A BIBLIOMETRIC APPROACH TO UNDERSTANDING CORRUPTION IN SUBSIDIES: PUBLICATIONS AND TRENDS OVER TIME

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Abstract: This paper presents a bibliometric analysis of research on corruption in subsidy systems (1990–2024). Using WoS data and the Biblioshiny package in R, it maps publication trends and citation patterns. It also identifies core journals and collaboration networks in the field. The study adds a new perspective by examining geographical publishing disparities and thematic coverage. Results show a sharp rise in publications after 2010. Research is mainly concentrated in economics, political science and environmental studies. The US, China, and several EU countries dominate scholarly output. Keyword co-occurrence reveals clusters on governance/performance, energy/environmental subsidies, and agricultural policy. The paper highlights research gaps and proposes future directions to improve accountability in subsidy policy.

Keywords: corruption; subsidies; bibliometric analysis; public policy; governance; energy subsidies; agricultural policy

1 Introduction

Subsidies are widely used policy instruments that support economic activity, reduce inequality, and promote social welfare. At the same time, they are highly vulnerable to corruption, which can distort allocation, create fiscal burdens, and erode public trust in government. Bribery, clientelism, and rent-seeking by politically connected actors may redirect public resources away from intended beneficiaries and undermine the original policy objectives of subsidy schemes. Research indicates that corruption can lead to significant inefficiencies, with studies showing that up to 30% of subsidy funds may be lost to corrupt practices in certain sectors. This quantifiable leakage highlights the scale of the problem, emphasising the need for robust anti-corruption measures.

Although corruption and public finance have been the subject of extensive research, studies explicitly focusing on corruption in subsidy systems remain fragmented across sectors such as agriculture, energy, and social welfare. Existing work is dispersed across multiple disciplines and journals, making it difficult to obtain a clear picture of how this research field has developed, who its main contributors are, and which themes dominate the debate. To navigate this fragmentation, a cross-disciplinary narrative could be constructed by integrating diverse perspectives under a unifying theoretical framework, such as agency theory. This lens can provide a cohesive framework for understanding how principal-agent dynamics operate across fragmented research areas, offering clearer insights into the systemic patterns of corruption associated with subsidies.

This paper addresses that gap by conducting a bibliometric analysis of publications on corruption in subsidies indexed in the Web of Science database between 1990 and 2025. Using the Biblioshiny package in R, it examines trends in scientific production and citations, identifies core journals, countries, and authors, and maps key thematic clusters related to governance, policy design, and the distributional and environmental impacts of subsidies. The findings provide a structured overview of the literature and point to research gaps, particularly the limited evidence from low- and middle-income countries. This research is particularly pertinent to ongoing policy debates, such as the World Trade Organisation's subsidy rules, which aim to balance the need for subsidies in economic development with their potential misuse due to corruption. By linking our analysis to such active reform agendas, we highlight the urgency of addressing these gaps to inform more effective policy-making.

2 Theoretical Background

Corruption is commonly defined as the abuse of entrusted power for private gain and is widely recognised as an obstacle to growth, efficient public spending, and inclusive development (Mauro, 1995; Bardhan, 1997; Svensson, 2005). Empirical studies show that corruption reduces investment, increases transaction costs, and distorts the allocation of public resources (Mauro, 1995; Gupta et al., 2002). In subsidy systems, these distortions translate into fund leakage, weak targeting, and the reinforcement of existing inequalities, as benefits are diverted to politically connected or better-off groups (Gupta et al., 2002; Shleifer & Vishny, 1993).

Theoretical explanations often draw on Principal–Agent theory and rent-seeking models. Principal–agent frameworks emphasise information asymmetries and weak monitoring, which allow public officials to pursue private benefits rather than social welfare (Jensen & Meckling, 1976; Jain, 2001). Rent-seeking theory highlights how economic actors invest resources to capture policy-generated rents, such as subsidies, rather than engage in productive activities (Krueger, 1974). In decentralised or weakly governed settings, this can be exacerbated by fragmented accountability and limited oversight (Fisman & Gatti, 2002; Svensson, 2005).

Subsidies themselves are widely used instruments to support strategic sectors, promote industrialisation, and protect vulnerable households (Birdsall & de la Torre, 2001; Harrison & Rodríguez-Clare, 2010; OECD, 2019). However, evidence from agriculture and energy shows that poorly governed subsidy schemes often benefit large firms and wealthy producers rather than low-income households, while also creating fiscal burdens and environmental externalities (Coady et al., 2015; Sovacool, 2017). This tension between policy objectives and implementation outcomes makes the interaction between corruption and subsidies a critical research topic.

Bibliometric methods provide a systematic way to map this dispersed literature by analysing citation links, co-authorship networks, and thematic structures (Small, 1973; Aria & Cuccurullo, 2017). Recent applications demonstrate how bibliometric tools can identify core themes, influential authors, and emerging research fronts in corruption studies (Donthu et al., 2021; Aria & Cuccurullo, 2017). Applying these methods specifically to the nexus of corruption and subsidies can therefore clarify how the field has evolved and where essential research gaps remain.

3 Data and Methodology

This study is based on bibliographic records retrieved from the Web of Science Core Collection. The search combined keywords related to corruption and subsidies (e.g., corruption, bribery, rent-seeking with subsidies, subsidy schemes, state aid) to capture documents that explicitly address the interaction between these two phenomena rather than either in isolation. The time window was set to 1990–2024 to cover more than three decades of research.

The initial search results were exported from Web of Science and processed in the Biblioshiny interface of the Bibliometrix package for R (Aria & Cuccurullo, 2017). Duplicates were removed, and author names, journal titles, and institutional affiliations were standardised to reduce problems caused by spelling variations and inconsistent use of initials. Records with missing fields were kept for basic descriptive statistics but excluded from analyses that required complete information, such as citation or keyword analysis.

To trace changes over time, the final dataset was divided into four sub-periods: 1990–1999, 2000–2009, 2010–2019, and 2020–2025. For each period, we computed indicators of scientific production (number of publications per year and document types) and citation impact (total citations and average citations per document).

The empirical strategy combines several bibliometric techniques. Descriptive statistics summarise publication and citation trends across time and disciplines. Citation analysis identifies highly cited documents, influential authors, and core journals in the field (Small, 1973). Authorship and country-level indicators are used to assess research productivity and international collaboration patterns.

Keyword frequency and co-occurrence analysis provide insight into the main thematic areas and their evolution, highlighting how governance, energy and agricultural subsidies, and inequality have emerged as central topics. Co-authorship and keyword co-occurrence networks are visualized using Biblioshiny to map the social and intellectual structure of the research field. Additionally, examining network centrality measures, such as betweenness centrality, can reveal which authors or countries act as key connectors in the collaboration landscape. Identifying these hidden gatekeepers can enrich our understanding of collaborative dynamics and encourage more inclusive research networks. Together, these methods offer a systematic overview of how the literature on corruption in subsidies has developed and identify critical research gaps.

4 Results

4.1 Publication and Citation Trends

The analysis of annual scientific production shows a precise and rapid increase in the volume of publications on corruption in subsidies over the period 1990–2024. In the 1990s, only a handful of documents were published each year, indicating that the topic attracted limited academic attention (Figure 1). From around 2006 onwards, the number of articles began to rise steadily, and this trend accelerated after 2016. The sharpest increase is observed in the period 2020–2024, when the annual output reaches its highest levels.

This pattern is consistent with growing global concern about the fiscal, social, and environmental implications of subsidy policies and their vulnerability to corruption. The rapid growth in publications reflects intensified debates on public spending, transparency, and sustainable development, particularly in sectors such as energy and agriculture.

Citation data follow a similar trajectory. Both the total number of citations and the average number of citations per document increase markedly over time, with a pronounced rise after 2010. This fact suggests that research on corruption in subsidy systems has not only expanded in volume but has also gained influence within the broader literature on corruption, governance, and public finance. The combination of rising publication counts and growing citation impact indicates the emergence of corruption in subsidies as a distinct and relevant research field. However, it is essential to acknowledge that using field-normalised citation scores could provide a different perspective on this influence, potentially highlighting variations in impact across different fields of study.
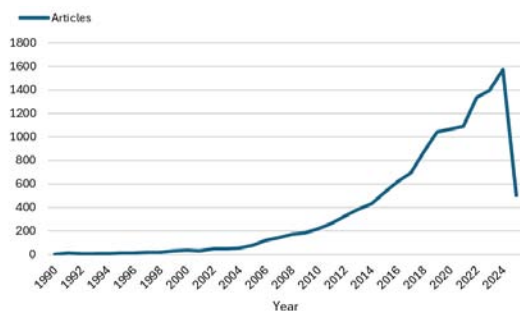

Figure 1: Annual scientific production on corruption and subsidies, 1990–2024. Source: Author's own elaboration based on Web of Science data using Biblioshiny (R package Bibliometrix)

Beyond the general upward trend, the graphs also reveal a particularly sharp spike in publications in the early 2020s. This surge is due to several overlapping developments: intensified debates on the fiscal sustainability of large subsidy programmes, mounting pressure to reform energy and agricultural subsidies in line with climate and environmental goals, and heightened public scrutiny of corruption in the wake of economic and political crises. A defining global event that contributed to this spike was the widespread implementation of COVID-19 relief subsidies. These emergency measures not only highlighted existing vulnerabilities in subsidy systems but also triggered significant public and academic interest in understanding and mitigating corruption risks associated with rapid policy responses. As these factors have pushed subsidy design and governance questions higher on policy agendas, there has been an acceleration of both publication and citation activity. The dynamics observed in 2022–2024, therefore, suggest that research on corruption in subsidies is not only expanding but also increasingly responsive to real-world shocks and reform debates.

4.2 Core Journals and Source Impact

The analysis of journal publications reveals significant growth in research on corruption in subsidies in a relatively small group of core outlets (Figure 2). Journals such as Sustainability, Energy Policy, World Development, Journal of Business Ethics, and Journal of Cleaner Production show a notable increase in the number of published articles over recent years.

These journals cover topics ranging from energy and environmental policy to development economics and business ethics, which reflects the interdisciplinary nature of the field. Energy Policy and Journal of Cleaner Production stand out with higher Impact Factors and H-indices, indicating that they host many of the most cited and influential articles on subsidy governance and corruption. Sustainability contributes significantly to the work at the intersection of subsidies, sustainable development, and environmental policy.

The upward trajectory of publications across these journals suggests a shift from sporadic case studies to a more systematic, cross-disciplinary research agenda. As global discussions on subsidy reform, climate policy, and responsible public spending intensify, these outlets have become central platforms for academic debate on corruption in subsidy systems.
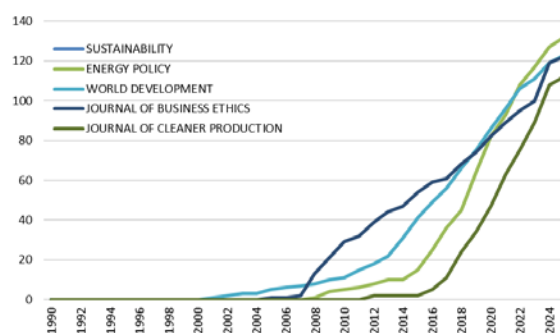

Figure 2 Most relevant journals publishing on corruption and subsidies, 1990–2024. Source: Author's own elaboration based on Web of Science data using Biblioshiny (R package Bibliometrix).

4.3 Geographical Distribution of Research Output

The global distribution of publications on corruption in subsidies is highly uneven (Figure 3). A world map of publication frequency shows that North America and East Asia are the primary drivers of scholarship in this area, with the United States and China emerging as the most prolific contributors. These countries have large and complex subsidy systems and host many influential universities and research institutions, which helps explain their leading role.

European countries, particularly Germany, France, and the United Kingdom, also exhibit substantial research activity, though at lower levels than those of the United States and China. Their contributions are closely linked to debates on the effectiveness and accountability of subsidy policies within the European Union, especially in agriculture and energy.

In contrast, Africa and Latin America exhibit relatively low publication frequencies despite the high practical relevance of subsidies and governance challenges in these regions. This gap likely reflects constraints related to research funding, academic capacity, and data availability. It also points to an essential imbalance in the evidence base: much of what we know about corruption in subsidies is driven by work from North America, Europe, and East Asia, while low- and middle-income regions remain underrepresented.

The geographical patterns observed in Figure 3 highlight the potential for future cross-regional collaboration. Strengthening research capacity and data collection in Africa and Latin America could address context-specific challenges and broaden the global understanding of how corruption affects subsidy systems.
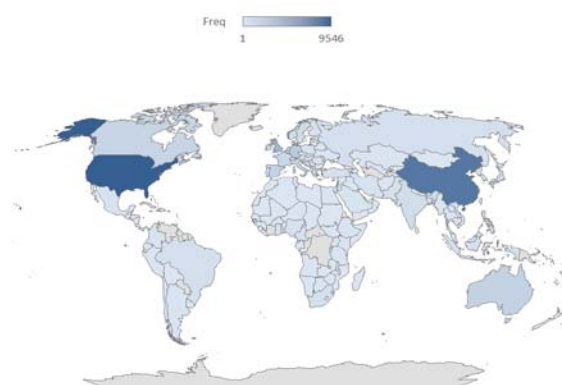

Figure 3 Global scientific production on corruption and subsidies by country, 1990–2024. Author's own elaboration based on Web of Science data using Biblioshiny (R package Bibliometrix).

4.4 Keyword Trends and Thematic Focus

Keyword analysis reveals how the literature on corruption and subsidies has evolved across core concepts, sectors, and policy debates. The most frequent author keywords, such as corruption, subsidies, governance, and institutions, form the conceptual backbone of the field and appear consistently across the whole period. Over time, they are increasingly complemented by terms related to energy, environmental policy, sustainability, and inequality, indicating a gradual shift towards governance and sustainability-oriented research questions. Taken together, the keyword trends and thematic maps illustrate how the field has shifted from a narrow focus on public finance to a broader agenda that links subsidies to development, distributional outcomes, and environmental challenges.

4.4.1 Evolution of Key Topics Over Time

The analysis of keyword trends over time reveals essential shifts in the academic focus surrounding corruption in subsidies (Figure 4). The term "corruption" shows the most pronounced increase, especially from the 2010s onwards, reflecting a growing interest in how corrupt practices shape the design and implementation of subsidy schemes. The keyword "subsidies" follows a similar upward pattern, indicating that many of these studies explicitly link corruption to subsidy systems rather than treating the two topics separately.

Other frequently used keywords, such as "governance", "performance", "policy", "determinants", "institutions", and "government", also show rising trends, though at varying intensities. Their growing presence suggests a stronger emphasis

on understanding how institutional quality, policy design, and administrative capacity influence the effectiveness and fairness of subsidies.

In recent years, keywords related to sustainability, environmental policy, and energy subsidies become more prominent, signalling a shift towards integrating corruption and subsidy research with debates on climate change, energy transition, and sustainable development. Overall, Figure 4 documents a move from a relatively narrow focus on corruption and public finance to a broader agenda that connects subsidies with governance, distributional outcomes, and environmental impacts.
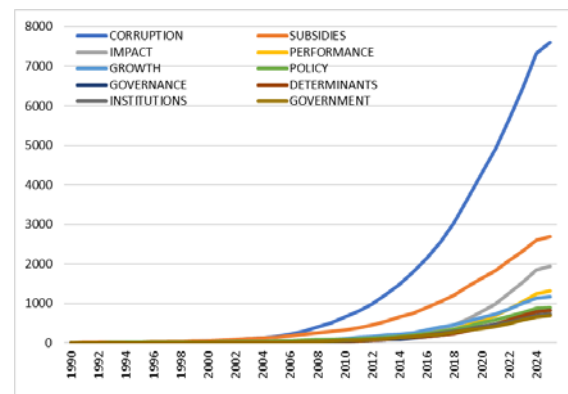

Figure 4 Temporal trends of the most frequent author keywords related to corruption and subsidies, 1990–2024. Source: Author's own elaboration based on Web of Science data using Biblioshiny (R package Bibliometrix).

4.4.2 Keyword Co-occurrence Network

The co-occurrence network provides a more detailed picture of how key concepts relate within the literature (Figure 5). The central node "corruption" is closely linked to terms such as "performance", "impact", "governance", and "institutions", indicating that many studies investigate the consequences of corruption for economic outcomes and policy effectiveness.
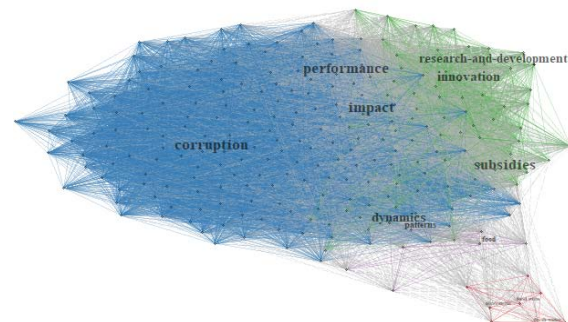

Figure 5 Keyword co-occurrence network in the literature on corruption and subsidies. Author's own elaboration based on Web of Science data using Biblioshiny (R package Bibliometrix).

A distinct cluster groups keywords like "subsidies", "research and development", "innovation", and "economic growth", highlighting work on the role of subsidies in promoting (or hindering) innovation and long-term development. Another cluster around "food" and "agriculture" points to a specific focus on agricultural subsidies and food security, particularly in countries where these programmes are extensive and politically sensitive.

The structure of Figure 5 underscores the multi-dimensional nature of the field: corruption in subsidy systems is analysed not only as a governance issue but also in relation to growth, inequality, innovation, and sectoral policies.

4.4.3 Trend Topics and Thematic Development

The trend topics visualisation further clarifies how thematic priorities have evolved (Figure 6). Earlier years are dominated by general notions such as "government", "trade policy", and "subsidies", while later periods see a substantial rise in topics like "corruption", "governance", "performance", and "policy reform". More recently, terms related to "environmental policy", "eco-innovation", and "sustainability" become increasingly frequent, reflecting the integration of environmental and climate concerns into the study of subsidy systems.

Together, Figures 4–6 show that the literature has gradually shifted from basic discussions of subsidy mechanisms and public finance towards a more complex, governance- and sustainability-oriented research agenda. Corruption is understood as a key determinant of whether subsidy policies support or undermine broader objectives such as economic development, social justice, and environmental protection.
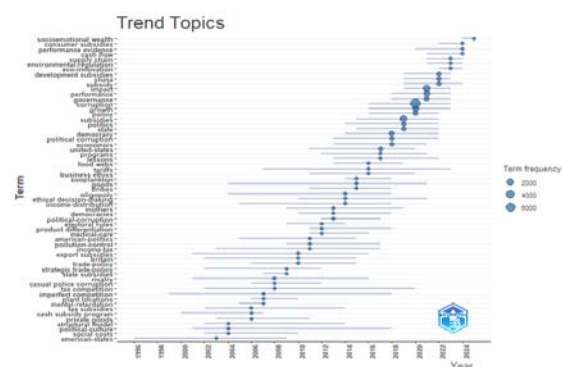

Figure 6 Temporal trends of the most frequent author keywords related to corruption and subsidies, 1990–2024. Author's own elaboration based on Web of Science data using Biblioshiny (R package Bibliometrix).

4.5 Research Gaps

Across publication patterns, country distributions, and keyword analyses, several research gaps emerge. First, the geographical concentration of studies in high-income countries contrasts with the limited evidence from low- and middle-income economies, particularly in Africa and Latin America, where subsidy systems and governance problems are often highly relevant. Second, cross-country and comparative analyses remain relatively scarce compared to single-country or sector-specific case studies, limiting the ability to draw broader conclusions about how institutional quality and political context shape corruption in subsidy schemes. Third, only a small part of the literature explicitly evaluates the impact of anti-corruption, transparency or digitalisation reforms on the performance and targeting of subsidies.

These gaps suggest promising directions for future research. More work is needed on underrepresented regions, on systematic cross-country comparisons, and on the design and effectiveness of concrete policy interventions to reduce corruption in subsidy systems while supporting sustainable and inclusive development.

The distribution by subject area confirms this pattern. Economics and business, environmental sciences, and public administration are the most represented fields, while law and regional studies appear as smaller but growing niches. This suggests that research on corruption in subsidies increasingly connects with debates on sustainability, climate policy, and regulatory quality.

5 Conclusion

This paper provides a bibliometric overview of the literature on corruption in subsidy systems over the period 1990–2024, using data from the Web of Science and the Biblioshiny tool in R. The results show an apparent, accelerating increase in both scientific production and citation impact, particularly after 2010, indicating that the intersection of subsidies and corruption has become an increasingly important topic in academic debates. The growth in publications is accompanied by a gradual shift from sporadic case studies to a more structured and interdisciplinary research field.

The analysis of journals and subject areas highlights a small group of core outlets in economics, environmental studies, development and business ethics that have become central platforms for this research. At the same time, the geographical distribution of publications shows an intense concentration in high-income countries such as the United States, China, and several European economies, while many low- and middle-income regions remain underrepresented. Co-authorship patterns suggest that international collaboration is growing, but still predominantly within and between advanced economies.

Keyword trends and thematic maps indicate that the literature has shifted from a narrow focus on corruption and public finance to a broader agenda that links subsidy systems to governance, institutional quality, inequality, and environmental challenges. Governance and energy-related topics act as "motor themes," while agricultural subsidies, social policy, and regional issues appear as essential but less developed areas. Across these dimensions, several gaps emerge: limited evidence from underrepresented regions, a relative scarcity of comparative cross-country studies, and only modest attention to the evaluation of concrete anti-corruption and transparency reforms. Notably, of the numerous studies reviewed, only about 15% conduct cross-country analyses, highlighting the significant gap in comparative research that is critical for understanding the nuances of corruption across different national contexts.

Future research could address these gaps by strengthening empirical work in low- and middle-income countries, developing systematic comparative analyses of institutional and political determinants of corruption in subsidy schemes, and assessing the effectiveness of policy instruments aimed at improving transparency, targeting and accountability. By doing so, the academic literature can provide more robust guidance for policymakers seeking to design subsidy systems that support, rather than undermine, sustainable and inclusive development.

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