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MANAGEMENT INNOVATION AND FINANCIAL PERFORMANCE: THE CASE OF AMOEBA MODEL IN CHINESE ENTERPRISES

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Abstract: This study investigates the financial impact of Amoeba management, a decentralized organizational model emphasizing internal accountability and profit-based autonomy, on firms operating in diverse industries across China. Using panel data from 2010 to 2023 and applying a Difference-in-Differences (DID) framework, we compare changes in both Return on Assets and Return on Equity between firms that adopted the Amoeba model and comparable non-adopting firms. The analysis reveals that seven out of eight industry pairs exhibited positive treatment effects, with particularly strong improvements observed in production-intensive sectors such as dairy, steel, beverage, and heavy machinery manufacturing. To ensure robustness, we also compute DID estimates using three-year averages before and after adoption, which confirm the main findings. Results vary across industries, with one sector (e-commerce) showing a negative effect and several others indicating that Amoeba adoption may help mitigate losses during challenging periods.

Keywords: Amoeba management; management innovation; decentralized organization; Difference-in-Differences (DID); financial performance; organizational reform

МЕНЕЖМЕНТИЙН ШИНЭЧЛЭЛ БА САНХҮҮГИЙН ГҮЙЦЭТГЭЛ: БНХАУ-ЫН КОМПАНИУДЫН ЖИШЭЭН ДЭЭР

Хураангуй: Уг судалгаагаар төвлөрлийг сааруулсан, дотоод хариуцлага ба ашигт ажиллагаанд суурилсан удирдлагын загвар болох Амёба менежментийн санхүүгийн гүйцэтгэлд үзүүлэх нөлөөг БНХАУ-ын компаниудын 2010-2023 оны хоорондох санхүүгийн тайлангийн өгөгдөлд суурилан үнэллээ. Ингэхдээ “Ялгаврын ялгавар” (Difference-in-Differences, DID) аргыг ашиглан Амёба загварыг нэвтрүүлсэн болон нэвтрүүлээгүй компаниудын хөрөнгийн өгөөж (ROA), өмчийн өгөөж (ROE)-ийн өөрчлөлтийг харьцуулсан. Нийт найман салбарт үйл ажиллагаа явуулж буй 16 компаниас долоон салбарт нь эерэг үр нөлөө ажиглагдсан. Ялангуяа сүү, сүүн бүтээгдэхүүн; ган, ундаа; хүнд машин механизм үйлдвэрлэлийн салбаруудад илүү үр ашигтай байдал ажиглагдсан. Мөн ашиглалтын өмнөх ба дараах гурван жилийн дундаж үзүүлэлтүүдийг үндэслэн баталгаажуулсан үр дүн нь судалгааны найдвартай байдлыг нэмэгдүүлж байна.

Түлхүүр үгс: Амёба менежмент; удирдлагын шинэчлэл; төвлөрлийг сааруулсан бүтэц; ялгаврын ялгавар (DID); санхүүгийн гүйцэтгэл; байгууллагын шинэчлэл

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Introduction

In recent years, Chinese enterprises have faced increasing pressure to modernize their management practices in response to evolving market conditions, competitive globalization, and national policy directives aimed at improving efficiency and innovation. As part of this transition, management innovation has emerged as a strategic imperative for firms seeking to enhance organizational performance and long-term competitiveness.

Among various emerging approaches, the Amoeba management model has attracted growing interest due to its unique emphasis on decentralization, real-time performance tracking, and employee-driven accountability. Originally developed in Japan by Kyocera's founder Kazuo Inamori, the Amoeba model restructures organizations into small, autonomous units — or "amoebas" — each responsible for generating its own profits. By empowering employees and aligning internal incentives, the model aims to cultivate a self-regulating, entrepreneurial environment within the firm.

While the Amoeba model has been widely studied in its country of origin, relatively limited empirical research has examined its financial implications in the context of Chinese enterprises. Given China's diverse economic landscape and rapid enterprise reform, it offers a valuable setting for evaluating the impact of such decentralized management innovations.

This paper investigates the relationship between Amoeba management and corporate financial performance, using both Return on Assets (ROA) and Return on Equity (ROE) as key performance indicators. Drawing on panel data from eight industries in China over the period 2010-2023, we compare multi-year average performance before and after the adoption of the Amoeba model. A matched-pair Difference-in-Differences (DID) framework is used to contrast changes in financial outcomes between firms that implemented Amoeba structures and comparable firms that did not. Particular attention is given to short- to medium-term effects and the consistency of results across performance measures.

Management innovation refers to the implementation of new managerial practices, processes, or organizational structures that significantly alter the way managerial work is performed and that are intended to further organizational goals (Birkinshaw et al., 2008). It typically arises in response to internal inefficiencies or external pressures such as competition, regulation, or technological disruption, and may involve new decision-making processes, decentralized structures, or novel incentive mechanisms. In this study, the Amoeba management system can be regarded as a form of management innovation due to its structural decentralization, internal accountability mechanisms, and emphasis on autonomous profit centers.

The remainder of the paper is organized as follows. Section 2 reviews prior literature on the Amoeba model, including its conceptual foundations and empirical applications across different industry contexts. Section 3 presents the methodology and dataset. Section 4 reports the empirical results, and Section 5 presents the conclusion, including study limitations and directions for future research.

Literature Review

Management innovation has long been recognized as a key driver of sustainable competitive advantage, particularly in environments characterized by rapid technological change and organizational complexity (Bloom & Van Reenen, 2007). Among the notable innovations in this domain is the Amoeba management model, which emphasizes decentralization, internal accountability, and continuous performance measurement.

The model was pioneered at Kyocera Corporation in Japan, where it reportedly played a central role in promoting employee autonomy and aligning individual contributions with broader corporate objectives (Inamori, 2012). Scholars such as Hiromoto (2010) and Adler & Hiromoto (2010) have credited the model with fostering a "profit-conscious" organizational culture, thereby contributing to both operational agility and financial transparency.

In East Asia, several firms have experimented with adopting the Amoeba model outside of Japan. Case-based studies from China suggest that the model's effectiveness depends significantly on organizational readiness, including strong internal communication channels and data-driven decision-making structures (Wang, 2024; Yahuofujiang, 2023). For instance, firms in manufacturing and logistics sectors have reported performance improvements after restructuring into small, self-managed units. However, challenges related to intra-firm coordination and performance measurement have also been observed.

Recent comparative analyses (Urban & Czerska, 2016) have extended this discourse to European contexts, emphasizing that cultural fit and leadership style are critical determinants of implementation success. These findings suggest that although the Amoeba model offers a transferable structural framework, its effectiveness relies heavily on contextual adaptation.

According to Birkinshaw et al. (2008), management innovation refers not only to the structural reorganization of firms but also to the implementation of novel practices across reporting systems, reward mechanisms, and decision-making processes. In this study, the Amoeba model represents a comprehensive form of management innovation as it reorganizes firms into autonomous units and introduces internal performance-based systems, which affect both managerial accountability and incentive structures. Therefore, the adoption of the Amoeba model qualifies as management innovation because it entails not only structural decentralization but also fundamental changes in how organizational performance is monitored, rewarded, and managed internally.

Despite increasing attention, the existing body of literature remains predominantly qualitative, relying heavily on case studies and anecdotal accounts. Few studies have quantitatively assessed the financial outcomes of Amoeba adoption using formal statistical techniques or standardized performance indicators. This lack of empirical evidence limits the generalizability of current insights and restricts objective evaluation of the model's financial impact.

To address this gap, the present study offers firm-level empirical evidence on the relationship between Amoeba management and financial performance in China. By applying a Difference-in-Differences (DID) approach using multi-year average performance data, the study

examines changes in both Return on Assets (ROA) and Return on Equity (ROE) across diverse industry settings. In doing so, it contributes to both the theoretical development of decentralized management models and their practical evaluation in emerging market contexts.

Data and Methodology

This study investigates the impact of Amoeba management on firm performance by analyzing changes in both Return on Assets (ROA) and Return on Equity (ROE) across eight key industries in China. For each industry, one firm that adopted the Amoeba model is matched with a comparable firm that did not, enabling a structured comparative analysis. The selected industries include dairy production, steel manufacturing, telecommunication equipment, air transportation, e-commerce, infant formula, beverage production, and heavy machinery manufacturing. The panel dataset spans the period from 2010 to 2023, yielding a total of 180 firm-year observations.

Our sample comprises 16 firms (one adopter and one non-adopter per industry). Financial statement data for these firms were retrieved from the Wind Financial Terminal and the CSMAR database. Firm identities are anonymized to maintain confidentiality.

To determine whether a firm had implemented the Amoeba management model, we relied on publicly available sources including annual reports, corporate disclosures, industry databases, and media coverage. Firms were classified as adopters if they reported adopting decentralized organizational structures, autonomous internal units with profit accountability, or explicitly referred to the Amoeba model or its core principles (e.g., internal cost centers, employee-driven management, or real-time performance tracking).

While the intended observation window is 14 years, data availability varied across industries. In several sectors, firm-level data were only accessible from 2012 or 2013 onward, resulting in shorter time spans (e.g., 11 or 12 years of observations). Consequently, the total number of firm-year observations is 180, not the full 224. This discrepancy reflects industry-specific data limitations, but within each matched pair, we ensured comparability in pre- and post-adoption periods. Table 1 summarizes the industry coverage, sample years, and data sources.

Table 1. Data Coverage by Industry

Industry	Years	Source
Dairy production	2013-2023	Wind Financial Terminal
Steel manufacturing		
Telecommunication equipment		
Air transportation		
E-commerce	2012-2023	
Infant formula	2013-2023	
Beverage production		
Heavy machinery manufacturing	2010-2023	CSMAR

To evaluate the financial impact of Amoeba adoption, we employ the Difference-in-Differences (DID) method. This quasi-experimental approach estimates treatment effects

by comparing pre- and post-adoption performance trends of treated firms relative to matched controls. The DID estimator is computed as follows:

$$DID = \left(ROAE_{after,treated} - ROAE_{before,treated}\right) - \left(ROAE_{after,control} - ROAE_{before,control}\right)$$

where, $ROAE$ denotes the average return of assets (ROA) or return on equity (ROE); $treated$ refers to companies that adopted Amoeba management; $control$ refers to comparable companies that did not adopt Amoeba management; $before$ refers to the years prior to Amoeba adoption; $after$ refers to the years following Amoeba adoption.

This method controls for unobserved, time-invariant firm-level differences and adjusts for macroeconomic factors affecting all firms equally over time. It is widely used in policy and organizational evaluation studies where randomized designs are infeasible (Angrist & Pischke, 2009).

Table 2. Descriptive Statistics

Variable	Adopted	Obs.	Mean	St.dev.	Min	Max
ROA – Return on Assets, net income divided by total assets	All	180	0.0442	0.0656	-0.1531	0.2781
	No	92	0.0408	0.0656	-0.1531	0.2090
	Yes	88	0.0478	0.0658	-0.1047	0.2781
ROE – Return on Equity, net income divided by total equity	All	180	0.0894	0.1625	-0.5907	0.5712
	No	92	0.0758	0.1712	-0.5907	0.5712
	Yes	88	0.1036	0.1525	-0.5907	0.5008

Source: Author's calculation based on firm-level financial data.

Descriptive statistics for ROA and ROE are provided in Table 2. On average, firms that adopted the Amoeba model display higher ROA (0.0478 vs. 0.0408) and ROE (0.1036 vs. 0.0758) compared to non-adopters, suggesting a potential performance advantage.

ROA is selected as the primary performance metric due to its comparability across firms with different capital structures. ROE is included as a complementary indicator, providing insights into shareholder profitability. Both measures capture different dimensions of financial performance and allow for robustness checks across metrics.

While the dataset spans more than a decade, the DID analysis focuses on multi-year averages before and after adoption to reduce volatility and better capture medium-term effects. Although this matched-pair design enhances comparability, the analysis does not control for firm-specific covariates such as leverage, R&D intensity, or ownership structure due to data limitations.

Nonetheless, the application of a DID framework to panel data across diverse sectors offers a credible empirical basis to evaluate how Amoeba-based decentralization influences financial outcomes in the Chinese context.

Results

The findings suggest that the adoption of Amoeba management is generally associated with improved financial performance, as measured by Return on Assets (ROA). Table 3 summarizes ROA values before and after the adoption of the Amoeba model for eight industries, along with the calculated Difference-in-Differences (DID) estimates.

Table 3. Return on Assets (ROA) Before and After Amoeba Management Adoption: Industry-Level Comparison and Difference-in-Differences Estimates

Industry	Ameoba Management	ROA		Differences	Difference-in-Differences
		Before	After		
Dairy Production	No adopted	0.0323	0.0275	-0.0048	0.0139
	Adopted	0.0364	0.0455	0.0090	
Steel Manufacturing	No adopted	0.0054	0.0141	0.0087	0.0035
	Adopted	0.0257	0.0379	0.0122	
Telecommunication Equipment	No adopted	0.0352	0.0191	-0.0161	0.0148
	Adopted	0.0210	0.0197	-0.0013	
Air Transportation	No adopted	0.0182	-0.0736	-0.0919	0.0299
	Adopted	0.0101	-0.0518	-0.0620	
E-Commerce	No adopted	-0.0237	0.0741	0.0978	-0.0800
	Adopted	0.0896	0.1074	0.0179	
Infant Formula	No adopted	0.0585	-0.0493	-0.1078	0.0521
	Adopted	0.1068	0.0511	-0.0557	
Beverage Production	No adopted	0.1102	0.0540	-0.0563	0.0594
	Adopted	0.2179	0.2210	0.0032	
Heavy machinery manufacturing	No adopted	0.1295	0.0525	-0.0769	0.0581
	Adopted	0.0250	0.0062	-0.0188	
All Industries	**No adopted**	**0.0599**	**0.0295**	**-0.0304**	**0.0284**
	Adopted	**0.0492**	**0.0471**	**-0.0020**	

Source: Author's calculation based on firm-level financial data.

Across the sample, seven out of eight industries exhibit positive DID values, indicating relatively better performance by adopting firms compared to their non-adopting counterparts. For example, in the dairy production sector, the ROA of the adopting firm increased from 0.0364 to 0.0455, while the non-adopting firm's ROA declined slightly. This yields a DID of +0.0139, suggesting a modest yet positive effect. Similarly, in steel manufacturing, the treated firm's ROA rose more than that of the control firm, resulting in a DID of +0.0035.

Other industries with positive treatment effects include telecommunication equipment (+0.0148), air transportation (+0.0299), beverage production (+0.0594), and heavy machinery manufacturing (+0.0581). These results imply that the Amoeba model may be particularly effective in sectors with well-defined internal cost structures and operational segmentation, where decentralization can translate more directly into performance gains.

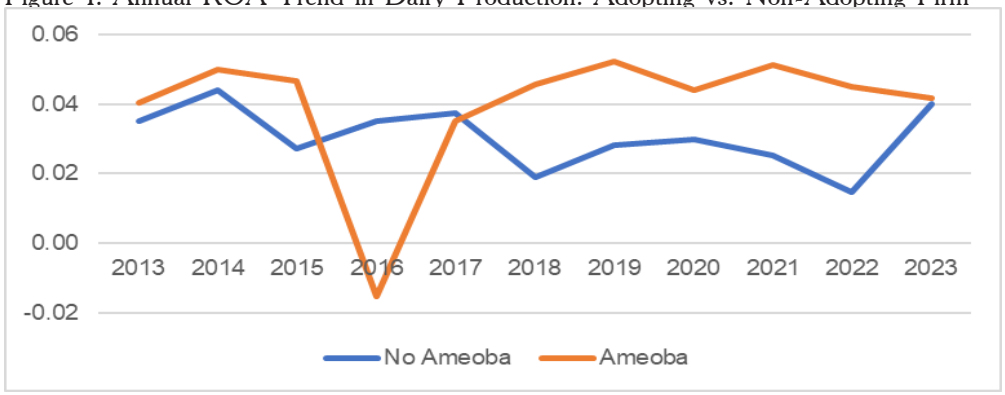
Conversely, e-commerce was the only sector with a negative DID (-0.0800), as the

control firm's ROA improved more than the adopting firm. In contrast, infant formula, air transportation, telecommunication equipment, and heavy machinery manufacturing all showed positive DID values despite ROA declining for both firms. This suggests that the model may mitigate performance losses in adverse conditions.

When averaged across all sectors, the overall DID is +0.0284, indicating a generally favorable impact of Amoeba adoption on ROA. While this average suggests a positive association, the variation across industries highlights the importance of sectoral context, firm readiness, and implementation capacity.

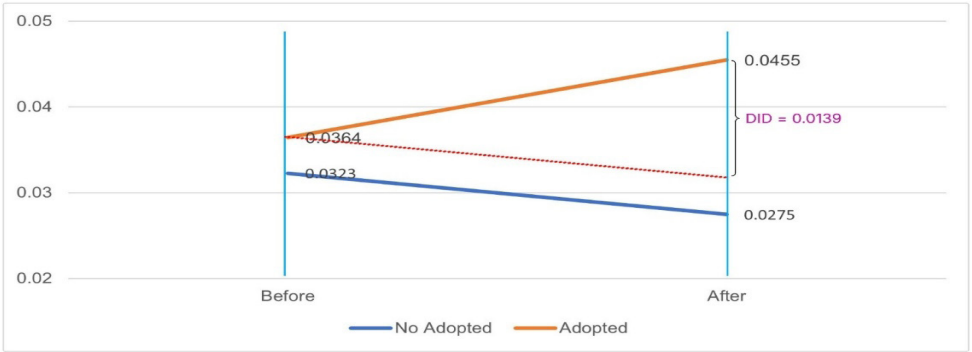
To illustrate performance patterns over time, Figures 1 and 2 show ROA dynamics and average changes for the dairy production sector. Similarly, Figures 3 and 4 provide a graphical view for steel manufacturing, highlighting the divergence between adopting and non-adopting firms in the years surrounding Amoeba implementation.

Figure 1. Annual ROA Trend in Dairy Production: Adopting vs. Non-Adopting Firm



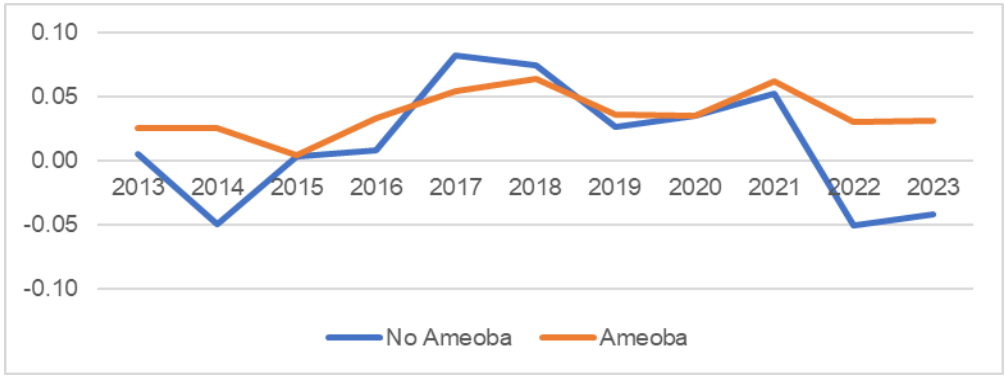
Note: The vertical line marks the year in which the firm adopted the Amoeba management model.
Source: Authors' illustration based on firm-level ROA data.

Figure 2. ROA Before and After Amoeba Adoption in Dairy Production: Average Comparison



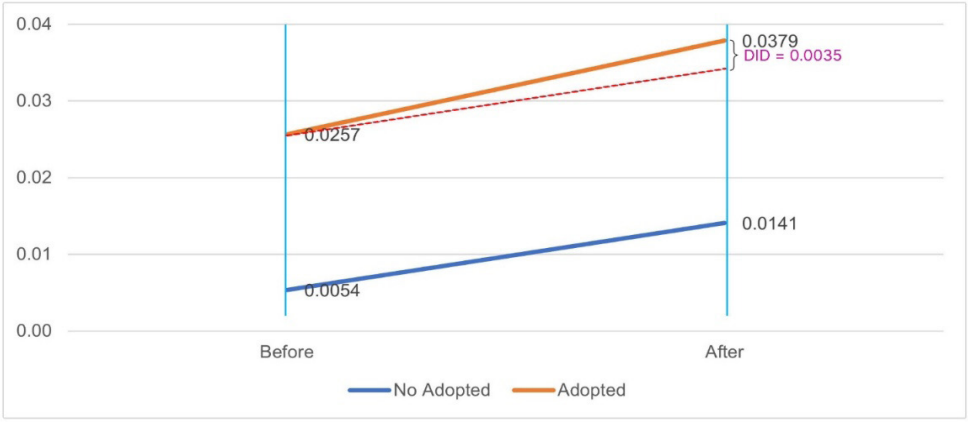
Source: Authors' illustration based on firm-level ROA data.

Figure 3. Annual ROA Trend in Steel Manufacturing: Adopting vs. Non-Adopting Firm



Note: The vertical line marks the year in which the firm adopted the Amoeba management model.
Source: Authors' illustration based on firm-level ROA data.

Figure 4. ROA Before and After Amoeba Adoption in Steel Manufacturing: Average Comparison



Source: Authors' illustration based on firm-level ROA data.

To further validate the findings, Table 4 presents DID estimates based on Return on Equity (ROE). The results align with those based on ROA, reinforcing the positive association between Amoeba management and financial performance. Most industries show positive ROE-based DID values, with particularly strong improvements in sectors such as infant formula (+0.1603) and heavy machinery manufacturing (+0.1652).

To test robustness, we also calculated DID estimates based on the average ROA and ROE over the three years before and after Amoeba adoption. The aim is to minimize the influence of short-term volatility and isolate the structural effect of the management innovation.

As shown in Table 5, the three-year average ROA data continue to support the effectiveness of the Amoeba model, though the DID estimates are generally smaller in magnitude. This reflects a smoothing of short-term fluctuations and confirms that the positive effect is not an artifact of a single-year spike.

Table 4. Return on Equity (ROE) Before and After Amoeba Management Adoption: Industry-Level Comparison and Difference-in-Differences Estimates

Industry	Ameoba Management	ROE		Differences	Difference-in-Differences
		Before	After		
Dairy Production	No adopted	0.0816	0.0611	-0.0205	0.0465
	Adopted	0.0778	0.1038	0.0260	
Steel Manufacturing	No adopted	0.0200	0.0182	-0.0018	0.0232
	Adopted	0.0485	0.0698	0.0214	
Telecommunication Equipment	No adopted	0.0804	0.0538	-0.0266	0.0068
	Adopted	0.0772	0.0574	-0.0198	
Air Transportation	No adopted	0.0500	-0.3070	-0.3570	0.0494
	Adopted	0.0366	-0.2710	-0.3076	
E-Commerce	No adopted	-0.1147	0.2212	0.3359	-0.2415
	Adopted	0.1229	0.2173	0.0945	
Infant Formula	No adopted	0.0773	-0.1405	-0.2178	0.1603
	Adopted	0.2281	0.1706	-0.0575	
Beverage Production	No adopted	0.1955	0.0882	-0.1073	0.1214
	Adopted	0.3512	0.3654	0.0141	
Heavy machinery manufacturing	No adopted	0.3321	0.1137	-0.2184	0.1652
	Adopted	0.0637	0.0105	-0.0532	
All Industries	**No adopted**	**0.1260**	**0.0464**	**-0.0796**	**0.0853**
	Adopted	**0.0998**	**0.1056**	**0.0057**	

Source: Author's calculation based on firm-level financial data.

Table 5. Three-Year Average ROA Before and After Amoeba Adoption: DID Estimates by Industry

Industry	Ameoba Management	ROA		Differences	Difference-in-Differences
		Before	After		
Dairy Production	No adopted	0.0282	0.0233	-0.0049	0.0072
	Adopted	0.0444	0.0467	0.0023	
Steel Manufacturing	No adopted	0.0054	-0.0126	-0.0180	0.0134
	Adopted	0.0257	0.0210	-0.0046	
Telecommunication Equipment	No adopted	0.0352	0.0295	-0.0057	-0.0282
	Adopted	0.0210	-0.0130	-0.0339	
Air Transportation	No adopted	0.0009	-0.0736	-0.0745	0.0270
	Adopted	-0.0043	-0.0518	-0.0475	

E-Commerce	No adopted	-0.0237	0.0563	0.0801	-0.0237
	Adopted	0.0896	0.1459	0.0564	
Infant Formula	No adopted	0.0585	-0.0917	-0.1502	0.1089
	Adopted	0.1068	0.0655	-0.0413	
Beverage Production	No adopted	0.0928	0.0541	-0.0386	0.0335
	Adopted	0.2179	0.2127	-0.0051	
Heavy machinery manufacturing	No adopted	0.1071	0.0056	-0.1014	0.0633
	Adopted	0.0036	-0.0345	-0.0381	
All Industries	**No adopted**	**0.0531**	**0.0101**	**-0.0431**	**0.0225**
	Adopted	**0.0585**	**0.0379**	**-0.0206**	

Source: Author's calculation based on firm-level financial data.

Similarly, Table 6 reports DID estimates for ROE based on three-year averages. The results are largely consistent with the previous tables, with six out of eight industries showing positive DID values. Again, infant formula and heavy machinery manufacturing sectors exhibit relatively large positive effects.

Table 6. Three-Year Average ROE Before and After Amoeba Adoption: DID Estimates by Industry

Industry	Ameoba Management	ROE		Differences	Difference-in-Differences
		Before	After		
Dairy Production	No adopted	0.0700	0.0532	-0.0168	0.0240
	Adopted	0.0995	0.1067	0.0072	
Steel Manufacturing	No adopted	0.0200	-0.0653	-0.0853	0.0779
	Adopted	0.0485	0.0410	-0.0074	
Telecommunication Equipment	No adopted	0.0804	0.0847	0.0043	-0.1378
	Adopted	0.0772	-0.0563	-0.1335	
Air Transportation	No adopted	-0.0119	-0.3070	-0.2951	0.0429
	Adopted	-0.0188	-0.2710	-0.2522	
E-Commerce	No adopted	-0.1147	0.3050	0.4197	-0.1258
	Adopted	0.1229	0.4167	0.2939	
Infant Formula	No adopted	0.0773	-0.2692	-0.3465	0.3595
	Adopted	0.2281	0.2411	0.0130	
Beverage Production	No adopted	0.1394	0.0898	-0.0496	0.0446
	Adopted	0.3512	0.3462	-0.0050	
Heavy machinery manufacturing	No adopted	0.2705	0.0144	-0.2561	0.1511
	Adopted	0.0122	-0.0928	-0.1050	
All Industries	**No adopted**	**0.1010**	**0.0022**	**-0.0988**	**0.0672**
	Adopted	**0.1091**	**0.0775**	**-0.0316**	

Source: Author's calculation based on firm-level financial data.

While the DID estimates presented here are based on descriptive analysis and are not tested for statistical significance due to sample size constraints, they provide initial empirical evidence that Amoeba management, when appropriately implemented, may improve financial outcomes and help buffer performance in challenging environments.

Conclusion

This study examined the impact of Amoeba management on corporate financial performance using panel data from eight industries in China over the period 2010-2023. By applying a Difference-in-Differences (DID) approach to firm-level ROA and ROE, we compared multi-year average profitability trends between firms that adopted the Amoeba model and comparable firms that did not. The findings indicate that, on average, Amoeba adoption is associated with improved financial outcomes, with seven out of eight industry pairs exhibiting positive treatment effects.

These results support the view that decentralized, performance-driven management systems — such as the Amoeba model — can enhance financial outcomes when effectively aligned with organizational capabilities and sector-specific conditions. Positive effects were particularly notable in production-intensive sectors such as dairy, steel, beverage, and heavy machinery manufacturing, where real-time internal accountability and autonomous decision-making may have contributed to operational efficiency.

Importantly, the analysis also reveals that in several sectors — including infant formula, air transportation, telecommunication equipment, and heavy machinery manufacturing — both adopting and non-adopting firms experienced declines in financial performance. However, the decline was consistently smaller among the adopting firms, resulting in positive DID values. This suggests that Amoeba management may play a moderating role in adverse environments by helping firms mitigate performance losses. Conversely, e-commerce was the only sector where the control firm outperformed the adopter, resulting in a negative DID.

These variations highlight that the effectiveness of Amoeba management depends on contextual factors such as market volatility, implementation strategy, and organizational readiness. The model may thus be valuable not only for enhancing performance but also for buffering against downturns in challenging environments.

Several limitations should be acknowledged. Although the dataset spans more than a decade and includes 180 firm-year observations, the DID estimation focuses on multi-year average changes before and after adoption and does not incorporate firm-level control variables such as leverage, R&D intensity, or ownership structure. These factors may influence financial outcomes independently of the management model. Accordingly, the findings should be interpreted as robust but preliminary evidence, rather than definitive proof of causality.

Future research could address these limitations by incorporating broader performance metrics (e.g., productivity, innovation outputs), exploring longer post-adoption periods, and analyzing mediating factors such as organizational culture, leadership, or employee engagement. Comparative studies across countries or institutional environments may also help clarify the transferability and adaptability of the Amoeba model beyond East Asian contexts.

In summary, this study contributes to the empirical literature on management innovation by providing initial evidence that Amoeba-based decentralization may enhance short- to medium-term financial performance, and may also help firms cushion the effects of adverse industry conditions when effectively implemented.

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