

# The Paradigm Shift in Government Budget Management: A CiteSpace Knowledge Map based on Zero-Based Budgeting Research

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## Abstract

Research on the transformation of government budget paradigms, particularly Zero-Based Budgeting (ZBB) reforms, holds significant theoretical and practical implications for deepening fiscal system reforms and enhancing the modernization of national governance capabilities. This study employs bibliometric methods, utilizing CiteSpace software to conduct keyword co-occurrence and clustering analysis on 247 relevant documents indexed in China National Knowledge Infrastructure (CNKI), systematically examining the publication sequence, annual distribution, core author groups, keyword clustering characteristics, emergence intensity, and evolutionary trends of the literature. The study found that the popularity of zero-based budgeting research continues to rise, and related practices have entered a stage of in-depth reform. Key factors such as the institutional environment, interest structure, and social demand constitute the current research hotspots. Future research will focus on three major directions for in-depth exploration: “digitalization” and “smartization” technology empowering budget reform, in-depth integration of the entire budget performance management process, and central-local coordination and regional resource optimization mechanisms. Based on the above analysis, the government should prioritize promoting the transformation of budget management models and exploring specific implementation pathways for deepening zero-based budget reform. The core lies in strengthening performance-oriented goals and optimizing the allocation of fiscal resources, with a focus on breaking through three structural bottlenecks: “reliance on historical data,” “policy rigidity,” and “project continuity.” This will effectively enhance the efficiency of fiscal resource allocation and the effectiveness of fiscal fund utilization.

## Keywords

Zero-based Budgeting; Knowledge Graphs; Budget Management.

## 1. Introduction

In 2000, China launched a reform of the central government budget system, introducing the zero-based budgeting method, which achieved initial success in enhancing the precision of budgetary planning. However, as the economy and society continued to develop and fiscal management requirements became increasingly stringent, issues such as reliance on base figures and rigid spending patterns in the traditional budgetary planning model became increasingly evident. To address this challenge, in 2021, the State Council issued the “Opinions on Further Deepening Budget Management System Reform” (State Council Document [2021] No. 5), explicitly proposing to “standardize budget expenditure management and promote fiscal expenditure standardization,” and requiring that “the principle of balancing revenue and expenditure be upheld, the zero-based budgeting philosophy be actively applied, the rigid and inflexible expenditure structure be broken, and the scale of expenditure budgets be reasonably determined.” In 2024, the Third Plenary Session of the 20th Central Committee of the

Communist Party of China adopted the “Decision of the Central Committee of the Communist Party of China on Further Deepening Reforms and Advancing Chinese-Style Modernization,” which made further strategic deployments, requiring “the launch of zero-based budgeting reform pilot programs in central government departments and support for local governments to deepen zero-based budgeting reform.” These policy developments signify that zero-based budgeting has become a key focus in China's efforts to deepen budget management system reform and enhance fiscal governance efficiency.

Zero-based budgeting (ZBB) is a budgeting philosophy and method whose core principle requires that all expenditure items be re-evaluated and justified in each budget cycle, abandoning reliance on historical expenditure levels, and starting from scratch to demonstrate the necessity, rationality, and priority of each expenditure item, thereby allocating resources accordingly. This concept was first proposed by American Vernon Lewis in 1952. After practical exploration in the corporate sector (such as the successful application by Texas Instruments in the 1970s), ZBB was widely introduced into the U.S. federal government's budget management during the Carter administration in 1979, sparking international attention and trials at the government level in many countries. Against this backdrop, China's new round of zero-based budgeting reforms bears the responsibility of breaking through the limitations of traditional budget models, restructuring the logic of fiscal resource allocation, improving the efficiency of fund utilization, and serving the modernization of national governance. However, integrating this budget model—originally developed in the corporate sector and tailored to specific national conditions—into China's complex government budget management system inevitably faces numerous theoretical challenges and practical obstacles (e.g., high information costs, difficulties in interdepartmental coordination, insufficient support from performance evaluation systems, and coexisting reform drivers and resistances). Therefore, conducting an in-depth exploration of the applicable pathways, key influencing factors, potential risks, and response strategies for zero-based budgeting within China's government budget management system holds urgent and significant theoretical and practical significance for promoting the smooth implementation of reforms and establishing a modern fiscal system. Based on this, this paper will employ the CiteSpace knowledge map analysis method to conduct a systematic quantitative and visual analysis of zero-based budgeting research literature. The aim is to comprehensively depict the knowledge foundation and evolutionary trajectory of this field, precisely identify core research forces and key literature, deeply explore research hotspots, cutting-edge trends, and their evolutionary patterns, and reveal the intrinsic connections and knowledge network structure among research themes. Through knowledge graph analysis, this study seeks to provide objective evidence for the overall landscape and development trajectory of zero-based budgeting research, identify potential research opportunities, and lay a theoretical foundation for further theoretical exploration and the promotion of zero-based budgeting reform practices in the Chinese context.

## 2. Research Design

### 2.1. Data Source

The literature was sourced from China National Knowledge Infrastructure (CNKI). The search terms were “zero-based budgeting,” and the search covered Chinese journals published between 2005 and 2025. The sources were classified as Peking University Core and CSSCI. A total of 263 documents were found. After removing irrelevant documents such as exam papers, news articles, and conference papers, 247 Chinese core documents were obtained. The search was conducted on May 27, 2025.

## 2.2. Research Methods

This study employs bibliometric methods and utilizes CiteSpace software to conduct a visual knowledge map analysis of the selected literature. By mining the intrinsic connections within the literature data, complex academic network relationships are transformed into visual maps, systematically revealing the research hotspots and evolving trends in the field of zero-based budgeting.

## 3. Knowledge Map Analysis of Zero-based Budget Management Research

### 3.1. Date of Publication

The volume of publications on zero-based budgeting has generally fluctuated over time. Between 2005 and 2009, there was an overall upward trend, although the volume of publications declined slightly in 2008. However, the volume of early publications was significantly higher than in recent years, indicating a higher level of attention in the early stages. In recent years, scholars' attention to zero-based budgeting has declined, but with the national budget system reform implemented in 2021 and further comprehensive reforms in 2024, the number of publications has steadily increased over the past two years. This indicates that policy changes are a key factor influencing research activity, and the new round of reforms has driven zero-based budgeting research into a recovery cycle.

### 3.2. Research Authors

As can be seen from Figure 1, Ma Caichen, Chen Rongfang, Li Chengwei, the Guangxi Provincial Department of Finance Research Team, and others are highly active in the field of zero-based budgeting research and have published a large number of papers. At the same time, the degree of association between authors is also high. Among them, Ma Xing, Wang Tong, Chen Yanli, Duan Pengfei, and Bu Xianglei are representative of four individuals who have close and in-depth cooperation, indicating that scholars are more inclined to conduct collaborative research.



Figure 1. Co-occurrence network diagram of authors in the field of zero-based budgeting research

### 3.3. Research Institute

As shown in Figure 2, each node represents an institution, with the size of the node label indicating the number of published papers, and the lines connecting the nodes representing collaboration between institutions. Among these, the School of Accounting at Xinjiang University of Finance and Economics and the International College of Nanjing Audit University stand out as key contributors with high research output and significant influence in this field. Institutions in regions such as Changchun and Nanchang exhibit intra-regional collaboration, reflecting the integration of local academic resources. The overall network density is low at 0.0014, with limited cross-regional collaboration, indicating varying levels of cooperation between institutions across different regions and systems. From the institutional distribution perspective, research focuses on university financial management and local fiscal management. Future attention should be directed toward potential research themes arising from collaboration among these institutions, as well as strategies to break down regional and topological barriers to deepen cooperation.

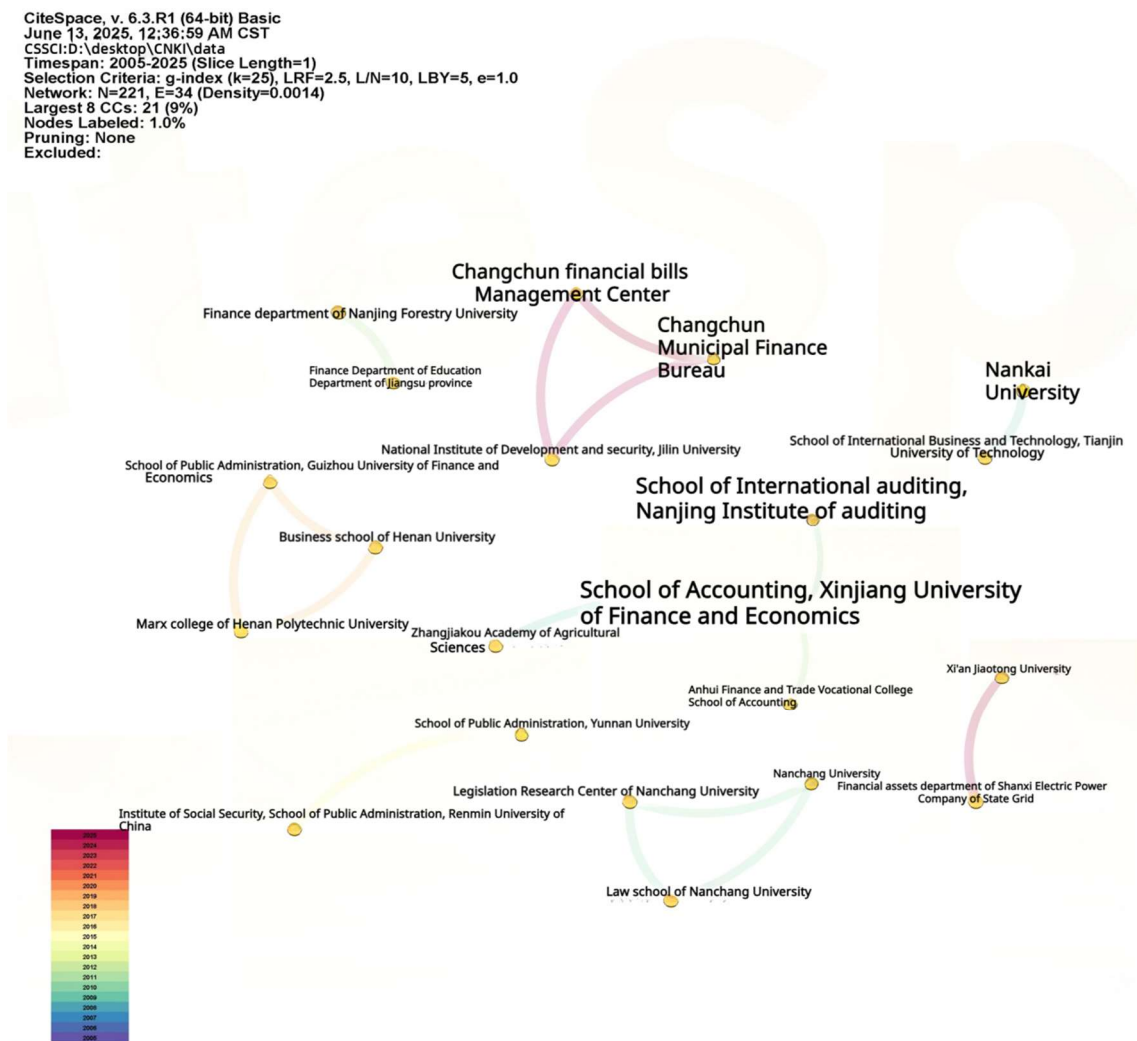


Figure 2. Zero-based budgeting research institutions appear on the network diagram



indicates that the keywords are discussed together in multiple documents). The network reveals that the core focus areas of the current research field are primarily concentrated in three key domains: “zero-based budgeting,” “budget management,” and “departmental budgeting.” Meanwhile, keywords such as “budget reform,” “performance budgeting,” and “higher education institutions” also frequently appear around these core areas, collectively forming the keyword cluster of this research field. The connections between keywords clearly demonstrate the close relationship between two keywords being discussed together in the same literature. The connection between “zero-based budgeting” and “budget management” is the strongest and most dense, a prominent feature that clearly indicates the close association between “budget management” and “zero-based budgeting” in existing research findings. This suggests that budget management constitutes the core anchor point of the field of study, and future research should focus on deepening the institutional integration path between budget management and zero-based budgeting to respond to the strategic needs of national budget management reform.

Through statistical analysis of the frequency and centrality of high-frequency words, research in the field of zero-based budgeting focuses on the following themes:

**Zero-based budgeting and budget preparation:** As a core concept, “zero-based budgeting” appears 43 times in the text, with scholars exploring its essence, advantages, and limitations. In addition to “zero-based budgeting,” common budgeting methods include incremental budgeting and rolling budgeting. Traditional budgeting can be transformed into zero-based budgeting. Chen Haiyan (2009) proposed that zero-based budgeting breaks away from traditional budgeting by starting from “zero,” examining all expenditure items, accurately assessing the funding needs of each department, and allocating funds precisely to maximize the efficiency of limited resources [1].

**The Role of Zero-Based Budgeting in Management:** With “zero-based budgeting” as the central term, the three keywords “budget management,” “departmental budgeting,” and “comprehensive budgeting” are closely interrelated. Among these, “budget management” appears 24 times and is a key area of research. Attention should be paid to the integration of zero-based budgeting into budget management, including the formulation, execution, adjustment, and supervision of budgets, to ensure the efficient use of funds [2]. “Departmental budgeting” appears 9 times. Liu Yongquan (2025) proposed that the basic framework of departmental budgeting is “basic expenditures + project expenditures,” and that funds from different types of special accounts must not be diverted among themselves, with a focus on ensuring the rational and compliant use of funds during the implementation process [3]. Therefore, it is necessary to explore how departmental budgeting can be applied using zero-based budgeting to standardize expenditure behavior and strengthen internal financial management and control within departments. The keyword “comprehensive budgeting” appears 5 times, emphasizing the need for comprehensive and full-process participation throughout the budgeting process.

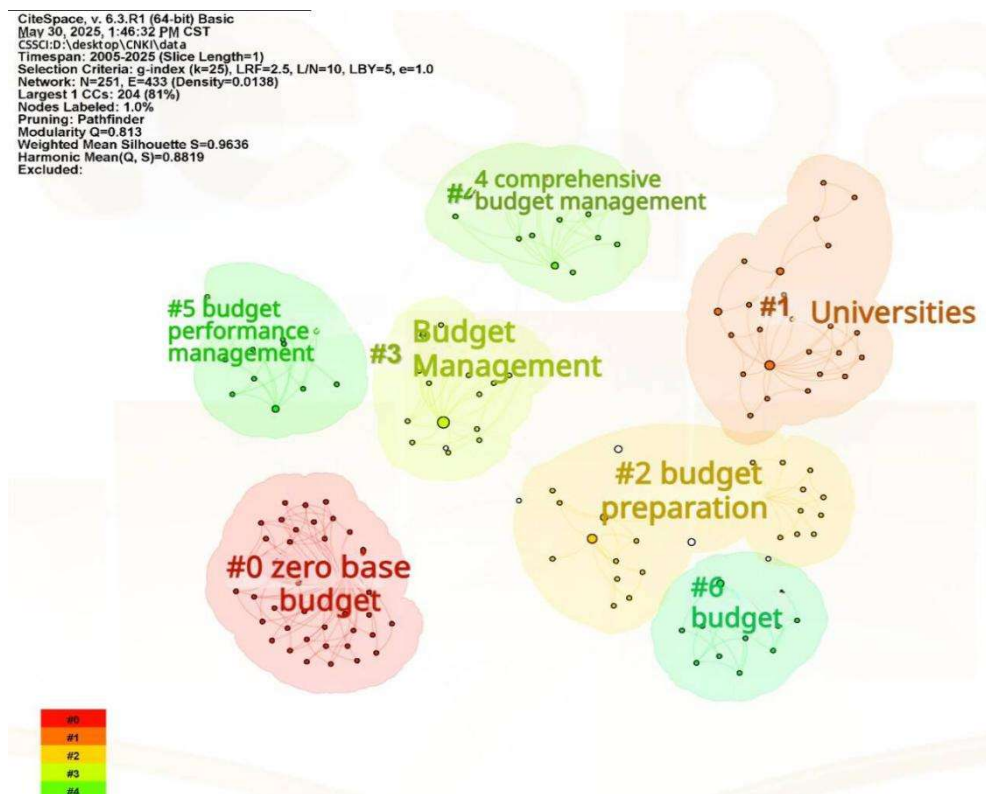
**Zero-Based Budgeting and Performance:** In the diagram, performance budgeting and performance evaluation are directly linked to zero-based budgeting. The focus should be on the relationship between budgetary resource allocation and output outcomes, with the establishment of a scientifically sound and reasonable performance evaluation indicator system. Ma Caisen (2025) mentioned that the transition from traditional performance budgeting to new performance budgeting is not an overnight process. It requires continuous improvement of the performance budgeting system, optimization of performance tools, and promotion of budget performance management to maximize its effectiveness in deepening zero-based budgeting and fiscal resource coordination [4].

**Zero-Based Budgeting Reform and Development:** Budget reform and problem-solving strategies are also key terms in the framework. Research on zero-based budgeting reform

should draw on the development path of budget reform, while continuously monitoring issues that arise during the reform process and the strategies employed to address them, such as the challenges of budget preparation, difficulties in data collection, and coordination issues among departments. Targeted recommendations and guidance should be provided to achieve the objectives of zero-based budgeting reform.

### 3.5. Keyword Cluster Analysis

As shown in Figure 5, there are a total of 251 nodes and 433 connections, with a density of 0.0138, indicating that the co-occurrence relationships among the keywords are not tightly clustered. The cluster diagram generated by CiteSpace shows that the Silhouette value exceeds 0.7, indicating that the clustering results are reliable. The template value (Q) is 0.813, and the average silhouette value (S) is 0.9636. Since  $Q > 0.3$  and  $S > 0.5$ , the network diagram is considered feasible. The analysis identified seven main clusters: “zero-based budgeting,” “higher education institutions,” “budget preparation,” “budget management,” “comprehensive budget management,” “budget performance management,” and “budget.” The clustering results are satisfactory and can be grouped into three categories for keyword clustering.



**Figure 5.** Zero-based budgeting field keyword cluster analysis map

The first group (#0 Zero-Based Budgeting, #1 Higher Education Institutions, #6 Budgeting) focuses on the application of zero-based budgeting in higher education institutions. According to the “Financial System for Higher Education Institutions” jointly formulated by the Ministry of Finance and the Ministry of Education, the system follows the principle of “unified leadership and centralized management,” adhering to the principle of “balancing income and expenditure.” Zhao Xia (2015) noted that Chinese higher education institutions compile the following year's budget by aggregating actual revenues. Since revenues and expenditures are roughly equal, and tuition fees and educational funding are one-time revenues, the annual budget is typically lower than actual revenues [5]. Zhao Shanqing (2014) mentioned that specialized funds for specific tasks and development projects in higher education institutions generally adopt zero-based

budgeting. For personnel expenses and operational expenses with specific standards, fixed quotas are directly applied [6]. The adoption of zero-based budgeting standardizes financial management processes across all stages of higher education financial operations, enhances financial governance capabilities, and ensures the healthy and orderly development of educational initiatives.

Second group: #2 Budget Preparation, #4 Comprehensive Budget Management, Clustered Terms Budget preparation involves allocating and forecasting future revenues and expenditures based on an organization's strategic goals and business needs, serving as the starting point for comprehensive budget management. Comprehensive budget management includes budget preparation and emphasizes “comprehensive control.” Zeng Linghui and Zheng Shiqu (2010) noted in their research findings that, based on experimental data, zero-based budgeting has no significant impact on budget preparation, and China's zero-based budgeting has not yet fully realized its potential [7].

The third group: #3 Budget Management, #5 Budget Performance Management. Cluster term: Budget management is closely linked to budget performance management. Budget management involves planning, controlling, and supervising fiscal revenues and expenditures throughout the entire process, while budget performance management integrates performance concepts into every stage of budget management. Xiao Peng (2024) noted that budget performance management has consistently played a crucial role in ensuring the effectiveness of fiscal expenditures and optimizing resource allocation [8].

### 3.6. Research Hotspot Analysis

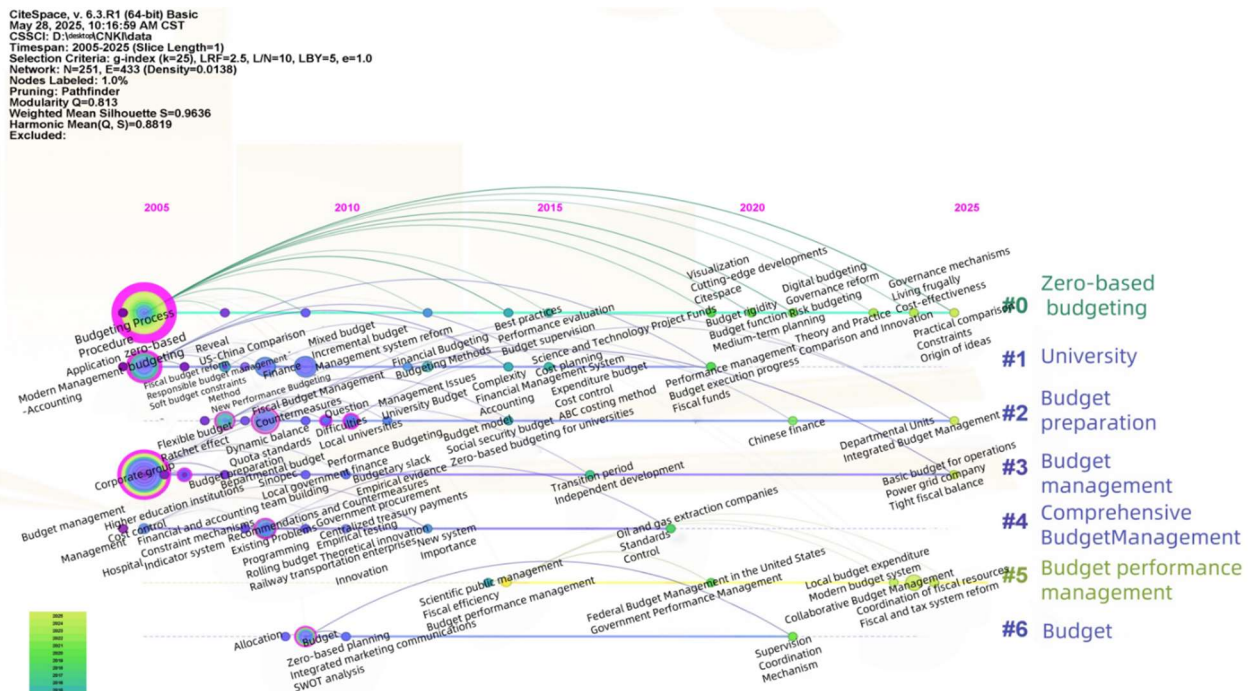


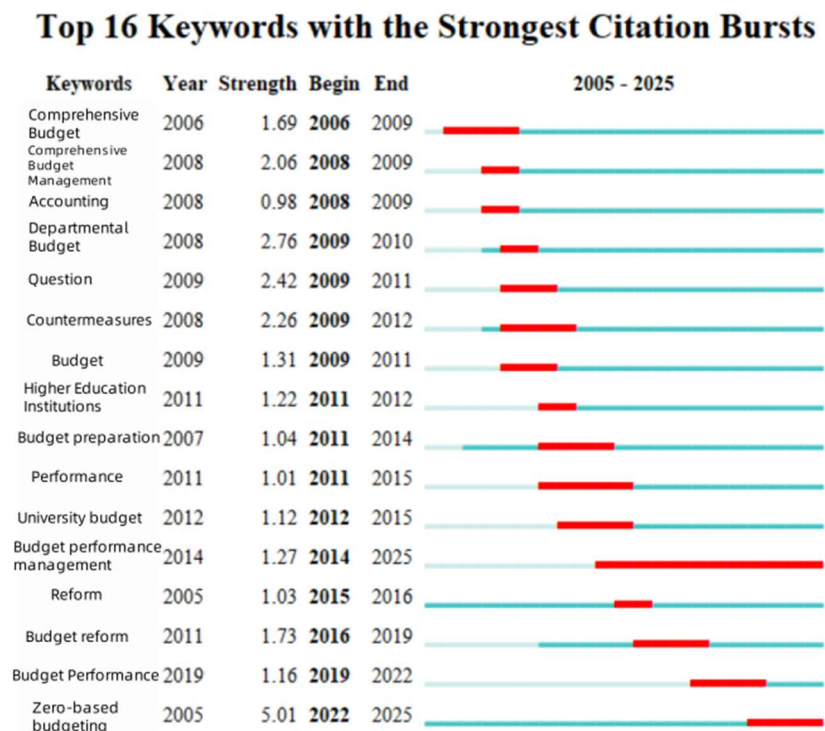
Figure 6. Zero-based budgeting field keyword timeline

Figure 6 illustrates the evolution of research related to zero-based budgeting from 2005 to 2025. The larger the circle around a keyword, the higher its frequency; conversely, the smaller the circle, the lower its frequency. The early period spans from 2005 to 2010, during which discussions on zero-based budgeting were relatively concentrated, primarily revolving around the three keywords “zero-based budgeting,” “higher education institutions,” and “budget management.” The focus was on exploring foundational concepts and subsequent methodologies. The mid-period spans from 2010 to 2020, during which research on budget performance management and other emerging themes gained attention, reflecting the

comprehensive development of the zero-based budgeting theme while traditional themes continued to evolve. The later period spans from 2020 to 2025, during which emerging themes such as “budget performance management” gained attention, reflecting the comprehensive development of the “zero-based budgeting” theme, while traditional themes continued to evolve.

### 3.7. Keyword Evolution and Co-occurrence

Figure 7 shows the time periods in which 16 emerging terms appeared. Among them, the intensity of “zero-based budgeting” reached as high as 5.01. As the country fully implemented reforms and developments in zero-based budgeting, research on zero-based budgeting became a new value and argument, emerging as a hot topic during the period from 2022 to 2025. The intensity of “departmental budgeting” is 2.76, which is related to the demands of fiscal system reform and standardized departmental financial management at the time. The intensity of “comprehensive budget management” is 2.06, with its first appearance in 2009, indicating that during this period, the concept of comprehensive budgeting emerged, and organizations developed a comprehensive understanding of resource control and utilization. Additionally, while the terms “budget preparation” and “budget performance management” briefly overlapped in their emergence, the overall timeline shows that “budget performance management” evolved from “budget preparation,” indicating that budget preparation is developing toward performance-oriented approaches. The sequential emergence of “higher education institutions” and “university budgets” suggests that zero-based budgeting is also penetrating the education sector, with research expanding from overall university budgets to specific budget components. Overall, from the early introduction of the concept to its refinement in specific areas, zero-based budgeting has continuously evolved and developed across various fields, aiming for optimal resource allocation and improved efficiency in the use of funds.



**Figure 7.** Zero-based budgeting field suddenly emerges

### 3.8. Future Research Trends

After analyzing the selected literature, future research will focus on three thematic directions, as shown in the figure, including “digitalization” + “smartification” empowering reform, full-process performance integration, and central-local coordination and regional optimization. Each theme includes research hotspots and keyword highlights, indicating the continuity and developmental nature of the themes. The three themes are centered on the scientific allocation of zero-based budgeting as the core objective, collectively driving the process of transitioning zero-based budgeting from “pilot” to “mature.”

#### Theme One: “Digitalization” + “Intelligence” Empowering Reform

Utilizing big data and artificial intelligence to enhance the budget system, predicting funding requirements for different projects through digital models, thereby addressing issues such as the high workload and digital processing challenges of zero-based budgeting, and transitioning from “human-driven” to “digital-driven.” Wu Xuefen (2021) mentioned that the effects of fiscal digital transformation should be fully utilized to promptly perceive fiscal operations and budget risks, supplemented by digital reform support systems such as “smart performance” to provide a more comprehensive, accurate, and transparent financial system for budget management [21]. Li Wenbin and Han Xiaocui (2024) mention that Guangdong and Zhejiang provinces have successively launched digital fiscal construction initiatives, aggregating fiscal data and centrally managing and sharing fiscal revenue and expenditure as well as budget data. Through digital technology, they achieve intelligent querying and analysis of fiscal data to assist in fiscal decision-making [22]. Lin Jing (2024) mentioned the continued promotion of the digitization and intelligence of budget management systems, embedding blockchain technology throughout the budget management process to achieve transparency and accountability in the “budget + performance” budget process, thereby enhancing local budget management governance levels [23].

#### Theme Two: Deep Integration of Performance Management Throughout the Entire Process

The concept of performance management should be integrated throughout the entire zero-based budgeting process, including planning, execution, and supervision stages. Wu Xuefen mentioned building an integrated budget management system, incorporating performance concepts and methods into all stages of budget management, and advancing all processes of budget management [21]. Ma Caichen and Sun Xiaoxue (2024) mentioned deepening the concept of performance in policy documents, establishing a performance-based zero-based budget system, promoting the deep integration of zero-based budgeting and performance management, and strengthening the linkage between performance evaluation results and budget funding allocation [11]. Performance budgeting assesses the actual costs of a project activity once they are roughly determined, enhances rolling management of the budget, and improves the operability of zero-based budgeting [24].

#### Theme Three: Central-Local Coordination and Regional Optimization

Regions should coordinate development, clarify tasks, and provide support to underdeveloped areas, breaking the concept of regional funds being “confined to their own territories,” and coordinating regional project funds. At the same time, they should mobilize the development capabilities of surrounding regions and adjust regional fiscal capacity disparities. Zhang Hui (2023) mentioned that in specific construction projects, overall planning and optimized design should be implemented, with real-time monitoring of debt conditions across regions to reduce unnecessary procedures. Central-local fiscal relations should be optimized to ensure the integrity, continuity, and connectivity of the fiscal system [25].

## 4. Research and Discussion

### 4.1. Trends in Zero-based Budgeting

#### 4.1.1. Domestic Exploration Phase

The paradigm shift in government budget management has been driven by fundamental reforms in budget management philosophy, methods, and systems to align with new socio-economic development requirements and the need for modernization of the national governance system, thereby maximizing public interest. The promulgation of the Implementing Regulations of the Budget Law of the People's Republic of China in 1995 established the status of zero-based budgeting. The State Council's 2005 reform focused on transforming the government from an economic development-oriented government (production fiscal system) to a public service-oriented government (public fiscal system). Gu Bingwei (2012) pointed out that, from a budgetary perspective, there has been an initial transition from functional budgeting to departmental budgeting, adopting advanced methods such as zero-based budgeting and rolling budgeting, with the aim of achieving performance budgeting outcomes [9]. Moving away from the previous base budget model, which followed a fixed “base + growth” pattern, the zero-based budget starts from “zero” in budget preparation, disregarding previous budget allocations. Instead, it determines expenditure budgets based on actual needs, fiscal capacity, and the urgency and importance of matters. In 2014, the new budget was promulgated and implemented, and zero-based budget reforms were successively advanced, with many regions launching new pilot programs. However, these reforms were not widely or deeply implemented. In 2021, the State Council issued the “Opinions on Further Deepening the Reform of the Budget Management System,” adjusting and improving the compilation model to enhance the role of zero-based budgeting in budget management. Starting in 2024, following the adoption of the “Decision of the Central Committee of the Communist Party of China on Further Deepening Reforms and Promoting Chinese-Style Modernization” at the Third Plenary Session of the 20th Central Committee of the Communist Party of China, the Ministry of Finance and 15 other central government departments took the lead in launching zero-based budgeting reform pilot programs. Many regions continued to focus on zero-based budgeting reform, making sustained efforts in areas such as project expenditure compilation, fiscal resource coordination, improvement of expenditure standards, and strengthening of performance evaluation.

#### 4.1.2. Domestic Pilot Phase

**Table 1.** The effects of zero-based budgeting in regions where it has been implemented domestically

| region                           | Time | Policy Name   | Content   |
|----------------------------------|------|---|---|
| Anhui                            | 2025 | Implementation Opinions of the People's Government of Anhui Province on Further Deepening Zero-Based Budget Reform  | Expanded the scope of reform, strengthened fiscal and financial coordination, emphasized performance orientation, tightened budgetary constraints, and improved supporting measures.  |
| Jiangsu                          | 2024 | Jiangsu Province Plan for Deepening Zero-Based Budgeting Reform   | Refine budget classification, arrange budgets strictly and prudently, and strengthen the integration and coordination of funds.   |
| Inner Mongolia Autonomous Region | 2024 | Three-Year Action Plan for Implementing Zero-Based Budgeting Reform (2025-2027)                                     | By establishing a system for zero-based budget reform, breaking down expenditure bases, and constructing a funding allocation mechanism that “guarantees what must be guaranteed, saves what can be saved, and emphasizes performance,” |
| Hunan                            | 2024 | Guiding Opinions of the People's Government of Hunan Province on Comprehensively Deepening Zero-Based Budget Reform | Reform budget preparation methods, strengthen fiscal resource coordination, deepen supporting institutional reforms, and strictly regulate budget management.   |
| Gansu                            | 2024 | Implementation Plan for Further Deepening Zero-Based Budget Reform  | Improve basic expenditure budget management, deepen project expenditure budget reform, strengthen budget management, increase coordination of funds, assets, and resources, and emphasize budget performance management.                |

## 4.2. Characteristics of Zero-based Budgeting

Starting from zero; disregarding past budget bases or historical expenditure levels, each budget item is re-evaluated and reviewed, with budget amounts determined based on their own importance and necessity.

Standardization: Use established standards as a basis, clearly define performance objectives and measurement indicators for each project, and track and evaluate them throughout the budget execution process;

Systematization: Conduct a comprehensive and systematic evaluation of all budget items, thoroughly analyze each project's objectives, tasks, benefits, and costs, assess whether they align with the organization's strategic planning and development needs, and determine resource allocation priorities accordingly;

Coordination: Compared to traditional methods, zero-based budgeting emphasizes close collaboration and communication among departments, clarifying their resource needs and expected performance while considering synergies with other departments. For example, achieving effective collaboration between business personnel and financial personnel, with financial personnel familiarizing themselves with output information and business personnel aligning with the management philosophy of zero-based budgeting [17].

## 4.3. Factors Affecting Zero-based Budgeting

Scholars have analyzed the origins and development of zero-based budgeting and examined pilot programs across various regions. The factors influencing zero-based budgeting primarily revolve around three key areas: institutional environment, interest structures, and social demand.

**Institutional Environment:** The implementation of the Budget Law in 2014 marked the launch of a new round of fiscal and tax system reforms in China. Provincial-level zero-based budgeting reforms were piloted in Guangdong, Shaanxi, and Guizhou. Starting in 2023, Anhui, Jiangsu, and Hunan successively launched province-wide zero-based budgeting reform practices. The basis for compilation and implementation measures varied across regions. From the perspective of outcomes, the reforms broke through the rigid expenditure patterns of local governments [10]. By institutionalizing reforms to break the inertia of reliance on historical baselines, governments strengthened local reform awareness through institutional documents and established a “one reform plan + N detailed rules” institutional framework [11].

**Interest structure:** By striving to improve the specialized project repository and reviewing departmental project expenditures, the finance department will not allocate project funds for those that fail to establish personnel information repositories and specialized information repositories in accordance with regulations [12]. Localities have used zero-based budget reform as an opportunity to strengthen government “separate revenue and expenditure” management, optimize project expenditure structures, implement list-based project management, and establish industrial funds to convert fiscal investments [13].

**Social Demand:** Promote the disclosure of budget information, increase financial transparency, and voluntarily accept supervision and inspection by the National People's Congress, audit authorities, and the general public to reflect the government's public service objectives [14]. Submit funds involving public interests to public discussion, and conduct supervision during the process of reviewing, criticizing, and revising the government's budget [15]. In the implementation of zero-based budgeting, the public's right to know, participate, and supervise is what drives the continuous exploration and improvement of the zero-based budgeting system [16].

#### 4.4. Reform Ideas for Zero-based Budgeting

First, establish a system of institutional frameworks, including a decision-making mechanism for expenditure scale, develop long-term budget planning, and use a budget negative list to reduce non-priority and non-essential funds, ensuring fiscal discipline [18]. Formulate a plan combining “overall reform + specific implementation guidelines,” clarify the procedures for zero-based budgeting, and establish a comprehensive institutional framework covering the entire chain from “project evaluation-cost-benefit analysis-performance objectives.”

Second, optimize technical tools by constructing a “data-driven – intelligent decision-making – full-chain supervision” technical ecosystem. Leverage big data technology to provide precise data support and ensure real-time updates of core indicators and other data. Additionally, introduce blockchain technology to build a budget execution tracking system, making fund flows transparent and forming a closed-loop management system of “review – allocation – monitoring – feedback” [19]. Through fiscal integration, break down “information silos” to improve budget preparation efficiency and reduce budget complexity. Additionally, use integration to assign values to budget projects, prioritize project expenditures, and enhance the efficiency of fund utilization [20].

Finally, reforms should be implemented gradually. Zero-based budgeting is one aspect of budget reform, but it has not yet been fully implemented in China. Efforts should be made to strengthen the modernization of the government governance system, clarify the relationships within government budget management, and cultivate professionals with expertise in basic business processes, thereby gradually advancing comprehensive reforms [16].

### 5. Conclusion and Outlook

This paper employs the analytical methods of CiteSpace software to construct a knowledge map analyzing zero-based budgeting from 2005 to 2025, identifying the evolving directions and trends of zero-based budgeting, and drawing the following conclusions: First, as a topic of long-term research in recent years, zero-based budgeting should be integrated with the political and economic trajectory of the nation, taking into account the characteristics of China’s economic development and incorporating them into zero-based budgeting reforms; Second, it is essential to focus on the factors influencing zero-based budgeting, understand the challenges that regions may face in implementing it, and analyze the economic causes and consequences of implementing zero-based budgeting; Finally, existing technical means will be utilized to evaluate government budget projects, implement dynamic management of the project repository, and comprehensively ensure the scientific, reasonable, and transparent nature of the zero-based budgeting system during its implementation process, thereby enhancing the efficiency and accuracy of fund utilization.

Based on existing research findings, future zero-based budgeting can be developed and studied from the following aspects: First, promoting reform in a classified manner, differentiated project management can be implemented by categorizing projects based on their lifecycle and the nature of changes. Projects with short lifecycles and rapid changes should prioritize the adoption of zero-based budgeting, such as expenditures for industrial support and research projects; second, strengthen performance-oriented management and resource coordination, making performance targets a prerequisite for budget approval, and focusing on reviewing the performance of new projects. Strictly manage non-essential expenditures such as “three public funds” and meeting/training expenses, implementing “zero growth” or “negative growth” management; finally, establish risk control mechanisms, conduct comprehensive assessments prior to the implementation of national policies to avoid overcommitting project funds, adjust authority levels in stages based on fiscal funds and project scale, while also preventing excessive fund idleness. Zero-based budgeting must align with real-time characteristics,

enabling deep reforms while minimizing fiscal impact, ultimately achieving national strategic development objectives, effectively safeguarding public welfare needs, and enhancing national governance capabilities.

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