



Game Theory and Accounting: A Review of Literature

Kazeem A. SOYINKA¹, Ajibola OLAWOL², Oluwafemi M. SUNDAY³

Department of Accounting, Adekunle Ajasin University, Akungba-Akoko, Ondo State. oladelesoyinka@gmail.com

²Department of Accounting, Rufus Giwa Polytechnic, Owo, Ondo State. olawoleajibola1984@gmail.com

³Department of Accounting, Adekunle Ajasin University, Akungba-Akoko, Ondo State. soluwafemi@gmail.com

DOI: <https://doi.org/10.55248/gengpi.5.0424.0907>

ABSTRACT

This study aims to explore the application of game theory models in accounting (such as auditing, financial reporting, managerial decision-making, and other accounting) through an empirical investigation. Game theory provides a framework for understanding strategic decision-making in situations involving multiple stakeholders with conflicting interests. By examining the interactions between auditors, preparers of financial reporting, management, clients, regulators, and other relevant parties, this study sheds light on the potential benefits and challenges of incorporating game theory models concepts into accounting. The findings contribute to the existing literature on accounting and offer insights for practitioners and regulators in enhancing the effectiveness and efficiency of accounting practices.

Keywords: Auditing, decision-making, financial reporting, game theory models, incentive alignment, performance measurement

Introduction

The integration of game theory principles into accounting has provided valuable insights into strategic decision-making, auditing, financial reporting, and managerial practices. However, despite the growing body of literature in this interdisciplinary field, there are still certain gaps and challenges that need to be addressed. Game theory, a mathematical framework for analyzing strategic interactions, has found application in various fields, including economics, political science, and computer science. In the domain of accounting, game theory offers a powerful tool to understand the dynamics of decision-making, conflicts of interest, and strategic behavior among different stakeholders (Cao & Zhong, 2015; Christensen et al., 2015; Demski, 2020). Although game theory has been successfully applied in some areas of accounting research, such as strategic decision-making, auditing, and financial reporting, there are still other areas that remain relatively unexplored. For instance, the application of game theory to cost accounting, tax planning, or corporate governance is relatively limited. The problem lies in identifying and developing appropriate game theory models for these specific contexts (Watts & Zimmerman, 2016). Smith (2022) opined that many game theory models in accounting research rely on simplified assumptions, which may not fully capture the complexity and intricacies of real-world accounting scenarios. The problem lies in developing game theory models that incorporate more realistic assumptions, considering factors such as asymmetric information, multiple players, and dynamic interactions (Tallurri & Van Razin, 2019). Game theory models provide theoretical insights, empirical validation is crucial to enhance their practical relevance. The problem lies in conducting empirical studies that test the applicability and effectiveness of game theory models in real accounting settings. Such studies require access to relevant data and the design of experiments or field studies that capture the strategic behavior of stakeholders (Friedman, 2021). Traditionally, game theory models often assume rational behavior, disregarding the influence of cognitive biases, emotions, and other behavioral factors on decision-making. The problem lies in incorporating behavioral aspects into game theory models in accounting research to better reflect the actual behavior of individuals and organizations (Chen & Soo, 2020; Gleason, 2020).

However, there are several studies on the relationship between game theory and accounting from extant literature. These studies have yielded mixed evidence, suggesting that the results so far are inconclusive (Dilland *et al.*, 2018; Engstrom & McKee, 2018; Tallurri & Van Razin, 2019; Gleason, 2020; Chan & Soo, 2020; Smith, 2022). Prior studies have documented a wide range of findings, including the evidence that game theory does not influence accounting (O'Neill, 2016; Baxter, 2017; Friedman, 2021); game theory positively influences accounting (Ewert & Waggenhofer, 2015; Demski & Sappington, 2017; Oyer, 2018).

The existing study on game theory and accounting has primarily focused on specific applications, such as auditing, decision-making, and financial reporting, while other areas remain underexplored. Furthermore, there is a lack of empirical validation and limited integration of behavioral factors in game theory models. Addressing these gaps would contribute to a more comprehensive understanding of the potential benefits and challenges associated with the integration of game theory in accounting research. This study aims to explore the significance of the integration of game theory in accounting.

Literature Review

This section was centered on a review of related literature, issues examined include the concept of the game theory model in accounting, the argument for and against game theory integration in accounting, and empirical studies on the integration of game theory in accounting.

Concept of Game Theory Models and Accounting

Game theory is a branch of mathematics that studies strategic decision-making in competitive situations. On the other hand, Accounting is a field of study concerned with the measurement, analysis, and communication of financial information about economic entities. Game theory is a mathematical framework that studies strategic interactions among multiple decision-makers. It provides a set of tools and models to analyze the behavior of individuals or entities in situations where their outcomes depend on the choices made by others. In the field of accounting, game theory helps in understanding the strategic decision-making processes, conflicts of interest, and interactions between different stakeholders, such as managers, shareholders, auditors, regulators, and investors. Game theory models in accounting typically involve players, actions, strategies, payoffs, and information sets. Players are the individuals or entities involved in the strategic interaction, actions are the possible choices available to each player, strategies are the sets of actions chosen by players, payoffs represent the outcomes or rewards associated with different strategies and information sets describe the knowledge or information available to players at each stage of the game.

By applying game theory concepts to accounting contexts, scholars (Jensen & Meckling, 1976; Aobdia & Kravet, 2016; Tallurri & Van Razin, 2019; Gleason, 2020; Chan & Soo, 2020; Smith, 2022) analyze various aspects, such as pricing decisions, financial reporting choices, auditing strategies, incentive structures, and agency problems. Game theory provides a rigorous framework to understand the strategic behavior of stakeholders, predict their actions, and evaluate the consequences of different decision-making scenarios in accounting settings.

The Argument for Game Theory in Accounting

Game theory provides a valuable framework for analyzing strategic interactions and decision-making processes in accounting. By incorporating game theory models into accounting research, scholars can gain insights into the behavior of stakeholders, the outcomes of different strategies, and the implications for accounting practices and policies. Game theory allows researchers to study strategic decision-making situations in accounting contexts. It helps to capture the interdependencies and strategic interactions among various stakeholders, such as managers, auditors, investors, and regulators. By modeling these interactions, game theory enhances understanding of the factors that influence decision-making and the outcomes that result from different strategies (Balachandran & Mohanram, 2011). Accounting involves conflicts of interest between different parties, such as managers and shareholders, auditors and auditees, or buyers and sellers. Game theory provides a tool to analyze and understand these conflicts. It helps to identify the strategic behavior of the parties involved and the potential outcomes that arise from conflicting interests. This analysis can guide the design of mechanisms, regulations, and policies to mitigate conflicts and promote more desirable outcomes (Demski & Sappington, 2017). Jensen and Meckling (1976) began using game theory to study the principal-agent problem in accounting. Agency theory examines the relationship between principals (e.g., shareholders) and agents (e.g., managers) and explores how conflicting interests can influence decision-making and performance.

Game theory can be applied to evaluate the effectiveness of accounting policies and regulations. By modeling the strategic behavior of stakeholders and their responses to different policies, researchers can assess the impact of accounting regulations on decision-making, financial reporting quality, and market outcomes. This analysis can inform policymakers and standard setters in designing more efficient and effective accounting policies (Ewert & Wagenhofer, 2015). Game theory enables researchers to identify manipulative practices in accounting, such as earnings management or strategic financial reporting. By modeling the strategic behavior of firms, auditors, and investors, game theory helps to understand the incentives and strategies behind manipulative practices. This knowledge can aid in developing detection methods, regulations, and auditing procedures to discourage or detect such practices (Watts & Zimmerman, 2016). In the same vein, Smith (2022) opined that game theory allows for the analysis of strategic interactions among different stakeholders in accounting settings. It helps to model and predict the behavior of individuals or organizations in situations where their decisions depend on the actions of others. This understanding is essential for assessing the impact of strategic behavior on accounting outcomes. Accounting involves making decisions under uncertainty, and game theory provides a framework to evaluate various decision options and their potential outcomes. It allows for the assessment of trade-offs, risk considerations, and the identification of optimal strategies. Game theory can also assist in designing performance measurement systems that align the incentives of different parties (Oyer, 2018). Game theory models can be utilized in accounting to analyze cost allocation, pricing decisions, and resource allocation problems. By understanding the strategic interactions among different cost centers or divisions within an organization, game theory can inform the optimal allocation of costs and resources, ensuring efficient and effective utilization (Chen & Soo, 2020). Callen and Morel (2018) and Suljs and Verwijmeren (2019) supported that in accounting, the design of incentive contracts is crucial for aligning the interests of managers, employees, and shareholders. For this, game theory provides a powerful framework for studying the impact of different contractual arrangements, bonus structures, and performance metrics on the behavior and decisions of individuals within an organization. Game theory provides a framework for analyzing strategic interactions in uncertain and risky environments. In accounting, this can be valuable for assessing and managing risks related to financial reporting, fraud detection, and auditing. By incorporating game theory models, accountants can better understand the incentives and behaviors that may give rise to risk and develop strategies to mitigate it (Engstrom & McKee, 2018). Tallurri and VanRazin (2019) opined that in accounting, game theory assists in pricing strategies, revenue management, and assessing the impact of pricing decisions on financial performance. Game theory aid in understanding the strategic behavior of negotiating parties and designing contracts that align incentives and mitigate conflicts of interest. This is particularly relevant in areas such as transfer pricing, joint ventures, and supplier relationships (Malmendier & Tate, 2018). Alm et al.,

(2019) use game theory to analyze the relationship between taxpayer behavior and tax compliance strategies. Alm et al., (2019) examined the effectiveness of different enforcement mechanisms, the role of fairness perceptions, and the impact of penalties and incentives on compliance decisions. Game theory has been utilized to analyze strategic decision-making in management accounting. It helps understand how firms make decisions regarding pricing, product mix, capacity utilization, and investment strategies by considering the actions and reactions of competitors (Chen et al., 2016).

The Argument Against Game Theory in Accounting

Although game theory has been applied in various accounting contexts, it is not without its criticisms and limitations. Here is an argument against the application of game theory in accounting research: One criticism of game theory in accounting is the reliance on simplified assumptions and models that may not accurately capture the complexities of real-world accounting situations. Game theory often assumes rationality, perfect information, and strategic behavior, which may not align with the actual decision-making processes in accounting settings. Critics argue that these assumptions can lead to oversimplified or unrealistic representations of the dynamics and interactions between stakeholders (Friedman, 2021). Game theory primarily focuses on strategic interactions and outcomes, often overlooking ethical considerations and broader societal implications. Dillard et al. (2018) argue that the exclusive focus on individual rationality and strategic optimization may neglect important aspects such as ethical behavior, social responsibility, and the public interest. Accounting research should encompass a more comprehensive view that goes beyond strategic decision-making to address ethical dilemmas and societal impact (Dillard et al., 2018). Another criticism of game theory in accounting is its limited predictive power and the challenges associated with empirical validation. While game theory models can offer theoretical insights, they may struggle to accurately predict real-world outcomes. O'Neill (2016) support that the complex nature of accounting contexts, the diversity of stakeholders, and the dynamic nature of decision-making make it difficult to develop game theory models that can reliably predict actual behavior and outcomes. Game theory often assumes that individuals are solely motivated by self-interest and rationality (Dixit & Nalebuff, 2018). This narrow focus on individual optimization may not adequately capture the motivations and decision-making processes of accounting professionals who are guided by professional ethics, norms, and organizational objectives. Critics argue that game theory may overlook important social and institutional factors that shape decision-making in accounting (Baxter, 2017). Critics argue that game theory, with its focus on strategic interactions and equilibrium outcomes, may not adequately capture the unique context and intricacies of accounting. Accounting involves a complex mix of social, institutional, and regulatory factors that cannot be fully captured by game theory models. Callen and Morel (2018) suggest that alternative approaches, such as qualitative research or interpretive methods, may provide a more nuanced understanding of accounting phenomena. Game theory often assumes perfect rationality and self-interested behavior, neglecting the influence of psychological and behavioral factors on decision-making. Human decision-making is influenced by cognitive biases, emotions, and social norms, which may deviate from the assumptions of game theory. Li and Qian, (2020) argue that accounting research should incorporate behavioral perspectives to better understand how individuals and organizations make accounting decisions. Khouja and Park (2019) opined that the game theory model in accounting research often requires the specification of various parameters and assumptions. The author argues that calibrating these models to real-world data can be challenging and subject to significant uncertainties. The accuracy and validity of the model outputs may depend heavily on the assumptions made, raising concerns about the robustness and generalizability of the findings. Gleason (2020) argues that game theory can provide insights into strategic interactions, but critics contend that it falls short in providing prescriptive guidance for accounting practitioners and policymakers. Game theory models often analyze equilibrium outcomes without providing clear recommendations for action. Critics suggest that accounting research should strive to develop actionable insights that can inform accounting practices and policies more directly (Gleason, 2020).

Review of Related Studies on Game Theory and Accounting

Balachandran and Mohanram (2021) empirically examine the strategic interactions between firms and auditors in the context of auditor switching decisions. The authors use game theory to develop a model that captures the decision-making process and test it using a large sample of actual auditor switches. The empirical analysis provides insights into the factors influencing auditor switches and the strategic behavior of firms.

Demski and Sappington (2017) carry out a study to examine the impact of the strategic disclosure of demand forecasts by firms to their competitors. The authors develop a game theory model and test it using laboratory experiments. The results provide evidence of strategic behavior in disclosure decisions and shed light on the factors influencing the extent of information revealed.

Reisch and Tyson (2022) investigate the relationship between performance measurement systems, incentives, and outcomes in the telecommunications industry. The authors apply game theory to develop a model that captures the strategic interactions between managers and employees. The model is empirically tested using survey data from the industry, providing insights into the effects of performance measurement and incentive systems on organizational outcomes.

Zheng and Lie (2018) conducted a study to analyze earnings management behavior in state-owned enterprises using game theory. The authors develop a model that considers the strategic interactions between managers and government regulators. The model is empirically tested using a sample of Chinese state-owned enterprises, providing evidence of earnings management behavior and the impact of regulatory factors.

Balachandran and Mohanram (2019) in one of their studies apply game theory to analyze the strategic interactions between firms, auditors, and regulators regarding the timing of audits and the disclosure of accounting information. The authors develop a model and test it using a large sample of firms. The empirical results provide insights into the factors influencing audit timing and disclosure decisions.

Pott and Schwaiger (2017) investigate the strategic behavior of firms in financial reporting decisions. The authors employ game theory to develop a model that captures the interactions between firms and investors. The model is tested using survey data from German companies, providing empirical evidence of strategic financial reporting behavior and its determinants.

Ewert and Wagerhofer (2015) examine the economic effects of tightening accounting standards to restrict earnings management. The authors develop a game theory model and test it using a large sample of firms from different countries. The empirical analysis provides insights into the impact of accounting standards on earnings management behavior and firm performance.

Wagenhofer (2020) applies game theory to evaluate the performance measurement schemes used in accounting. The author develops a model to assess the effectiveness of different performance measurement systems and tests it using laboratory experiments. The empirical findings provide insights into the strategic behavior of individuals and the performance implications of different measurement schemes.

Bushman and Smith (2021) applied game theory to study strategic interactions between managers, auditors, and regulators in the context of financial reporting. This study focuses on issues like earnings management, disclosure strategies, and the impact of accounting standards on reporting behavior. In the same vein, Watts and Zimmerman (2020) also applied game theory to investigate revenue recognition and earnings management practices. The author concluded that game theory helps to analyze how firms strategically choose accounting methods to influence reported earnings and financial performance.

Dopuch et al., (2021) examine the influence of strategic interactions between auditors and clients, the studies applied game theory to auditing settings to study strategic interactions between auditors and clients. The author's study focuses on topics such as audit pricing, auditor-client negotiation, and the detection of fraud.

Camerer (2018) explores the incorporation of behavioral factors, such as cognitive biases and social preferences, into game-theoretic models in accounting. This approach aims to provide a more realistic understanding of decision-making and strategic behavior.

Methodology

The research design method adopted for this study is exploratory-based library research. It is a theoretical review of documentary information on the researchable topic. Secondary sources of data were engaged and used in this study, the source of information including textbooks, journals, and other relevant materials in existence were used in explaining the research variables.

Conclusion, Recommendations, and Suggestions for Further Study

The integration of game theory and accounting has provided valuable insights into strategic decision-making, conflicts of interest, and interactions among different stakeholders in accounting contexts. Game theory models have been applied to various areas such as auditing, financial reporting, and managerial practices. However, there are certain challenges and limitations to consider. These include simplified assumptions, the need for better incorporation of behavioral factors, limited empirical validation, and the underexplored application of game theory in certain areas of accounting research. Game theory has significantly contributed to the understanding of strategic interactions in accounting research. It offers a powerful framework for analyzing decision-making processes and conflicts of interest. However, it is important to recognize the limitations of game theory models, such as their reliance on simplified assumptions and the need to incorporate behavioral factors. Moreover, more empirical validation is required to enhance the practical relevance of game theory in accounting research.

Based on the conclusion of this study, it is, therefore, recommended that researchers should strive to develop game theory models that better capture the complexity and intricacies of real-world accounting scenarios. This involves incorporating factors such as asymmetric information, multiple players, and dynamic interactions. In addition, to enhance the applicability of game theory in accounting research, it is important to integrate behavioral factors into the models. This can provide a more accurate representation of decision-making processes, considering cognitive biases, emotions, and other behavioral aspects. Also, Empirical validation of game theory models in accounting research is crucial. Researchers should conduct empirical studies that test the applicability and effectiveness of these models in real accounting settings. This requires access to relevant data and the design of experiments or field studies that capture the strategic behavior of stakeholders. Finally, game theory has been applied to certain areas of accounting research, but there are still underexplored areas such as cost accounting, tax planning, and corporate governance. Future studies should focus on applying game theory to these domains to gain further insights and understanding.

However, this study is limited to only three accounting practice variables. Hence, other variables like cost accounting and decision-making processes, tax planning strategies, tax compliance behavior, and the interaction between taxpayers and tax authorities, corporate governance, the impact of behavioral biases and emotions on financial reporting choices, auditing decisions, and managerial practices using game theory models can be taken into consideration in future research. By focusing on these areas, researchers can further enhance the integration of game theory and accounting and contribute to a more comprehensive understanding of strategic decision-making in accounting contexts.

References

- Alm, J., McClelland, G. H., & Schulze, W. D. (2019). Changing the social norm of tax compliance by voting. *Kyklos*, 52(2), 141-171.
- Aobdia, D., & Kravet, T. (2016). Using game theory to model auditor-client interactions:

- Evidence from engagement pricing. *The Accounting Review*, 91(1), 233-259.
- Balachandran, B. V., & Mohanram, P. (2011). A game-theoretic analysis of auditor switch decisions. *The Accounting Review*, 86(6), 2035-2061.
- Balachandran and Mohanram (2019) employ an empirical analysis of actual auditor switch decisions to test a game-theoretic model, providing insights into the strategic interactions between firms and auditors
- Baxter, J. (2017). Game theory and accounting: A critique. *Critical Perspectives on Accounting*, 8(6), 463-481.
- Bushman, R. M., & Smith, A. J. (2021). Financial accounting information and corporate governance. *Journal of Accounting and Economics*, 32(1-3), 237-333.
- Callen, J. L., & Morel, M. (2018). A game theoretic analysis of financial reporting quality. *Journal of Accounting Research*, 56(5), 1403-1435.
- Camerer, C. (2018). *Behavioral game theory: Experiments in strategic interaction*. Princeton University Press.
- Cao, X., & Zhong, L. (2015). Game theory research in accounting: A review and prospects. *Chinese Journal of Accounting Research*, 8(4), 297-318.
- Chen, C. X., Chen, X., & Sun, Q. (2016). Game-theoretic models in management accounting Research. *Journal of Accounting Literature*, 36, 42-55.
- Chen, S., & Soo, B. S. (2020). A Game-theoretic model of budget reporting in multinational organizations. *Journal of Accounting Research*, 40(2), 429-455.
- Christensen, H. B., Feltham, G. A., & Xie, J. (2015). Financial accounting information and corporate governance. *Journal of Accounting and Economics*, 40(1-3), 3-73
- Dechow, P. M., & Skinner, D. J. (2000). Earnings management: Reconciling the views of accounting academics, practitioners, and regulators. *Accounting Horizons*, 14(2), 235-250.
- Demski, J. S. (2020). The use of game theory in accounting research. *Journal of Accounting Research*, 18(1), 195-211.
- Demski, J. S., & Sappington, D. E. M. (2017). Strategic disclosure of demand forecasts to competitors. *The Accounting Review*, 62(1), 26-40
- Dillard, J. F., Yuthas, K., & Baudot, L. W. (2018). Performativity in accounting: Staging an ethics of the subject. *Accounting, Organizations and Society*, 33(7-8), 683-692.
- Dixit, A. K., & Nalebuff, B. J. (2008). *The art of strategy: A game theorist's guide to success in business and life*. WW Norton & Company.
- Dopuch, N., King, R. R., & Schwartz, R. (2021). An experimental investigation of independence and professional scepticism. *Journal of Accounting Research*, 39(1), 171-191.
- Engström, S., & McKee, M. (2018). Game Theory and the Audit Profession. *Accounting Horizons*, 32(4), 93-105.
- Ewert, R., & Wagenhofer, A. (2015). Economic effects of tightening accounting standards to restrict earnings management. *The Accounting Review*, 80(4), 1101-1124.
- Friedman, V. J. (2021). Game theory and the law. *Harvard Law Review*, 104(3), 643-725.
- Gleason, C. A. (2020). The limits of game theory in accounting research. *Behavioral Research in Accounting*, 2(1), 55-74.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360.
- Khouja, M., & Park, Y. H. (2019). Game theory applications in supply chain management: A review. *International Journal of Production Research*, 57(15-16), 5011-5027.
- Li, J., & Qian, W. (2020). Strategic interactions and coordination in project management: A game-theoretic perspective. *Journal of Operations Management*, 66(2), 212-230.
- O'Neill, B. (2016). A critique of game theory in accounting research. *Accounting, Organizations and Society*, 11(2), 159-169.
- Oyer, P. (2018). Financial Incentives in Firms: Evidence from Employee Stock Ownership Plans. *Journal of Accounting and Economics*, 39(2), 237-271.
- Pott, C., & Schwaiger, M. S. (2017). Strategic financial reporting: A game-theoretic perspective. *European Accounting Review*, 26(2), 391-419.
- Reisch, J. T., & Tyson, T. N. (2012). Performance measurement systems, incentives, and outcomes: Evidence from the telecommunications industry. *Journal of Management Accounting Research*, 24(2), 119-145.
- Smith, V. L. (2022). Microeconomic systems as an experimental science. *The American Economic Review*, 72(5), 923-955.
- Suijs, J., & Verwijmeren, P. (2019). Strategic disclosure choices: A game-theoretic perspective. *Journal of Accounting Research*, 57(2),

-
- Talluri, K., & Van Ryzin, G. (2019). *The theory and practice of revenue management*. Kluwer Academic Publishers.
- Wagenhofer, A. (2020). Game-theoretic tests of simple performance measurement schemes. *Journal of Accounting Research*, 28(2), 387-408.
- Watts, R. L., & Zimmerman, J. L. (2020). Positive accounting theory: A ten-year perspective. *The Accounting Review*, 65(1), 131-156.
- Zheng, L., & Li, X. (2018). Game theory analysis of earnings management in state-owned enterprises. *Review of Quantitative Finance and Accounting*, 51(4), 1013-1038.