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COORDINATING GOVERNMENT FISCAL POLICY AND DEBT MANAGEMENT: BIBLIOMETRIC ANALYSIS AND VISUALIZATION

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Abstract

The coordination of government fiscal policy and debt management is critical for economic stability, yet emerging economies face distinct challenges in balancing fiscal sustainability with growth objectives. This study addresses the research gap regarding the interplay between fiscal space, debt dynamics, and policy coordination, particularly in understudied regional contexts. Using a bibliometric analysis of 562 Scopus-indexed publications (1999-2024), we employ citation network analysis, keyword co-occurrence mapping, and burst detection to identify evolving research trends and thematic clusters. Results reveal that fiscal sustainability and debt responsiveness are central concerns, with emerging themes including fiscal reaction functions, COVID-19 impacts, and sovereign debt management. The study highlights the need for context-sensitive fiscal rules and improved policy coordination to enhance debt sustainability in infrastructure-focused development settings. These findings offer practical insights for policymakers designing fiscally responsible growth strategies.

Keywords: *Fiscal Space, Fiscal Sustainability, Government Debt, Bibliometric Analysis, Content Analysis, Visualization.*
JEL Codes: *E63, H63, H81.*

Introduction

Fiscal policy at the governmental level is a critical focus area for numerous scholars and policymakers. This policy can be classified as either sustainable or unsustainable, depending on the perspective of the state. The concept of financial sustainability was introduced by Buiter (1985). He posited that financial sustainability pertained to the financial condition or capacity of a country as an economic entity. He proposed general standards for "sustainable indicators" and "government net worth", and he analyzed fiscal sustainability based on the principle of the "No-Ponzi game". Public spending and cumulative government debt are cyclical (Butkus et al., 2021; Olaoye et al., 2021). Temporary changes in fiscal expenditure have little impact on fiscal sustainability, while permanent changes in fiscal expenditure have a great impact on fiscal balance. The governments should avoid the destruction of fiscal rules and maintain the continuity of fiscal policy (Beldiman, 2024; Dziemianowicz & Kargol-Wasiluk, 2024).

On the other hand, fiscal space and the amount of room left for policy can be used to quantify government fiscal policy (Ko, 2020; Motsepe, 2023). The notion of fiscal space was first introduced by Heller (2005), who described it as the amount of budget space that permits governments to allocate funds for the intended uses without jeopardizing the long-term viability of the financial situation. Fiscal space is represented by the gap between a nation's current debt level and its expected sustainable debt level. A larger gap denotes a rise in the nation's government debt burden ratio (Ellalee & Alali, 2023; Fathy Abdelgany

& Badr Al-deen, 2023). There are three ways to create fiscal space: first, fiscal adjustment according to the fiscal response function. For example, increasing fiscal revenue can be achieved by strengthening tax collection and administration as well as by adjusting the tax rate. However, challenges such as administrative issues, technical difficulties, and international tax competition can hinder efforts to increase tax revenue. Therefore, expansion of the fiscal space should be coordinated with fiscal policies and monetary policies (Bilbiie et al., 2021; Lunina et al., 2020). Secondly, it aims to cut unnecessary government expenditures and reorganize government financial expenditure items to enhance the efficiency of capital use (Bairami et al., 2020). Third, the monetization of fiscal deficits. The risk associated with high levels of debt hinges on the willingness and capability of decision-makers to manage the repercussions of flawed debt losses over an extended period. When a country primarily holds government debt in its local currency, increasing the money supply in the market can help lower domestic debt repayment costs. However, it is crucial to consider the potential future impacts of inflation and rising welfare costs on the economy (Ghosh et al., 2013; Kose et al., 2017)

The issue of government debt is economic; whether the government defaults on its debt affects fiscal stability, which in turn determines whether the economic entity faces the risk of bankruptcy (Debrun et al., 2019; Gomez-Gonzalez et al., 2022). From the perspective of the fiscal budget and the interests of debtors, the budget imbalance and default risk caused by changes in the corresponding fiscal policy are also the embodiment of the government debt risk (Liu & Zhang, 2022). Loose budget rules will lead to higher levels of government debt and lower balanced growth rates; that is, strict fiscal rules are more conducive to government debt sustainability and long-term economic growth (Yamin et al., 2023; Yusuf & Mohd, 2021). However, some studies suggest that the original deficit rules can lead to higher economic growth and fiscal improvement (Afonso et al., 2022; Awadzıe et al., 2022; Qehaja et al., 2022). The research on government debt primarily focuses on government fiscal policy, yet the particular relationship between government fiscal policy and debt remains unclear (Ma & Qamruzzaman, 2022; Shah et al., 2024; Tran, 2018).

Government debt serves as a critical instrument for managing the macroeconomy and is intricately connected to governmental fiscal policies (Blueschke et al., 2020; Davoodi et al., 2022; Menguy, 2020). Its effective utilization can play a significant role in stabilizing and stimulating economic activity (Afonso & Ibraimo, 2020; Croce et al., 2021). The financial crisis that swept across the globe in 2008 had a far-reaching impact on the world economy, and in regulating economies, countries have introduced monetary and fiscal policies. Stimulated by low or even negative interest rates, major economies have increased their debt-raising efforts, resulting in debt inflation with a faster growth rate since the 1950s (Cottarelli, 2021; Ouliaris & Rochon, 2021). Many countries, including the United States, face high debt and low growth as government debt continues to rise (Adrian et al., 2024; Heimberger, 2023; Kütemeier, 2021). The sudden epidemic of COVID-19 in 2020 and its global spread increased the debt again (Bitner et al., 2024; Chien et al., 2022; Mitsi, 2023). According to statistics, 2020 has been the fastest-growing year for government debt globally since 1970, with government debt as a percentage of gross domestic product (GDP) averaging more than 120 percent in developed economies and 63 percent in developing countries (Kose et al., 2021).

Two key elements of fiscal policy and government debt, similar to the warp and weft of fabric, significantly impact smooth functioning and sustainable development of countries. It is crucial and far-reaching to explore the connection between these elements and to coordinate policies effectively (Sasmal & Sasmal, 2020; Yang et al., 2022). On the one hand, the financial situation directly determines the government's response to

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various economic shocks and promotes the implementation of social development projects (Alshaib et al., 2023; Arkadeva et al., 2022; Iwegbu & Dauda, 2022; Musa et al., 2024). On the other hand, government debt, as an important way for the government to raise funds, has been closely linked with all aspects of finance since its birth (Bednář, 2023; Bischi et al., 2022). Moderate government debt can inject impetus into economic growth, help the government break through the capital bottleneck and achieve leapfrog development. When the debt becomes unmanageable, e.g., through rapid growth or structural imbalances, the government faces ample pressure to repay that debt. This phenomenon not only threatens the sustainability of public finances but can also lead to a systemic economic crisis (Kose et al., 2020; Ouyang & Li, 2021).

In recent years, research on the fiscal space and sustainability of government debt has garnered increasing attention from scholars. However, currently, there is no comprehensive literature review that explores the relationship between government fiscal policy and debt. Furthermore, existing literature fails to clarify their internal connections, making it difficult to establish a future research agenda. This study provides bibliometric analysis concerning the evolution of research on government fiscal conditions and debt, emphasizing the intrinsic relationships existing between fiscal matters and public debt. It also outlines a future research agenda that needs to be addressed. RQ1: What is the historical lineage of research related to government fiscal policy and debt management? RQ2: What are the proposed future research agendas related to government fiscal policy and debt management?

The purpose of this bibliometric analysis is to identify key researchers and to examine the progression of various research perspectives regarding government fiscal policy and public debt. The theories that explain government fiscal space, fiscal sustainability, debt risk, the appropriate amount of debt, and debt sustainability may be helpful to researchers. In addition to recommending the use of new data and methods to better understand the internal connection between government fiscal policy and debt, this analysis also explores how to adopt policies to regulate the government's fiscal policy and debt conditions by adopting multi-dimensional perspectives and learning from various fields.

The majority of the published evidence on government debt and fiscal issues, including books, review papers, case studies, and empirical research, was searched and assessed for this study. Visual analysis offers a comprehensive understanding of this field by helping to identify patterns, trends, and gaps in the literature (Iscaro et al., 2021).

We profiled key research topics, significant authors, publication dates, and new areas of interest using citation network analysis, co-citation analysis, and keyword analysis. This research highlights the importance of understanding many concepts related to fiscal policy and public debt, especially the significant role that debt plays in governmental financial systems. The results also offer the research agenda for academics wishing to develop the field of government fiscal policies and debt as well as insightful information for practitioners and policymakers.

Methods

Research methodology

Figure 1 presents the research methodology used in this study, which employs bibliometric analysis to reveal the knowledge map related to research on government finance and debt, using software VOSviewer_1.6.20 and CiteSpace6.3.R1, and utilizes Citation Network Analysis, Global Citation Score, Citation Network Analysis, Global Citation Score, Burst detection analysis, Keyword Co-Occurrence Network and other visualization techniques to show the research development process and structural relationships, seeking to more

efficiently understand the research field, the correlation relationship and new points of interest.

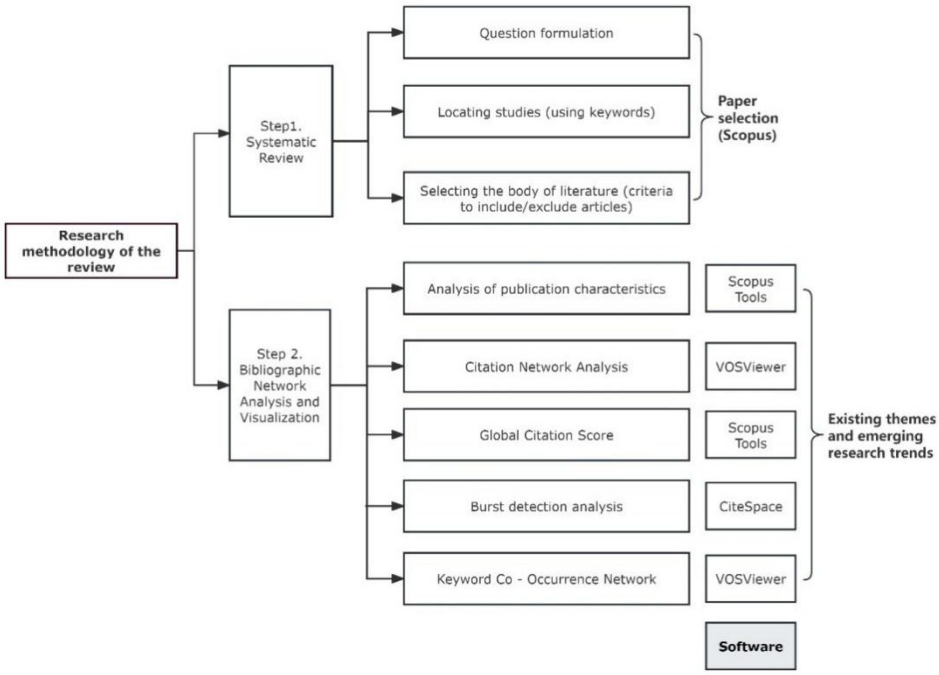

Figure 1. Flowchart of the investigation

Data sources

Our analysis is grounded in the Scopus database, one of the premier and most widely used databases for scientific research. Compared with other databases, the Scopus database provides broader content coverage (Pranckutė, 2021). Visual analysis offers a comprehensive understanding of this field by helping to identify patterns, trends, and gaps in the literature. Scopus is more user-friendly because it includes data on authors, organizations, and serial sources (Achury-Saldana et al., 2022). In addition, Scopus offers freely accessible data on authors and sources, including metrics, which helps researchers find more information (Singh et al., 2021). Lastly, the Scopus database was selected for vast volume and variety of its publications. Compared to other databases, Scopus has a larger selection of publications and can analyze citations, especially for papers published after 1995 (Gusenbauer, 2022; Visser et al., 2021).

Screening data

The Scopus database was searched by combining article titles, abstracts, and keywords to comprehensively cover research fields related to government fiscal policy and debt, serving as the basic data source for the relevant analysis. The research queries incorporated various phrases, synonyms, and abbreviations related to "fiscal" and "government debt". In this case, "fiscal space" OR "fiscal sustainability" were employed to query about government fiscal policy, while "debt" was used to query about debt. Considering the above factors, the following query (Equation 1) was formulated:

(("fiscal space" OR "fiscal sustainability") AND ("debt")) (1)

The search of the literature from 1999-2024, with a search date of January 1, 2025, yielded 655 documents. Subsequently, authors reselected the literature using the following criteria: (1) including documents in the fields of "Economics, Econometrics and Finance", "Social Sciences", "Busi-

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ness, Management, and Accounting"; (2) including "Article", "Book chapter", "Review", "Book"; (3) excluding all non-English documents; (4) deleting all duplicate documents based on "Author" and "Title"; (5) deleting documents with missing author information. Eventually, 562 documents were obtained (Figure 2).

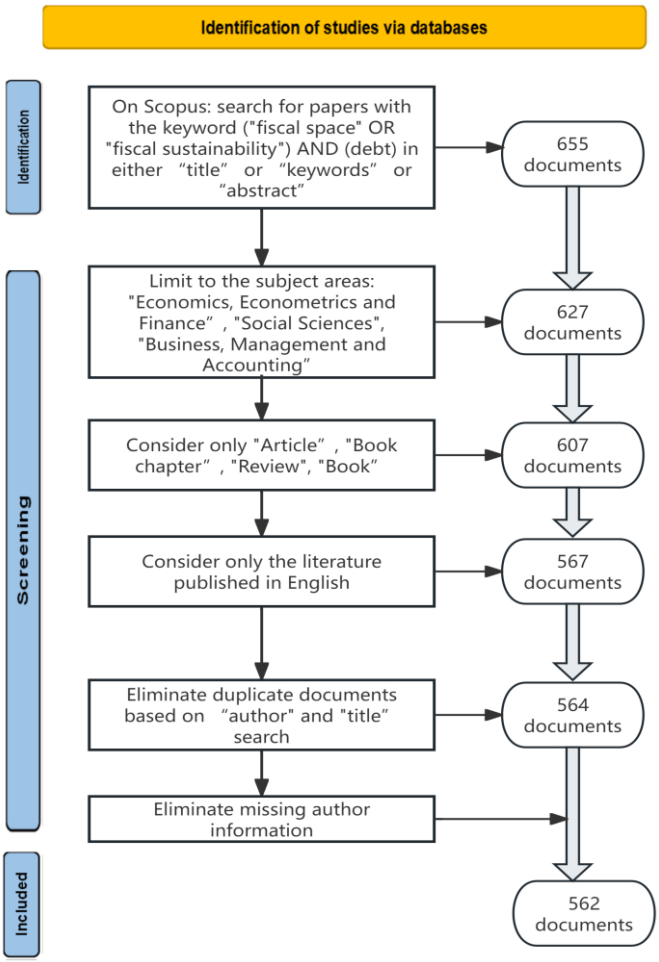

Figure 2. Paper selection procedure and results

Results

Volume, disciplines and geographical distribution

Number of publications

The annual volume of publications within a specific research domain and its associated trend can effectively mirror the level of attention accorded to that field (Farooq, 2023; Schiuma et al., 2023). As shown in Figure 3, from 1999 to 2024, the number of publications in the research area of government fiscal policy and debt demonstrated an overall upward trajectory. In the initial stage, spanning from 1999 to around 2010, the quantity of publications was relatively meager, with a sluggish growth rate. Specifically, the annual number of publications was predominantly less than 10. Starting from 2011, the number of publications witnessed a more pronounced increase. In 2011, it reached approximately 30, representing a substantial upsurge, compared with the preceding period. From 2013 to 2019, although the number of publications continued to grow, the growth rate remained relatively stable. The annual number of publications gradually climbed from around 30 to

nearly 50. In 2021, a minor peak emerged, with the number of publications reaching around 60. Subsequently, there was a slight decline in 2022 and 2023; however, the number remained above 50. As of 2024, the number of published articles peaked at nearly 70, indicating that the research enthusiasm in this field is continuously intensifying. Based on the current growth trend, it is anticipated that the number of articles published in this field may continue to maintain a high level or even experience further growth in the coming years. Given the ongoing evolution of the global economic landscape, factors such as fluctuations in debt levels, adjustments to fiscal policies, and the development of emerging economies are likely to continue to attract scholars to conduct in-depth investigations into the "relationship between government fiscal policy and debt (Moscone et al., 2024)".

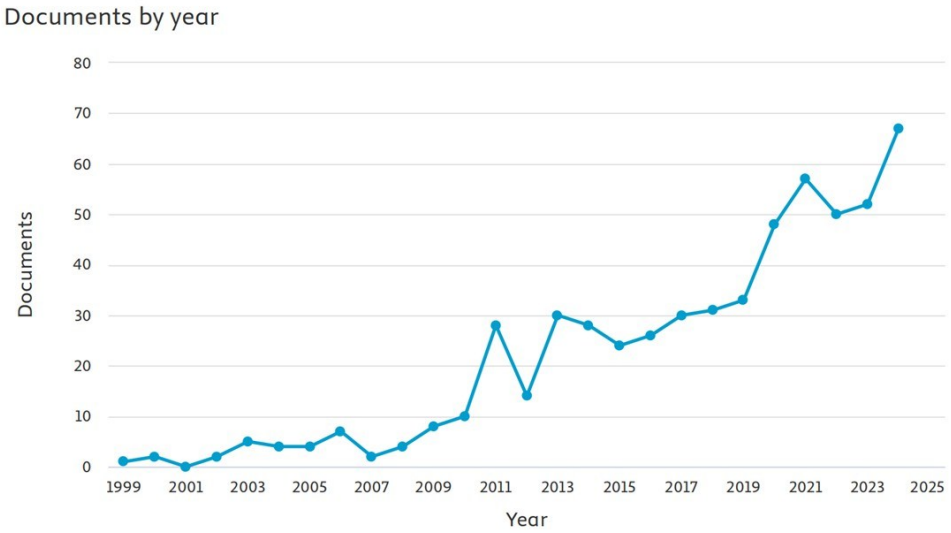

Figure 3. Annual scientific production

Distribution of disciplines

Analysis of the disciplinary distribution of research related to government fiscal policy and debt can, to a certain extent, reflects the theoretical and practical value of this field (Mok et al., 2020; J. Singh & Sehgal, 2024). As shown in Figure 4, in terms of academic fields in which these articles were published, economics holds an overwhelmingly dominant position, accounting for as high as 53.4%. Social sciences rank second, with a proportion of 22.0%. This result indicates that research on the relationship between government fiscal policy and debt also encompasses a wide array of social science disciplines, including, but not limited to, sociology and political science, which have examined the issues of government fiscal policy and debt from diverse perspectives. The proportion of business and management is 15.2%, which reflects the close connection between this field and business activities as well as management practices. Government fiscal and debt policies can exert a significant impact on business operations, the market environment, financial management, and other aspects. Consequently, business and management disciplines also attach great importance to this topic. The remaining disciplines such as mathematics, energy, and decision sciences account for a relatively small proportion. This disciplinary distribution suggests that government fiscal policy and debt are prominent research topics in economics, social sciences, and business and management disciplines, and the research findings therein possess high theoretical and practical significance.

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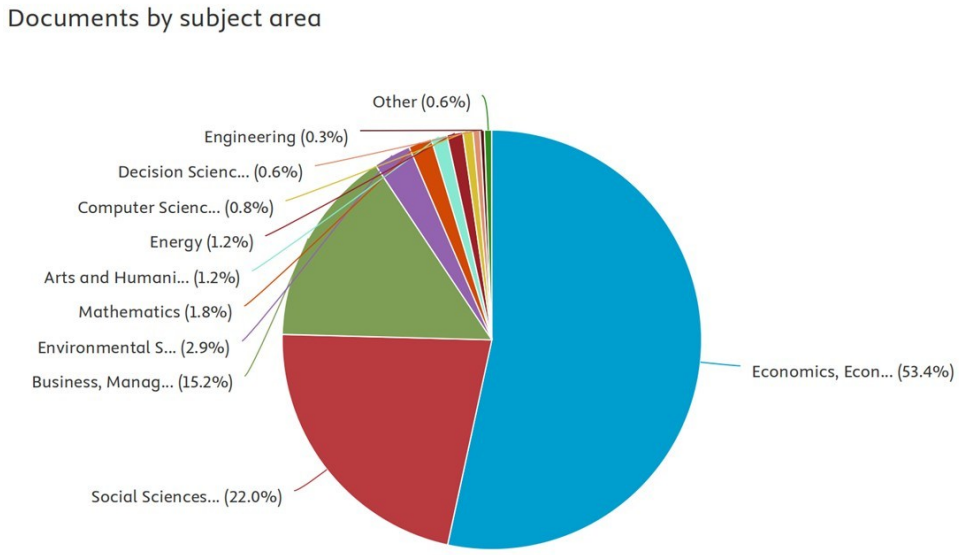

Figure 4. Documents by subject area

Geographical distribution

As is evident from the geographical distribution graph, the United States has an obvious advantage in the field of research on government fiscal policy and debt among top 10 nations and regions in terms of the number of publications. The number of its publications is close to 130, which indicates a remarkably high level of research activity in this country. The United Kingdom, Germany, India, China, and other countries have relatively similar numbers of publications, all hovering around 30-40, placing them in the second tier. Countries like Italy, Japan, Spain, South Africa, and France are in the third echelon, with around 20 publications or less. From the geographical distribution of publications, mainstream economies around the world are currently confronted with issues related to government fiscal policy and bond issuance (Gyamerah & Asare, 2024; Kumar & Prasanna, 2024). Moreover, the more severe these problems are, the more active the scientific research related to them becomes (see Figure 5).

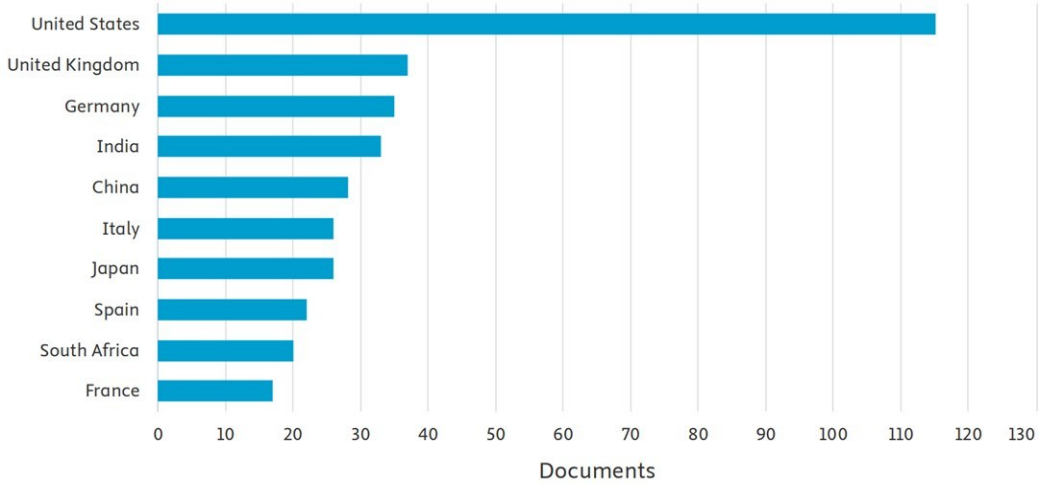

Figure 5. Documents by country or territory

Citation network analysis (CNA)

The methodology known as citation network analysis (CNA) views citations as the ties that connect papers, which are represented as nodes (McLaren & Bruner, 2022). By tracing citation networks, researchers can gain a deeper understanding of how previous research has influenced subsequent studies and can identify the historical development of research (Koenigsmarck & Geissdoerfer, 2021; Luo et al., 2022). Figure 6 depicts the citation network graph of the literature. It encompasses a total of 107 nodes and 170 connections, forming five distinct clusters. The basic information of these clusters is presented in Figure 6 and Table 1.

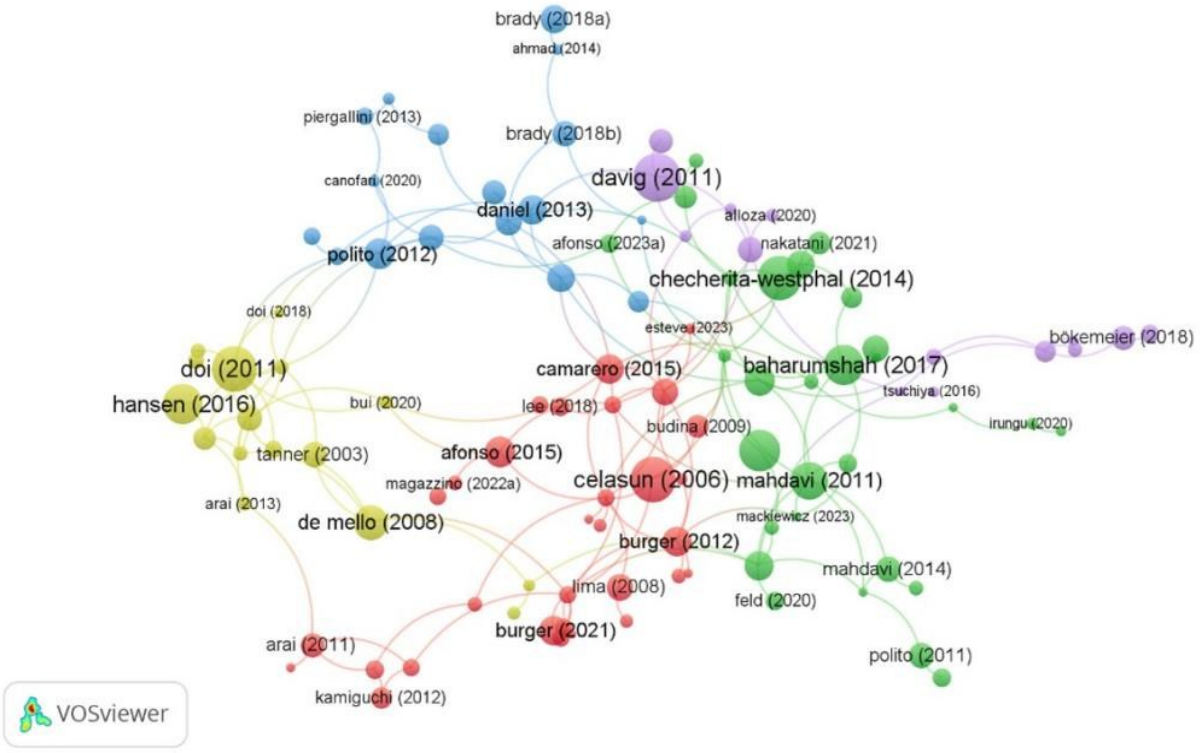

Figure 6. Citation network map

Table 1. Topics for research based on the most significant clusters in the citation network

Cluster	Nodes	Links	Topics	Top 3 cited papers*	Period	Size** (%)
1	31	95	Fiscal sustainability assessment and fiscal response function in emerging market countries	(Celasun et al., 2007) (Afonso & Jalles, 2014) (Burger et al., 2012)	2006-2024	29
2	29	98	The impact of debt on fiscal position and economic growth	(Checherita-Westphal et al., 2014) (Rose, 2010) (Baharumshah et al., 2017)	2010-2023	27
3	17	52	Factors influencing fiscal sustainability and related policies in Europe and the United States	(Polito & Wickens, 2011) (Daniel & Shiamptanis,	2011-2022	16

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				2013) (Berenguer-Rico & Carrion-i-Silvestre, 2011)		
4	16	61	The relationship between debt dynamics and fiscal sustainability in Brazil and Japan	(Doi et al., 2011) (Hansen & İmrohoroğlu, 2016) (De Mello, 2008)	2003-2022	15
5	14	34	The relationship between fiscal space and debt and inflation in a multi-country perspective.	(Davig et al., 2011) (Leeper & Walker, 2011) (Afonso & Jalles, 2016)	2010-2020	13

Note(s): **Minimum citations = 4;**N = 107(100%).*

Each cluster's primary research issues and the most frequently cited sources such as the top three cited publications are the main subjects of this research. The study's topics include the relationship between debt, fiscal space, and fiscal policies in different economies around the world as well as the factors that influence these relationships and the evaluation of their fiscal sustainability.

Cluster 1 centers on the assessment of fiscal sustainability and the exploration of fiscal response functions in emerging market countries. Scholars have investigated these aspects from different perspectives. Afonso & Jalles (2014) applied panel unit root and cointegration analysis methods to assess the sustainability of public finances in 18 OECD countries from 1970 to 2010. The study revealed that fiscal policy in most countries was unsustainable. Although there was a long-run causal relationship between government debt and the primary balance, the marginal long-run effect of government debt on the primary balance was zero. Celasun et al. (2007) proposed a probabilistic analysis of public debt sustainability using a "fan chart". By constructing a stochastic simulation algorithm incorporating the fiscal reaction function and studying five emerging market countries, including Argentina and Brazil, they found that the fiscal reaction function could stabilize debt to a certain extent. However, there was still a risk in the face of shocks. Camarero et al. (2015) analyzed data from 17 OECD countries from 1970 to 2012 and found that the fiscal sustainability of most countries was weak. There was a cointegration relationship between revenues and expenditures, but it was affected by structural mutations. Some countries had relatively stronger fiscal sustainability, while others were less sustainable.

Cluster 2 summarizes the impact of debt on fiscal position and economic growth. Mahdavi & Westerlund (2011) utilized panel data techniques to study the fiscal sustainability of state and local governments in the United States. They found that "broader" balances, which included special funds and federal grants, were more likely to meet the "strong" sustainability condition. In contrast, "narrow" balances had "weak" sustainability problems in some areas, and certain technical balanced-budget rules only had a positive effect on narrow balances. Checherita-Westphal et al. (2014) derived and estimated the growth-maximizing public debt ratios for OECD, EU, and euro-area countries through a theoretical model. The study argued that if the euro area set a common debt target, it should maintain its debt level at around 50% of GDP. Additionally, it described the application of a forward-looking budget response function to the debt-targeting framework. Baharumshah et al. (2017) took Malaysia as a case study

and used a Markov transformation model to assess its fiscal policy sustainability from 1980 to 2014. The study found that Malaysia's fiscal deficit path was generally sustainable but fluctuated during economic hardships. There was a threshold effect in the debt-economic growth relationship, and economic growth was inhibited when the debt-to-GDP ratio exceeded 54.71%. Rose (2010) explored the relationship between the fiscal sustainability of state and local governments in the U.S. and political and fiscal regimes. The study found that different regimes had varying impacts on fiscal sustainability. Chen (2014) applied various nonlinear unit root tests, e.g., Threshold Autoregression (TAR) and Momentum Threshold Autoregression (MTAR), to study the debt-to-GDP ratios of the G7 and some European countries. The results showed that after accounting for nonlinear trends, the debt-to-GDP ratios of Canada, Germany, the U.S., and Italy were stationary. However, the asymmetry of the adjustment was model-dependent.

Cluster 3 focuses on the factors influencing fiscal sustainability and related policies in Europe and the United States. Brady & Magazzino (2018) used panel unit root tests, cointegration tests, and causality tests to evaluate the sustainability of fiscal policy in the EU28 nations between 1980 and 2015. They discovered a long-term correlation between government debt, primary balances, spending, and revenues. However, in some countries, such as the PIGS (Portugal, Italy, Greece and Spain) countries, government expenditures were growing faster than revenues, raising concerns about fiscal sustainability. Berenguer-Rico & Carrion-i-Silvestre (2011) harmonized the research methodology for fiscal sustainability and proposed new statistics to test the sustainability of the U.S. fiscal deficit and debt. They found that the U.S. fiscal policy was deeply sustainable in the long run, but there was variability in the degree of sustainability. Daniel & Shiamptanis (2013) addressed the issue of fiscal limits by deriving constraints on fiscal rules to ensure that governments could avoid explosive behavior in debt and primary surpluses.

Cluster 4 is dedicated to the relationship between debt dynamics and fiscal sustainability in Brazil and Japan. De Mello (2008) analyzed Brazilian data from 1995 to 2004, estimated a fiscal reaction function, and tested the sustainability of public debt dynamics. The study concluded that Brazilian governments at all levels responded to debt changes by adjusting the target for primary budget surpluses, and that institutional factors had a significant impact on fiscal sustainability. Public debt dynamics were sustainable, and the central government followed a "spend first, tax later" policy. Hansen & İmrohoroğlu (2016) constructed a neoclassical growth model to study Japan's fiscal reforms and government debt. They found that Japan needed to increase tax revenues to significantly stabilize its debt. If it relied on consumption tax or labor income tax, the tax rate would need to be increased substantially. Consumption tax was less distortionary compared to labor income tax. The study also suggested that fiscal sustainability could be achieved by reducing public expenditure and increasing tax revenue sources. Doi et al. (2011) constructed a quarterly data series of Japan's fiscal balance and debt from 1980 to 2010 by calculating the minimum tax required to stabilize the debt-to-GDP ratio. They found that to achieve the said stabilization, the ratio of government revenue to GDP needed to be permanently increased to 40 - 47%. Using a Markov switching model to estimate the response of the primary surplus to debt changes, the results showed that the primary surplus did not respond positively to debt under either system. Fiscal policy was “positive” Monetary policy was “negative”. The overall conclusion was that Japan's current fiscal situation was unsustainable.

Cluster 5 is centered around the relationship between fiscal space and debt and inflation in a multi-country perspective. Davig et al. (2011) built a rational expectations framework. They aimed to study the impact of rising debt in a “fis-

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cal limit" situation. They concluded that high inflation was possible. In addition, high inflation was closely tied to the timing and combination of policy adjustments. They noted that if fiscal expectations were not well-anchored, monetary policy would have trouble controlling inflation. Leeper & Walker (2011) pointed out that advanced economies faced fiscal pressures because of aging populations. This situation might reach the fiscal limit and restrict the capability of monetary policy to regulate inflation. They also discussed how to model the fiscal limit and the direction of research. Using root and cointegration analysis, Afonso & Jalles (2016) studied fiscal sustainability in 18 OECD countries. They discovered that in most countries, it was hard to achieve fiscal sustainability. In some countries, the growth rate of government expenditure was higher than that of revenue. In addition, in most countries, Granger causality was established between government debt and primary balance.

Global citation score (GCS) analysis

Global citation score analysis serves as a means to identify influential papers. Irrespective of whether a document is part of the citation network, it is assigned a GCS, which represents the total number of citations the document has received in the entire database (Knoke & Yang, 2019). The standardized GCS, on the other hand, categorizes works based on the ratio of the total number of citations per year to the number of years since publication (up to 2024). This standardized GCS analysis helps pinpoint ten papers that are currently of the greatest interest to the scientific community. Moreover, this assessment method can single out the most popular articles in the field at present (Strozzi et al., 2017).

Table 2 presents the top ten articles ranked by standardized GCS. All of them are journal articles, and only four of them are related to the clusters derived from the Citation Network Analysis (CNA). This result indicates that some articles may have a high GCS and thus appear in the citation network yet have a relatively low standardized GCS (Pauwels et al., 2016). Augustin et al. (2022) focuses on the impact of national fiscal capacity on sovereign credit risk in the context of the COVID-19 pandemic shock. By analyzing a sample of 30 developed countries, it was found that countries with constrained fiscal capacity had positive and significant sensitivity of sovereign default risk to the intensity of the COVID-19 virus spread.

In contrast, for countries with sound fiscal positions, this sensitivity is not significant. Further analysis of Eurozone countries and the U.S. showed that this finding holds under a common monetary policy. The study also identified a fiscal threshold, where when the debt-to-GDP ratio exceeds 61%, the sensitivity of sovereign default risk to virus transmission increases substantially. It has policy implications, such as the need to strengthen fiscal capacity to cope with external shocks. Ranked second is the article by Ghosh, Kim, et al. (2013). Employing the construction of theoretical models and empirical analyses, this paper explores public debt sustainability in developed countries. It defines fiscal space, analyzes the phenomenon of fiscal fatigue, and concludes that fiscal space varies across countries and is influenced by multiple factors. As a result, it provides a new framework and methodology for assessing debt sustainability. De Grauwe & Ji (2013), ranked third, focuses on whether government bond markets in the euro area are more vulnerable to self-fulfilling liquidity crises compared to those in independent countries. Through empirical analysis, they discovered that the spread movements of treasury bonds in some euro-area countries deviated from fundamentals and were highly influenced by market sentiment, verifying the hypothesis that the euro area is more fragile and drawing policy-relevant insights.

The article with the highest standardized GCS was published in 2022. It does not have an

extremely high GCS, suggesting that although it has been published for a relatively short period, the content of the study is of great interest. Secondly, the top three articles in terms of GCS are equally notable, and the subsequent articles have significantly fewer citations, indicating that these top three articles have had a substantial impact on this research area. Additionally, among the top ten articles (see Table 2), those published in 2013 account for the largest proportion, indicating that research on the relationship between government fiscal policy and debt has received increasing attention since 2013, which is a crucial year in this research field.

Table 2. Best 10 most cited articles ranked by normalized GCS

Rank	Title	Authors	Journal	CNA	GCS	Norm. GCS*
1	In sickness and debt: The COVID-19 impact on sovereign credit risk	(Augustin et al., 2022)	Journal of Financial Economics	No	60	11.5
2	Fiscal Fatigue, Fiscal Space and Debt Sustainability in Advanced Economies	(Ghosh, Kim, et al., 2013)	Economic Journal	No	315	4.82
3	Self-Fulfilling Crises in the Euro Zone: An Empirical Test	(De Grauwe & Ji, 2013)	Journal of International Money and Finance	No	346	2.55
4	What is the risk of European sovereign debt defaults? Fiscal space, CDS spreads and market pricing of risk.	(Aizenman et al., 2013)	Journal of International Money and Finance	No	211	1.82
5	The Fourier approximation and testing for the null of cointegration	(Tsong et al., 2016)	Empirical Economics	No	59	1.5
6	The effects of the European debt crisis on earnings quality	(Kousenidis et al., 2013)	International Review of Financial Analysis	No	80	1.36
7	Fiscal sustainability using growth-maximizing debt targets	(Checherita-Westphal et al., 2014)	Applied Economics	Yes	64	1.1
8	Primary surplus behavior and risks to fiscal sustainability in emerging market countries: A "fan-chart" approach	(Celasun et al., 2006)	IMF Staff Papers	Yes	66	0.39
9	Inflation and the fiscal limit	(Davig et al., 2011)	European Economic Review	Yes	73	0.31
10	Japanese government debt and sustainability of fiscal policy	(Doi et al., 2011)	Journal of the Japanese and International Economies	Yes	69	0.15

Note(s): ** Norm. GCS = Citation in 2024/years since the adoption.*

Burst detection analysis (BDA)

In order to gain insights into the latest evolutionary trends within a disciplinary research domain, scholars must identify and monitor the research frontiers (Olaru et al., 2024). This analysis enables them to forecast the development trajectory of the research field and refine the research questions that warrant further exploration (Li et al., 2022; Shan et al., 2022). Keyword emergence refers to a rapid increase in the number of occurrences of a keyword in the literature during a certain period, causing a change in the hotspot of the research field (Chen, 2017; Kenekayoro, 2020). Keyword burst analysis expands the keyword network, aiming to uncover the variables contributing to citation accumulation by illuminating the frontiers and advancements in

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each research area (Yan & Zhang, 2022). Thus, keywords that have burst in recent years can, to some degree, mirror the current research frontiers (Nguyen et al., 2022; Shen et al., 2023; Wang et al., 2024).

Consequently, the burst detection analysis (BDA) graph of citations can be employed to identify the prevailing research hotspots. The figure below presents the top 25 keywords derived from the literature analyzed using CiteSpace software. As shown in Figure 7, it is evident that the research hotspots related to government fiscal policy and debt have undergone a phased transformation during the period from 1999 to 2024. In the early stages, "economic policy" was the primary area of focus. From 2003 to 2010, research attention shifted towards topics such as "Eurasia", "Asia", "Africa", and "Brazil", as well as "debt crisis" and "budget deficit", making them the central themes of investigation. Between 2011 and 2018, keywords like "inflation", "fiscal consolidation", "government debt", and "primary deficit" gained prominence. Subsequently, from 2019 to 2024, research placed emphasis on "fiscal space", "debt sustainability", and related concepts. Notably, significant attention recently was paid to "COVID-19", "sovereign debt", "panel data", and "fiscal reaction function". This indicates that in the context of the COVID-19 pandemic, a current research hotspot lies in analyzing the relationship between the fiscal reaction function and debt, leveraging panel data for in-depth exploration.

Top 25 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	1999 - 2024
economic policy	1999	1.97	1999	2016	
eurasia	2003	2.44	2003	2009	
asia	2003	2.38	2003	2010	
brazil	2003	1.8	2003	2008	
debt relief	2003	1.74	2003	2008	
financial crisis	2004	2.47	2004	2011	
africa	2005	2.54	2005	2008	
debt crisis	2005	2.22	2005	2009	
budget deficit	2006	3.01	2006	2014	
inflation	2011	2.12	2011	2013	
gross domestic product	2011	1.78	2011	2012	
european monetary union	2013	2.38	2013	2014	
fiscal consolidation	2013	1.99	2013	2014	
government debt	2002	1.71	2013	2014	
primary deficit	2013	1.67	2013	2018	
cointegration analysis	2010	2.26	2015	2016	
primary balance	2016	1.93	2016	2018	
fiscal rules	2006	2.3	2019	2020	
fiscal space	2013	2.58	2020	2021	
debt sustainability	2009	1.74	2020	2024	
european union	2012	1.79	2021	2024	
covid 19	2021	1.75	2021	2024	
sovereign debt	2021	1.75	2021	2024	
panel data	2015	2.77	2022	2024	
fiscal reaction function	2015	2.07	2022	2024	

Figure 7. Results of keyword burst detection from 1999 to 2024

Since the COVID-19 epidemic broke out in late 2019, several keywords have emerged as major factors. These keywords include "fiscal space", "debt sustainability", "European Union", "Covid 19", "sovereign debt", "panel data", and "fiscal reaction function". Among them, the latest keywords that showed up are "Covid 19" and "sovereign debt". They emerged in 2021. Furthermore, the keywords "panel data" and "fiscal reaction function" burst in 2022. These keywords are still relevant up to now, so they reflect the cutting-edge issues of current research.

The keyword with the longest duration of burst and appearance is "economic policy". It first appeared in 1999 and burst from 1999 to 2016, with a burst duration of 17 years. This phenomenon shows that "economic policy" has been a hot research topic in this field for a long time.

The keyword with the strongest burst intensity is "budget deficit". Its burst started in 2006 and ended in 2014, with an intensity of 3.01. From 2006 to 2014, the global economy went through a complex cycle. The global financial crisis in 2008 was a critical point. Before the crisis, economies of some countries were booming, and government revenues were relatively sufficient. However, people's optimism about the economy led to overspending, and budget deficits had already built up to some extent. After the crisis, the economic recession caused a sharp drop in fiscal revenues. At the same time, governments tried to stimulate economic recovery by adopting large-scale fiscal stimulus policies, like tax cuts and increased public spending. The government also increased spending on things like unemployment relief and financial institution bailouts to stabilize the economy. This change in fiscal revenues and expenditures made the budget deficit issue prominent during this period, and it became the focus of the government finance and debt research field.

Co-occurrence analysis of keywords (COAK)

By utilizing the Co-occurrence analysis, it becomes feasible to identify research trends and further refine the results obtained from CNA and BDA. A significant limitation of CNA is that it may exclude crucial works that are essential for reference, particularly in the context of new studies. Therefore, keyword co-occurrence analysis, when applied to BDA data, needs to be performed to provide supplementary support for CNA analysis (Máté et al., 2024).

As shown in Figure 8, VOSviewer was employed to generate a network comprising 23 nodes, which were organized into 5 distinct clusters. Given that there is no overlap among these node groupings, each keyword can be assigned to only one cluster. The co-occurrence network is characterized by 128 links, with a cumulative link strength of 432. In this network, the higher the frequency of a keyword co-occurring with other phrases, the greater its numerical value, suggesting a more significant role within the network. In addition, the more frequently the keyword appears in the study dataset, the larger its corresponding node size (Ejsmont et al., 2020). Furthermore, the degree of yellowness of the nodes and links serves as an indicator of their timeliness and relevance to the topics of fiscal space, fiscal sustainability, and debt.

Among the 1150 keywords analyzed, those that occurred at least five times formed five clusters, collectively containing 23 keywords. The three most prominent clusters accounted for 82.61% of the most relevant keywords. The keyword with the highest link strength, reaching 160, is "fiscal sustainability". Coincidentally, "fiscal sustainability" also has the highest frequency of occurrence, with 172 instances. It is followed by "public debt" (98 occurrences), "fiscal policy" (78 occurrences), and "fiscal rules" (33 occurrences) (see Figure 8 and Table 3).

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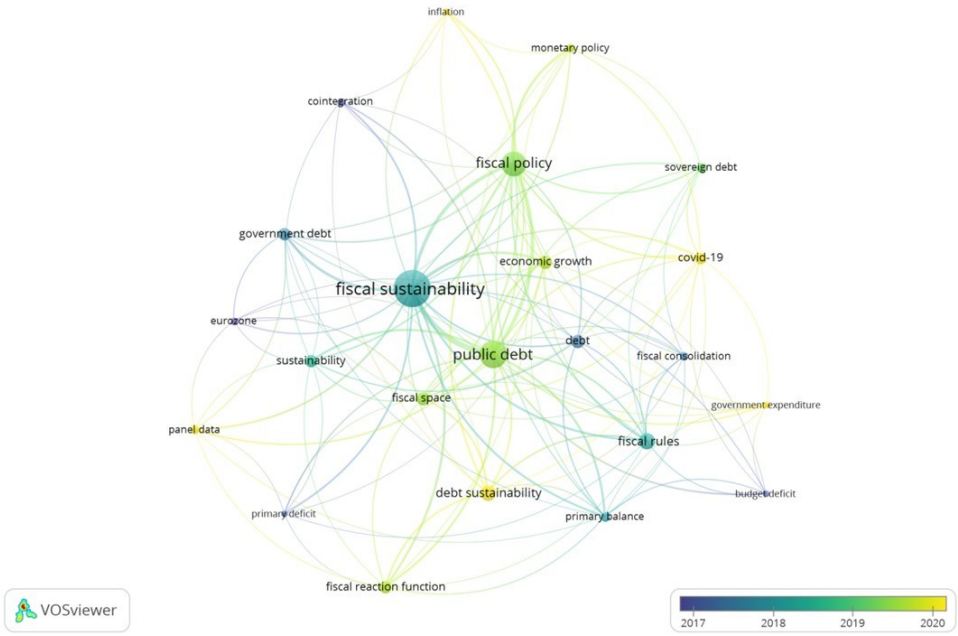

Figure 8. Co-occurrence of keywords network map

Table 3 provides comprehensive data on clustering and keywords. These groupings represent five different study themes. The frequency of co-occurrence of terms in the dataset dictates the order in which they are presented.

Table 3. Main research topics based on COAK

Cluster	Keywords	Total link strength	Occurrences	Main research topics
1	public debt	152	98	The relationship between public debt, economic growth and fiscal deficits under the fiscal rule
	fiscal rules	39	33	
	economic growth	36	24	
	debt	27	23	
	primary balance	32	13	
	fiscal consolidation	14	10	
	budget deficit	14	7	
2	fiscal sustainability	160	172	Exploring the association between fiscal sustainability, fiscal space and government debt in the euro area based on panel data
	fiscal space	29	24	
	government debt	28	22	
	sustainability	23	21	
	panel data	19	10	
	eurozone	12	8	
	primary deficit	15	7	
3	fiscal policy	99	78	The impact of fiscal and monetary policies on sovereign debt under epidemic shocks
	covid-19	25	17	
	sovereign debt	15	13	

	monetary policy	21	11	
4	debt sustainability	34	30	The association between debt sustainability and the fiscal reaction function
	fiscal reaction function	30	20	
5	cointegration	15	9	Cointegration between fiscal sustainability and government debt
	inflation	13	7	

Cluster 1 centers on the relationship among public debt, economic growth, and fiscal deficits within the framework of fiscal rules. Afonso & Jalles (2017) concentrated on 11 eurozone countries. Their research indicated that fiscal policies of Belgium, France, Germany, and the Netherlands appear to be sustainable. However, they also found that some state debts responded negatively to budgetary surplus innovations. The global financial crisis had a substantial impact, and spending-related fiscal rules significantly affected sustainability. Aldama & Creel (2019) employed a Markov transformation fiscal rule, using annual data from the United States between 1940 and 2016. The results demonstrated that, overall, the U.S. fiscal policy is sustainable, although there are periods of unsustainability. Nevertheless, the policy responses during sustainable phases are adequate to ensure long-term debt stability. Baharumshah et al. (2017) utilized a Markov transformation model to assess the sustainability of Malaysian fiscal policy and the relationship between debt and growth. The study showed that, in most periods, the fiscal policy was sustainable but challenging during difficult economic times. When the debt exceeds approximately 54.71% of GDP, it depresses economic growth, and there is a unidirectional causal relationship.

Cluster 2 is dedicated to exploring the interrelationship between fiscal sustainability, fiscal space, and government debt in the euro area, leveraging panel data. Davig et al. (2011) posited that in scenarios of high debt levels within the fiscal limit, passive monetary policy can lead to inflation and disrupt inflation expectations. Tsong et al. (2016) enhanced the covariance test through the Fourier approximation method for analyzing fiscal sustainability. They found a long-run relationship between fiscal revenues and expenditures in most countries, thereby presenting a novel approach to evaluating fiscal sustainability. Ghosh, Ostry, et al. (2013) investigated the impact of fiscal space on debt sustainability and risk pricing in monetary union member countries. They discovered that membership had both positive and negative effects, and market valuation was significantly influenced by fiscal space. Aizenman et al. (2013), through panel regression analysis of multi-country data, identified fiscal space as a crucial factor in sovereign risk pricing. Hansen & İmrohoroğlu (2016) constructed a neoclassical growth model to analyze Japan's finances. They found that Japan's high debt and aging population result in a heavy fiscal burden, and stabilizing the debt requires a significant tax increase.

Cluster 3 delves into the impact of fiscal and monetary policies on sovereign debt under epidemic-related shocks. Burger & Calitz (2021) studied South Africa's fiscal situation. They found that South Africa's debt-to-GDP ratio had increased prior to the COVID-19 pandemic, and that the fiscal situation deteriorated further during the pandemic. The study suggested that excessive government spending as a proportion of GDP is detrimental to economic growth. Past fiscal adjustment efforts were insufficient, and future fiscal policies, such as reducing non-interest expenditures or increasing revenues, need to be adjusted. Specific measures proposed include cutting the wage bill, reducing the budget for goods and services, and implementing a debt ceiling to stabilize the debt-to-GDP ratio. Kose et al. (2022) constructed a fiscal space database covering 202 countries from 1990 to 2020. They found that the fiscal space of emerging markets and developing

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economies (EMDEs) generally contracted in the 1990s, improved in the early 21st century, deteriorated in the 2010s, and further worsened in the 2020s. The COVID-19 pandemic in 2020 further narrowed the global fiscal space. Agarwala et al. (2021) analyzed the impact of climate change on fiscal sustainability and sovereign debt markets. They noted that climate change affected sovereign risk through multiple channels, including natural capital depletion, the fiscal impact of climate disasters, the consequences of adaptation and mitigation policies, supply and demand shocks, innovation competitiveness and efficiency, productivity, financial stability, international trade and capital flows, and political stability.

Cluster 4 focuses on the relationship between debt sustainability and the fiscal reaction function. Nakatani (2021) studied the impact of disasters on debt dynamics and proposed a fiscal rule. This rule, based on non-resource and non-grant revenues for recurrent expenditures, integrates debt-budget balance goals and disaster-shock considerations. It offers new perspectives for fiscal policy-making in small countries, presenting several advantages not found in traditional rules. Sun (2018) determined that China's public and external debts were sustainable in the short and medium term. However, since 2009, non-financial corporate debt and the resulting non-financial private debt have been unsustainable. High indebtedness of local governments, non-financial corporations, and shadow banks may pose potential risks to financial stability. Paniagua et al. (2017) examined the sustainability of public finances in the euro area after the 2008 financial crisis. They found that while most member states adjusted their policies in response to rising debt, adjustments of some countries were weak; e.g., the fiscal response to public debt generally increased after 2009. Burger et al. (2012) focused on South Africa's fiscal sustainability. They have found that since 1946, in response to the rising debt, the South African government has adjusted its primary deficits or surpluses, indicating that its fiscal policy is sustainable.

Cluster 5 is centered around the cointegration between fiscal sustainability and government debt. Priesmeier & Koester (2013) contended that when analyzing fiscal sustainability, both fiscal sustainability itself and Wagner's law should be considered. Their study of German data revealed that since 1973, due to the fiscal policy response to the oil crisis, German public finances had experienced persistent expenditure increases and revenue decreases. Wagner's law posits that GDP growth leads to an increase in public spending, and the interaction between these two factors undermines the sustainability of German public finances. The study emphasized the importance of integrating multiple factors in fiscal analysis and highlighted the crucial role of Germany's debt-brake mechanism in restoring fiscal sustainability. Polito & Wickens (2011) proposed a fiscal stance index based on VAR-model predictions for the fiscal situations of European Union countries and the United States. This index can effectively reflect the dynamic changes in the fiscal stance by comparing the present value of the future debt-to-GDP target ratio with the current debt-to-GDP ratio. It can also be decomposed into different components to analyze the influencing factors. Through an empirical study of data from 14 European countries and the United States between1970 and 2011, they found that countries' fiscal stances fluctuated over time and generally deteriorated after the 2007 global financial crisis. Compared with traditional econometric tests and temporary tax-gap indicators, this index has the advantages of being forward-looking, providing more information, and being more transparent.

Discussion

This paper provides a thorough examination of multiple perspectives and trends in research on government fiscal policy and debt since

its emergence in the late 1990s. It utilizes VOSviewer, CiteSpace, and other software to conduct network analysis and mapping in order to present a clearer picture of the research history and current hotspots. The application of bibliometric analysis to examine the impact of government debt on fiscal conditions while also addressing fiscal and debt sustainability aims to elucidate the relationship between government finances and debt. This approach seeks to foster an enhanced understanding of how to regulate government fiscal policies and debt management through a novel perspective on policy design (Ali et al., 2023).

The results indicate that the number of publications in this research area has rapidly increased since 1999, with a significant acceleration in growth following the COVID-19 pandemic (Kaur et al., 2024). The study identifies economics, sociology as well as business and management as the disciplines most closely associated with this research field. The leading countries in this area are primarily developed, or large economies, with the United States positioned far ahead of others. The three most influential publications identified are: "In Sickness and Debt: The COVID-19 Impact on Sovereign Credit Risk" by (Augustin *et al.*, 2022), "Fiscal Fatigue, Fiscal Space, and Debt Sustainability in Advanced Economies" by Ghosh, Kim et al. (2013), and "Self-Fulfilling Crises in the Eurozone: An Empirical Test" by De Grauwe & Ji (2013).

Through CNA and COAK, five crucial clusters have been derived: the relationship between public debt, economic growth, and fiscal deficits under fiscal rules; the association between fiscal sustainability, fiscal space, and government debt in the Eurozone; the impact of fiscal and monetary policies on sovereign debt during epidemic shocks; the relationship between debt sustainability and the fiscal reaction function; and the cointegration between fiscal sustainability and government debt.

Additionally, BDA and COAK have visualized the historical development of research (Ji et al., 2023). Initially, the research field focused on economic policies and government debt. Subsequently, significant attention was paid to debt crises and budget deficits in major economies worldwide. After the outbreak of the COVID-19 pandemic, the relationship between fiscal space and debt sustainability emerged as a hot research topic.

This study employs a systematic evaluation approach to identify and synthesize all relevant literature. The findings reveal the connection between government fiscal policy and debt from multiple perspectives. Regarding the link between debt dynamics and fiscal sustainability, both elements are significantly influenced by factors such as the fiscal system and fiscal transfers. Different fiscal systems have varying impacts on fiscal sustainability, and there is a positive association between fiscal transfers and debt, suggesting an implicit subsidy (Jennes, 2021; Nguyen & Luong, 2021). In terms of the long-term relationship between debt ratios and fiscal space, the fiscal policies of some countries can effectively respond to debt shocks, promoting long-term fiscal sustainability. In contrast, the opposite is true for other countries (Efuntade et al., 2022; Kim & Ostry, 2020; Lozano-Espitia & Julio-Román, 2020). From the angle of the relationship between debt sustainability and the fiscal reaction function, fiscal responses to public debt have generally increased since 2009, indicating a connection between changes in debt and fiscal policy responses. The adjustment of fiscal policy is a crucial mechanism for addressing changes in debt (Jaramillo & Hernández, 2023; Ogbeifun & Shobande, 2020). Fiscal sustainability, changes in fiscal space balance, and debt sustainability are interrelated. The debt-brake mechanism is crucial for restoring fiscal sustainability, and there exists a dynamic cointegration relationship between debt and the fiscal stance, which allows for a better assessment of fiscal policy and debt conditions (Beetsma, 2022; Nandelenga, 2021).

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After comprehensive examination of the existing literature on government fiscal policy and debt, this paper outlines the historical development of research in this area and uncovers the connection between government fiscal activities and debt. At present, there are more academic studies on debt sustainability and on fiscal sustainability, but government fiscal policy and debt are relatively rarely linked in the literature and there are few studies examining how to balance the relationship between government fiscal policy and debt to achieve sustainable fiscal status, ample policy space, sustainable debt and to maintain economic growth. Government fiscal policy and debt are closely interconnected and cannot be analyzed in isolation from either side (Bianchi et al., 2020; Cantore et al., 2019; Cavallo et al., 2018; Liu et al., 2024). Therefore, the future research direction in the intrinsic link between government fiscal policy and debt is based on analyzing how to formulate relevant policies to regulate the combination of finance and government debt to achieve stable economic growth. In terms of the research object, the research object of the existing literature is mainly concentrated in Europe, America, and other regions of developed economies, with less research on the topic in the "BRICS" (China, Brazil, India, Russia and South Africa) as the representative of the emerging economies, whose rapid economic growth in the future in the global economy will play a more imperative role.

Conclusion and Limitations

This study is groundbreaking as it is the first to collect and conduct bibliometric research on related literature from the perspective of fiscal policy and debt management. Furthermore, this research theme has significant practical implications for public finance. The analysis of visualization presents a distinctive perspective on the interrelations among concepts and trends within the field (Barbu et al., 2022; Ramanujan et al., 2017; Xu et al., 2022). It offers valuable insights for policymakers and researchers seeking to regulate government fiscal policy and debt through the implementation of synergistic policies. The novelty of this paper lies in the complexity of its research methodology. By utilizing Scopus tools, VOSviewer, CiteSpace, and other software, a detailed analysis of relevant literature is performed, and the results are visually represented. In-depth analyses for each cluster, along with representative literature, are also included.

The study implies that an interplay between government fiscal policies and debt dynamics represents one of the most crucial concerns in modern governance. This relationship fundamentally shapes a national economic trajectory, influencing from growth prospects to fiscal sustainability and policy space (Patel & Alva, 2024; Purificato & Sodini, 2023; Slepov et al., 2017; Spyrakis & Kotsios, 2021). Because of the record amounts of global debt, it is important to carefully consider the intricate relationships between how governments handle their fiscal affairs and the debt trajectories that arise. (Barreto, 2024; Brito, 2017; Krishna & Singh, 2020). This study explores the multifaceted relationship between fiscal policy and debt dynamics, analyzing tendencies, regional variations, sustainability mechanisms, and potential policy approaches to achieve balanced outcomes.

The practical implications of this study highlight the necessity of effective coordination among fiscal, monetary, and debt management authorities through established institutional frameworks. Such coordination is vital to prevent policy conflicts that could exacerbate refinancing risks and jeopardize fiscal sustainability, especially during economic downturns when policy objectives may diverge (Afonso et al., 2019; Miao & Su, 2024). Governments should adopt sovereign fiscal debt management strategies that include strategic maturity structures, offering fiscal

protection against macroeconomic shocks. Conversely, debt managers ought to embrace longer fiscal resilience horizons based on medium- and long-term economic forecasts rather than solely focusing on short-term cost minimization (Aljaloudi & Ibrahim, 2024; Jungherr et al., 2024; Wu et al., 2022; Zenios et al., 2021).

This study has some limitations. First, all literature is sourced from the Scopus database. While it is the most comprehensive database for peer-reviewed articles, relying on a single database may still impact the results of bibliometric analysis (Kristia & Rabbi, 2023). In addition, although government finances can be classified as sustainable or unsustainable based on their status and the extent of fiscal space available for policy implementation, the query equation can retrieve most of the literature related to government fiscal matters and debt. However, it is still possible that a small amount of relevant literature remains uncollected. Future research should explore different databases and queries to broaden its scope.

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