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A Study on the Relationship between CEO Succession Based on Big Data Information Processing Technology and Corporate Performance



Abstract: - The recognition of data elements as a crucial production factor in China in 2019 highlights the rising importance of leveraging data assets. The pivotal role of big data information processing technology in economic and financial realms cannot be understated. CEO succession is a pivotal event that heavily influences a company's performance. However, past research on the correlation between CEO succession and corporate performance has yielded inconclusive results. This study addresses this gap by employing advanced analytical models, namely propensity score matching and difference-in-differences techniques, grounded in the realm of big data information processing technology to explore the intricate relationship between CEO succession and corporate performance. By analyzing data from A-share listed companies spanning from 2014 to 2021, noteworthy insights have emerged. Firstly, a notable negative correlation between CEO succession and corporate performance has been observed, affirming the notion of a "disruptive effect" associated with CEO transitions, leading to a decline in corporate performance. Furthermore, the study sheds light on the multi-faceted nature of factors influencing corporate performance, cautioning against attributing poor performance solely to the CEO. Consequently, enhancing corporate performance demands a nuanced approach that goes beyond mere CEO replacements, emphasizing a holistic strategy encompassing various avenues for improvement.

Keywords: Big data information processing technology, CEO succession, propensity score matching analysis, difference-in-differences model, corporate performance.

I. INTRODUCTION

With the evolution of big data information processing technologies, the multiplier effect of data on enhancing production efficiency is becoming increasingly prominent. In 2019, China officially acknowledged data elements as essential components of production[1], underscoring the critical role of big data information processing technologies in influencing economic and financial activities. The Chief Executive Officer (CEO), as the highest executive entrusted by company owners, holds ultimate responsibility in strategic management, organizational planning, performance management, and navigating environmental shifts within the company. The CEO commands and directs nearly all resources of the company towards achieving its objectives[2]. CEO succession stands as one of the most influential corporate decisions internally, shaping the trajectory of the organization. Externally, for stakeholders such as creditors, shareholders, suppliers, customers, and governmental bodies, CEO succession serves as a signal reflecting the future prospects of the company[3]. Consequently, CEO succession not only directly influences the operational and policy environment of the company but also profoundly influences its overall performance[4].

Prior scholars have conducted extensive research on the relationship between CEO succession and corporate performance, yet they have arrived at divergent predictions and conclusions based on their respective theoretical foundations. Huson, Malatesta, and Parrino (2004) argued that CEO succession fails to enhance corporate performance[5]. Conversely, other scholars such as Virany, Tushman, and Romanellia (1992); Karaevli (2007); as well as Zhang and Rajagopalan (2010) asserted that CEO succession can align the abilities and knowledge of the incoming CEO with the organizational environment, potentially elevating corporate performance[5-8]. The inconsistency in conclusions drawn by earlier researchers regarding the impact of CEO succession on corporate performance may stem from several factors. Firstly, scholars have applied varying standards in measuring corporate performance metrics, where the utilization of different benchmarks for calculation can lead to disparate research outcomes. Secondly, the methodologies employed by most scholars may not fully mitigate sample selection bias, thereby rendering it challenging to attribute fluctuations in corporate performance solely to CEO succession.

Hence, this study aims to surmount measurement challenges by harnessing big data information processing techniques to extract multidimensional financial metrics of publicly traded companies from the CSMAR database. By constructing a comprehensive framework for evaluating corporate performance, we seek to gauge the net effects

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of CEO succession on corporate performance, free from the interference of extraneous variables. To achieve this, we will employ advanced big data information modeling methodologies to develop propensity score matching analyses and difference-in-differences models.

The study will unfold in the following manner: Section 2 will delve into a literature review, articulating the core facets of this research in light of existing scholarship. Section 3 will elucidate the sample selection process using cutting-edge big data information processing technologies. In Section 4, we will delve into empirical analysis through the application of sophisticated big data information modeling techniques to construct robust models. Finally, Section 5 will draw together the research findings and conclusions.

II. LITERATURE REVIEW

A. *Big Data Information Processing Technologies and Corporate Performance*

As the digital economy continues to advance, data has emerged as a critical factor of production. The capabilities encompassed within big data include the analysis, organization, selection, and application of data at various levels[9]. Hopkins (2011) asserted that an organization's ability to make decisions through the processing of big data defines its capacity in handling big data [10]. According to Feng Wenna and Ma Jiaqi (2022), mastering the art of big data can enable companies to predict customer behavior, leading to the tailored design of services or products for diverse clientele, subsequently fostering a competitive edge through customer loyalty [11]. Hao S et al. (2019) highlighted that the crux of digital transformation for businesses lies in leveraging big data to drive the development of new services [12]. George G et al. (2016) underscored the role of big data as a crucial core element driving the development of data-informed new technologies [13]. Numerous scholars have recognized the significance of big data information processing technologies and conducted extensive research in this realm, with the majority of findings indicating that businesses can enhance their service development performance through the integration of big data resources [14]. Exploring the conditions under which companies can leverage big data information processing technologies to improve performance remains a pivotal challenge that organizations must address in their ongoing digital transformation journeys [15]. Consequently, scholars are dedicated to researching innovation in management driven by big data. Currently, scholars have reached a consensus on three key aspects: Firstly, big data has emerged as a pivotal competitive asset for companies, particularly in the era of the digital economy. Big data resources play a substantive role in enhancing various organizational capabilities. For instance, concepts such as "data empowerment", as proposed by Luo Zhongwei et al. (2017), advocate that companies with proficiency in handling big data can augment their value creation capabilities through skills or technologies [16]. Subsequent studies, such as that of Chen Jian et al. (2020), introduced the concept of "data enablement", positing that companies equipped with the ability to process big data can bring about disruptive patterns, transform crucial capabilities, and even demonstrate the capacity to create new competitive paradigms [17]. Secondly, it is established that the foundational utilization of big data resources can enhance a company's organizational learning capabilities. Ghasemahaei and Calic (2019) suggested that organizations can leverage big data analysis and processing to bolster their exploitative and explorative organizational learning capabilities [18]. Thirdly, the creation of value through big data necessitates that companies possess the ability to adapt and promptly update their critical structures. Baesens et al. (2016) advocated that organizations should avoid inertia in their existing business models and organizational processes, as this could impede the role of big data information processing in influencing strategic management decisions [19].

The consensus within the academic community regarding the application of big data information processing technologies for company digital transformation has been well-established [20-21]. Whether examined at a macro or micro level, the significance of big data information processing technologies stands out prominently. At the macro level, digital transformation, facilitated by big data information processing technologies, can exert significant influence on society as a whole [22]. At the micro level of companies, organizations must formulate digital transformation strategies through the utilization of big data information processing technologies to drive innovation and, thereby, enhance their overall performance [23].

B. *CEO Succession and Corporate Performance*

The concept of the Chief Executive Officer (CEO) emerged in the 1960s and stands as a significant outcome of corporate governance reform. In modern companies, the CEO not only holds the highest operational authority but also wields decision-making power delegated by the board of directors. Given the CEO's deeper market insight, granting them a certain level of decision-making autonomy enables the organization to respond swiftly to external environmental shifts, thereby ensuring the smooth progression of business operations [24]. With the advent of the era of economic big data and the advancement of economic globalization, profound changes have occurred in both

the internal and external environments of companies. These notable transformations pose significant challenges to the highest strategic leader of companies—the CEO, with a marked increase in CEO succession rates compared to a decade ago. Both the corporate and academic spheres have substantiated the profound impact of CEOs on corporate performance. Moreover, when a CEO experiences succession, the resulting changes carry even greater implications for corporate performance.

Early scholars have extensively explored the impact of CEO succession on corporate performance, with many contending that the relationship between CEO succession sources and corporate performance determines the origins of CEO succession. However, regarding the relationship between CEO succession and corporate performance, scholars have not reached a consensus. Western studies have given rise to two diametrically opposed theoretical perspectives: the “organizational adaptation view” and the “organizational disruption view”. The “organizational adaptation view” posits that successor CEOs, compared to internal CEOs, can access more external information and possess greater technological acumen, thereby promoting organizational learning, enhancing innovation capacity, and consequently improving corporate performance. Conversely, the “organizational disruption view” presents a starkly contrasting viewpoint. For instance, Vancil R. F. (1987) suggested that CEO succession may bring significant risks to the organization and increase operational costs. Friedman S. and Saul K. A. (1991) asserted that successor CEOs, particularly those from external sources, may struggle to collaborate effectively with the existing top management team due to a lack of familiarity with the organization. Zhang L. et al. (2011) argued that CEO succession could lead to turbulence within the executive team. Additionally, Zhang Y. and Rajagopalan N. (2004) posited that CEO succession may disrupt operational processes and internal regulations, thereby exerting a detrimental impact on corporate performance.

C. Literature Review

In conclusion, early scholars have not reached a unanimous research conclusion regarding the relationship between CEO succession and corporate performance. While some studies suggest that CEO succession can enhance corporate performance, others indicate that it may lead to a decline in performance. One of the reasons for the heterogeneity in the conclusions of previous studies is the varied application of data processing models by different scholars, leading to inevitable biases in research outcomes. Given the significant impact that big data resources can have on enhancing various organizational capabilities and even influencing entire societies, this paper endeavors to conduct an empirical study on the relationship between CEO succession and corporate performance using propensity score matching and difference-in-differences models constructed based on big data processing technology. By eliminating other confounding factors, the aim is to derive the net effect of CEO succession on corporate performance.

III. SAMPLE SELECTION AND DATA PROCESSING

In this study, big data processing technology was employed to retrieve financial indicators of A-share listed companies from the CSMAR database for analysis. The sample period spans from 2014 to 2021. After data processing, CEO succession information was compiled and is presented in Table 1. Given that the same listed company may experience CEO succession more than once within the same year, the consolidated data in Table 1 refers to the merging of multiple CEO successions within the same year into a single instance. Wang Fusheng and Wang Sheyan (2012) suggested that multiple CEO successions within a year may not accurately reflect the impact of CEO succession on corporate performance [25]. Therefore, in subsequent research, we will utilize the consolidated data for empirical analysis.

From Table 1, it is evident that the CEO succession rate fluctuates around 20% annually, indicating a relatively high rate of CEO successions each year. In this study, big data information processing techniques were applied to filter the data: eliminating ST-class companies; excluding companies in the financial sector; removing companies with liabilities exceeding assets (debt-to-asset ratio exceeding 100%); eliminating companies with negative values for main business income, total assets, and owner’s equity; discarding companies with missing values in performance and key control variables. Finally, all data underwent winsorization (1.5%). This process resulted in retaining 24,401 observations. The processed performance variables and key control variables are presented in Table 2.

Table 1: CEO Succession Information (2014-2021)

Years	2014	2015	2016	2017	2018	2019	2020	2021	Total
Total number of listed companies	3339	3489	3708	4198	4615	4775	4704	4741	33569
Total CEO successions	854	976	828	871	1044	1110	951	887	7521
CEO succession rate per year (%)	22.57	27.97	22.33	20.74	22.62	23.24	20.21	18.70	22.67
Total CEO successions after mergers	813	914	777	810	976	1043	886	811	7030
CEO succession rate per year after mergers (%)	24.34	26.19	20.95	19.29	21.14	21.84	18.83	17.10	21.21

Table 2: Results of Performance Variables and Key Control Variables Processing

Cod	Variable Names:	Maximum	Minimum	Average	Standard deviation
List	Listing Duration	36.000	0.000	12.922	8.496
Size	Firm Size	28.548	17.641	22.194	1.325
Lev	Debt-to-Asset Ratio	0.861	0.057	0.407	0.200
Sale_up	Revenue Growth Rate	0.986	-0.676	0.116	0.278
Boardsize	Board Size	18.000	3.000	8.400	1.640
Ind	Proportion of Independent Directors	0.800	0.143	0.377	0.055
Topone	Ownership Stake of Largest Shareholder	89.991	0.286	33.654	14.770
Hhi5	Herfindahl-Hirschman Index	0.810	0.000	0.164	0.118
Ceo_stk	CEO's Ownership Stake	88.920	0.000	6.520	12.728
Chair_stk	Chairman's Ownership Stake	88.920	0.000	10.218	15.125
Duality	CEO Duality	1.000	0.000	0.321	0.467
Masterpay	Natural Logarithm of Total Compensation for Top Three Executives	18.197	11.719	14.570	0.700
Managestk	Executive Ownership Stake	0.832	0.000	0.090	0.153
State	State Ownership	1.000	0.000	0.083	0.276
Roa	Return on Total Assets	0.184	-0.183	0.040	0.060
Roe	Return on Equity	0.303	-0.504	0.060	0.120

Part of the data processing in Table 2 includes the following: Listing Duration = 2021 - IPO Year of the listed company; Firm Size = $\ln(\text{Total assets of the listed company})$; CEO-Chair Duality refers to whether the Chairman and CEO are the same person. If they are the same person, the variable is 1; otherwise, it is 0. The calculation methods for the other indicators can be found in the CSMAR database indicator description.

In this study, corporate performance was divided into 5 groups from high to low, and the CEO succession rate in all companies was calculated for each group. The CEO succession rate of the top-performing 1st group was subtracted from that of the lowest-performing 5th group. A T-test was conducted on the calculated results, with the test results presented in Table 3.

As shown in Table 3, whether using Roa or Roe as the alternative variable for corporate performance, the CEO succession rate in the higher-performing group is lower than in the lower-performing group. The results of this statistical analysis indicate that companies with lower performance are more likely to replace their existing CEOs, leading to CEO succession issues. However, the impact that CEO succession has on corporate performance requires further empirical analysis to examine.

Table 3: CEO Succession Rate in Different Corporate Performance Categories

Performance Metrics for Companies	(1) CEO succession rate in the top performance group	(2) CEO succession rate in the second-highest performance group	(3) CEO succession rate in the middle performance group	(4) CEO succession rate in the second-lowest performance group	(5) CEO succession rate in the lowest performance group	Difference in CEO succession rate (1) - (5)
Roa	0.146	0.143	0.174	0.200	0.251	-0.106***
Roe	0.168	0.144	0.163	0.198	0.241	-0.074***

Note: *** denotes statistical significance at the 1% level in the T-test, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

IV. EMPIRICAL ANALYSIS USING BIG DATA

A. Propensity Score Matching Model Analysis

This study employs big data analysis techniques to construct a propensity score matching model. Based on whether a company has experienced CEO succession, we divided the sample into two categories: the succession group—comprising publicly traded companies that have undergone CEO succession—and the non-succession group—comprising publicly traded companies where CEO succession has not occurred. Through the application of big data information processing techniques, we developed a counterfactual research model to control for sample selection bias. In studying the relationship between CEO succession and corporate performance, effectively controlling for sample selection bias entails identifying companies from the non-succession group that closely match those in the succession group.

The logic behind constructing the counterfactual research model is as follows:

1) *Firstly, select covariates. This study employs a stepwise regression approach using a Logit regression model to select appropriate variables that impact corporate performance. Variables with lower levels of significance were eliminated, retaining only those with higher levels of significance.*

2) *Next, compute propensity scores. This involves calculating the conditional probability that a publicly traded company will experience CEO succession given the known features X of the sample, as depicted in Equation (1):*

$$p(X) = \Pr[D = 1|X] = E[D|X] \tag{1}$$

Where, D is an indicator function where its value is 1 if a certain publicly traded company experiences CEO succession and 0 if it does not. The Logit model can be utilized for estimation, as shown in Equation (2):

$$p(X_i) = \Pr(D_i = 1|X_i) = \frac{\exp(\beta X_i)}{1 + \exp(\beta X_i)} \tag{2}$$

Where X_i represents the vector of covariates affecting whether a publicly traded company experiences CEO succession, β is the corresponding vector of coefficients, and the propensity score is the estimated value from the Logit model.

3) *Subsequently, conduct propensity score matching. This study will employ three prominent matching methods in academia: one-to-one matching, caliper matching, and kernel matching.*

4) *Lastly, calculate the Average Treatment Effect on the Treated (ATT), which is the average change in performance for publicly traded companies that experience CEO succession. The expression for ATT is given in Equation (3):*

$$ATT = \frac{1}{N_1} \sum_{i:D_i=1} (y_i - \hat{y}_{0i}) \tag{3}$$

Where, N_1 is the total number of companies in the succession group, $\sum_{i:D_i=1}$ is the summation over all publicly traded companies that experienced CEO succession, y_i denotes the performance of company i , and \hat{y}_{0i} represents the counterfactual estimation, indicating the estimated performance of publicly traded companies that experienced CEO succession had they not undergone CEO succession.

Based on the estimation using the counterfactual research model, the results indicating the Average Treatment Effects of CEO succession on corporate performance are presented in Table 4.

Table 4: Average Treatment Effects of CEO Succession on Corporate Performance

	One-to-One Matching		Caliper Matching (Caliper 0.01)		Kernel Matching	
	ATT	T value	ATT	T value	ATT	T value
ROA	-0.0093***	-8.180	-0.0092***	-9.970	-0.009***	-9.430
ROE	-0.0195***	-8.800	-0.0188***	-10.270	-0.017***	-9.750

Note: *** denotes statistical significance at the 1% level in the T-test, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

From Table 4, it is evident that whether employing one-to-one matching, caliper matching, or kernel matching methods, and whether using Roa or Roe as measures of corporate performance, the empirical results consistently indicate a negative relationship between CEO succession and corporate performance. Furthermore, this negative correlation has been validated through T-tests at the 1% significance level. The findings from the propensity score matching model suggest that CEO succession exerts a detrimental impact on corporate performance. Moving forward, we will proceed to construct a staggered difference-in-difference model to further investigate the relationship between CEO succession and corporate performance.

B. Analysis of the Staggered Difference-In-Difference Model

One limitation of the propensity score matching model lies in its reliance on observable variables for measurement, potentially leading to interference from unobservable factors on the average treatment effect. To overcome this challenge, we will leverage advanced big data processing techniques to construct a difference-in-difference model, effectively mitigating the influence of unobservable variables and obtaining a more precise estimation of the impact of CEO succession on corporate performance. However, due to the varied timing of CEO successions among listed companies, we are unable to employ a traditional difference-in-difference model, as it is typically suited for situations where policy implementation timing is consistent. Therefore, we have devised a staggered difference-in-difference model to undertake empirical analysis in this scenario.

1) *Benchmark regression of the model*

The staggered difference-in-difference model constructed in this study, as shown in Equations (4) and (5), is as follows:

$$performance_{it} = \alpha + \beta did + \lambda control_{it} + \varphi_i + \mu_t + \varepsilon_{it} \tag{4}$$

$$did = treat_i \times post_t \tag{5}$$

Here, $performance_{it}$ represents the dependent variable, namely the corporate performance of listed company i in year t . We utilized Roa and Roe as alternative variables for corporate performance. $treat_i$ is the policy implementation variable, indicating whether listed company i undergoes CEO succession. If CEO succession occurs, $treat_i$ is 1, otherwise it is 0. $post_t$ is the time variable, signifying whether CEO succession happened in year t for the listed company. If CEO succession occurred in year t , $post_t$ equals 1, otherwise 0. did represents the interaction term of the difference-in-difference, calculated as the product of $treat_i$ and $post_t$. φ_i and μ_t denote the fixed effects for listed companies and time, respectively. ε_{it} is the random disturbance term. β is the estimated coefficient for the difference-in-difference, reflecting the net impact effect of CEO succession on corporate performance. $control_{it}$ represents the control variables. The primary control variables selected in this study were mainly derived from the variables influencing corporate performance in Table 2. We conducted staggered difference-in-difference regressions on Models (4) and (5), with the results presented in Table 5.

Table 5: Results of Staggered Difference-In-Difference Regression Analysis

Corporate performance	Roa	Roe
did	-0.010***	-0.041***
T value	(-5.61)	(-4.12)
Control variable	Controlling	Controlling
Fixed effect	Controlling	Controlling
Time effect	Controlling	Controlling

Note: *** indicates significance at the 1% level in the T-test, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

As depicted in Table 5, whether regressed with Roa or Roe as the metric for corporate performance, the coefficient β of the variable did is negative and significantly passes the T-test at the 1% level. This suggests a significantly negative relationship between CEO succession in listed companies and corporate performance. In

essence, CEO succession not only fails to enhance corporate performance but actually leads to a decline in performance.

2) *Parallel trend test of the model*

The parallel trend test involves examining whether the corporate performance of listed companies that undergo CEO succession and those that do not undergo CEO succession should exhibit parallel trends before the CEO succession occurs. Following the approach of Jacobson et al. (1993), we constructed Model (6) to conduct the parallel trend test[35]:

$$performance_{it} = \alpha + \sum_{t=-4}^6 \delta_t D_{it} + \lambda control_{it} + \varphi_i + \mu_t + \varepsilon_{it} \tag{6}$$

In Model (6), D_{it} is a dummy variable. If listed company i undergoes CEO succession in year t , D_{it} is 1; otherwise, it is 0. Other variables hold the same significance as in Model (4) and Model (5). In Model (6), δ_t reflects the difference in corporate performance between listed companies experiencing CEO succession in year t and those that do not undergo CEO succession.

During the parallel trend test, we encountered a scarcity of data five years before and six years after CEO succession. Consequently, we aggregated all data from five years before CEO succession to the -5th period and all data from six years after CEO succession to the 6th period. The fifth year before CEO succession serves as the base period. Results of the parallel trend test for Roa and Roe are reported in Figs. 1 and 2.

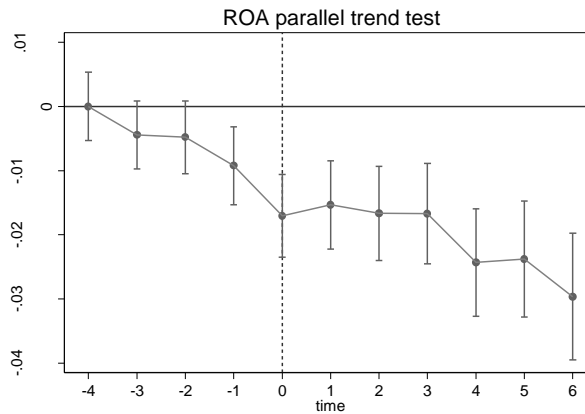


Fig. 1 Results of Roa Parallel Trend Test

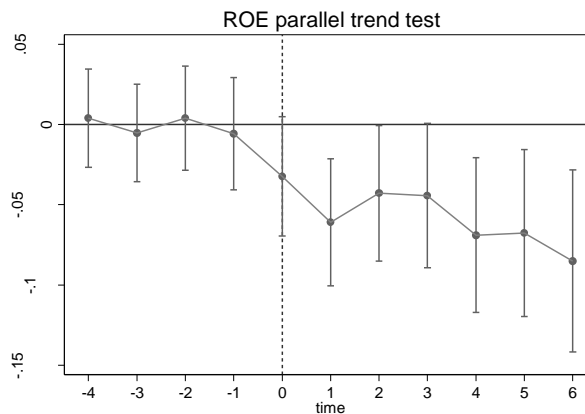


Fig.2 Results of Roe Parallel Trend Test

Note: Solid points represent the coefficients δ_t in Model (6), while short vertical lines depict the upper and lower confidence intervals (95% level) corresponding to robust standard errors.

As shown in Figs. 1 and 2, the estimated coefficient values of δ_t for each period are not statistically significant in terms of using Roa or Roe as measures of corporate performance before CEO succession. This indicates that there is no significant difference between the succession and non-succession groups before CEO succession occurs. However, after CEO succession, the estimated coefficient values of δ_t for both the succession and non-succession

groups exhibit significant differences. This suggests that the sample under study has passed the parallel trends test of the staggered difference-in-differences model.

- 3) *Placebo test for the model*
- a) *Time placebo test for the model*

In order to conduct the time placebo test for the model, we assume that the occurrence of CEO succession happens four years in advance for each listed company. Based on this assumption, we construct a new interactive difference-in-difference variable, DID4, for the difference-in-difference regression analysis. The regression results are presented in Table 6.

Table 6 Results of the Time Placebo Test

Corporate performance	Roa	Roe
DID4	0.000	0.013
T value	(0.05)	(1.05)
Control variables	Controlling	Controlling
Fixed effect	Controlling	Controlling
Time effect	Controlling	Controlling

Note: *** indicates significance at the 1% level in the T-test, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

As shown in Table 6, the regression results indicate that the coefficients of the DID4 variable have become insignificant. This demonstrates that the empirical findings in Table 5 are indeed attributed to the occurrence of CEO succession and not influenced by other external interfering factors. The time placebo has passed the test.

- b) *Individual placebo test for the model*

The analysis of the staggered difference-in-difference model may be influenced to some extent by random factors or omitted variables. Therefore, this study conducts an individual placebo test to examine the extent of these interfering factors. By randomly selecting listed companies where CEO successions occur and generating succession times randomly, we constructed randomized experiments at both the succession time and listed company levels. Subsequently, we conducted a staggered difference-in-difference regression and validate the empirical conclusions' reliability based on the probabilities of the regression coefficient estimates obtained from the constructed experiments. We repeated this construction process for each performance metric 500 times to further enhance the efficiency of the individual placebo test. The distribution graphs of the estimated coefficients of the difference-in-difference variables, based on this procedure, are depicted in Figs. 3 and 4.

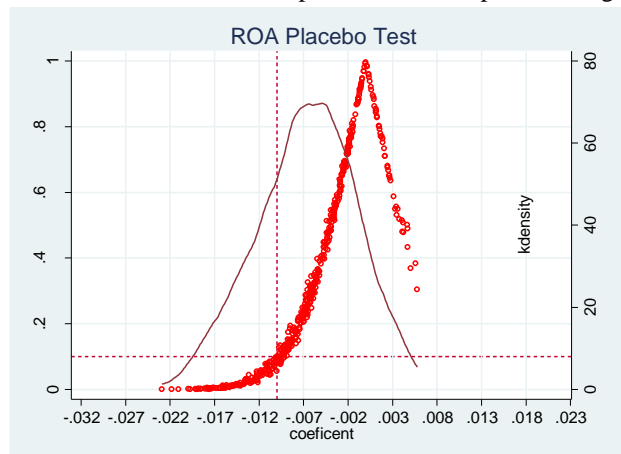


Fig. 3: The Results of the Individual Placebo Tests for Roa

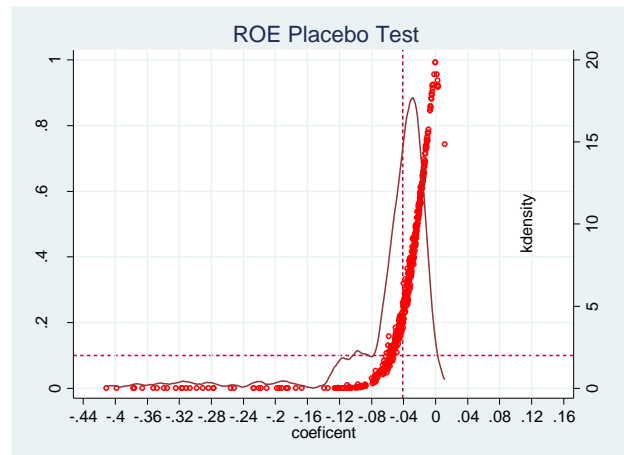


Fig. 4: The Results of the Individual Placebo Tests for Roe

As illustrated in Figs. 3 and 4, whether considering Roa or Roe as the corporate performance variables, the majority of the estimated coefficients from our constructed staggered difference-in-difference model are centered around zero and exhibit a distribution that closely approximates a normal distribution. Most of the regression results are found to be statistically insignificant. The fundamental regression coefficient estimates shown in Table 5 are situated at the high tail of the distribution of our constructed regression coefficients, suggesting their occurrence is a rare event. This indicates that the model designed in this study does not have significant issues with omitted variables, and the research conclusions derived from the baseline regression are relatively robust.

V. CONCLUSION

This study, founded on the technological advancements in big data processing, establishes propensity score matching models and difference-in-difference models to empirically analyze the relationship between CEO successions in listed companies and corporate performance. The innovation and original contribution of this study lie in the following aspects: 1. Leveraging big data processing techniques to extract diverse financial indicators of listed companies from the CSMAR database. By adhering to statistical and econometric principles, a multidimensional indicator measurement system is constructed, overcoming the issue of measurement bias that could arise from the singular measurement approach adopted by previous scholars. 2. Employing big data modeling techniques to devise propensity score matching models and staggered difference-in-difference models. This strategic application effectively mitigates external influences, thereby addressing potential sample processing biases that may have existed in previous studies.

The empirical findings of this study reveal a negative correlation between CEO successions in listed companies and corporate performance, a relationship that is statistically significant at the 1% level based on T-tests. To bolster the credibility of these empirical results, various robustness checks such as parallel trend analysis, time-placebo tests, and individual placebo tests have been employed. The outcomes of these diverse examinations continue to uphold the empirical findings of this study, underscoring the relative robustness of the research conclusions presented herein.

The research findings of this study indicate the following key points: 1. After isolating various external influencing factors, a significant negative correlation between CEO successions and corporate performance emerges. In essence, the assumption that CEO successions lead to improved corporate performance does not hold true. Instead, CEO successions may precipitate an “organizational disruption effect”, consequently resulting in a decline in corporate performance. 2. The underperformance of a company cannot be solely attributed to the current CEO. Rather, it should be viewed as the composite outcome of various interacting factors. Therefore, in times of decreased corporate performance, the reflex action of dismissing the incumbent CEO and expecting enhancements through the appointment of a new CEO may not be the optimal solution. Instead, a holistic approach considering multiple factors should be contemplated to uplift corporate performance effectively.

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REFERENCES

- [1] Xie Kang, Xia Zhenghao, Xiao Jinghua. The Enterprise Realization Mechanism of Big Data Becoming a Real Production Factor: From the Product Innovation Perspective. *China Industrial Economics*, 2020, (05): 42-60. DOI: 10.19581/j.cnki.ciejournal.2020.05.014.
- [2] Li Weining, Guo Yuejuan. A Literary Summary of the Study of CEO's Succession. *Leadership Science*, 2010, (23): 48-49. DOI: 10.19572/j.cnki.ldkx.2010.23.021.
- [3] Beatty, R. P., & Zajac, E. J. CEO change and firm performance in large corporations - Succession effects and manager effects. *Strategic Management Journal*, 1987, 8(4): 305-317.
- [4] Kesner, I. F., & Sebor, T. C. Executive succession: Past, present & future. *Journal of Management*, 1994, 20, 327-372.
- [5] Huson, M. R., Malatesta, P. H., & Parrino, R. Managerial succession and firm performance. *Journal of Financial Economics*, 2004, 74(2), 237-275.
- [6] Virany, B. Tushman, M., & Romanelli, E. An organizational learning model of convergence and reorientation. *Organization Science*, 1992, 3: 72-91.
- [7] Karaevli A. "Performance Consequences of New CEO' Outsiderness": Moderating Effects of Pre-and Post-Succession Contexts", *Strategic Management Journal*, 2007, Vol.28, No.7, pp.681-706.
- [8] Zhang, Y., Rajagopalan, N.. Once an outsider, always an outsider? CEO origin, strategic change, and firm performance. *Strategic Management Journal*, 2010, 31, 334-346.
- [9] Li Ping. The Influence Mechanism of Big Data Capability on the Innovation Performance of Retail Companies: A Mediating Effect Based on Knowledge Integration. *Journal of Commercial Economics*, 2023, (22): 24-28.
- [10] Hopkins M.S. Big data, analytics and the path from insights to value. *MIT Sloan Management Review*, 2011, 52 (2).
- [11] Feng Wenna, Ma Jiaqi. Research on the Influence Mechanism of Big Data Analytics Capabilities on Manufacturing Firms' Servitization Performance. *Journal of Central University of Finance & Economics*, 2022 (2).
- [12] Hao S, Zhang H, Song M. Big data, big data analytics capability, and sustainable innovation performance. *Sustainability*, 2019, 11 (24): 7145.
- [13] George G, Osinga E C, Lavie D, et al. Big data and data science methods for management research. *Academy of Management Journal*, 2016, 59 (5): 1493-1507.
- [14] Chi Maomao, Wang Junjing, Wang Weijun. Research on the influencing mechanism of firms' innovation performance in the context of digital transformation: A mixed method study. *Studies in Science of Science*, 2022, 40 (02): 319-331. DOI: 10.16192/j.cnki.1003-2053.20210719.001.
- [15] Liu Yezheng, Sun Jianshan, Chen Xiayu et al. Value Discovery of Big Data: The 4C Model. *Management World*, 2020 (2): 129-138.
- [16] Luo Zhongwei, Li Xianjun, Song Xiang. Evolution of Enterprise Organization Structure Based on the Hypothesis of "Empower" to "Enable": Based on the Case Study of Handu Group's Practice. *China Industrial Economics*, 2017, (9): 174-192.
- [17] Chen Jian, Huang Xiang, Liu Yunhui. From Empowerment to Enablement - Company Operations Management in the Digital Environment. *Management World*, 2020, (2): 117-128.
- [18] Ghasemaghaei, M., and G. Calic. Does Big Data Enhance Firm Innovation Competency? The Mediating Role of Data-Driven Insights. *Journal of Business Research*, 2019, 104 (7): 69-84.
- [19] Baesens, B., R. Bapna, J. R. Marsden, J. Vanthienen, and J. L. Zhao. Transformational Issues of Big Data and Analytics in Networked Business. *Mis Quarterly*, 2016, 40 (4): 807-818.
- [20] Bharadwaj A, El Sawy O A, Pavlou P A, et al. Digital Business Strategy: Toward a Next Generation of Insights. *MIS Quarterly*, 2013, 37 (2): 471-482.
- [21] Vial G. Understanding Digital Transformation: A Review and a Research Agenda. *The Journal of Strategic Information Systems*, 2019, 28 (2): 118-144.
- [22] Majchrzak A. Designing for Digital Transformation: Lessons for Information Systems Research from the Study of ICT and Societal Challenges. *Management Information Systems Quarterly*, 2016, 40: 267-277.
- [23] Hess T, Matt C, Benlian A, et al. Options for Formulating a Digital Transformation Strategy. *MIS Quarterly Executive*, 2016 (2): 123-139.
- [24] Wang Chu. A Study of the Theoretical Relations among Origin of CEO Successor Board Capital and Firm Performance. *Journal of Capital University of Economics and Business*, 2012, 13 (06): 111-118. DOI: 10.13504/j.cnki.issn1008-2700.2012.06.013.
- [25] Jacobson, L. S., J. LaLonde, and D. G. Sullivan. Earnings Losses of Displaced Workers. *American Economic Review*, 1993, 83(4): 685-709.