Taxation and Foreign Direct Investments: a Revisionist study

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Resumo/Abstract

This research maps the scientific production of the last ten years about Taxation and Foreign Direct Investments (FDI). It derives valuable insights for knowledge of the current stage of scientific production and future research on the subject. This is highly relevant topic for world economies, given the recognized importance of FDI as a source of economic growth and technological development in transition economies. The methodology consists of an exploratory-descriptive approach, investigating the literature on the interrelationships between taxation and the level of FDIs through bibliometric analysis using the Proknow-C method. The results show that (i) the main current research topics are "determinants", "countries", "institutions", incentives", "fdi", "investment" and "taxation"; (ii) the most

prominent author in the references of the BP is "Devereux MP" and the journal with the most significant participation is the journal "International Tax and Public", (iii) countries like Germany, England and USA showed a strong prominence regarding the scientific production on the theme "Taxation and FDI" and finally; (iv) works by Devereux & Griffith (1998), Mooij & Ederveen (2003), Blonigen & Davies (2004) and Bénassy-Quéré et al. (2005) are highly relevant, with a decisive impact on research on the subjec

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Abstract

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Keywords: Foreign Direct Investment; Tax Reform; Tax Incentives; Economic Growth.

1 Introduction

Foreign Direct Investment (FDI) has been considered an essential for economic growth and technological development source in transition economies (Silajdzic & Mehic, 2022). For countries in transition, foreign direct investments (FDI) can be of great importance for structural change in the economy, improving international competitiveness, and general economic and social development (Getzner & Moroz, 2020). In addition to numerous other externalities that, if realized, would boost the economic growth of the receiving country (Carminati & Fernandes, 2013).

In this context, several developing economies have dedicated themselves to understanding the determinants of FDIs so that they can become attractive for attracting them. Previous literature on FDI attractiveness has identified several factors that make a country attractive for FDI. However, it has still encountered difficulties explaining what occurs when several countries are approximately equal in all these factors (Bailey & Warby, 2019). Moreover, given the many possible determinants that theory and intuition suggest, it is difficult to know which regressors are genuinely significant and which appear to be so due to omitted variable bias (Chanegriha et al., 2017).

Among possible determinants, tax policy and other factors have been seen as essential in attracting FDI. In practice, countries trying to attract foreign direct investment usually use various tools to influence the foreign investor's allocation decision by reducing corporate tax rates (Alvarez-Martinez et al., 2019) by lowering corporate tax rates, offering different tax incentives, or even changing their entire tax regime (Azemar & Dharmapala, 2019; Paun, 2019).

However, the effects associated with providing these incentives are often questioned, especially in light of the need to achieve at least a minimum level of attractiveness in the business environment (Hintosova et al., 2021). Moreover, previous research has pointed out that tax incentives are rarely decisive factors in firms' location decisions (Danzman & Slaski, 2021, 2022).

Given the preference for attracting FDIs through tax policy, several studies have been devoted to analyzing the effects of tax incentives as determinants of Foreign Direct Investment (FDI) flows among world economies (Lawless, 2013). Previous studies have analyzed the effectiveness of tax incentives in attracting investment (Klemm & Van Parys, 2012), the relationship between tax rates and the level of FDI (Lawless, 2013), the relationship between corporate tax reductions and level of FDI (Baccini et al., 2014), the effects of fiscal decentralization on tax incentives among subnational governments (Li, 2016), the determinants of the establishment of subsidiaries of multinational companies in tax havens (Jones & Temouri, 2016), the impact of taxation and other factors on GDP and FDI (Paun, 2019) and the effectiveness of tax policy in attracting FDI in transition countries (Silajdzic & Mehic, 2022).

The results of this research point to a negative relationship between tax rates and GDP and FDI (Klemm & Van Parys, 2012; Lawless, 2013; Paun, 2019). However, although tax policy is an essential determinant of FDI, it is not the main factor (Paun, 2019). Its effects seem to be conditional on technological development (Silajdzic & Mehic, 2022), in addition to other factors such as infrastructure, unemployment, cost of doing business, and labor force (Paun, 2019).

In this context, it is noted that the literature analyzing the relationship between taxation and FDI has still found some mixed (Baccini et al., 2014) and inconclusive, generating a large field for research. Thus, to contribute to the literature that investigates the relationship between taxation and FDI attraction, this study aims to **expand the knowledge about previous research that examined the effects of tax incentives on the level of Foreign Direct Investments (FDI), and to gain insights into future research**. Furthermore, this diagnosis can provide valuable insights into the current stage of scientific production and future research on the topic.

We used an exploratory-descriptive approach to develop knowledge on "Taxation versus FDI". It is exploratory for investigating the literature on the interrelationships between taxation and FDI level; it is descriptive for reporting the characteristics of the articles selected through the analysis.We conducted a bibliometric analysis of scientific production over a 10-year horizon, using the scientific database "*Web of Science*" as a research source. Its choice is based on the fact that it is one of the world's leading scientific citation databases, widely used in studies related to meta-analysis (Zhu & Liu, 2020).

The bibliometric analysis consists of a set of quantitative methods and techniques for managing and processing information and databases (Santos & Kobashi, 2009), and scientific mapping is widely employed in the research environment to provide an overview of the state of the art of scientific knowledge on a given topic (Pessin et al., 2022). The purpose of bibliometric techniques is to help researchers understand the current stage of a given subject, its currents, models, and restrictions, to build a representative and qualified set of references on the subject, called a Bibliographic Portfolio (BP). It also allows that, through the analysis of the references in the BP, the researcher can determine the historical roots of the research areas or the works of decisive importance in an area (Marx & Bornmann, 2016).

The tool to be used for structuring the bibliographic portfolio consists of the methodology called "Proknow-C" (Knowledge Development Process-Constructivist), developed by Ensslin et al, which aims to build a bibliometric analysis in four distinct steps: (i) selection of a portfolio of relevant publications, (ii) descriptive bibliometric analysis as an analysis of numerical metrics, (iii) systematic review of publications according to the selected portfolio and, (iv) definition of new research questions according to the previous steps applied (Pessin et al., 2022).

The choice of this methodology is justified by the systematization of its application to the object of study in the construction (and expansion) of knowledge on the subject. Finally, the relevance of this study is justified by the importance of bibliometric indicators in identifying benchmark organizations, as research organizations, policymakers, and research funders tend to use benchmark units as points of comparison for a given research unit to understand and monitor its development and performance (Wang & Jeppsson, 2022). The relevance of Foreign Direct Investments for economic growth and development in economies in transition (Silajdzic & Mehic, 2022), and finally, the increasing expansion of the topic "taxation and FDI" in the last 10 years.

2 Theoretical frameworks

In recent decades, policymakers worldwide have seen Foreign Direct Investment (FDI) as a vital part of their country's goals for economic advancement (Bailey & Warby, 2019). The empirical literature has shown several reasons governments are increasingly interested in attracting Foreign Direct Investments. First, FDI promotes economic growth through complementary effects on domestic investment, productivity increases, and overall economic efficiency, increasing interest in understanding foreign investment's critical determinants (Silajdzic & Mehic, 2022).

The literature on FDI attractiveness has identified several factors that make a country attractive for this type of investment. However, most of the literature on FDI attractiveness focuses on push factors such as democracy, political stability, investment treaties, country size, income levels, other labor conditions, infrastructure, natural resources, and proximity, among others (Bailey & Warby, 2019).

In addition to the traditional determinants of FDI, favorable tax policy has been considered an essential factor influencing the location decisions of Multinational Enterprises - MNEs (Azemar & Dharmapala, 2019; Silajdzic & Mehic, 2022). Thus, many developing countries have offered different tax incentives, reducing corporate tax rates or even changing their entire tax regime to attract FDIs, sacrificing the immediate revenue from foreign capital (Li, 2016; Paun, 2019; Azemar & Dharmapala, 2019; Alvarez-Martinez et al., 2019).

In this context, in the last decade, there has been significant growth in research to analyze the influence of tax incentives on attracting FDI's. However, some results are still inconclusive and sometimes conflicting. Klemm & Van Parys (2012) analyzed the effectiveness of incentives in attracting investment in several Latin American, Caribbean, and African countries from 1985-2004, using dynamic panel data econometrics. The results indicate that lower tax rates and longer tax exemptions effectively attract FDI in Latin America and the Caribbean, but not in Africa. This shows that the tax issue may not be a determining factor in attracting FDI for certain economies.

Lawless (2013) investigated the relationships between measures of tax complexity and the level of FDI attractiveness in several OECD countries. The results indicate that tax complexity measures have a significant inhibitory effect on the presence of FDI for a pair of countries but have little impact on the level of FDI flows.

Baccini et al. (2014) analyzed the relationship between corporate tax cuts and the level of Foreign Direct Investment (FDI). Their results point out that non-discriminatory tax cuts on direct investment profit increase FDI, but in selected government-sanctioned investment projects, they do not. They also found that their effects on the level of FDI vary dramatically across regions. This shows that tax incentives alone may not be enough to attract FDI.

Li (2016) investigated the effects of fiscal decentralization on tax incentives among subnational governments. His results indicate that the impact of fiscal decentralization on tax

incentives and, by implication, revenue mobilization depends on the design of central-local government relations. Jimborean & Kelber (2017) analyzed the drivers of FDI in Central and Eastern European countries from 1993 to 2014 using panel data. Their study results show that external and internal determinants drive FDI flows.

Chanegriha et al. (2017) analyzed the determinants of FDI in several world economies using panel data. Of the potential economic, geographic, and political determinants studied, only a third proved robust: openness, education, government spending, corporate tax rate, infrastructure, conflict experience, democratic governance, natural resources, geographic location, number of borders, coastal area, and language. Paun (2019) analyzed the impact of taxation and other factors on GDP and FDI. His results show that taxation is essential in increasing GDP and attracting these investments. However, it is not the main factor, which shows that countries should not rely on tax reduction to attract FDI.

Forte & Neves (2021) analyzed the determinants of FDI in small states through panel data. The results of their research indicate the importance of the quality of human capital and the availability of infrastructure as the main drivers of FDI in small states. Additionally, the level of openness of the country, availability of natural resources, corporate tax, and control of corruption show a relevant role in this process.

Finally, Silajdzic & Mehic (2022) analyzed the impact of corporate income tax on FDI in the context of less advanced transition economies. Their results indicate that while tax policy appears to be an essential determinant of FDI, its effects appear to be conditional on the level of technological development.Thus, supported by the related works and potential research gaps not yet answered, there is a large field of expansion, justifying the present bibliometric study.

3 Methodological Procedures

In scientific research, a method is an indispensable means of solving scientific problems and a critical object of research (Wang et al., 2022). The research process begins with a problem, question, or doubt, motivating the search for information whose traditional sources are the bibliographic databases, either reference or full text (Tasca et al., 2010).

There is no single approach to selecting and classifying Bibliographic Portfolio for research development in the scientific mapping process. However, the methodological choices used in the search for information and the selection of the "database" or "repository of scientific publications" tend to exert enormous influence on the outcome of the mapping (Stahlschmidt & Stephen, 2022).

The use of technology and the current volume of electronic publications have evaluated scientific publications as more complex (Ensslin et al., 2015). The growing volume of scholarly articles has reinforced the need for knowledge management methods that can intelligently reuse academic knowledge and facilitate the development of scientific research. (Wang et al., 2022).

In this context, scientific mapping techniques and bibliometric analysis technologies have evolved considerably in recent years, becoming consolidated as regular practices at the beginning of research (Pessin et al., 2022). Methodologies and technologies such as HistCite (2003), CiteSpace (2004), Bib Excel (2009), Proknow-C (2010), VOSviewer (2010), Gephi (2010), SciMat (2011) Methodi Ordinatio (2015) Bibliometrix (2017) and Intelligent Bibliometrics (2022) have been continuously used to support decision-making patterns for selecting a bibliography (Pessin et al., 2022).

Among these methodologies and technologies, this study chose to use the Proknow-C instrument, as the primary methodology, in conjunction with the tools *Microsoft Excel* (2010),

VOSviewer (2022) and the package (*Bibliometrix*, 2022). The Proknow-C was chosen because it is an approach whose purpose is to generate knowledge on a given topic through a structured and systematic process that selects and critically reviews the literature according to the researcher's perceptions and delimitations (Valmorbida, 2016).This approach has proven to be adequate to the objectives of this work.

In the choice of tools for generating graphs, tables, and figures, we opted for the joint use of the three technologies (Microsoft Excel, VOSviewer, and Bibliometrix) according to the functionality and type of resource needed. Finally, to identify the number of citations of each article analyzed, we used the Google Scholar (2022) platform, which has an automatic tracking algorithm that extracts bibliographic data, citations and other information about academic articles from various sources, which can be used for metrics related to publications, citations, among other information. (Singh et al., 2022). The following sections aim to demonstrate the process of BP selection and construction.

3.1 Procedures for the selection of theoretical references

The procedures described in the scientific article selection step were performed in the months of May and June 2022. The literature review aimed to provide an overview of the state of the art of scientific knowledge on the subject - Taxation and the level of FDI - in order to serve as subsidies for researches whose objective is to analyze the effects of tax incentives on the level of Foreign Direct Investments.

It was used as a research source the database "*Web of Science*", made available by the Coordination for the Improvement of Higher Education Personnel (CAPES), since it is a repository of representative publications of productions in the areas of "Management", "Economics" and "Finance", widely used in studies related to meta-analysis (Zhu & Liu, 2020).

Once the list of journal bases was chosen, the two research axes were defined, (i) Taxation and (ii) FDI - Foreign Direct Investment, from which the keywords to be used in the searches were derived. In the definition of the keywords, a pilot test was made on the "*Scopus*" base, carrying out three combinations of terms, "*tax incentives" and "investment"*, "*fiscal policy*" *and "investment" and "tax reform"* and "*investment*" to identify the descriptors most used in this field of knowledge. Next, an unstructured pre-read of the titles and abstracts of the 5 most cited articles was performed, selecting the most used keywords in the "descriptors" field.

In view of the results found, the keywords related to FDI Taxation - Direct Investment to be used in the searches were defined, namely: *"tax reform"*, *"tax incentives"*, "tax *policy", "taxation"*, *"corporate tax"*, *"income tax"*, *"international tax"*, "*fiscal policy"*, *"economic policy", "investment"*, "*direct investment"*, *"fdi", "economic growth"*, *"economic development"*, and *"gdp growth"*.
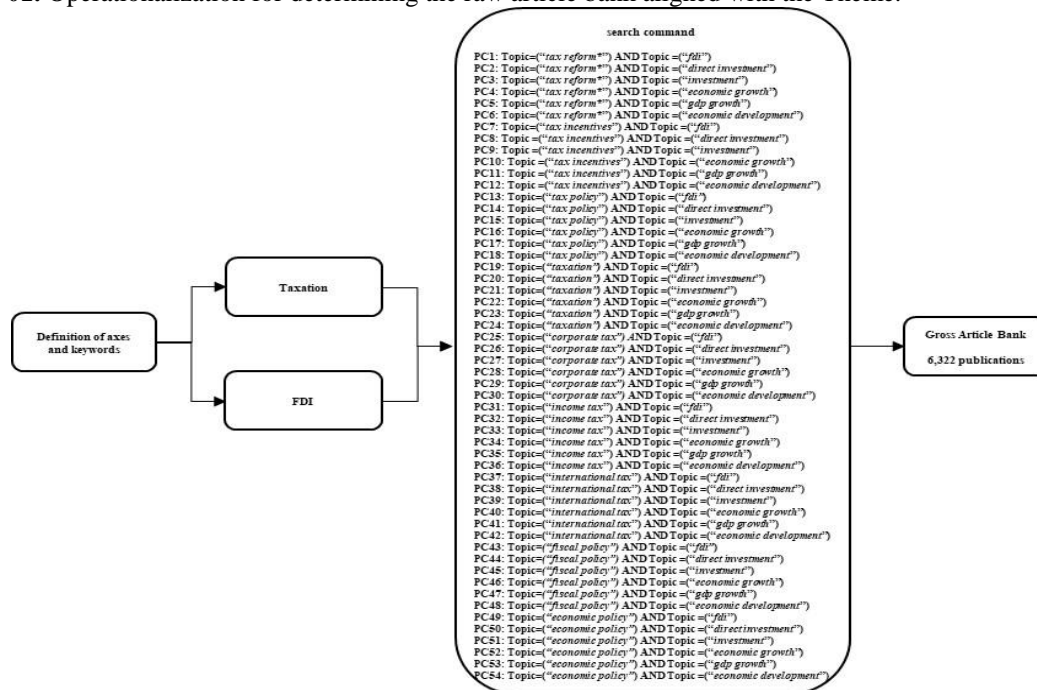
3.2 Selection of the articles that will compose the portfolio for the research

Using the previously defined key words, the first step was to combine them, determining the terms to be used in the "search command". The list of the search terms to be used is shown in figure 01.

The search process for articles aligned with the Theme was carried out in the scientific database "*Web of Science*". This database was chosen because it is a repository of scientific production considered relevant in the international scientific community and because it offers several search options and advanced filters that allow the use of "*Boolean* expressions*"*, being, therefore, adequate to the objective of this research

The search criteria used the following additional parameters: (i) articles, (ii) published in the last 10 years and in 2022, (iii) in the categories of Business, Management, Economics and Business Finance. The results returned 6,322 references, as illustrated in Figure 01.

Figure 01. Operationalization for determining the raw article bank aligned with the Theme.
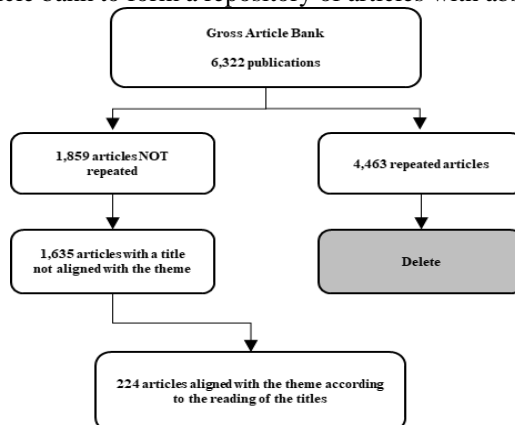

Source: Prepared by the authors. Adapted from Koch et al. (2021).

Once the articles that will compose the "Raw Article Bank" have been selected, we proceed to the next step of the method, screening.

3.2 Selection of the articles that will compose the portfolio for the research

Once the 6,322 publications were selected, they were screened. From this quantity, it was possible to identify that the search parameters used returned 4,463 items to be excluded from the database because they were duplicates, resulting from the interaction between the search commands. Once these exclusions were made, the sample comprised 1,859 non-duplicated references, as shown in Figure 02.

Figure 02. Filtering the raw article bank to form a repository of articles with abstracts aligned to the Theme.

Source: Prepared by the authors. Adapted from Koch et al. (2021).

Based on the 1,859 selected publications, the titles of the articles were read to observe their alignment with the theme proposed in this study. After this analysis, 1,635 articles were excluded for not having in their titles sufficient elements to demonstrate alignment with this study. Thus, 224 articles remained to be analyzed for being highly related to the object of study (Figure 02). The other screening procedures are illustrated in Figure 03.

Figure 03. Filtering of the raw article bank to form a repository with articles aligned to the Theme.
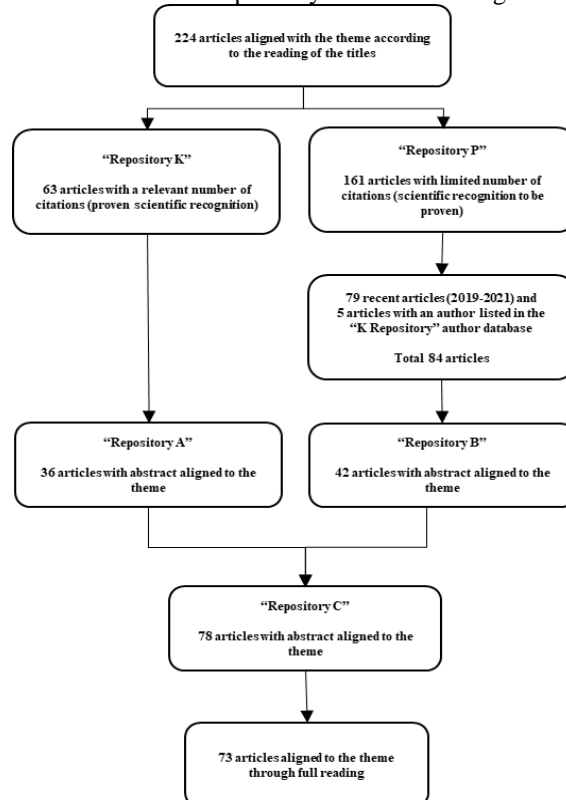
Source: Prepared by the authors. Adapted from Koch et al. (2021).

With the 224 articles with titles aligned to the Theme proposed for study, a search was conducted using the Google Scholar (2022) tool to quantify the number of citations, ordering them in descending order.

This made it possible to verify the most prominent articles by the number of citations and to divide the sample into two blocks, using the Pareto Principle: 20% of the articles with high representativeness in terms of the number of citations, forming "Repository K"; and 80% of the articles with low number of citations, forming "Repository P". Figure 04 illustrates the cut-off criteria and a summary of the articles that will compose the "K" and "P" Repositories.

Figure 04. Pareto diagram for the composition of the "K" and "P" Repositories after the cut-off criteria, according to the level of Scientific Recognition.
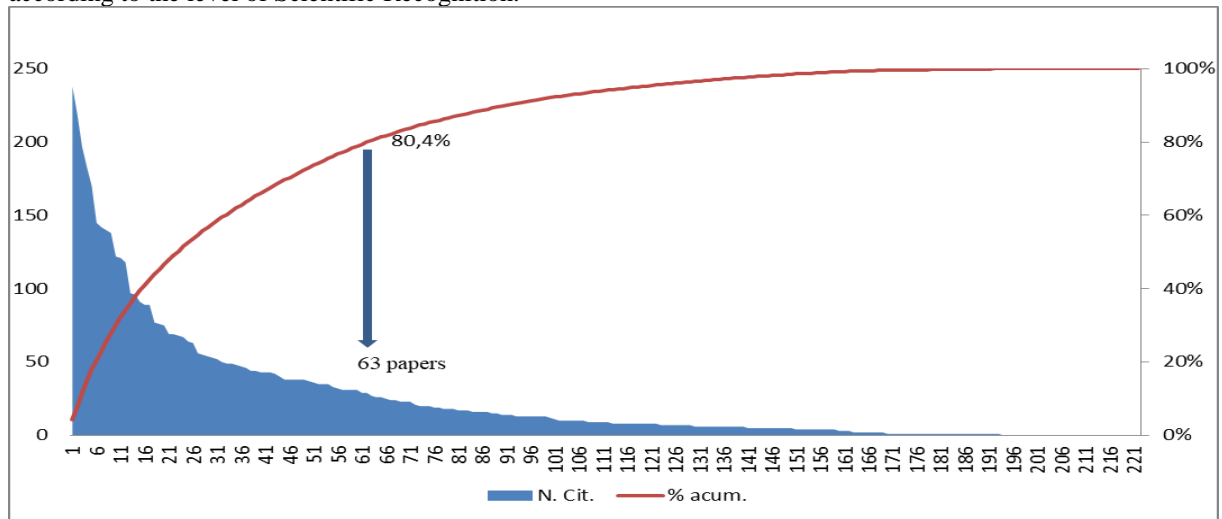
Source: Research data. Prepared by the authors.

Considering that the articles in the sample reached a total of 5,624 citations, 80% of this number is close to 4,523 citations. Thus, 63 articles (80.4%) were selected for the "K Repository" and 161 articles for the "P Repository".

Once the articles with greater scientific recognition were defined (Repository K), their *abstracts* were read to verify if they were aligned with the focus of the research in question. Thus, of the 63 abstracts analyzed, 27 were excluded for lack of alignment with the research object.

Thus, 36 articles were selected since they met the following requirements: (i) have an abstract aligned with the research theme; (ii) have a relevant volume of citations that places them among the 80% most cited; and (iii) have an accessible abstract. These formed "Repository A." This repository became the core of the theoretical framework on the theme "Taxation and FDI", serving as a criterion for the evaluation of the other 161 less cited articles ("Repository P").

Once the articles in "Repository K" were evaluated, the analysis of the articles in "Repository P" was carried out, formed by the less cited articles that have not yet managed to obtain relevant scientific recognition, perhaps due to their recent publication.

Thus, following the criteria foreseen in the Proknow-C methodology, to be selected to compose the PB, the articles from "Repository P" must fulfill two requirements: (i) have been published less than 2 years before the analysis (years 2020, 2021 and 2022) and; (ii) if they have been published more than 2 years before, they must necessarily be from a researcher whose authorship is present in the group of articles selected for "Repository K".

Analyzing the articles in the "P Repository", the following stratification was obtained: (i) 76 articles were published before 2020, among which only 5 articles are by authors in the "K Repository"; and (ii) 79 articles were published recently, 66 of which were published in the last 2 years (2020-2021) and 13 in 2022.

Thus, following the Proknow-C methodology, 84 articles from "Repository P" became eligible to read their abstracts to verify whether they are aligned with the research theme and, if so, whether they can become part of the BP. After reading the abstracts of these 84 articles, 42 are aligned with the Theme of this research, forming the "B Repository".With this procedure of re-analysis of articles published less than 2 years ago (including those from 2022), the final Bibliographic Portfolio (sum of repositories A and B) totaled 78 scientific

articles, forming "Repository C".

As a final procedure, the articles from "Repository C" were read in full to evaluate their adherence to the research theme. From this quantitative, 73 articles were aligned with the Theme after the full reading, and were included in the Final BP.

4 Bibliometric Analysis of the Bibliographic Portfolio

The processes described above gave rise to a PB composed of 73 articles aligned to the Theme by the full reading, which are arranged in Annex 01 in descending order according to the number of citations. With the formation of the PB of articles, according to Annex 01, the bibliometric analysis described in the subsequent steps was performed.

4.1 Bibliometric analysis of the selected articles

First the analysis of the evolution of articles aligned to the Theme was performed according to the reading of the PB titles. Figure 05 shows the results obtained.

Figure 05. Evolution of articles aligned to the Theme according to the reading of the PB titles.
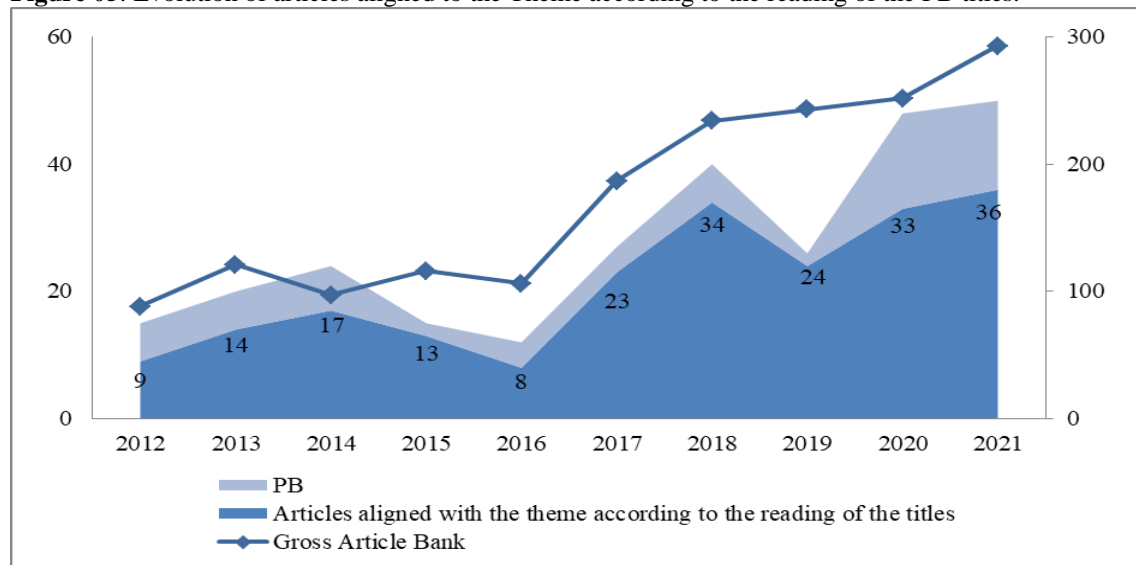
Source: Research data. Prepared by the authors.

According to Figure 05, in the first five-year period (2012-2016), 61 articles were published with the Theme aligned with the objective of this work, and in the second (2017-2021), 150 articles (growth of 146% between the periods). This shows that the international literature has shown a growing interest in evaluating the interrelationships between taxation and the level of FDI over the years. Figure 06 presents a summary of the most recurrent descriptors concerning the co-occurrence of the keywords and their inter-relationships.

**Figure 06.** Co-occurrence of Key Words in BP.
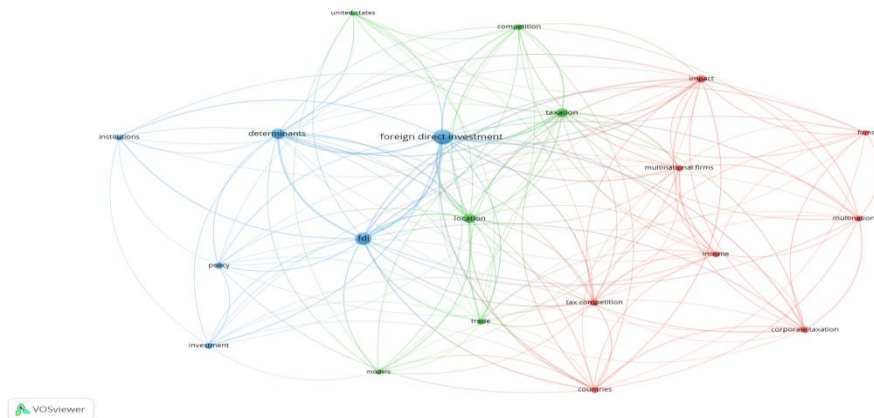
Source: Research data. Prepared by the authors using the software *VOSviewer (*2022).

Figure 06 shows the frequency of occurrence of the keywords, by the size of the circle, and the strength of association between them, represented by the proximity between them. Analyzing the co-occurrence of the keywords and their inter-relationships, one notices that the terms "*foreign direct investment*," "*fdi," "determinants," "locations,"* and "*taxation*" took on greater prominence in BP, with a strong association.

4.1.1 Articles

We analyzed the scientific recognition of PB articles, identified through the number of citations in (Google Scholar, 2022) In June 2022, Figure 07 illustrates the 10 most cited PB articles.

Figure 07. BP articles with highest number of citations based on Google Scholar (2022).
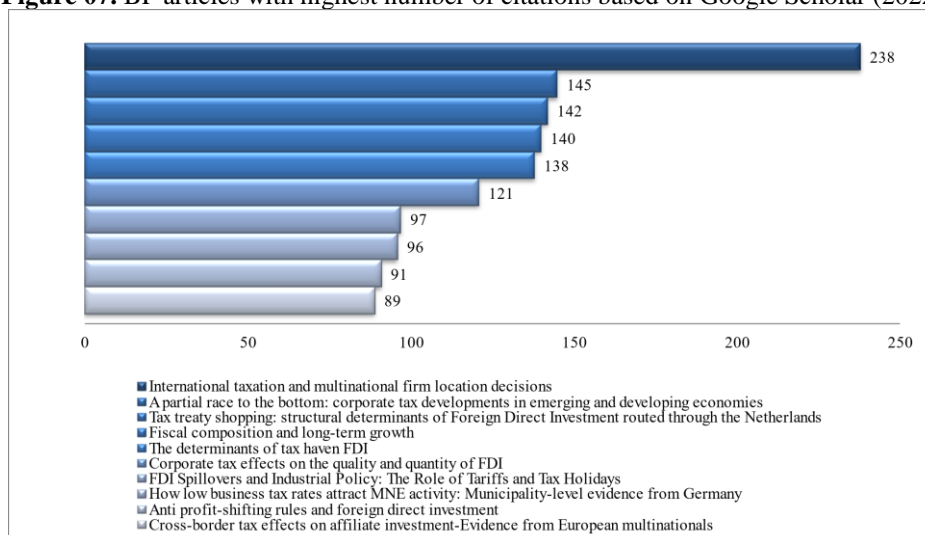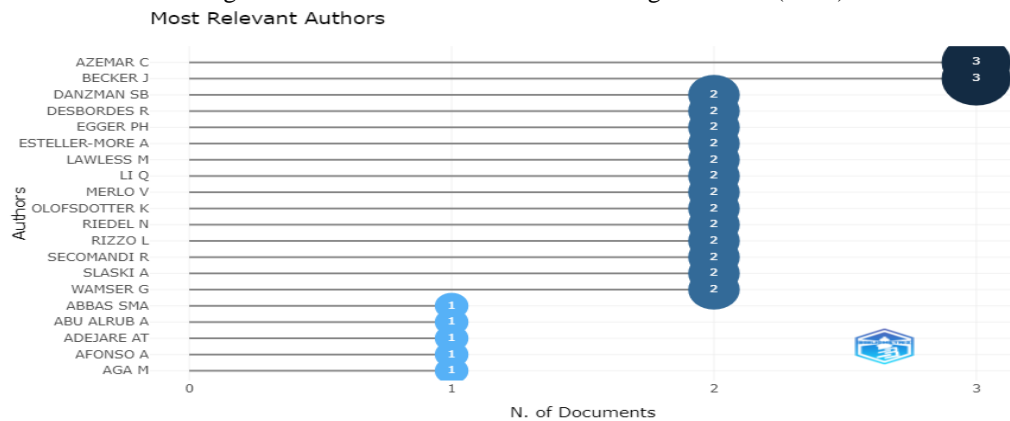

Source: Research data. Prepared by the authors.

Figure 07 shows that the articles "*International taxation and multinational firm location decisions*", "*A partial race to the bottom: corporate tax developments in emerging and developing economies*", "*Tax treaty shopping: structural determinants of Foreign Direct Investment routed through the Netherlands"*, "*Fiscal composition and long-term growth*" and "*The determinants of tax haven FDI*" were the most relevant about the others, measured by

the number of citations.

4.1.2 Authors
The authors' participation in the composition of the PB can be seen in Figure 08.

Figure 08. BP articles with highest number of citations based on Google Scholar (2022).
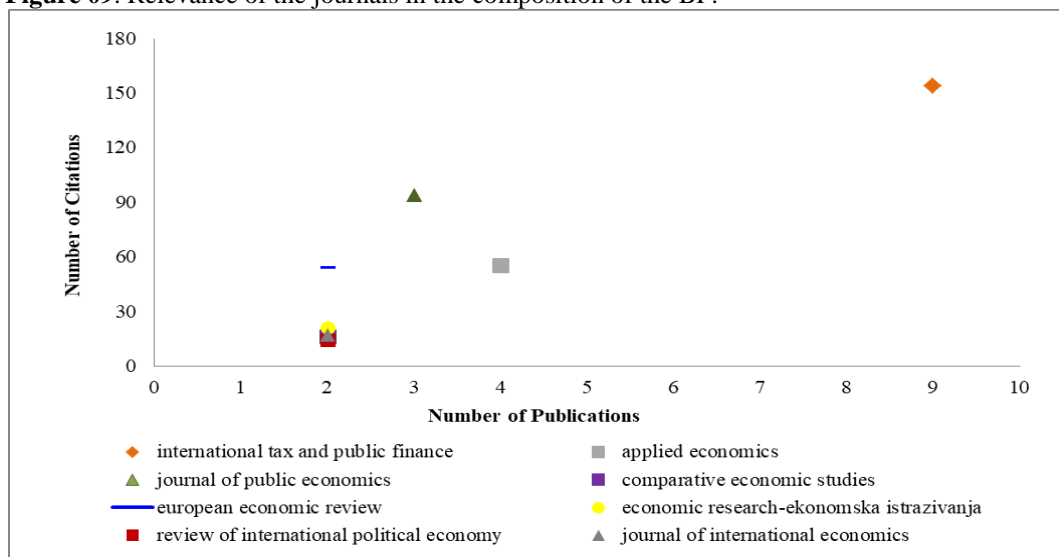

Source: Research data. Prepared by the authors using the package (*Bibliometrix*, 2022).

According to the data presented in Figure 08, it can be seen that the authors "Azemar C." and "Becker J." had the most participation in PB articles compared to the others, both with 3 published articles.

4.1.3 Journals
In this section, we analyze the periods with the highest BP relevance. Figure 09 shows the results obtained.

Figure 09. Relevance of the journals in the composition of the BP.

Source: Research data. Prepared by the authors.

Figure 09 shows the journals that had more than one publication in the BP. The journal "*International Tax and Public*" was the most relevant in terms of number of citations (154) and a number of publications (9). It was followed by the *Journal of Public Economics* (94

citations and 3 publications), *Applied Economics* (55 citations and 4 publications) and the *European Economic Review* (54 citations and 3 publications). The others had less than 21 citations, with 2 publications each.

These results demonstrate the strong contribution of the journal *International Tax and Public* to the literature investigating the relationship between taxation and FDI attraction.

4.1.4 Countries

In this section, we perform the analysis of co-authorship by country. This procedure helped to identify reference research centers working on topics similar to the scope of this paper. The results found are presented in Figure 10.

**Figure 10.** Analysis of co-authorship of BP articles by countries.
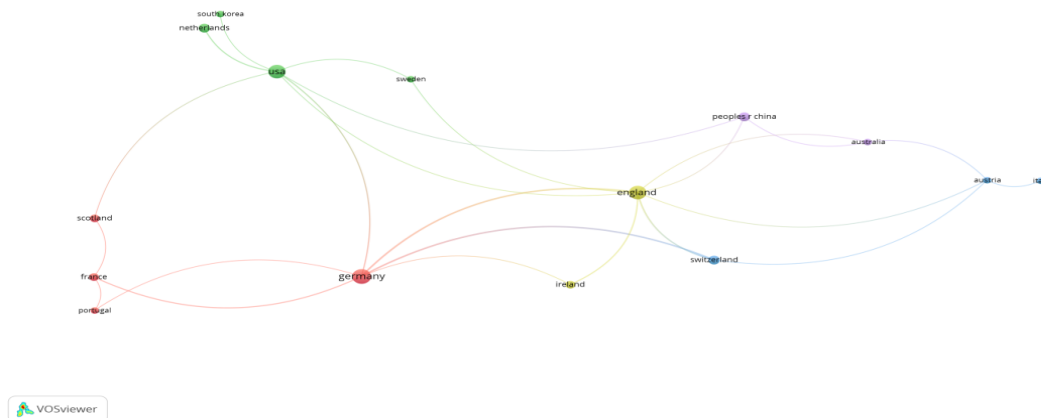
Source: Research data. Prepared by the authors using the software (*VOSviewer*, 2022).

According to the results presented in Figure 10, one can notice the prominence of countries like "*Germany*", "*England"* and "*USA" in terms* of scientific production on the theme "Taxation and FDI". These nations act as the main "*nodes*" connecting the scientific productions in the area and together represent more than a third of the total number of papers and the number of citations of the BP.

4.1.5 Classification of articles according to academic relevance in the BP

In this section, we present the classification of PB articles according to their academic relevance, using two criteria: (i) the number of citations in the Google Scholar (2022) and (ii) the number of citations of the author with more citations in the references of the BP articles. The result can be visualized through the intersection points of these two aforementioned indicators. Figure 11 illustrates the results found from the 20 most cited PB articles.

Figure 11. Classification of articles according to relevance related to the theme "Taxation and FDI".
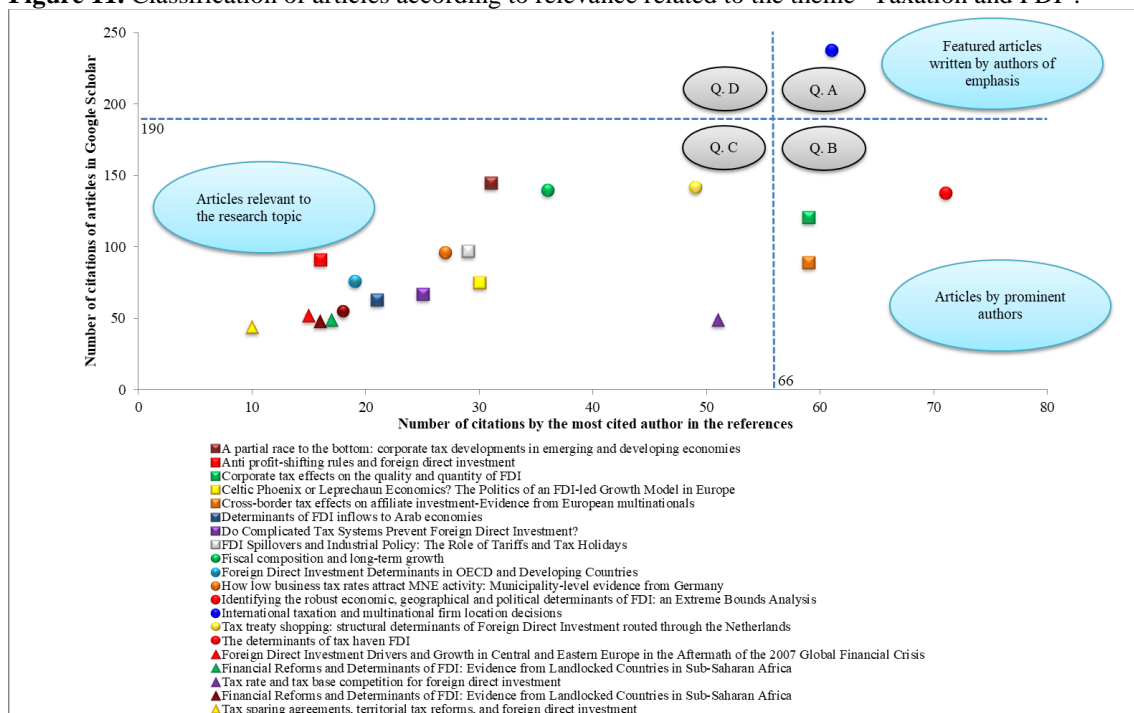
Source: Research data. Prepared by the authors.

By drawing a vertical and horizontal line, one can divide Figure 11 into four quadrants. As a cut-off criterion, we identified the number of citations of the most cited BP article (238) and the highest number of citations of the author with the most citations in the references of the BP articles (71) and arbitrated the percentage of 80%, finding respectively 190 for the vertical axis and 66 for the horizontal axis.

The "Quadrant A", composed of outstanding articles written by prominent authors, accommodates articles with great potential to contribute to future research on the topic "Taxes and FDI", featuring the work "International taxation and multinational firm location decisions prominently", by Barrios et al. (2012).

"Quadrant B" accommodates articles by prominent authors with many citations from the most cited author in the references. In this quadrant, the articles ; and "*The determinants of tax haven FDI*" by Jones & Temouri (2016)Corporate tax effects on the quality and quantity of FDI" by Becker et al. (2012) and "*Cross-border tax effects on affiliate investment-Evidence from European multinationals*" by Becker & Riedel (2012). Finally, "Quadrants C and D", although not having the same characteristics as the previous quadrants, accommodate all the other articles in the BP, relevant to the research topic.

4.2 Bibliometric analysis of the references of the selected articles

The bibliometric analysis of the references of the selected articles helps to understand which authors of works are most cited by the articles that make up the BP. An important advantage of its analysis is that it makes it possible to determine the historical roots of research areas or the works of decisive importance in an area (Marx & Bornmann, 2016).

In this context, an analysis of the references of the articles in the BP was carried out to identify seminal works, highly recognized by the literature and with significant impact for the study of the Theme, as well as prominent authors in this field of study. First, the most cited authors in the references of the BP were analyzed. Figure 12 illustrates the most cited authors

in the references of the BP.

Figure 12. Analysis of the Most Cited Authors in PB References.
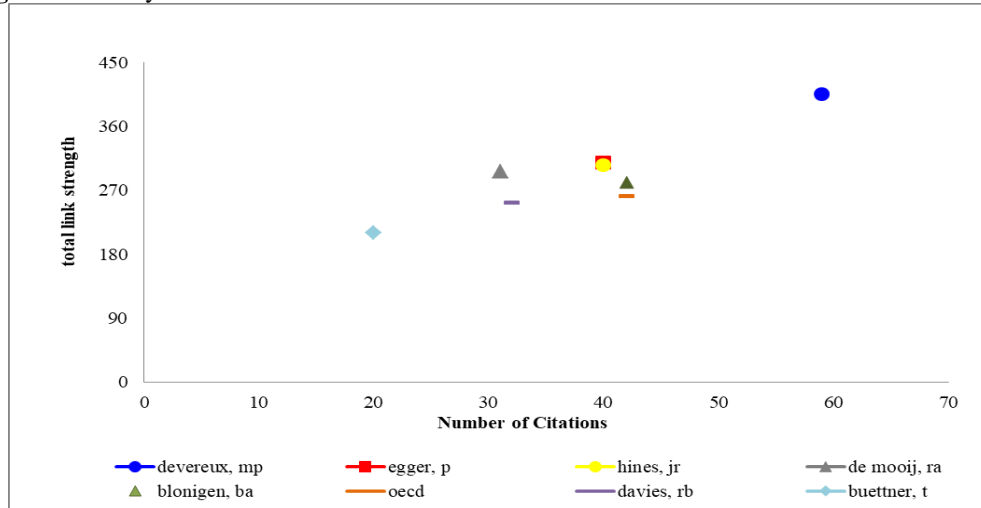
Source: Research data. Prepared by the authors using the software *VOSviewer (*2022).

The results presented in Figure 12 indicate that the most prominent author in the references of PB is "Devereux MP", which has 59 citations, with a "*total link strength*" of 405. Next, "Egger P", "Hinnes JR", "Blonigen BA" and "OECD" stand out as authors with the highest number of citations in the references of PB. Next, we present in Figure 13 the prominent papers in the PB references.

Figure 13. Articles from the references with the highest number of citations in the BP and their network of relationships.
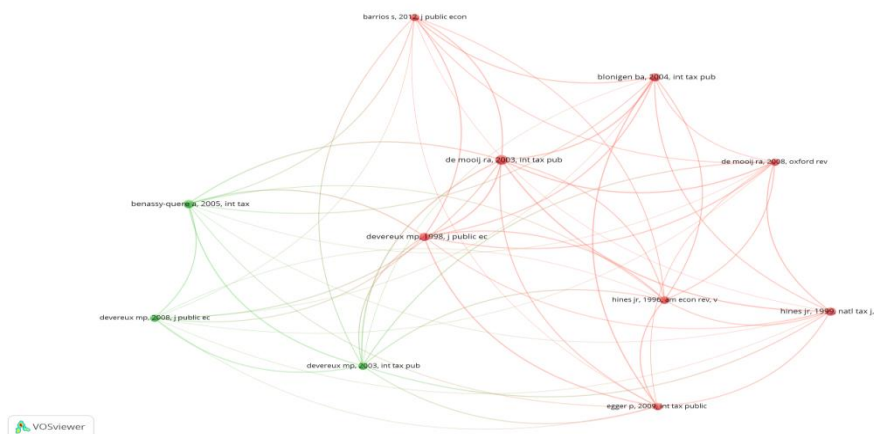
Source: Research data. Prepared by the authors.

Analyzing the results presented in Figure 13, one can see that the works of Mooij & Ederveen (2003), Devereux & Griffith (1998), Hines Jr (1999), Blonigen & Davies (2004) e Bénassy-Quéré et al. (2005) are the most cited in the references of BP, with the first three being the main "*nodes*" of connection among the 11 most cited papers, as illustrated. Table 01 illustrates the relevance of some of these works based on the number of citations in Google Scholar.

Table 01. Level of scientific relevance of the main papers cited in the references of the BP according to the number of citations in the Google Scholar (2022).

Author	Title	Publication Title	Nº of citations
Devereux & Griffith (1998)	Taxes and the location of production: evidence from a panel of US multinationals	Journal of Public Economics	1246
Mooij & Ederveen (2003)	Taxation and Foreign Direct Investment: A Synthesis of Empirical Research	International Tax and Public Finance	1040
Blonigen & Davies (2004)	The effects of bilateral tax treaties on U.S. FDI activity	International Tax and Public Finance	525
Bénassy-Quéré et al. (2005)	How Does FDI React to Corporate Taxation?	International Tax and Public Finance	370

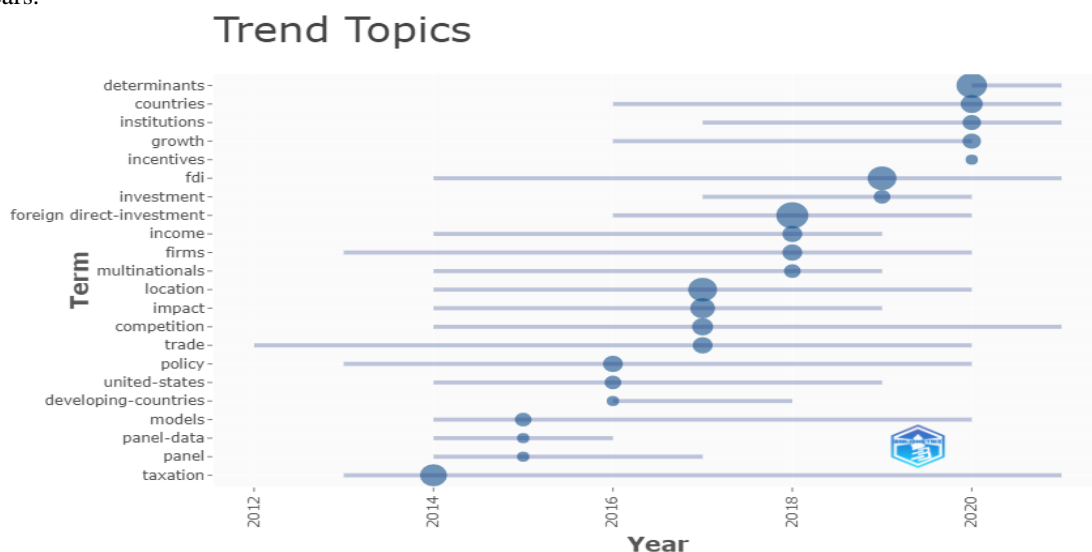Source: Research data. Prepared by the authors.

These results (Table 01) allow us to identify research lines, seminal works in the area, and relationship networks between seminal authors. A brief comparison between the results shows that the most cited article is five times larger than the most cited in Figure 06; and the least cited in Table 01 exceeded the number of citations of the most cited article in Figure 06. This shows the relevance of these papers and their decisive importance to the Theme.

Finally, due to the scientific relevance of these works, we suggest incorporating the articles presented in Table 01 to the articles in the BP to serve as research sources for future works that intend to investigate the same Theme indicated in this research.

4.3 Mapping the Evolution and Trends of Research on the analyzed Theme in the last 10 years

This section presents the evolution of the primary descriptors used in research investigating the interrelationships between Taxation and Investment over the last decade (2012-2021) based on PB data. Figure 14 illustrates the results found, where the larger circle shows the average citation frequency calculated by quartiles.

Figure 14. Evolution and Trends of topics of interest in "Taxation and Investment" research over the last 10 years.

Source: Research data. Prepared by the authors using the package *Bibliometrix* (2022).

The results presented in Figure 14 show that the main current research topics are "*determinants*", "*countries*", "*institutions*", *incentives", "fdi*", "*investment*" and "*taxation*", almost all with an average frequency between 2019 and 2020 (except "*taxation*"). As emerging themes from 2020, we have the descriptors "*determinants*" and "*incentives*" and as

emerging themes, "*growt*".

The themes "*investment*" and "*foreign direct-investment*" seem to have been replaced by their synonym or acronym "*fdi*" *as* of 2020 and the themes "*firms*" "*locatition*", "*trade*", "*policy*" and "*models*" seem to have momentarily frozen as of 2019. The others seem to have immersed from 2018.

Finally, the themes "*countries*", "*institutions*" "*fdi*", "*competition*" and "*taxation*" show strong continuity over the years, projecting themselves as future research trends, along with the emerging themes "*determinants*" and "*incentives*".

Figure 15 helps us to complement the analysis by showing it has analysis points: (i) the frequency of occurrence of the keywords, by the size of the circle, (ii) the strength of association between them, represented by the proximity between them, and (iii) the temporal average of the frequency of their occurrence (quartile).

Figure 15. Co-occurrences of the keywords, strength of association and average frequency (quartile) of their occurrence in the last 10 years.
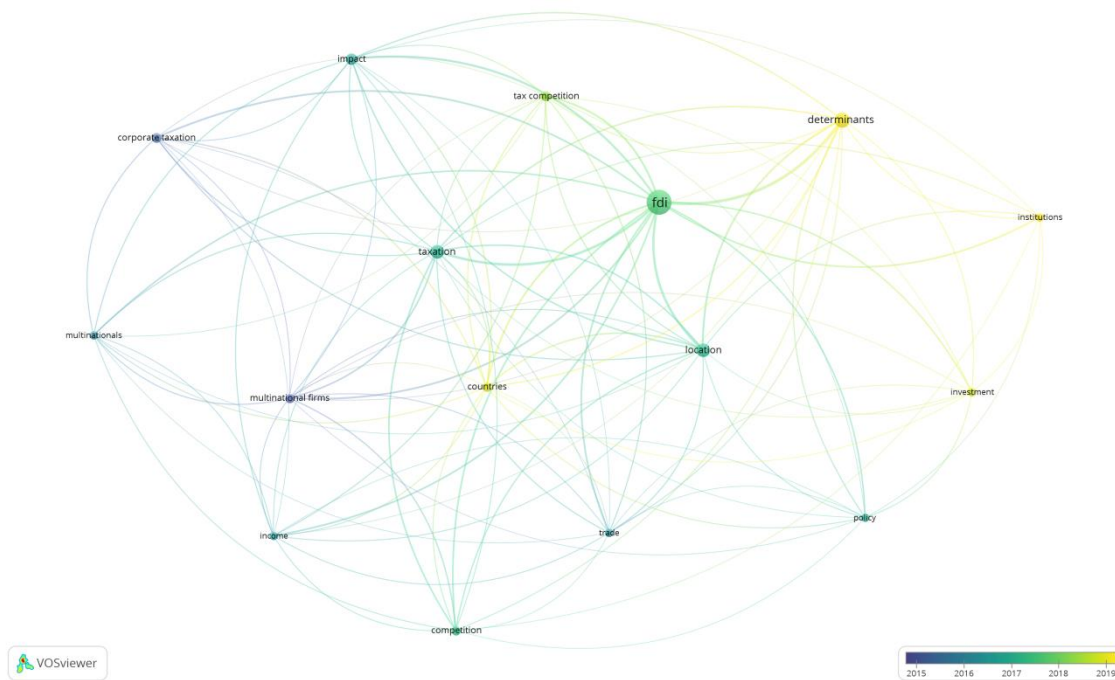
Source: Research data. Prepared by the authors.

The results presented in Figure 15 show that the main research topic on the Theme is "*fdi*", followed by "*determinants*", "*locations*" and "*taxation*" and illustrates the average frequency relative to the quartile of its occurrence.

5 Conclusion

Given the importance of Foreign Direct Investment (FDI) as a source of economic growth and technological development in economies in transition, this paper aims to review the existing literature on taxation and FDI. Using the methodology called "Proknow-C" it was possible to map the scientific production of the last 10 years, which resulted in the selection of 73 studies that form a representative and qualified Bibliographical Portfolio on the Theme, which allows researchers to verify the current stage of research on the subject and identify opportunities for future work. The results of this BP can be seen in Annex 01.

The results found have an essential relevance for academia, government, and society:

it enables reference organizations, among other stakeholders, to understand and monitor the development and performance of the Theme, to identify potential collaboration partners or competitors, and to design their research funding strategies.

The bibliometric analysis of the articles selected to compose the BP revealed that:

(i)   the most prominent journals *were "International taxation and multinational firm location decisions", "A partial race to the bottom: corporate tax developments in emerging and developing economies", "Tax treaty shopping: structural determinants of Foreign Direct Investment routed through the Netherlands", "Fiscal composition and long-term growth" and "The determinants of tax haven FDI*";

(ii)   "Azemar C." and "Becker J." had the largest participation in articles in the BP compared to the others, both with three studies in the BP;

(iii)   the journal "*international tax and public*" was the most relevant in terms of number of publications and number of citations and;

(iv)   G*ermany*, E*ngland* and USA are the countries that have more prominence in terms of scientific production on the subject "Taxation and FDI".

(v)   The bibliometric analysis of the references of the articles that make up the BP revealed that: the most prominent author in the BP references is "Devereux MP", followed by "Egger P", "Hinnes JR", "Blonigen BA" and OECD; the works of Mooij & Ederveen (2003), Devereux & Griffith (1998), Hines Jr (1999), Blonigen & Davies (2004) and Bénassy-Quéré et al. (2005) are the most cited in BP references, with the first 3 being the main "nodes" among the 11 most cited papers.

In addition, the results also point to the strong relevance and decisive impact of the papers "*Taxes and the location of production: evidence from a panel of US multinationals*", "*Taxation and Foreign Direct Investment: A Synthesis of* Empirical *Research*", "*The effects of bilateral tax treaties on U.S. FDI activity*" and "*How Does FDI React to Corporate Taxation?*

Performing the classification of articles according to academic relevance in PB, the articles "*International taxation and multinational firm location decisions*" by Barrios et al. (2012); and "*The determinants of tax haven FDI*", de Jones & Temouri (2016). showed indications of being the ones with the most significant potential to contribute to future research on the subject "Taxes and FDI", compared to the others.

Finally, after mapping the evolution and trends of research on the Theme analyzed in the last 10 years, the results show that the main current research themes are "*determinants", "countries", "institutions", incentives", "fdi", "investment", and "taxation", which are* also a trend for research on the Theme analyzed.

References

Alvarez-Martinez, M., Barrios, S., d'Andria, D., Gesualdo, M., Pontikakis, D., & Pycroft, J. (2019). The economic consequences of corporate tax rates reductions in the EU: Evidence using a computable general equilibrium model. WORLD ECONOMY, 42(3), 818–845. https://doi.org/10.1111/twec.12703

Azemar, C., & Dharmapala, D. (2019). Tax sparing agreements, territorial tax reforms, and foreign direct investment. Journal of Public Economics, 169, 89–108. https://doi.org/10.1016/j.jpubeco.2018.10.013

Baccini, L., Li, Q., & Mirkina, I. (2014). Corporate Tax Cuts and Foreign Direct Investment. Journal of Policy Analysis and Management, 33(4), 977-U111. https://doi.org/10.1002/pam.21786

Bailey, N., & Warby, B. (2019). Explaining the competition for FDI: Evidence from Costa Rica and cross-national industry-level FDI data. Research In International Business And Finance, 47, 67–77. https://doi.org/10.1016/j.ribaf.2018.07.002

Barrios, S., Huizinga, H., Laeven, L., & Nicodeme, G. (2012). International taxation and multinational firm location decisions. Journal Of Public Economics, 96(11–12), 946–958. https://doi.org/10.1016/j.jpubeco.2012.06.004

Becker, J., Fuest, C., & Riedel, N. (2012). Corporate tax effects on the quality and quantity of FDI. European Economic Review, 56(8), 1495–1511. https://doi.org/10.1016/j.euroecorev.2012.07.001

Becker, J., & Riedel, N. (2012). Cross-border tax effects on affiliate investment-Evidence from European multinationals. European Economic Review, 56(3), 436–450. https://doi.org/10.1016/j.euroecorev.2011.11.004

Bénassy-Quéré, A., Fontagné, L., & Lahrèche-Révil, A. (2005). How Does FDI React to Corporate Taxation? International Tax and Public Finance, 12(5), 583–603.

Bibliometrix. (2022). https://www.bibliometrix.org/home/

Blonigen, B., & Davies, R. (2004). The effects of bilateral tax treaties on U.S. FDI activity. International Tax and Public Finance, 11, 601–622. https://doi.org/10.1023/B:ITAX.0000036693.32618.00

Chanegriha, M., Stewart, C., & Tsoukis, C. (2017). Identifying the robust economic, geographical and political determinants of FDI: an Extreme Bounds Analysis. Empirical Economics, 52(2), 759–776. https://doi.org/10.1007/s00181-016-1097-1

Danzman, S., & Slaski, A. (2021). Explaining deference: Why and when do policymakers think FDI needs tax incentives? Review of International Political Economy. https://doi.org/10.1080/09692290.2021.1885475

Danzman, S., & Slaski, A. (2022). Incentivizing embedded investment: Evidence from patterns of foreign direct investment in Latin America. Review of International Organizations, 17(1), 63–87. https://doi.org/10.1007/s11558-021-09418-0

Devereux, M. P., & Griffith, R. (1998). Taxes and the location of production: Evidence from a panel of US multinationals. Journal of Public Economics, 68(3), 335–367. https://doi.org/10.1016/S0047-2727(98)00014-0

Ensslin, L., Waiczyk, C., Chaves, L. C., & Ensslin, E. R. (2015). The process of evidencing the state of the art in scientific production management. Transinformacao, 27(3), 219–228. Scopus. https://doi.org/10.1590/0103-37862015000300004

Forte, R., & Neves, C. (2021). Drivers of FDI in small states. Journal of the Asia Pacific Economy, 0(0), 1–27. https://doi.org/10.1080/13547860.2021.1963042

Getzner, M., & Moroz, S. (2020). Regional development and foreign direct investment in transition countries: A case-study for regions in Ukraine. Post-Communist Economies, 32(6), 813–832. https://doi.org/10.1080/14631377.2020.1745564

Google Scholar. (2022). Google Scholar. https://scholar.google.com.br

Hintosova, A., Sudzina, F., & Barlasova, T. (2021). Direct and Indirect Effects of Investment Incentives in Slovakia. Journal Of Risk And Financial Management, 14(2). https://doi.org/10.3390/jrfm14020056

Jimborean, R., & Kelber, A. (2017). Foreign Direct Investment Drivers and Growth in Central and Eastern Europe in the Aftermath of the 2007 Global Financial Crisis. Comparative Economic Studies, 59(1), 23–54. https://doi.org/10.1057/s41294-016-0018-9

Jones, C., & Temouri, Y. (2016). The determinants of tax haven FDI. Journal Of World Business, 51(2), 237–250. https://doi.org/10.1016/j.jwb.2015.09.001

Klemm, A., & Van Parys, S. (2012). Empirical evidence on the effects of tax incentives. International tax and public finance, 19(3), 393–423. https://doi.org/10.1007/s10797-011-9194-8

Koch, A. M., Gasparetto, V., & Ensslin, S. R. (2021). Avaliação de Desempenho em Cadeias de Suprimentos Agroalimentares: Aplicação do Processo Proknow-C para Geração de Conhecimento. Sociedade, Contabilidade e Gestão, 16(3), 1–20. https://doi.org/10.21446/scg_ufrj.v0i0.43437

Lawless, M. (2013). Do Complicated Tax Systems Prevent Foreign Direct Investment? Economica, 80(317), 1–22. https://doi.org/10.1111/j.1468-0335.2012.00934.x

Li, Q. (2016). Fiscal decentralization and tax incentives in the developing world. Review Of International Political Economy, 23(2), 232–260. https://doi.org/10.1080/09692290.2015.1086401

Marx, W., & Bornmann, L. (2016). Change of perspective: Bibliometrics from the point of view of cited references—a literature overview on approaches to the evaluation of cited references in bibliometrics. Scientometrics, 109(2), 1397–1415. https://doi.org/10.1007/s11192-016-2111-2

Microsoft Excel. (2010). https://office.live.com/start/excel.aspx?omkt=pt-BR

Mooij, R. A. D., & Ederveen, S. (2003). Taxation and Foreign Direct Investment: A Synthesis of Empirical Research. International Tax and Public Finance. https://doi.org/10.1023/A:1026329920854

Paun, D. (2019). Tax competition and factors influencing the gross domestic product and foreign direct investments of CEE countries. Economic Research-Ekonomska Istrazivanja, 32(1), 876–893. https://doi.org/10.1080/1331677X.2019.1585896

Pessin, V. Z., Yamane, L. H., & Siman, R. R. (2022). Smart bibliometrics: An integrated method of science mapping and bibliometric analysis. Scientometrics. https://doi.org/10.1007/s11192-022-04406-6

Santos, R. N. M. dos, & Kobashi, N. Y. (2009, janeiro). Bibliometria, cientometria, infometria: Conceitos e aplicações [Article]. https://repositorio.ufpe.br/handle/123456789/10089

Silajdzic, S., & Mehic, E. (2022). How effective is tax policy in attracting foreign direct investments in transition countries? Central European Business Review, 11(1), 19–39. https://doi.org/10.18267/j.cebr.274

Singh, V. K., Srichandan, S. S., & Lathabai, H. H. (2022). ResearchGate and Google Scholar: How much do they differ in publications, citations and different metrics and why? Scientometrics, 127(3), 1515–1542. https://doi.org/10.1007/s11192-022-04264-2

Stahlschmidt, S., & Stephen, D. (2022). From indexation policies through citation networks to normalized citation impacts: Web of Science, Scopus, and Dimensions as varying resonance chambers. Scientometrics, 127(5), 2413–2431. https://doi.org/10.1007/s11192-022-04309-6

Tasca, J. E., Ensslin, L., Ensslin, S. R., & Alves, M. B. M. (2010). An approach for selecting a theoretical framework for the evaluation of training programs. Journal of European Industrial Training, 34(7), 631–655. https://doi.org/10.1108/03090591011070761

Valmorbida, S. (2016). Construção de conhecimento sobre avaliação de desempenho para gestão organizacional: Uma investigação nas pesquisas científicas internacionais. Revista Contemporânea de Contabilidade, 13, 123. https://doi.org/10.5007/2175-8069.2016v13n28p123

VOSviewer. (2022). VOSviewer. https://www.vosviewer.com//

Wang, Q., & Jeppsson, T. (2022). Identifying benchmark units for research management and evaluation. Scientometrics. https://doi.org/10.1007/s11192-022-04413-7

Wang, Y., Zhang, C., & Li, K. (2022). A review on method entities in the academic literature: Extraction, evaluation, and application. Scientometrics, 127(5), 2479–2520. https://doi.org/10.1007/s11192-022-04332-7

Zhu, J., & Liu, W. (2020). A tale of two databases: The use of Web of Science and Scopus in academic papers. Scientometrics, 123(1), 321–335. https://doi.org/10.1007/s11192-020-03387-8