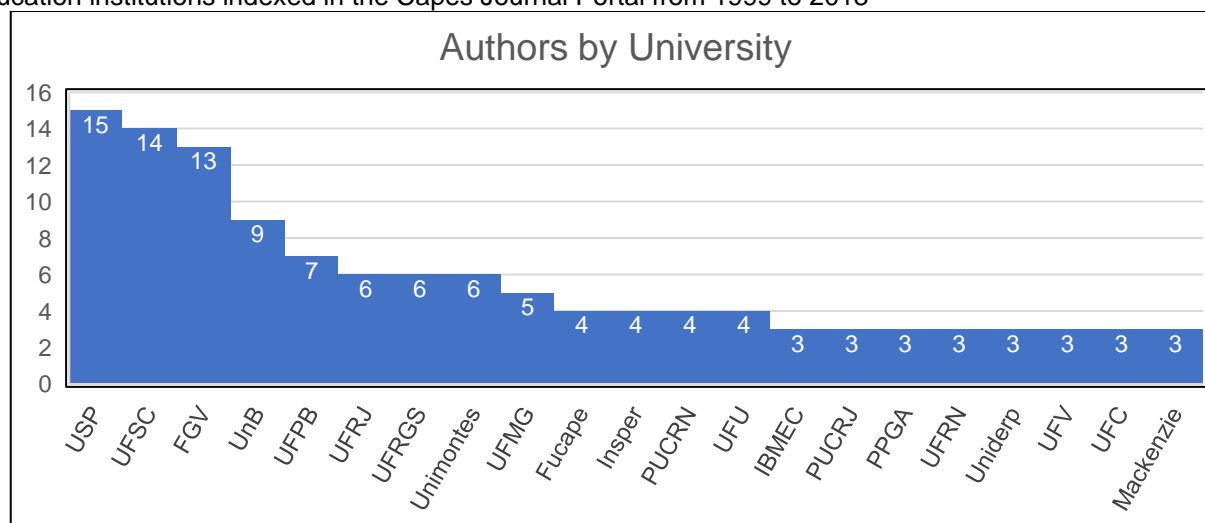


Source: Authors

An analysis of the ranking of Brazilian institutions with the highest number of authorships of publications in the area of Derivatives was carried out in order to survey the research institutions on this topic. Within the total sample of 42 higher education institutions (HEIs) with at least 3 authors in the Capes Journal Portal database, fourteen (33.33%) are federal educational institutions, two (4.76%) are state universities, and twenty-six (61.91%) are private institutions.

The University of São Paulo (USP) occupies the first place, with fifteen associated authorships, that is, the IES has an author of an article who informed that he was affiliated with the institution. An article may be counted more than once, depending on the number of authors of the article. In the 63 selected articles, 154 authors were identified, an average of 2.44 authors per article published in the period, and these values can be seen in Figure 2 in this research work.

Figure 2 - Absolute frequency of authorship of Brazilian publications on Derivatives associated with higher education institutions indexed in the Capes Journal Portal from 1999 to 2018



Source: Authors

Table 1 shows the list of higher education institutions (HEIs) with up to 3 authorships in the Capes Journal Portal in the area of Derivatives, where none of the HEIs belong to the North region and five belong to the Midwest region of Brazil. The Southeast region has the largest number of HEIs (26) and the largest number of associated authorships (87). The states with the highest number of authorships are São Paulo (n=11), followed by Rio de Janeiro (n=8) and Minas Gerais (n=6).

Table 1 - Absolute frequency of authorship of Brazilian publications on Derivatives indexed in the Capes Journal Portal from 1999 to 2018

PARENTS	REGION	STATE	QT IES	QT Authors
Brazil	Central-West	DF	5	17
	Northeast	Ceará	1	3
		Paraíba	1	7
		Bahia	1	3
		Northern Grade River	2	2
	North	-	-	-
	Southeast	São Paulo	11	45
		Rio de Janeiro	8	17
		Espírito Santo	1	4
		Minas Gerais	6	21
	South	Rio Grande do Sul	2	7
		Santa Catarina	3	17
		Paraná	3	6
Spain	Catalonia	Barcelona	1	1
USA		Connecticut	1	1
Total			46	151

Source: Authors

After performing an analysis of the sample, it was possible to observe that there are no authors with publications focused on the area of Derivatives, since practically no author was found with more than one publication in the area of Derivatives within the period considered.

In the first article, published in 1999 in the journal *Cadernos de Estudos*, the author discusses the concern with increasing information to investors by disclosing the impact of derivatives on the company's finances and especially on the body of the balance sheet.

In the second article, published in 2008 in the journal *RAE*, the researcher makes a comparison between fixed income funds and the IRF-M index, informing how it is possible to add information in a marginal way to the analysis of the performance of fixed income funds and their economic impact on the models employed.

Regarding the journals, it was found that there are five journals with more than two articles published in the period considered, which concentrate 33.33% of all articles published in the area, as shown in Table 2 below.

Table 2 - Frequency of Brazilian scientific production on Derivatives in journals specialized in Administration, Finance and Accounting by journal indexed to the Capes Journal Portal database from 1999 to 2018

Newspapers	No. of items	%
Brazilian Journal of Finance	11	17,4
Rap music	04	6,34
Accounting Environment Magazine	03	4,76
Journal of Management Sciences	03	4,76

Source: Authors

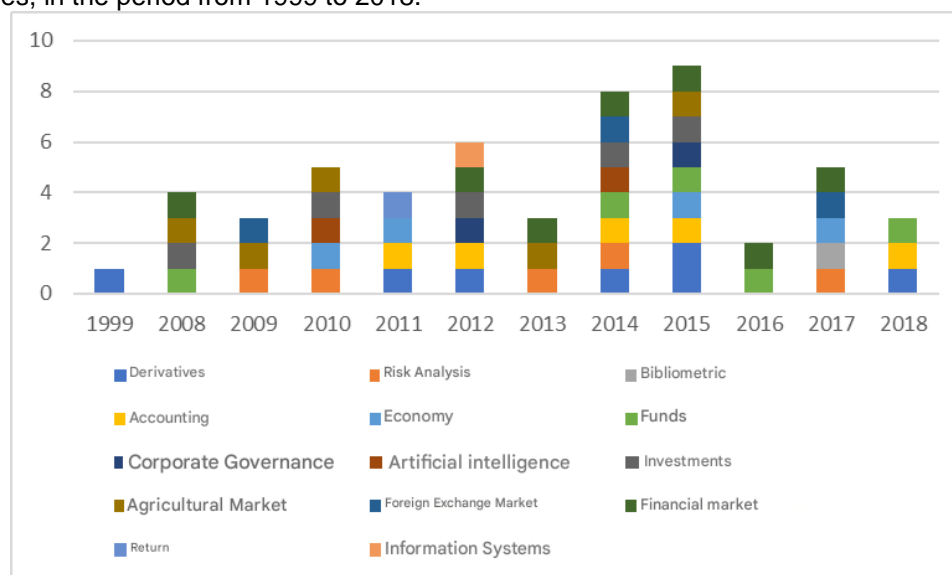
The most used journal for publications in the area of Derivatives was the Revista Brasileira de Finanças, edited by the Getúlio Vargas Foundation (FGV). As the editorial informs, the journal stands out for being the pioneer in the dissemination of knowledge about finance in Brazil with academic publications.

The bibliometric analysis allowed us to record an evolution of the themes related to Derivatives over time. In order to present a synthesis of the themes discussed in the various articles analyzed in this study, the themes in certain areas of knowledge were separated based on the themes and the main results achieved.

An area of knowledge can be classified as a set of knowledge that is realized in a collective way, and can be constructed following the nature of the object of investigation. Its purpose can be the search for knowledge, teaching, research and practical applications.

In this way, the following subareas emerged: derivatives, risk analysis, bibliometrics, accounting, economics, funds, corporate governance, artificial intelligence, investments, agricultural market, foreign exchange market, financial market, return and information system. Figure 3 shows the evolution of the themes.

Figure 3 - Evolution of the topics discussed in the journals available on the CAPES journal portal, which dealt with DERivatives, in the period from 1999 to 2018.



Source: prepared by the authors

Once the organization of these data with the evaluation of the themes was carried out, it was possible to observe that the studies and research on the theme of Derivatives were expanded over the years, in addition to the gap that occurred between the years 2000 and 2007. It should be noted that in 2008 there was the American Sub Prime crisis that dealt precisely with derivatives in the real estate market, which may be an indication that there was more demand for it because it is a relevant topic and because it is in the media constantly.

FINAL CONSIDERATIONS

The bibliometric analysis presented data on how the behavior of researchers on the subject of derivatives took place, since in Brazil people are still considered conservative in relation to investments in variable income.

The lack of publications in the period from 2000 to 2007 indicates that people did not seek to read the subject of variable income, since in this period the basic interest rate (SELIC) on January 19, 2000 was 19% per year and on December 5, 2007 it was 11.25% per year. according to research carried out on the BACEN website. After this period, the rate decreased, forcing people to seek information and knowledge in variable income, currently the rate is 6% per year.

It was found in this bibliometric analysis that the articles investigated, for the most part, remained limited to the areas of financial market, funds, accounting and risk analysis.

The study showed that the most used journal is the Brazilian Journal of Finance of FGV is the educational institution with the largest number of authorships and publications on the subject, demonstrating that there is a look and attention to the theme, its importance and relevance to the academic world.

The large concentration of higher education institutions (HEIs) as well as both lato sensu and stricto sensu graduate courses in the southeast region, especially São Paulo and Rio de Janeiro, presented the largest number of publications and journals with periods on the subject.

Finally, it was observed that the bibliometric analysis proved to be an effective quantitative tool for understanding the situation of Brazilian scientific research related to research on topics little commented on such as Derivatives and Financial Market.

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