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Central Banks and Profitability: A Systematic Literature Review

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Abstract: Although the topic of central bank has been studied mainly in relation to the role of monetary authority and financial system regulator, the topic of central bank profit has not yet received much attention because it is difficult to observe central bank profitability due to their nature as public institutions. The review provides evidence from 22 documents, which are then classified into five central bank profitability themes: independence, monetary policy effectiveness, competition, operations and risk, and public finance. We conclude that central bank profitability can be a research agenda as profitability can be perceived as central banks' financial strength to conduct their responsibility and to maintain their credibility.

Keywords: Central Bank, Profitability, Credibility, Capital Structure

INTRODUCTION

Central banking as an entity is very different from commercial or corporate entities where the objective is to obtain the maximum profit to maximize shareholders' wealth. Commercial entity operations or activities can grow in line with the development of the business entity. The impact of the operational results of commercial entities is in the form of profits which then increase the capital of the company. To generate optimal profits, companies do this in two ways, namely by increasing income through business activities and by minimizing the costs that must be incurred to carry out these business activities (Boycko Shleifer, Vishny, 1996). In contrast to the facts above, neither profitability nor market capitalization are the main considerations for central banks. Central banks are created by certain legal statutes or laws. Central bank performance is fundamentally measured on how well the institution meets the objectives stated explicitly in the regulations. Therefore, the main benchmark for central bank performance is guided by how effective the policies taken by the central bank are to achieve the central bank's objectives as mandated by law. For example, to what extent does the central bank issue policies in the monetary sector, for example, interest rate policies and other policies, so that the goal of achieving and maintaining stability in the value of the domestic currency can be achieved. Furthermore, considering that the central bank is a public institution, another measure, although not the

main one, is to pay attention to how efficiently the central bank achieves "output", especially internal efficiency which minimizes costs to achieve goals (Stella, 2008).

In general, the central bank is an institution that has an important role in the economy, especially in the areas of monetary policies and financial system stability. This can be seen from the functions and objectives of central banks which are not identical to commercial banks or other financial institutions. Basically, central banks are formed to achieve certain socio-economic goals involving national interests or general welfare, such as price and exchange rate stability and economic development. Central banks have unique and specific business processes and do not aim to seek profits as large as commercial entities because they carry out mandates regulated by law. Any policies conducted by a central bank have directly influenced the size of the balance sheet, especially the strong asset growth. These policies have changed how the central bank implements monetary policy which ultimately has an impact on the size of the central bank's balance sheet and the amount of liquidity in the banking system. Large asset purchases and low interest rates if they last for a long time as well as a slowing economic recovery will cause the central bank's balance sheet to be much larger. Central bank assets can be filled with long-term and risky assets.

The expansion of the central bank's balance sheet has an impact on the risk that the central bank becomes more open to market developments, including changes in the value of foreign assets or long-term interest rates which can reduce the value of assets, while the value of liabilities remains constant. This could raise political questions and could even damage the central bank's credibility and reputation. A country is better off if the central bank has the financial strength needed to carry out its functions. Therefore, it is necessary to properly control the central bank's balance sheet. Strengthening the financial strength of the central bank will also ultimately increase the credibility of the central bank as this is also seen good to the public interests (de Mendonça, & Tiberto, 2017).

The rest of the papers is as follows. Section 2 provides methodology and study selection of literature used in this paper. Section 3 provides literature synthesis including common themes and patterns emerge from the existing literature. Section 4 discusses the implications of this study along with the limitations. Section 5 concludes.

METHOD

For this review, central banks as the main topic must include profit as part of the research as well as other relevant topics such as monetary policies and financial system. Studies that only provided banks or financial services (such as efficiency or specific financial products) or only profitability were excluded.

This section explains the process of screening and selecting studies based on predetermined criteria (see Figure 1). We use Web of Science Core Collection (<https://www.webofscience.com/>) as the main source of database for our purpose. The keyword in the first step is considered appropriate to find relevant documents in this process. The next steps are inclusion and exclusion during the search process which include criteria for considering studies for this review. Each step of the collection process generates the number of documents as follows:

1. Searching all fields by using a keyword "central bank profit": 669 documents.
2. Filtering based on economics or business finance subjects: 272 documents.
3. Filtering based on meso criteria (economics): 191 documents.
4. Filtering based on micro (economic growth, monetary policy, corporate governance, DEA): 132 documents.
5. Filtering based on document type (article): 124 documents.
6. Filtering based on SSCI database: 98 documents.

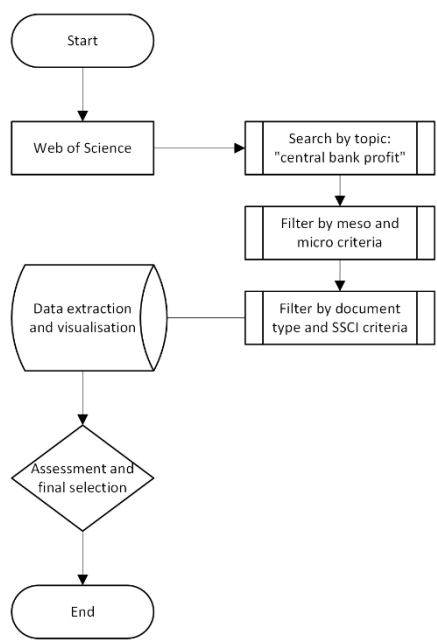


Figure 1: Document selection process

After the last step using WoS selection, we search and select each document based on central bank and capital structure criteria. We exclude documents that are directly related to central bank but do not explain central bank capital or reserve such as unemployment and commercial bank profitability.

To synthesize collected literature and conduct bibliometric analysis, we use bibliometrix and biblioShiny (Aria & Cuccurullo, 2017) which involves quantitative analysis of scientific publications. The bibliometrix package in R environment is created specifically for bibliometric analysis, including co-authorship, citation, keyword, and more analyses. It has features for importing bibliographic data from various sources, cleaning and preparing the data, and producing reports and visualizations. The bibliometrix package serves as the backend for bibliometric analysis in biblioShiny, that offers an intuitive bibliometric analysis interface that eliminates the need to write R code and use web interface allows users to input their bibliographic data, choose analysis options, and create interactive reports and visualizations. In this study, we use both bibliometrix and biblioShiny to analyze publication patterns, research theme networks, and research insights about the topic of central bank profit. We use 98 documents based on the selection criteria as described above. Finally, we evaluate and assess each document based on the relevancy of this topic, where the final documents are 18 journal articles. Furthermore, we also critically analyze the validity and reliability of the research carried out in selected and highly relevant papers.

RESULTS AND DISCUSSION

There is a few rigorous evidence on investigations that combine central banks with their profitability as it is difficult to observe central bank profits as they are not always reported to the public. Studies related to central bank profit increased after the year 2000. As described in Figure 1, annual scientific production shows the yearly output of scientific publications for the past 30 years related to central bank profit. Interestingly, the average number of citations reached its peak in 2009 compared to other years, which is related to the economy during these periods. Most of the studies are conducted by researchers mainly in Europe and the US, which were hardly hit by the Great Depression. During this period, central banks may suffer losses in their reserves, and most importantly their profits.

Although the three clusters have various themes within the groups, each cluster has some connection to another cluster. For example, monetary policy and risk clusters can overlap with performance and competition clusters through the governance of financial systems and institutions. Another example of the connection between all clusters is when profits retained by central banks as a reserve fund are combined with an unconstrained governance mechanism, inflationary bias can result.

Most of these themes emerge from publications in several prominent journals in economics and finance such as the American Economic Review, Journal of Money, Credit and Banking, Journal of Political Economy, Review of Economic Studies, and Journal of Finance. These journals' articles frequently have a significant impact on the academic community, shaping financial and economic theories, policies, and practices. Papers published in these journals are frequently cited as scholarly contributions by researchers, policymakers, and professionals. While specific studies on central bank profit may differ, Figure 4 illustrates the relationship between most cited references (including journal titles), authors, and author keywords on the topic being studied using a three-field plot. Based on these results, we select some articles that are closely related to our topic such as Kim and Kim (2011, 2013), Bassetto & Messer (2013), and Mandel & Tomsik (2013).

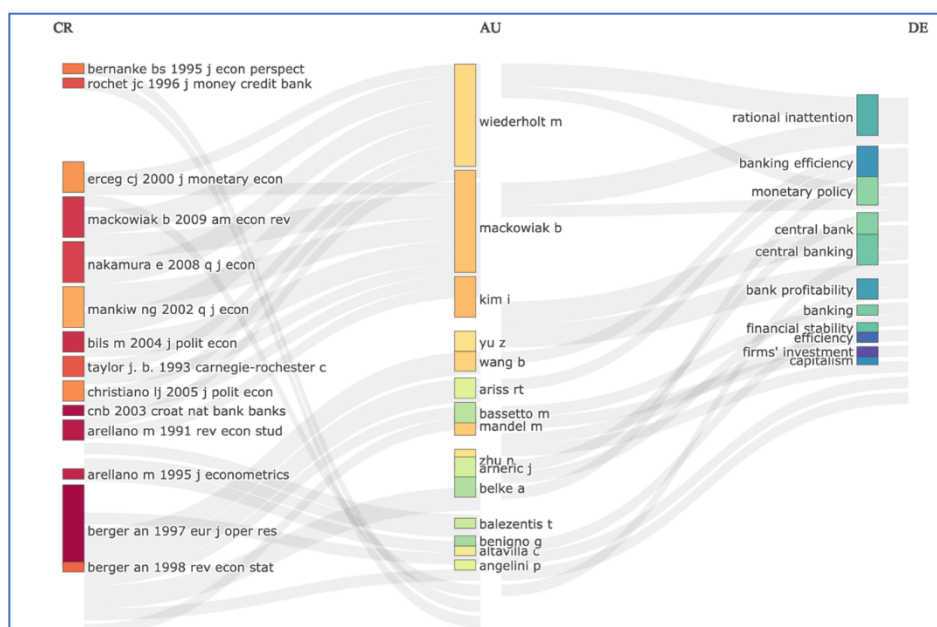


Figure 4. Three-field plot

Themes and Patterns

Each specific topic in each cluster then is mapped based on multidimensional scaling (MDS). MDS is a statistical technique available in bibliometrics. MDS is used to depict the similarity or dissimilarity of objects such as documents, authors, or keywords in the context of studies collected in this review. MDS attempts to represent these objects in a lower-dimensional space while preserving as much of their pairwise similarities or dissimilarities as possible. The resulting thematic map represents the relationships between specific topics or themes, helping us in identifying specific topics of the documents and gaining insights into the overall structure of a research field. The results are provided in Figure 5. Although central bank profit is not specifically shown in Figure 5, indeed many relevant articles are included in this mapping.

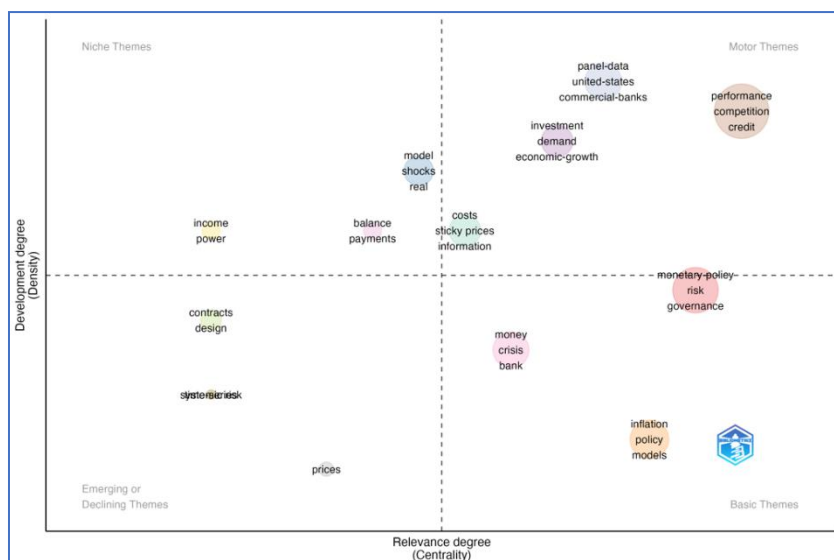


Figure 5. Thematic map based on keywords

Furthermore, we divide the studies based on the publication year to analyze the changes in research themes. The cut-off year is based on the time of average citations per year as depicted in Figure 2, and we have four periods: 1991-2007, 2008-2015, 2016-2020, and 2021 to present, as shown in Figure 6. There are many themes changes between the second and third periods, while in the last three years, only two topics remain, namely risk and credit. Based on the studies collected for this review, the risk is related to the possible loss of central bank reserves or assets, while credit is related to the central bank’s role in enhancing financial intermediation.

We selected some articles using the WoS database based on relevancy criteria and hand-searched several articles or working papers not captured by WoS to look for contemporary studies related to central bank profit. We finally selected 18 journal articles to further analyze the studies and to look research gap for further studies. The selected articles are given in Table 1.

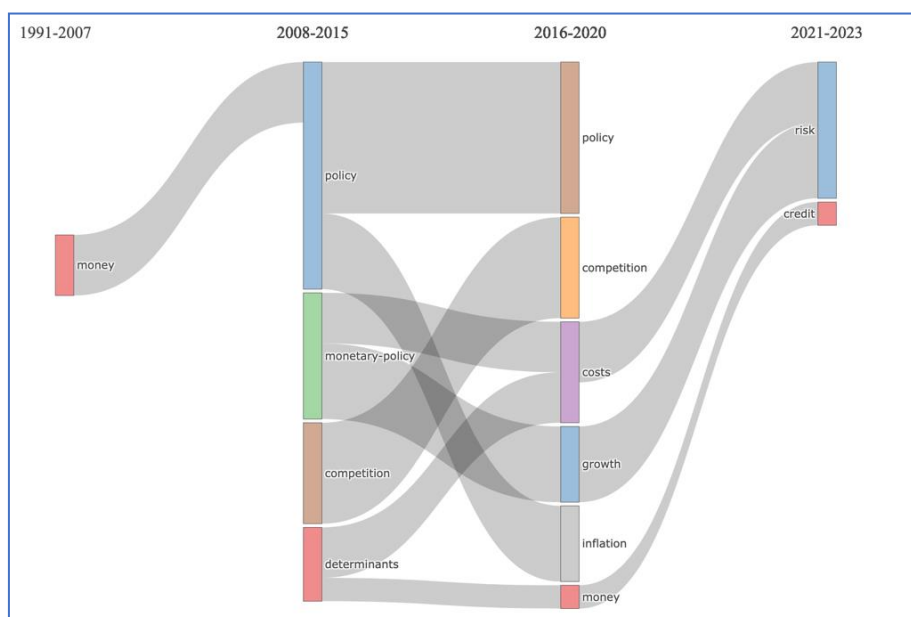


Figure 6. Theme evolution

Table 1. Selected Documents

| No | Authors | Source Title | Publication Year |
|----|--|---|------------------|
| 1 | Goncharov, Ioannidou, Schmalz | Journal of Finance | 2023 |
| 2 | Baltensperger, & Jordan | Kyklos | 1998 |
| 3 | Alvarez-Parra, Arreaza & Zambrano | Economia | 2018 |
| 4 | Polanski, & Szadkowski | Economists Voice | 2023 |
| 5 | Gaganis, & Pasiouras | Journal of Banking & Finance | 2013 |
| 6 | Kim, & Kim | Hitotsubashi Journal of Economics | 2011 |
| 7 | Sweeney | Journal of Banking & Finance | 1997 |
| 8 | Sjöö, & Sweeney | Journal of International Money and Finance | 2001 |
| 9 | Mandel, & Tomsík | Eastern European Economics | 2013 |
| 10 | Kim, & Kim | Emerging Markets Finance and Trade | 2013 |
| 11 | Prieto | Journal of Evolutionary Economics | 2022 |
| 12 | Bassetto, & Messer | Fiscal Studies | 2013 |
| 13 | Fischer | Economics Letters | 2003 |
| 14 | Saacke | Journal of International Money and Finance | 2002 |
| 15 | Fishe, Robe, & Smith | Journal of Futures Markets | 2016 |
| 16 | Cole | Evolutionary and Institutional Economics Review | 2023 |
| 17 | Schwarz, Karakitsos, Merriman & Studener | Accounting Economics and Law-A Convivium | 2015 |
| 18 | Hoffmann & Loeffler | Review of International Economics | 2017 |
| 19 | Adler, Castro & Tovar | Open Economic Review | 2016 |
| 20 | Bell, Chui, Gomes, Moeser-Boehm & Tejada | BIS Bulletin | 2023 |
| 21 | Pinter | Open Economic Review | 2018 |
| 22 | Stella | IMF Working Paper | 2008 |

Using results in Figures 3, 4, 5, and 6, we further develop five common themes that contribute to the understanding of the question of central bank profitability and to the overall studies collected in this review. The themes are described as follows:

(1) Central bank independence and profitability

Studies could investigate how a central bank's authority affects its decision-making processes and the effectiveness of its monetary policy. The research investigates the extent to which the central bank's accumulated earnings reinforce its independence and insulate it from external political influences. (Kim & Kim, 2011, 2013; Prieto, 2022). Studies could also investigate how profitable central banks can help economic development through central bank policies and financial stability measures (Schwarz, Karakitsos, Merriman, Studener, 2015). The potential losses may undermine the central bank's operational independence and reputation, thus also endangering its institutional independence. Hoffmann & Loeffler (2017) argue central banks may be forced to engage in less costly absorption operations to prevent losses, which could limit their ability to conduct monetary policy independently.

(2) Profitability and monetary policy effectiveness

This theme includes investigating how the profitability of a central bank affects the effectiveness of its monetary policy as measured by inflation, money supply, and credit supply. Researchers may investigate whether profitable central banks are more adaptable in implementing monetary policies and responding to economic challenges (Polanski, & Szadkowski, 2023). Some researchers emphasize the importance of the central bank's asset structure in maintaining the credibility of its currency, with profitability being of secondary importance (Baltensperger, & Jordan, 1998). Alvarez-Parra, Arreaza & Zambrano (2018) also highlights the relationship between central bank financial strength and inflation rates, with financially weaker central banks associated with higher inflation rates.

(3) Central bank and competition

This theme covers exploring the relationship between central bank profit and competition in banking industries. Studies examine whether central banks as regulators are better equipped to implement and enforce rules or regulations, contributing to fair and efficient competition in financial sectors (Gaganis, & Pasiouras, 2013; Cole, 2023).

(4) Central bank operations and risk

This theme comprises investigating central banks' operational aspects, such as investments, foreign exchange operations, and open market operations. Studies could investigate how these operations affect or contribute to the central bank's profit margins (Sweeney, 1997; Sjöo, & Sweeney, 2001; Saacke, 2002; Fischer, 2003; Mandel & Tomsik, 2013; Fische, Robe, & Smith, 2016; Hoffmann & Loeffler, 2017). The researchers explore the role of the central bank's balance sheet in a monetary model. It examines different asset-management policies of the central bank and the riskiness of its position (Bassetto & Messer, 2013).

(5) Central bank profit and public finance

The theme includes investigating how central bank profit affects public finance, such as profit transfers to the government, fiscal sustainability, and budgetary considerations (Bassetto & Messer, 2013; Alvarez-Parra, Arreaza & Zambrano, 2018; Polanski, & Szadkowski, 2023).

Alvarez-Parra, Arreaza & Zambrano (2018) the extent and structure of profit transfers, where they conclude that the extent of profit transfer is irrelevant as long as it does not depend on the fiscal authority's spending behavior. They also emphasize that the structure of assets should prioritize the central bank's need to guarantee the credibility of its currency, with profitability being of secondary importance. To minimize the impact on government spending behavior, Alvarez-Parra, Arreaza & Zambrano (2018) suggest keeping profit transfers constant over time and reflecting the average of previous profits.

Polanski & Szadkowski (2023) discuss the financial situation of central banks and its impact on their ability to generate profits and transfer them to the government. Polanski, & Szadkowski (2023) introduces the concept of the break-even point, referring to a zero-profit situation, and applies it to the study of central bank finances. Polanski, & Szadkowski (2023) explore the factors influencing the size of central bank transfers and analyze possible solutions to mitigate the problem of diminished profits. They also emphasize the challenges faced by central banks in generating positive financial results and the implications for government transfers. Baltensperger & Jordan (1998) argue transfers should evolve at a constant rate based on an average of previous profits to minimize the fiscal authority's spending response.

Some studies can have overlapping topics as we proposed above. For example, Goncharov, Ioannidou & Schmalz (2023) address the research gap related to the motivations and incentives that drive central banks to prioritize profitability and the implications of these concerns on their policy choices and outcomes using variables such as central bank operating expenses to government tax revenues, central bank total assets to GDP, central bank *de jure* independence, and high dividend payout ratios. Goncharov, Ioannidou, & Schmalz (2023) argue that central bank profit is difficult to observe. They documented central banks do not continuously report more positive profits than negative benefits, especially when political pressure is greater, the public is more receptive to extreme political views, and the governor of the central bank meets the requirements to be appointed again. In addition, research found that provision was an important tool used by the central bank to manage reported profits and

avoid losses. Goncharov, Ioannidou & Schmalz (2023) concluded that there was an agency problem in the central bank, which caused unbroken earnings incentives that correlated with policy choices and central bank policy results.

Implications

Based on the documents, there are several implications that can be drawn:

1. The extent of profit transfers from central banks to the government is considered irrelevant if it does not depend on the government's spending behavior. This implies that the focus should be on maintaining the credibility of the central bank's currency rather than maximizing profit transfers.
2. The structure of central bank assets should prioritize the need to guarantee the credibility of the currency. While profitability is important, it is of secondary importance compared to maintaining trust and confidence in the currency.
3. To minimize the impact on government spending behavior, it is suggested that profit transfers should be kept constant over time and reflect the average of previous profits. This implies that stable and predictable profit transfers can help avoid potential distortions in government spending patterns.
4. Central banks care about their profits because profitability is seen as an indicator of their financial health and stability. Central bank profitability is measured using metrics such as return on assets, and it is important for central banks to maintain positive profitability to ensure their effectiveness in fulfilling their mandates.
5. The analysis of central bank profitability and its implications can help identify potential agency problems and incentives that central banks face. Understanding these factors can provide insights into the policy choices and outcomes of central banks.
6. Agency problems at central banks can create profitability concerns and incentives to avoid losses. This highlights the importance of addressing these agency problems to ensure the effective functioning of central banks.

Overall, the implications of these studies emphasize the importance of maintaining the credibility of the currency, ensuring stable profit transfers, and addressing agency problems to enhance the effectiveness of central banks in fulfilling their roles.

Limitations of the Review

The limitations of the studies based on these documents can be identified as follows:

1. **Subjectivity in accounting practices:** The studies rely on accounting data and the discretion exercised by central banks in reporting profits and provisions. The subjectivity in accounting practices and potential manipulation of financial statements could introduce biases or limitations in the analysis.
2. **Contextual specificity:** The findings of these studies may be specific to the particular time period, countries, or central banks under investigation. The results may not be applicable or generalizable to other contexts with different economic, political, or institutional characteristics.
3. **Causality and endogeneity:** Establishing causality is challenging in these studies. The relationship between central bank profits and their transfer to the government may be influenced by various factors, such as economic conditions, political considerations, and institutional frameworks. It is difficult to disentangle the causal direction and account for potential endogeneity issues.
4. **Data availability and quality:** The studies rely on the availability and quality of data from sources such as Bankscope and central bank financial statements. If the data is incomplete, inconsistent, or unreliable, it may introduce biases or limitations in the analysis and interpretation of results.

CONCLUSION

This review begins with a question concerning a central bank's profitability and balance sheet expansion increases vulnerability to market changes, potentially reducing asset value while maintaining responsibilities. This could raise political concerns and damage the bank's credibility, particularly in conducting financial system stability and monetary policy.

The review summarizes evidence from 22 documents which are then classified into five themes in relation to central bank profitability: central bank independence, monetary policy effectiveness, competition, operations and risk, and public finance. The topic of central bank profit is not yet widely explored as it is difficult to observe central bank profitability given its nature as a public institution.

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