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Public Debt: Bibliometric Analysis and Characterization of Perspectives

Deuda pública: análisis bibliométrico y caracterización de perspectivas

Dívida Pública: Análise Bibliométrica e Caracterização de Prospectos

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ABSTRACT

The issue of public debt is becoming more and more relevant, and there is a worldwide concern about the increase of public debt in both developing and first-world countries. The objective of this review is to provide an overview of the evolution of the academic literature on public debt. For the development of the research, the methodological process consisted of two phases. On the one hand, a scientific mapping of the area, consisting of a bibliometric analysis of the scientific production registered in Scopus and, on the other hand, a network analysis that allowed the identification of the most relevant documents on public debt; from which the main research trends in the area were established. It was found that the network allows for the identification of three perspectives: 1. Relationship between public debt and economic growth; 2. Public debt and its social impact; 3. Relationship between public debt and fiscal policy. It is concluded that the literature agrees on public debt as a response mechanism not only to investment needs or compliance with the Sustainable Development Goals but also to pandemics, natural disasters, and other unplanned events.

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Keywords: systematic review, global economy, economic growth, social impact, fiscal policy

RESUMO

A questão da dívida pública está a tornar-se cada vez mais relevante, e existe uma preocupação global sobre o aumento da dívida pública tanto nos países em desenvolvimento como nos países do primeiro mundo. O objetivo desta revisão é fornecer uma visão geral da literatura académica em evolução sobre a dívida pública. Para o desenvolvimento da investigação, o processo metodológico consistiu em duas fases. Por um lado, um mapeamento científico da área, constituído por uma análise bibliométrica da produção científica registada em Scopus e, por outro, uma análise em rede que permitiu identificar os documentos mais relevantes sobre a dívida pública; a partir dos quais foram estabelecidas as principais tendências de investigação na área. A rede identificou três perspectivas: 1. a relação entre a dívida pública e o crescimento económico; 2. a dívida pública e o seu impacto social; 3. a relação entre a dívida pública e a política fiscal. Conclui-se que a literatura concorda sobre a dívida pública como mecanismo de resposta não só para as necessidades de investimento ou para o cumprimento dos Objetivos de Desenvolvimento Sustentável, mas também para responder a pandemias, catástrofes naturais e outros eventos não planeados.

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palavras-chave: revisão sistemática, economia global, crescimento económico, impacto social, política fiscal.

RESUMEN

El tema de la deuda pública cobra cada vez mayor relevancia, se nota una preocupación mundial por el aumento de ésta tanto en países en desarrollo como del primer mundo. El objetivo de esta revisión es ofrecer un estado de la evolución de literatura académica sobre la deuda pública. Para el desarrollo de la investigación el proceso metodológico constó de dos fases. Por un lado, un mapeo científico del área, consistente en un análisis bibliométrico de la producción científica registrada en Scopus y, por otro lado, un análisis de red que permitió identificar los documentos más relevantes sobre la deuda pública; a partir de lo cual se establecieron las principales tendencias de la investigación en el área. Se encontró que la red permite identificar tres perspectivas: 1. Relación entre deuda pública y crecimiento económico; 2. La deuda pública y su impacto social; 3. Relación entre deuda pública y política fiscal. Se concluye que la literatura coincide respecto a la deuda pública como mecanismo de respuesta no sólo frente a las necesidades de inversión o cumplimiento de los Objetivos de Desarrollo Sostenible sino, también, en cuanto a la atención a pandemias, desastres naturales y otros eventos no planificados.

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Palabras clave: revisión sistemática, economía global, crecimiento económico, impacto social, política fiscal

1. INTRODUCTION

Public debt is one of the main thematic axes of discussion in several countries (Greiner, 2020; Blanchard, Gopinath, and Rogoff, 2021) as it affects economies and forms of public administration, which makes it a global concern, particularly in advanced economies (Featherstone, 2015). States increase public debt to the point that it is one of the main reasons for attention and investment in different societies and economies (Matesanz and Ortega, 2015; Kanagasabapathy, Singh, and Shimpi, 2018; Thepmongkol and Sethapramote, 2018; Le Van et al., 2019). Specifically, as of 2020, global debt increased 28 percentage points, according to the International Monetary Fund - IMF, which currently makes public debt a global challenge, as the dynamics of debt, combined with the fiscal insolvency of countries translates into a threat to financial stability (Álvarez Hernández, Álvarez Hernández, and Álvarez Texocotitla, 2017; República, 2021).

Some investigations show how countries should pay more attention to public debt in post-pandemic times (Amato et al., 2021; Dumitrescu, Kagitci and Cepoi, 2021; Toktosunova et al., 2021). The Covid-19 crisis radically changed the game for economies globally and urged a reassessment of guidelines for healthy public expenditure management (Carnazza and Liberati, 2021; Da Cunha Resende, Bittes Terra, and Filho, 2021; Semik and Zimmermann, 2021). The Covid-19 pandemic increased pressure on public finances (Butkus et al., 2021a, 2021b). This leads to a profound rethinking of the role of public debt in modern capitalist economies and of efficient, equitable, and politically feasible ways to finance it (Amato et al., 2021).

Despite the importance that the topic of public debt has been gaining throughout the 21st century, there is still no review in the literature that shows its evolution and presents its perspectives through network analysis. Several authors have reviewed the topic of public debt showing from case studies defined in the evolution of debt in certain countries, to financial analysis and its impacts on economic development (Nützenadel, 2015; Ifigu, 2018; Murín, 2018; Frascaroli, Oliveira, and Almeida, 2021):

Frascaroli, Oliveira, and Almeida (2021) investigated two cases of regions that used expansionary fiscal policies in recent years to increase short-term economic activity: the European Monetary Union and Brazil. In turn, Murín (Murín, 2018) explored the influence of the structure of public debt on growth in advanced economies. While Nützenadel (2015) analyzed the rise of public debt in Italy since 1970. Likewise, Ifigu (2018) studied the relationship between public debt and economic growth in Albania after the dictatorships. It is to consider other reviews explaining the

European sovereign debt crisis of 2011-2013 (Gulati et al., 2020), which indicate that, during the crisis, some nations facing rising borrowing costs adopted commitments to treat bondholders as priority claimants, i.e., in case of shortage of funds the payment is made first to bondholders.

This article conducts a systematic review that shows the evolution of academic literature on public debt, searching the Scopus database; once the results were obtained, they were exported to RStudio. From there, the documents were identified and classified using the tree structure, which sought to facilitate the understanding of the evolution of this concept and to identify its perspectives, where the root exposes the classic documents, the trunk contains the structural ones, and the leaves present the recent or current ones.

This article consists of four sections in addition to this introduction. The first section It is the context where a description of the topic is made, highlighting its relevance and some background and definitions, the second describes the methodological procedure used to search for and process the documents under investigation. The third section presents the results of the research and, finally, the main conclusions are presented.

2. CONTEXT

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Public debt is of vital importance to be one of the primary sources of funding for governments in Latin America to acquire resources to meet all claims to fulfill its social mission. According to the definition proposed by the World Bank and the International Monetary Fund, External Debt is understood as follows: "The amount at a given point in time of disbursed and outstanding contractual liabilities assumed by residents of a country vis-à-vis non-residents, with a commitment to repay capital, with or without interest, or to pay interest, with or without repayment of capital" (Fondo Monetario Internacional, 1993).

The Colombian Public Debt is composed of Internal Debt and External Debt, according to the National Planning Department, the first is understood as the following: "the total amount of payments made during the fiscal year for the amortization of borrowings contracted with domestic creditors and paid in Colombian pesos". External debt is: "the operations agreed in foreign currency that are paid through these and that in some way or circumstance directly affect the nation's Balance of Payments by increasing foreign liabilities". (Rodríguez & Segura, 2013).

The real cost of public debt will be determined by macroeconomic variables -including the exchange rate- and by the different forms of contracting, whether fixed or floating rates, internal

or external debt. In principle, these forms of contracting can be reduced to a medium-term horizon in which a real interest rate -weighted average- will be paid. (Clavijo, 2002). The external debt has a great interrelation with some macroeconomic variables and one of these variables is the Balance of Payments, which influences the behavior of the current account, estimating deficits or surpluses. (Rodríguez & Segura, 2013)

Among the different public credit operations carried out by the country to provide the state entity with resources, goods or services that allow it to fulfill its mission, are the contracting of loans, the issuance, subscription and placement of public debt securities, supplier credits and the granting of guarantees for payment obligations of state entities. (Rodríguez & Segura, 2013). Most recently sovereign debt has taken the form primarily of loans from commercial banks, although in earlier periods, governments raised funds abroad mainly through bonds issued in foreign capital markets.

In order to understand the size and composition of the country's public debt, the various government agencies are classified into those that carry out financial activities - Financial Public Sector FPS - and those that carry out non-financial activities - Non-Financial Public Sector NFPS-. The FPS group includes entities that carry out intermediation tasks under market conditions, others that promote development through directed credits, special savings, investment, provident and rescue funds, etc. The central bank has a special status within this group. Within NFPS, they are grouped into general government and public enterprises. General government is made up of all those agencies that provide non-market goods and services for collective consumption (education, health, defense, social security, state administration, etc.) and whose financing comes primarily from taxes and other contributions. Public companies are characterized because they provide, at market prices, goods, and services on a large scale, such as water, energy, telephony, etc., from the sale of which they obtain their financing. (Lozano, 2002)

The distinction between these two levels of the NFPS is paramount in debt statistics and their economic impact. The pressure that a government's debt service exerts on its future budgets, and thus on future taxation, is different from the pressure that a public corporation's debt service exerts on its finances, whose management resembles that of private corporations. Unlike countries in Europe and Asia, most Latin American countries do not have public finance information broken down between general government and public enterprises. (Lozano, 2002)

Traditional debt sustainability exercises almost always consider the costs of the so-called 'certain' public debt, represented by the external and domestic debt disbursed to the public sector.

The so-called contingent debt, comprising pension liabilities, financial system support bonds or public guarantees extended in risk-sharing projects with the private sector, is rarely mentioned. Certain debt is that which has been effectively disbursed to public entities and therefore, already constitutes a liability of the State to the lender. Contingent debt, as its name indicates, is subject to the occurrence of some event before it is recorded as such. In general, the main contingent debt faced by a country is the pension debt, where part of the population is waiting to complete certain age conditions and/or a minimum number of contributions to be entitled to such pension right. The main conceptual difference between certain public debt and contingent debt is that interest is paid on the former according to a previously agreed rule -either at a fixed or floating rate, either in local or foreign currency-. However, the final result of this financial cost on the debt cannot be known ex-ante, since its determinants are affected by monetary and exchange rate policy and the interrelationships between these markets and public spending. (Clavijo, 2002)

3. METHODOLOGY

The methodology consisted of two steps. First, an analysis of the importance of the topic was made based on bibliometric methods, using the Bibliometrix software, which, being open source, allows creating the scientific mapping in a clear and agile way (Aria and Cuccurullo, 2017) based on the scientific production registered in Scopus. Then, a chronological analysis by information networks was performed, following the tree structure, which allowed identifying the most relevant documents on public debt, from which it was possible to establish the co-citation analysis and, with it, the identification of the main research trends in the area.

3.1 Scientific mapping

To proceed the scientific production and mapping analysis performed in this research, the five bibliometric methods suggested by Zupic and Carter (2015) were used: citation analysis, word co-occurrence analysis, co-citation analysis, co-authorship analysis, and bibliographic coupling analysis. The database consulted was Scopus, which, according to Echchakoui (2020), used together, allow a broader view of the knowledge and trends that focus the research interest. The scientific community considers Scopus to be the main bibliographic databases for global consultation (Pranckute, 2021). Table 1 lists the search parameters used in this research.

Table 1. Search parameters on public debt topic

Terms	Parameters	Scopus Result
TITLE (“Public debt”) AND PUBYEAR > 1999 AND PUBYEAR < 2024	article title	1305
Consultation date	August 28th 2024	

Based on these criteria, it was possible to identify that 1305 records were published in Scopus; The query parameters were limited to the words “public debt”. As for the language of publication on this topic, 91% are in English, while 3% and 3% are in Spanish and 1% in German, 1% in French, 1% in Portuguese and 1% in Italian respectively. This is since this database has among their criteria for indexing journals that these comply with the publication of documents in this language, which, in turn, motivates authors to try to make their applications under this criterion in order to increase their visibility and impact (Reyes Rodriguez and Moraga Munoz, 2020).

Following the guidelines of Aria & Cuccurullo (Aria and Cuccurullo, 2017) the bibliometric analysis was carried out with the Bibliometrix tool. With this free-use tool, it is possible to work with different databases, it has been used and validated in several investigations (Campra et al., no date; Duque-Hurtado et al., 2020; Rodriguez-Soler, Uribe-Toril, and De Pablo Valenciano, 2020; Guleria and Kaur, 2021; Abbas et al., 2022; Fernandez Lopez et al., 2022).

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3.2 Network analysis

Among the actions that made it possible to establish the knowledge network of this area, the records obtained in Scopus was merged using R software; subsequently, their references were extracted until the citation network was reached, for which Graph theory was used as a model. This model allows the analysis of information on the typology and characteristics of the network, the documents that comprise it, and, in general, the analysis of scientific collaboration (Guerrero-Sosa et al., 2020).

The result of the analysis is the knowledge network on public debt achieved from the documents obtained from the Scopus database. This network analysis, also known as a co-citations map, allows us to see the structure of a knowledge area, in addition, it facilitates the identification of research trends (Liu et al., 2021; Muschetto and Siegel, 2021). The graphical visualization of the public policy knowledge network was carried out with Gephi software (Jacomy et al., 2014).

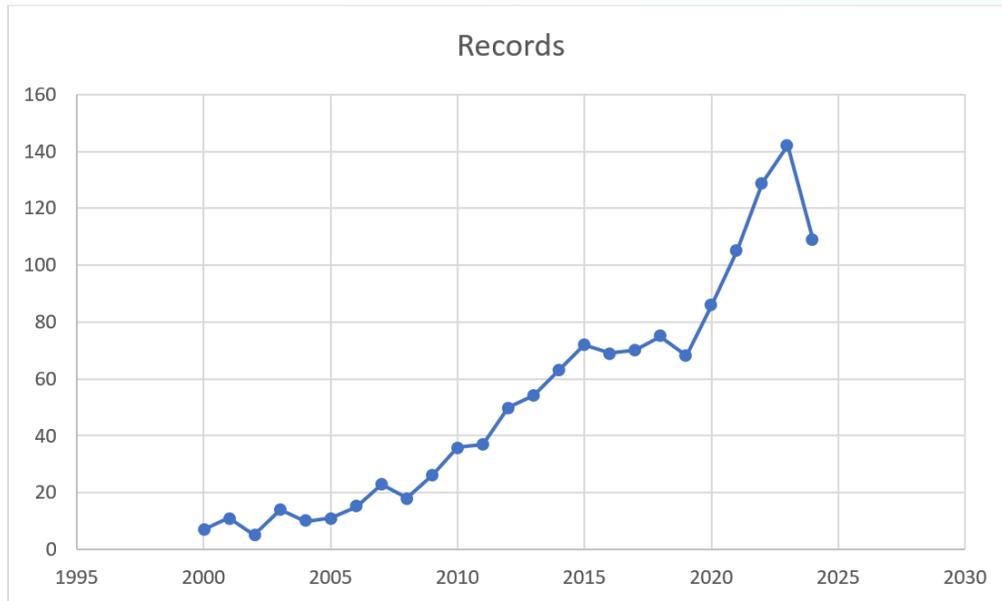
The indegree, outdegree, and betweenness indicators are calculated for each of the records in the network, which allow the works to be classified using the figure of a tree (Robledo et al., 2014; Valencia et al., 2020). Taking this analogy into account, three categories emerge: The roots (high indegree), where the classic papers and those of hegemonic theoretical relevance within the field of study are observed, especially contemplating publications that are cited but do not cite others (Wallis, 2007). Then there is the trunk (high betweenness), there are located documents that cite and that, at the same time, are cited by others (Zhang & Luo, 2017), in this component structural works are grouped, those connect the theoretical foundation of the classics, with current research. Finally, the leaves (high outdegree), focus on the most recent papers and cite the others (Wallis, 2007). These papers show the current trends or also called perspectives in which research in the area is framed, constituting the emerging research fronts. This methodological procedure has been employed and validated in previous studies (Buitrago et al., 2020; Clavijo-Tapia et al., 2021; Duque, Meza, Giraldo, et al., 2021; Duque, Meza, Zapata, et al., 2021; Duque, Toro, et al., 2020; Duque & Cervantes, 2019; Ramos et al., 2021; Rubaceti et al., 2022; Torres et al., 2021; Trejos-Salazar et al., 2021).

4. RESULTS

4.1 Bibliometric analysis

Figure 1 shows the scientific production associated with the topic of public debt in the Scopus citation index from 2000 to 2024. In the last five years, 44 % of the research has been published and the subject has an annual growth rate of 10.46%. During the years 2021 to 2024 the highest number of publications per year is presented, which is related to the importance of public debt in times of pandemic and post-pandemic (Gonzalez, 2020; Amato et al., 2021; Carnazza and Liberati, 2021; Dumitrescu, Kagitci and Cepoi, 2021; Semik and Zimmermann, 2021).

Figure 1. Annual scientific production in the period 2000 - 2024 about the public debt topic



Another topic of analysis is related to scientific production by country, where it is shown that public debt is of global importance, as suggested by several authors (Chorafas, 2013; Ahmed and Juboori, 2019; Asada, 2020; Liu and Lyu, 2021; Zhou, 2021). The United States leads in the number of publications in the area of public debt, with 175, followed by Germany and Italy with 124 and 113, respectively. France has 87 entries, the United Kingdom 75, and Spain 56. (Table 2). This distribution of scientific output highlights the varying levels of academic interest and research capacity in different countries. The dominance of the United States in this field may reflect its significant role in global financial markets and its complex public debt structure, which has been a focal point for both domestic and international researchers. Despite the concentration of publications in a few countries, the presence of entries from other nations, such as France, the United Kingdom, and Spain, underscores the global relevance of public debt as a research area. This indicates a widespread recognition of the critical role that public debt plays in both national and global economic health

Table 2. Scientific production by country on public debt topic

Country	Records
United States	175
Germany	124
Italy	113
France	87
Undefined	77
United Kingdom	75
Spain	56
India	44
Japan	43
China	43
Brazil	38
Australia	33
Turkey	32
South Africa	32
Nigeria	31
Romania	28
Austria	28
Canada	27
Malaysia	25
Switzerland	23

Following the topics of analysis, the most relevant authors in the area are identified. The author with the highest scientific production in Scopus is Greiner, who has 20 publications in Scopus, as shown in Table 3. Likewise, it should be noted that authors with more than 2 thousand citations are among the 10 most cited in public debt, namely Odhiambo, Nicholas M; Panizza, Ugo and Presbitero, Andrea F. This shows the relevance of public debt among the world academic and scientific community.

Table 3. Most relevant authors in Scopus about public debt topic

Author	Scopus		H Index
	Number of publications	Number of citations	
Greiner, Alfred	20	24780	71
Odhiambo, Nicholas M	10	3202	27
de Mendonca, Helder Ferreira	8	711	14
Farmer, Karl	8	109	5
Neck, Reinhard	5	351	12
Panizza, Ugo	7	2761	23
Presbitero, Andrea F.	7	1399	19
Seegmuller, Thomas	5	296	11
Beetsma, Roel M.W.J.	3	2047	22

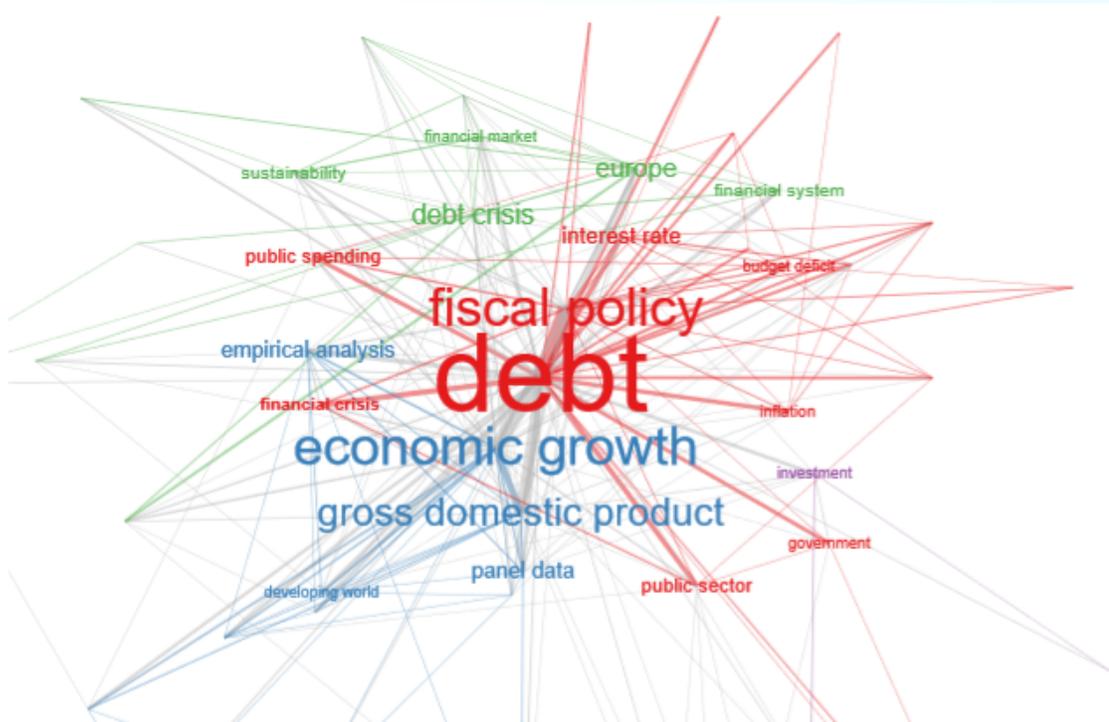
Regarding the analysis of the most relevant journals in the area (Table 4), it was found that among the top ten journals that publish on public debt, eight are located in quartiles 1 and 2 of Scopus, which shows that this topic is of great importance for the different countries at a global level and, therefore, is a concern for researchers. It is found that the journals *Journal of Policy Modeling*, *Public Choice*, and *Journal of Economic Dynamics and Control* are Q1 and of Dutch origin, while the United Kingdom and the United States include the other seven main journals published in DP. The prominence of these journals in the field suggests they play a crucial role in disseminating research that influences both academic thought and policy-making. For instance, the *Journal of Policy Modeling* and *Public Choice* often publish studies that directly inform government policies, reflecting the strong connection between academic research and practical applications in economic governance.

Table 4. Most relevant journals in Scopus about public debt topic

Journal	Registers	Quartile	H-Index	Total	Percentage	Country
Journal of macroeconomics	17	Q2	48	15	0.01	US
Economic modelling	17	Q2	77	13	13	United Kingdom
Applied economics	16	Q2	85	14	14	United Kingdom
Applied economics letters	16	Q3	51	12	12	United Kingdom
Journal of policy modeling	14	Q1	53	11	11	Holanda
Macroeconomic dynamics	13	Q2	46	11	11	United Kingdom
Economics bulletin	9	Q3	31	8	11	US
Public choice	9	Q1	81	9	9	Netherlands

The word co-occurrence network (Figure 2) shows that public debt is closely related to economic growth (Cuénoud, 2011; Jabłoński, Zmuda and O’Riordan, 2015; Wyplosz, 2015; Simovic, 2018; Deng, Liu, and Tian, 2020; Vinayagathan and Ranjith, 2021), to fiscal policy (Keuschnigg et al., 2000; Bui, 2018; Pečarić, Slišković and Kusanović, 2018; Simovic, 2018) and with Gross Domestic Product (Dolenc, 2009; Égert, 2015; Radonjić et al., 2020; Butkus et al., 2021b; Rajakaruna, Suardi and Perera, 2021). Moreover, it has important connections with public spending (Moraga and Vidal, 2010; Popa, 2013; Bokan, Hallett and Jensen, 2016; Lemoine, 2017; Ahmed and Juboori, 2019; Aloui and Eyquem, 2019; Bentour, 2021; Sakkas and Varthalitis, 2021), interest rates (Stettner, 1945; Oguro and Sato, 2014; Von Weizsäcker, 2014; Aloui and Eyquem, 2019; Maitra, 2019; Halkos et al., 2020; Ragot and Pinois, 2020; Aimola and Odhiambo, 2021), budget deficits (Shizume, 2011; Comin, 2012; McCausland and Theodossiou, 2016; Beqiraj, Fedeli and Forte, 2018; Kuncoro, 2018; Sasmal and Sasmal, 2020; Misztal, 2021), government and public sector (Neményi, 1996; Bui, 2018; van Riet, 2020; Gaborieau and Pronello, 2021).

Figure 2. Cooccurrence network of words on public debt topic



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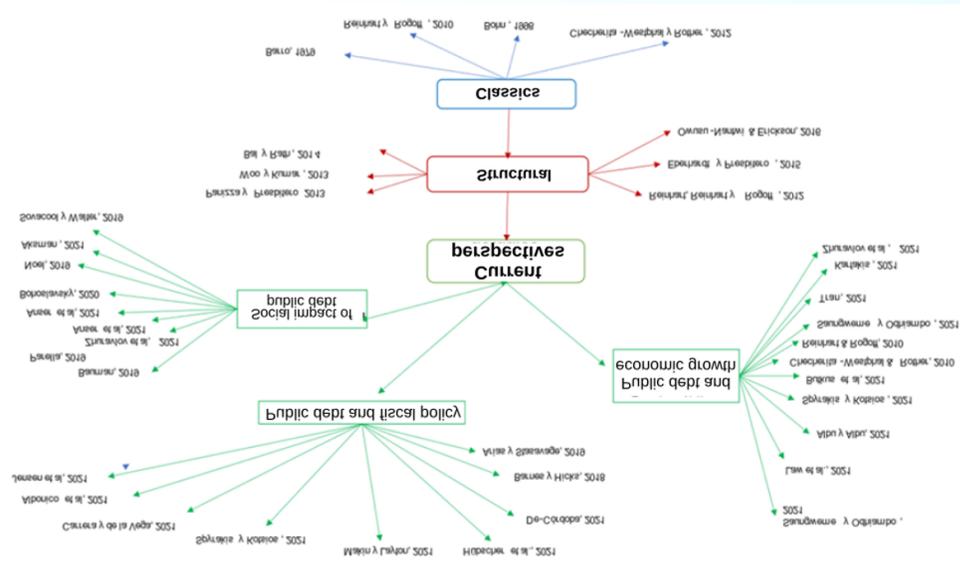
4.2 Analysis of the evolution of the topic (tree structure)

Based on the identification and classification of the documents found about public debt, Figure 3 shows the classic (root), structural (trunk), and current perspectives (leaves) documents, the analysis of which will be detailed below.

Root (classic, hegemonic or seminal documents).

Considering that the root is constituted by the research papers that support public debt as a relevant topic, evidenced by the highest number of citations, it was found that one of the papers considered as a starting point for research on public debt is the one presented by Barro (1979), which develops a simple theory of “optimal” public finances that identifies some influential factors in the choice between taxes and debt issuance.

Figure 3. Tree structure obtained from the analysis of public debt topic



Another seminal paper on public debt is the one by Reinhart and Rogoff (2010), which, in the context of the sharp rebound in public sector debt during the 2007-2009 financial crises in the United States, analyzes a set of historical data on public debt to look for a systemic relationship between high levels of public debt, growth and inflation. The main contribution of this paper to the understanding of this issue is that, in both advanced and emerging countries, high levels of debt/GDP (90% or more) are associated with markedly lower growth. These findings are integrated with Bohn's (1998) studies on the debt-to-GDP ratio in wartime.

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Another paper that makes up the root is the one by Checherita-Westphal and Rother (2012), which investigates the average impact of public debt on GDP per capita growth in twelve euro area countries over a period of about 40 years starting in 1970. This research finds a non-linear impact of debt on growth with a tipping point, beyond which the public debt-to-GDP ratio has a negative impact on long-term growth, at around 90-100% of GDP. Confidence intervals for the debt tipping point suggest that the negative growth effect of high debt can start from levels of 70% to 80% of GDP. The channels through which government debt is found to have a non-linear impact on the economic growth rate are private saving, public investment, and total productivity factors.

Finally, there is the paper by Barro (1979) in which the assumption that government bonds are perceived as net wealth by the private sector is found to be crucial in demonstrating the real effects of changes in the stock of government debt. The research shows, in the context of a model

overlap of generations, that finite lifetimes will not be relevant for the capitalization of future tax liabilities unless current generations are connected to future generations by a chain of inter-generational transfer transactions (either in the old-to-young direction or in the young-to-old direction). Applications of this result to social security and other types of transfer schemes show that, in the presence of imperfect private capital markets, government debt issuance increases net wealth if the government is more efficient than the private market in carrying out the loan process.

Trunk (documents that connect the network).

The papers that make up the trunk of this review are those that have a higher percentage of centrality among the papers considered basic and the most recent scientific publications, which means that they are the ones that connect the network. The first paper in this category is Reinhart, Reinhart, and Rogoff (2012), which identifies major episodes of public debt overhang in advanced economies since the early 19th century, characterized by public debt levels at the level of GDP above 90% for at least five years. Among the 26 episodes they identified, 20 lasted more than a decade. The long duration disproves the view that the correlation is mainly due to debt accumulation during downturns in the business cycle. The long duration also implies that the accumulated output shortfall due to the debt overhang is potentially massive. These growth-reducing effects of high public debt are apparently not exclusively transmitted through high real interest rates, since, in eleven of the episodes, interest rates are not materially higher.

Another structural paper is Eberhardt and Presbitero (2015), which finds support for a negative relationship between public debt and long-term growth across countries. The paper by Panizza and Presbitero (2013) studies whether the public debt has a causal effect on economic growth in a sample of Organisation for Economic Co-operation and Development, OECD countries. The results are consistent with the existing literature that has found a negative correlation between debt and growth.

The paper by Woo and Kumar (2015) analyzes whether the global financial crisis leads to an increase in public debt worldwide. This research points out that high initial public debt is significantly associated with slower subsequent growth. Another structural paper is Bal and Rath (2014), which examines the effect of public debt on economic growth in India between 1980 and 2011 using the autoregressive ARDL model with distributed lags, the paper plots a long-run equilibrium relationship between public debt and economic growth and identifies that central

government debt, Total Factor Productivity (TFP) growth, and debt servicing affect economic growth in the short run.

A structural paper that complements these analyses is Owusu-Nantwi and Erickson (2016), which argues that the key underlying issue behind economic development, is the issue of public debt, but that it has been mostly ignored by empirical research. Economic development requires investment in infrastructure, education, social welfare, health, and other sectors of economies. The study reveals a positive and statistically significant long-term relationship between public debt and economic growth. The study recommends that Ghana should acquire public debt for very high-priority projects and programs that are well evaluated and self-sustaining and can contribute positively to economic growth.

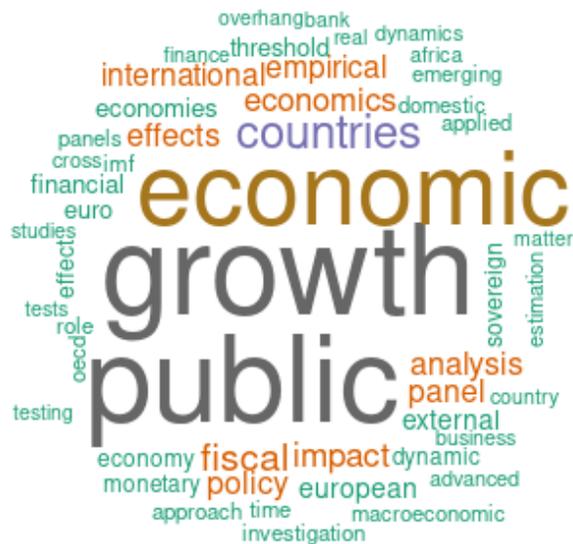
Leaves (Current Perspectives on Public Debt Research)

The analysis of current documents on public debt issues allowed to define 3 types of perspectives or current research trends, which will be described below.

Perspective 1. Relationship between public debt and economic growth.

The literature consulted allowed to identify a constant of analysis in which public debt and economic growth are related, which is one of the perspectives that will be studied the most (Figure 4). The works of Saungweme & Odhiambo (2021b) suggest investigations to test for the existence of nonlinear relationships between variables using recently developed econometric techniques with which to determine the relationship between public debt and economic growth. Similarly, Law et al. (2021), worked with the dynamic panel threshold technique to understand the relationship between public debt and gross domestic product in 71 developing countries from 1984 to 2015, which shows the threshold value of debt of 51.65%

Figure 4. Perspective 1. Relationship between public debt and economic growth



Likewise, several innovative methodologies are proposed, including the one planned by Albu & Albu (2021), who estimate that the wavelet methodology will be important in studies of the relationship between public debt and economic growth. In turn, works such as those by Spyraakis & Kotsios (2021); Butkus et al (2021a); Checherita-Westphal & Rother (2012); Reinhart & Rogoff (2010); Saungweme & Odhiambo (2021a); Tran (2021) concentrate their analysis on establishing the dynamics of indebtedness and its impact on economic growth; while, works such as those of Karfakis (2021) seek to identify changes in historical real production growth rates, to understand the asymmetric behavior of real production expansions and contractions, and to consider whether the growth rate of the debt-to-GDP ratio is a leading indicator of the time-varying transition probabilities between expansions and contractions.

Finally, the literature review allowed us to observe that the concept of sustainability will also be of importance in the analysis of the relationship between public debt and economic growth, as expressed by Zhuravlov et al (2021). It is observed, then, that the analysis of public debt involves a constant relationship with its impact on the economic growth of the States; such a relationship is so important that, beyond considering expanding the object of analysis to other theoretical relationships, it is possible to identify different methodological approaches in terms of trend.

Perspective 2. Public debt and its social impact

Even though public debt is a constant of inquiry at the global level, the approaches, and methodological designs to analyze it are applied to regional cases that, in addition, expose suggestions to be considered in public policies that commit the strategies or actions to overcome the effects of public debt in the States under study (Olaoye et al., no date; Baumann, 2019; Parella, 2019; Zhuravlov et al., 2021). It is also noted that research on the social impact of public debt (Figure 5) is also oriented towards poverty in times of pandemic and post-pandemic and its relationship with public debt (Anser et al., 2020). Research is aimed at establishing the connections between public debt and public health conditions, given that the greater the poverty, the greater the risk of contagion and vulnerability to infectious diseases.

Regarding post-pandemic analyses, it is considered that public debt, being a factor of poverty deepening, should be treated in interrelation with public health with respect to growth and health care policies in favor of the poor (Anser et al., 2020). Another research trend on public debt and its impact on social issues is framed in contextual and conceptual references in which social issues prevail over economic growth, promoting economic diversification and its correlation with poverty and inequality indexes (Bohoslavsky, 2020).

Figure 5. Perspective 2. Public debt and its social impact



Another trend in the analysis of public debt involves comparative studies between the countries that make up the Organisation for Economic Cooperation and Development (OECD) and its relationship with the social aspects of each member country. In this line of analysis, in the perspective of the social, a wide range of topics is presented, ranging from the materialization of investments in the Welfare State to the impacts generated by public debt (Noel, 2019), in this same sense is the analysis of Aksman (2021) who also proposes a set of new equations that allow finding a link between the cost of closing the relative poverty gap and income inequality of families, to which Parella (2019) agreed in the perspective of the market economy and its prevalence worldwide. Likewise, other research shows comparative analyses between public debt and mining-energy projects (Sovacool & Walter, (2019) that focus their interest on the social risks of these.

Perspective 3. Public debt and fiscal policy

Public debt and its relationship with the fiscal policy are topics of general interest, and not exclusive to academics and specialists in the area, so research tends to develop models that allow a visual approach to the dynamics of economic activity, the public budget, and the maximum amount of sustainable public debt, which contributes to decision-making not only in fiscal policy but also in public opinion, based on information that is clear and easy to understand (Barnes and Hicks, 2018; Arias and Stasavage, 2019; De-Córdoba, Molinari and Torres, 2021).

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In this sense, given the importance of public debt in the political and social life of States (Figure 6), there is a growing interest in the scientific community about conducting research aimed at observing the impact generated by the level of public debt on electoral decisions according to investment or austerity proposals for new government terms, the latter being the least desirable for the people (Makin, 2018; Hübscher, Sattler and Wagner, 2021). This interest becomes even stronger given the economic legacy left by the Covid-19 crisis (CVC), from which research will be presented that analyzes the macroeconomic risks derived from the high public debt ratios generated by investment requirements to minimize the short-term economic impact (Makin and Layton, 2021).

Likewise, Spyraakis & Kotsios (2021); Carrera & de la Vega (2021) show that research will consider debt crises, austerity measures, and their impact on financial markets, for which comparative studies will be advanced among highly indebted countries and possible measures to face public debt; from this, methods will be generated to understand the application of fiscal policy, feedback control of the economic system and its political and social implications. We will also analyze the

The journals *Journal of Policy Modeling*, *Public Choice* and *Journal of Economic Dynamics and Control* are Q1 and of Dutch origin, while the United Kingdom and the United States include the other seven main journals published in DP. The author with the highest scientific output in Scopus is Greiner.

There is clarity regarding public debt as a response mechanism not only in the face of investment needs or fulfillment of the Sustainable Development Goals but also with respect to addressing pandemics, natural disasters, wars, and other unplanned events (Iriqat and Abdalrahman, 2016; Amato et al., 2021; Carnazza and Liberati, 2021; Makin and Layton, 2021).

The network preliminarily presents three perspectives: Perspective 1. Relationship between public debt and economic growth; Perspective 2. Public debt and its social impact; Perspective 3. The relationship between public debt and fiscal policy. These perspectives are integrated by an important number of investigations that consolidate them and show that it is possible to continue developing studies on public debt in these areas. The following research topics were found and are recommended to be addressed by future research (Table 5):

Table 5. Topics for future research on public debt

Perspective	Topic	Reference
Public debt and economic growth	Test for the existence of nonlinear relationships between variables using recent econometric techniques.	Saungweme & Odhiambo, 2021
	Debt threshold	Law et al, 2021
	New methodologies	Albu & Albu, 2021
	Debt sustainability	Zhuravlov et al, 2021
	Indebtedness, growth rates, economic expansion, and contraction	Spyrakis & Kotsios, 2021; Butkus et al 2021a; Checherita-Westphal & Rother, 2012; Reinhart & Rogoff, 2010; Saungweme & Odhiambo, 2021a; Tran, 2021

Social impact of public debt	Overcoming the effects of public debt in States	Baumann, 2019; Olaoye et al., n.d.; Parella, 2019; Zhuravlov et al., 2021
	Public debt and mining and energy projects	Sovacool & Walter, 2019
	Comparative studies	Aksman, 2021
	Poverty and inequality	Anser et al., 2020; Bohoslavsky, 2020
	Market economy	Parella, 2019
	Public debt and public health	Anser et al., 2020
Public debt and fiscal policy	Public opinion	Arias & Stasavage, 2019; Barnes & Hicks, 2018; De-Córdoba et al., 2021
	Impact generated by the level of public debt	Hübscher et al., 2021; Makin, 2018
	Macroeconomic risks of high indebtedness	Makin & Layton, 2021
	Austerity and financial markets	Albonico et al., 2021; Jensen et al., 2021

Finally, according to the literature reviewed, this is the first systematic review on public debt that applies graph theory to analyze the scientific production in this field. As in any other type of research, the systematic review presented in this article shows certain limitations. First, the initial search was conducted in the Scopus database, because of those the investigations that not included in these databases are outside the scope of the current study. Secondly, the search topic public debt could imply certain limitations, since it may exclude keywords related to public debt. For future research, it is suggested to perform a meta-analysis of this field, in addition to deepening the analysis of the three proposed perspectives.

6. CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest

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