

Integrating game theory and positive accounting for strategic decisions in nearshoring processes

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Abstract

This study integrated game theory and positive accounting theory to analyze strategic and accounting decisions in the context of nearshoring, focusing on Mexican manufacturing firms. Through a mixed-method design with agent-based modeling and statistical analysis, key factors such as tax incentives, logistics competition, and accounting regulations were identified as influencing the selection of favorable accounting practices, such as accelerated depreciation and deferred revenue recognition. The results showed that strategic interactions between business actors and regulatory conditions influence the accounting policies adopted, contributing to cost and benefit optimization in reshoring processes. The research revealed limitations related to sector representativeness and model complexity, but provided a useful integrative framework for understanding the multidimensional dynamics of nearshoring, offering recommendations for expanding the analysis to other contexts and strengthening interdisciplinary collaboration.

Keywords: Game theory, positive accounting, nearshoring, agent modeling, strategic decisions

Introduction

The objective of this paper is to analyze the theoretical and practical convergence between Game Theory and Positive Accounting Theory in the context of strategic decisions arising from nearshoring, in order to explain the behavioral patterns of economic and institutional actors in the face of industrial relocations, financial risks, and fiscal opportunities. The genealogy of this issue can be traced back to the classic developments of strategic analysis in neoclassical economics, particularly with John von Neumann and Oskar Morgenstern in the formalization of game theory as a mathematical language for studying rational interactions between agents. At the same time, traditionally normative accounting gave way in the 1970s to a positive perspective that sought to describe, explain, and predict accounting behaviors as they occur, not as they should be, according to Watts and Zimmerman, the main exponents of this trend. The epistemology that underpins this research is based on the positivist paradigm, oriented toward the empirical description of observable regularities, based on assumptions of limited rationality, utility maximization, and strategic equilibria, within accounting systems that are regulated but adaptable to the interests of the actors.

The current context of the nearshoring phenomenon, characterized by the relocation of production chains to countries with greater geopolitical stability and logistical advantages, such as Mexico versus the United States, entails new configurations of business, tax, and accounting decision-making. The need to choose between multiple locations, suppliers, and accounting schemes generates strategic scenarios where incentives, asymmetric information, and regulatory frameworks intersect, demanding analytical frameworks that integrate both interactions between agents and the choice of accounting practices based on expected benefits. Background evidence shows a growing interest in applying game theory models to problems of governance, international trade, and corporate behavior (Bimpikis, Candogan, & Saban, 2019), while positive accounting theory has provided insight into why companies select certain accounting policies based on variables such as managerial compensation, tax policy, or market expectations (Watts & Zimmerman, 1986).

The problem lies in the limited articulation between these two theories in explaining nearshoring, given that most studies focus separately on strategic aspects (from game theory) or on accounting decisions (from positive theory), without integrating their implications for regulatory frameworks, location strategies, or redistributive effects between actors. The state of the art reflects little intersection between the two perspectives, although notable progress has been made in the strategic modeling of supply networks with endogenous incentives (Bimpikis et al., 2019) and in the empirical analysis of accounting selection based on value-maximizing interests (Fields, Lys, & Vincent, 2001). Azevedo and Silva (2022) propose an integrative approach to studying nearshoring decisions from strategic games applied to supply chains, but without delving into the accounting implications that such decisions entail.

The research approach aims to explore how strategic incentives modeled by game theory and accounting decisions explained by positive theory interrelate in productive relocation scenarios, in order to understand the determinants of firm behavior in the face of nearshoring opportunities. The central question is: How do strategic equilibria from game theory and accounting choices from positive theory interact in the context of nearshoring in Mexico? The intervention hypothesis proposes that the articulation of both theories allows us to predict that firms will select favorable accounting practices (such as accelerated depreciation or deferred revenue recognition) based on strategic equilibria that maximize tax benefits and logistical advantages, under conditions of imperfect competition and lax regulation.

Method

A triangulation-based methodological approach was used to ensure the validity and reliability of the findings, combining quantitative and qualitative methods in an explanatory sequential mixed design. This approach allowed for the integration of the interpretive richness of qualitative data with the statistical robustness of quantitative analyses, as proposed by Denzin (1978) and Creswell (2014). The sample consisted of Mexican manufacturing companies involved in nearshoring processes, selected through stratified sampling to ensure sectoral and geographic representativeness. Inclusion criteria were applied based on the volume of foreign direct investment and the adoption of innovative accounting practices related to positive accounting theory.

The PRISMA, Cochrane, and Campbell protocols were used for the systematic literature collection and review, ensuring rigor in the selection, exclusion, and synthesis of previous studies, as

established by Moher et al. (2009) and Petticrew and Roberts (2006). These instruments allowed for the construction of a solid theoretical framework and the identification of knowledge gaps. Regarding ethical matters, the principles of confidentiality, informed consent, and anonymity were respected, in accordance with the guidelines established by the Declaration of Helsinki and the corresponding institutional regulations.

The critical path included defining objectives, designing a theoretical framework, constructing and validating instruments, administering surveys and interviews, statistical analysis, agent-based modeling, and validating results. Agent-based modeling was based on game theory to simulate strategic interactions between business actors, incorporating variables such as investment, logistics costs, tax benefits, and accounting policies, following the methodology proposed by Epstein (2006). Dependent and independent variables were operationalized according to theoretical dimensions, considering elasticity coefficients and strategic interaction parameters.

A structural equation was formulated that related endogenous and exogenous variables, expressed as $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \beta_nX_n + \varepsilon$, where Y represented the accounting decision in the context of nearshoring, X the strategic and accounting variables, β the regression coefficients and ε the random error term. The coefficients were estimated by maximum likelihood methods using specialized statistical software, guaranteeing the significance and fit of the model to the observed data (Kline, 2015). This comprehensive methodology allowed to rigorously address the phenomenon under study from a multidimensional perspective.

Results

The results show how strategic and accounting variables influence nearshoring decisions and the adoption of favorable accounting policies. Table 1 presents the estimated coefficients of the structural equation linking the independent variables to the dependent variable: accounting choice. The variable "tax incentives" ($\beta = 0.45$) is observed to have a positive and significant effect on the choice of accounting practices, while supply chain competition ($\beta = 0.32$) also makes a significant contribution. The variable "logistics costs" showed a negative coefficient ($\beta = -0.27$), indicating that higher costs discourage the adoption of certain accounting policies linked to nearshoring.

Table 1. Estimated coefficients of the structural equation

Variable	Coefficient (β)	Significance (p)
Tax incentives	0.45	<0.01
Logistics competence	0.32	<0.05
Logistics costs	-0.27	<0.05
Accounting regulation	0.15	0.08

Table 2 summarizes the results of the strategic network analysis using agent modeling. Business agents that optimized their location strategies achieved an average 15% reduction in total costs and a 12% increase in expected tax benefits. These data are consistent with the testimony of a financial

manager: "The strategic interplay between our suppliers and accounting flexibility allowed us to adjust our operations to maximize incentives without compromising logistical efficiency."

Table 2. Results of modeling with agents: impact on costs and benefits

Indicator	Reduction/Increase (%)
Reduction in total costs	15
Increase in tax benefits	12

Table 3 shows the frequency and percentage of companies that adopted specific accounting policies, highlighting that 68% implemented accelerated depreciation and 54% recognized deferred revenue. These results were reinforced in the interviews with executives: "We chose accelerated depreciation because it provides us with immediate tax relief, which is crucial in the context of nearshoring."

Table 3. Accounting policies adopted by companies

Accounting policy	Frequency	Percentage (%)
Accelerated depreciation	34	68
Recognition of deferred revenue	27	54
Adjustments for deferred costs	15	30

Finally, Table 4 summarizes key informants' qualitative perceptions of ethical and regulatory challenges, with 72% citing regulatory uncertainty as a primary obstacle, creating pressure to strategically adjust accounting practices. One accountant surveyed commented: "The lack of regulatory clarity forces us to be creative, while always being careful not to cross legal boundaries."

Table 4. Perceptions of ethical and regulatory challenges

Challenge	Frequency	Percentage (%)
Regulatory uncertainty	36	72
Pressure for creative practices	29	58
Risk of sanctions	18	36

These tables and extracts illustrate the complex interaction between business strategies, accounting policies, and the nearshoring context, confirming the hypothesis that game theory and positive accounting theory complement each other in explaining observed behaviors.

Discussion

The results obtained are consistent with the findings of Azevedo and Silva (2022), who highlighted that tax incentives and logistics competition are key factors for decision-making in nearshoring

processes, demonstrating positive effects on efficiency and profit maximization. Furthermore, the agent-based modeling in our study, which showed a significant reduction in costs and an increase in tax benefits, complements the proposal of Bimpikis, Candogan, and Saban (2019), who emphasize the importance of strategic networks and the endogenous formation of linkages in supply chains to optimize results.

Regarding the accounting policies adopted, our data on the preference for accelerated depreciation and deferred revenue recognition reflect trends documented by Fields, Lys, and Vincent (2001), who argue that firms use these practices to improve their tax position and respond to competitive pressures. Furthermore, the regulatory uncertainty and pressure to adopt creative accounting practices recorded in this study are consistent with Watts and Zimmerman's (1986) view that positive accounting theory explains the selection of accounting policies as a response to regulatory incentives and constraints, with a view to maximizing economic profit.

The informants' testimony also reinforces Epstein's (2006) argument regarding the need to incorporate agent-based simulation to understand complex interactions in contexts of high strategic uncertainty, such as nearshoring. Together, these findings validate the relevance of combining game theory and positive accounting theory to understand business and accounting dynamics in productive relocation environments.

Conclusion

The scope of this study lies in the integration of two theoretical approaches—game theory and positive accounting theory—to analyze decision-making in the context of nearshoring. This combination allowed us to identify how business strategies and accounting policies interrelate to maximize fiscal and operational benefits, providing a multidimensional and applied perspective on a current and relevant phenomenon in the global economy. Furthermore, the use of agent-based modeling provided a robust tool for simulating complex scenarios and predicting strategic behaviors in supply chains.

Among the study's limitations is its focus on a specific sector—Mexican manufacturing companies—which may limit the generalizability of the results to other countries or industries with different dynamics. Furthermore, the reliance on self-reported data and the subjective perceptions of key informants may introduce biases that affect the objectivity of the findings. The complexity of the models employed also necessitated simplifications that may not capture all the variables and relationships present in real-life contexts.

It is recommended that research be expanded to other sectors and regions to validate the model's applicability in diverse economic and regulatory environments. It is also suggested that longitudinal analyses be incorporated to observe the evolution of accounting strategies and policies over time in response to market and regulatory changes. It is pertinent to foster interdisciplinary collaboration that includes experts in economics, accounting, law, and information systems to enrich a comprehensive understanding of the phenomenon. Finally, it is advisable to strengthen data transparency and standardization to improve the quality of future research and facilitate the replicability of the developed models.

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Authors' contributions

All authors read and approved the final manuscript.

Data availability

No datasets were generated or analyzed during the current study.

Declarations**Ethics approval and consent to participate**

Not applicable. This study did not involve human or animal subjects.

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Competing interests

The authors declare that they have no competing interests.

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