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The Impact of CFO Serving as a Director on Total Factor Productivity

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Abstract: *The more the economy develops, the more important accounting becomes. Based on the data of A-share listed companies from 2007 to 2023, this paper examines the impact of CFO serving as a director on total factor productivity (TFP) and its mechanism of action, aiming to explore the impact of CFO serving as a director on the high-quality development of enterprises in the Chinese context. The results show that CFO serving as a director has a significant negative effect on corporate TFP, and this conclusion remains robust after validation through various estimation methods. At the same time, it is found that the marginal impact of CFO serving as a director on total factor productivity varies under different capital intensities. The mediating effect analysis reveals that CFO serving as a director may indirectly suppress the total factor productivity of enterprises by reducing innovation input. Even after considering the mediating effect of innovation input, there is still a significant direct inhibitory effect of CFO serving as a director on the total factor productivity of enterprises. The lagged analysis results also show that the decisions and actions of CFO serving as a director have a significant inhibitory effect on the total factor productivity of enterprises one period later. Further analysis in this paper finds that this inhibitory effect is not significant in companies with high capital intensity, but is significantly inhibitory in low capital intensity enterprises. The research results of this paper provide a new perspective for understanding the governance effect of CFO serving as a director and provide empirical support for optimizing corporate governance structure and improving total factor productivity.*

Keywords: *CFO Serving as a Director, Total Factor Productivity (TFP), Board of Directors Structure, Governance Mechanism*

1. Introduction

In recent years, optimizing corporate governance structure has become a key issue in enhancing core competitiveness. As a core member of corporate governance, the Chief Financial Officer (CFO) has extended its functions from traditional financial accounting to the field of strategic decision-making. Total factor productivity (TFP), as a core indicator for measuring the efficiency of resource allocation and technological progress, has attracted much attention in the current economic operation, which is generally stable and seeks progress while maintaining stability. Some enterprises strengthen the voice of CFOs in corporate governance by having CFOs serve as directors, attempting to cope with performance pressure through centralized control of financial resources. So, does this governance arrangement truly benefit the long-term development of enterprises? What is the mechanism of its impact on total factor productivity? Although existing research has focused on the economic consequences of senior executives' multiple positions[1], there is still a lack of systematic discussion on the relationship between CFO power concentration and TFP. In the context of a transitional economy, the institutional environment and market characteristics may further amplify the complexity of governance structure.

Existing literature indicates that CFO serving as a director can improve corporate investment efficiency and curb inefficient investment behavior [2], but over time, this arrangement may have an inhibitory effect on corporate investment efficiency. Specifically regarding the CFO role, CFO serving as a director can have positive effects such as more effective internal control and higher accrual quality in enterprises [3]. However, whether this arrangement will lead to insufficient strategic innovation input or induce short-term behavior has not yet reached a consensus. In addition, most existing empirical studies focus on the European and American markets, and there is limited discussion on the particularity of CFO functions in China's emerging markets. Based on this, this paper empirically examines the impact of CFO serving as a director on corporate TFP and its mechanism of action, using A-share listed

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companies from 2007 to 2023 as samples, and attempts to answer the following questions: Does the concentration of CFO power sacrifice long-term production efficiency for short-term performance? Under what circumstances is its inhibitory effect more significant? Through systematic research design and empirical analysis, this paper aims to provide a new perspective for understanding the governance effect of CFO serving as a director and provide empirical evidence for enterprises to optimize governance structure.

2. Theoretical Analysis and Research Hypothesis

(1) The Impact of CFO Serving as a Director on Total Factor Productivity

Principal-agent theory[4], as the core framework of the institutional economics contract theory, focuses on the rights and responsibilities relationship between principals and agents. This theory points out that principals authorize agents to exercise decision-making power through contracts, but due to information asymmetry and goal divergence, agents may take actions that deviate from the interests of principals [5]. Its core mechanism lies in reducing agency costs and ensuring that agents' behavior aligns with principals' goals through contract design and incentive constraints. Based on this logic, this study believes that CFO serving as a director may exacerbate the short-term characteristics of corporate strategic decision-making and have a negative effect on total factor productivity (TFP). Specifically, the core responsibilities of CFOs are concentrated on financial accounting, risk control, and the achievement of short-term performance targets [3]. When they also hold director positions, the financial perspective may overly penetrate the strategic decision-making process. Decisions dominated by financial experts usually avoid high-risk long-term innovation inputs (such as R&D expenditure and technological upgrading) and instead rely on cost-cutting or capital expenditure compression to meet short-term financial indicators [2]. In addition, the dual role of CFOs may weaken the independence of the board of directors[6], widen the information gap between management and the board of directors, and thus induce earnings management behavior [5]. Such short-term behavior may temporarily improve operational efficiency and financial performance in light-asset industries such as the service industry, but may come at the expense of long-term technological accumulation and production efficiency, ultimately suppressing corporate total factor productivity.

Resource allocation theory focuses on the optimization mechanism of limited resources allocation in different uses to maximize economic benefits. CFO serving as a director may strengthen the centralized control of financial resources by the governance layer [7], but in emerging markets with imperfect institutional environments, such a centralized governance model is prone to "imbalance of power and responsibility" problems. For example, in state-owned enterprises, due to the absence of owners, CFOs may form excessive collusion with directors appointed by the state-owned assets supervision and administration commission through serving as directors[6], leading to decision-making biased towards administrative goals rather than market efficiency. At the same time, the governance embeddedness of financial experts may squeeze the decision-making voice of directors with technical or strategic backgrounds [8], inhibit the internal integration of diversified knowledge in the board of directors, and ultimately weaken the flexibility of resource allocation and innovation adaptability. When enterprises face financing constraints or declining profits, the board of directors may strengthen financial control through CFO serving as a director, but strategic formulation dominated by financial experts is prone to short-term decision-making preferences, resulting in a decline in resource allocation efficiency. In summary, the excessive focus of CFOs on financial indicators may neglect strategic innovation input, thereby suppressing corporate total factor productivity. Based on this, the following hypotheses are proposed:

H1a: CFO serving as a director has an inhibitory effect on total factor productivity of enterprises.

H1b: CFO serving as a director has a promoting effect on total factor productivity of enterprises.

3. Research Design

3.1 Sample Selection and Data Sources

This paper selects A-share listed companies from 2007 to 2023 as research samples. Considering the representativeness of the samples and the integrity of the data, the following treatments were made to the samples: special treatment companies such as ST and PT were excluded; companies with missing data were excluded; financial industry companies were excluded. After screening, a total of 33,437 valid

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samples were obtained. The data come from Guotai An, Resset databases, and manual collection, and the data processing uses Stata 18.0 software. To prevent extreme values from affecting the research results, the main continuous variables involved in this paper were subjected to 1% and 99% winsorize tail treatment.

3.2 Variable Definitions

(1) Dependent Variable

The dependent variable in this paper is total factor productivity (TFP) of enterprises. Referring to the practice of [9], total factor productivity (TFPLP) of enterprises is selected as the dependent variable. Common methods for calculating total factor productivity of enterprises mainly include OLS, FE, GMM, LP, and OP methods. Considering that both LP and OP methods can solve endogeneity problems, and compared with OP method, LP method can better alleviate the problem that investment variable values are negative and insensitive to productivity, this paper mainly adopts LP method to calculate total factor productivity of enterprises, and additionally uses GMM method and OP method to remeasure total factor productivity of enterprises as alternative dependent variables for robustness test.

Table 1: Variable Definition

Variable Type	Variable Symbol	Variable Description
Dependent Variable	*TFP_LP*	Total Factor Productivity
	TFP_OP	
	TFP_GMM	
	TFP_OLS	
Explanatory Variable	*CFO_Board*	1 if CFO serves as a director, 0 otherwise
Company Characteristic Control Variables	*Size*	Company size: usually measured by the natural logarithm of total assets or market value, reflecting the size of the company.
	Lev	Debt-to-Asset Ratio (Leverage): A measure of a company's financial leverage, calculated as Total Liabilities divided by Total Assets, indicating the level of debt risk.
	ROA	Return on Assets (ROA): Reflects the efficiency of asset utilization by a company, calculated as Net Income divided by Total Assets.
	GrossProfit	Gross profit margin (gross profit / operating revenue)
	CAP	Capital intensity
	Growth	Corporate growth: Revenue growth rate
	Top1	The shareholding ratio of the largest shareholder: the proportion of shares held by the largest shareholder in a company's total issued shares, used for analyzing the concentration of equity.
	Degree_num	The educational level of the CFO: LOW indicates associate degree or below; HIGH indicates bachelor's, master's, or doctoral degree; ELSE indicates correspondence education, EMBA, or MBA.
	Indep	The proportion of independent directors: the ratio of the number of independent directors to the total number of directors on the board, reflecting the corporate governance structure.
	Dual	Dual role integration: A dummy variable (usually 0 or 1) indicating whether the chairman and general manager are held by the same person (1 = combined roles, 0 = separate roles), used for analyzing governance efficiency.
	RDsz	R&D expenses

(2) Explanatory Variable

The explanatory variable in this paper is a dummy variable CFO_Board to describe the status of CFO serving as a director. If there is a CFO serving as a director in a given year, the variable is 1, otherwise it is 0. Since CFO is not an official or statutory title, combined with the actual situation in China, the CFO

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defined in this paper includes CFO, Chief Financial Officer, Financial Director, Financial Officer in Charge, Chief Accountant, etc.

(3) Control Variables

Referring to the research of Yuan and Dang [7] ,Wang [8], etc., control variables are mainly developed from two directions: CFO characteristics and company characteristics. Control variables of CFO characteristics include CFO gender, age, education, professional ability, compensation, shareholding ratio, etc.; control variables of company characteristics include equity concentration, board size, proportion of independent directors, company size, corporate profitability, asset operating ability, etc. These control variables may affect total factor productivity of enterprises, so they are controlled in regression analysis to improve the accuracy of research results. Table 1 presents the variable definitions, which include all relevant variables used in this paper.

3.3 Model Specification

To test Hypothesis H1, this paper constructs Model (1) to examine the impact of CFO serving as a director on total factor productivity of enterprises.

$$TFPi,t=\beta 0+\beta 1CFO\_Aboard+Controli,t+Industryi,t+Yeari,t+Firmi,t+\varepsilon i,t$$

Where i represents individual companies, t represents years, Control represents other control variables that may affect total factor productivity of enterprises, εi,t represents random disturbance terms. In addition, this paper further controls for possible differences across industries (Industry), annual effects (Year), and firm fixed effects (Firm).If β1 is negative, it indicates that CFO serving as a director has an inhibitory effect on total factor productivity of enterprises, and Hypothesis 1 is established.

3.4 Descriptive Statistical Analysis

Table 2 reports the descriptive statistical results of the variables for the full sample. From the situation of CFO serving as a director, the proportion of companies with CFO serving as a director in the sample is 24.8%, indicating that nearly one in four companies in the sample has the situation of CFO serving as a director.

Table 2: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
TFP LPw	33437	8.317	1.052	5.98	11.173
CFO Boardw	33437	.248	.432	0	1
Sizew	33437	22.175	1.275	19.727	26.012
Levw	33437	.44	.204	.059	.894
ROAw	33437	.037	.065	-.221	.214
GrossProfitw	33437	.277	.174	-.013	.813
Growthw	33437	.164	.388	-.572	2.213
Top1w	33437	.335	.146	.086	.734
Indepw	33437	.374	.054	.273	.571
Dualw	33437	.248	.432	0	1
CAPw	33437	2.469	2.067	.397	13.396

4. Empirical Tests and Analysis

4.1 Basic Regression

The regression results in Table 3 show that the coefficient of the core explanatory variable CFO_Boardw on TFP_LPw is significantly negative at the 1% level, confirming the theoretical inference of Hypothesis H1 that CFO serving as a director inhibits production efficiency. This phenomenon may be due to the short-sighted tendency of decision-making under the dual role of CFO: excessive focus on short-term financial indicators (such as ROA) may crowd out long-term innovation inputs, thereby inhibiting technological upgrading and production efficiency improvement. The lagged model regression results show that the inhibitory effect of L.CFO_Boardw on TFP is consistently significant, confirming the theoretical inference that there is a time-lag effect when CFO serves as a director. This result may be attributed to the triple conduction delay of decision-making execution cycle, governance structure

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stickiness, and market response lag.

Table 3: Benchmark Regression

	Main Regression Results	Lagged Variable Regression Results
VARIABLES	LP Regression Results	Lagged Variable Regression Results
CFO_Boardw	-0.018***	
	(-3.10)	
L.CFO_Boardw		-0.023***
		(-3.69)
Sizew	0.623***	0.625***
	(254.63)	(254.35)
Levw	0.329***	0.331***
	(18.32)	(19.70)
ROAw	1.565***	1.520***
	(25.26)	(29.18)
GrossProfitw	-0.585***	-0.582***
	(-28.40)	(-30.93)
Growthw	0.061***	0.067***
	(7.29)	(9.24)
Top1w	-0.027	-0.026
	(-1.52)	(-1.38)
Indepw	0.236***	0.260***
	(5.08)	(5.31)
Dualw	0.020***	0.017***
	(3.66)	(2.70)
CAPw	-0.194***	-0.195***
	(-84.93)	(-138.53)
Constant	-5.159***	-5.189***
	(-98.16)	(-96.70)
Observations	33,437	29,643
R-squared	0.816	0.816

Note: ***, **, * are significant at the 1%, 5%, and 10% levels, respectively (the same below)

4.2 Robustness Test

To verify the robustness of the main benchmark regression results, this study conducted robustness tests using three estimation methods: GMM, OP, and OLS. The conclusions are consistent with the main regression results (regression results can be obtained from the author).

4.3 Mediating Effect

Based on the dual perspectives of principal-agent theory and resource-based view, this study constructs a model of the impact of CFO's concurrent positions on total factor productivity (TFP), focusing on examining the mediating role of innovation input. At the theoretical level, the concentration of financial governance decision-making power may lead to strategic resource misallocation, specifically manifested as abnormal fluctuations in R&D input having a non-linear impact on technological transformation efficiency. The four-stage test results show that: first, the benchmark regression confirms a negative association of 0.018 units between CFO's concurrent positions and TFP (t=-3.10), initially revealing the tendency of dual-position arrangement to inhibit production efficiency; second, the mediating path test shows a significant mediating effect in the dimension of innovation input (coefficient=-0.001, t=-5.20); third, the elasticity calculation of output shows that an increase of 1 unit in R&D input can drive a 2.007 unit increase in TFP (t=17.91), and this elasticity coefficient reaches the industry average level of technology-driven enterprises; finally, the effect decomposition verification finds that the direct effect remains significant at 0.015 units (t=-2.65) after controlling for the mediating variable, revealing the existence of other non-mediated transmission paths in addition to the R&D channel.The detailed results of these tests are presented in Table 4.

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Table 4: Regression Results of the Impact on the Mediator

	(1)	(1)	(1)
VARIABLES	Effect on Mediator Regression Results	Effect of Mediator Regression Results	Direct Effect Regression Results
RDsz		2.007***	2.007***
		(17.91)	(17.91)
CFO_Boardw	-0.001***	-0.015***	-0.015***
	(-5.20)	(-2.65)	(-2.65)
Sizew	0.000**	0.623***	0.623***
	(2.16)	(255.63)	(255.63)
Levw	-0.013***	0.354***	0.354***
	(-19.13)	(19.78)	(19.78)
ROAw	-0.022***	1.610***	1.610***
	(-8.84)	(26.00)	(26.00)
GrossProfitw	0.031***	-0.647***	-0.647***
	(26.67)	(-31.02)	(-31.02)
Growthw	-0.001***	0.064***	0.064***
	(-5.14)	(7.60)	(7.60)
Top1w	-0.017***	0.006	0.006
	(-22.44)	(0.36)	(0.36)
Indepw	0.014***	0.208***	0.208***
	(7.18)	(4.48)	(4.48)
Dualw	0.003***	0.014**	0.014**
	(12.07)	(2.53)	(2.53)
CAPw	-0.003***	-0.188***	-0.188***
	(-51.68)	(-80.10)	(-80.10)
Constant	0.021***	-5.202***	-5.202***
	(9.39)	(-99.29)	(-99.29)
Observations	33,437	33,437	33,437
R-squared	0.148	0.817	0.817

4.4 Heterogeneity Analysis

When exploring the impact of CFO serving as a director on total factor productivity (TFP) of enterprises, the capital structure in which the enterprise is located has a significant impact on its governance structure and production efficiency. There are systematic differences in capital intensity among different enterprises. These differences may lead to differences in the impact of CFO serving as a director on TFP in enterprises with different capital intensities. Enterprises with high capital intensity usually rely on a large amount of fixed assets and capital inputs to maintain operations, while those with low capital intensity rely more on human capital and technological innovation. First, for high capital intensity enterprises, CFO serving as a director focuses more on financial control and cost management to improve the return on capital investment. This governance arrangement may help optimize the capital structure and financial decision-making of enterprises, thereby improving production efficiency. However, in low capital intensity enterprises, CFO serving as a director may be more inclined to optimize short-term financial indicators, neglecting long-term technological innovation and production efficiency improvement. This short-term behavior may inhibit the long-term technological accumulation and innovation capacity of enterprises, thereby having a negative impact on total factor productivity. In combination with the above analysis, this study conducts heterogeneity tests based on capital intensity grouping, and Table 5 presents the relevant regression results. The analysis shows that in the high capital intensity group, the association between CFO's concurrent positions and TFP did not pass the significance test (coefficient=0.016, t=0.84), reflecting the limitations of the governance effect of CFO's dual positions in this type of enterprise. In contrast, the low capital intensity group shows a significant negative association (coefficient=-0.023, t=-2.24), revealing that CFO's dual identity on the board of directors may trigger a short-term financial orientation, thereby crowding out strategic resources needed for technological innovation and production efficiency improvement.

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Table 5: Regression Analysis Table by Capital Intensity Classification

	(1)	(2)
	High	High
VARIABLES	Low	Low
CFO_Boardw	0.016	-0.023**
	(0.84)	(-2.24)
Sizew	0.652***	0.629***
	(65.64)	(124.64)
Levw	0.225***	0.058
	(3.66)	(1.49)
ROAw	0.634***	0.242***
	(4.78)	(2.73)
GrossProfitw	0.204***	-0.092**
	(3.31)	(-2.38)
Growthw	0.061***	0.075***
	(4.46)	(8.96)
Top1w	-0.124*	-0.150***
	(-1.65)	(-3.60)
Indepw	0.332**	0.269***
	(2.08)	(2.93)
Dualw	0.077***	0.027***
	(4.49)	(2.77)
CAPw	-0.111***	-0.739***
	(-22.26)	(-54.46)
Constant	-6.513***	-4.340***
	(-29.55)	(-37.37)
Observations	10,925	22,512
R-squared	0.822	0.888

5. Research Conclusions and Suggestions

Based on the data of A-share listed companies from 2007 to 2023, this study systematically examines the impact of CFO serving as a director on total factor productivity (TFP) and its mechanism of action. The empirical results show that CFO serving as a director has a significant inhibitory effect on corporate TFP, and this conclusion remains robust after validation through multiple methods such as GMM, OP, and OLS. The specific transmission path is shown as follows: CFO power concentration leads to a 0.1 percentage point decrease in corporate innovation input, and there is still a continuous inhibitory effect of 0.015 units (coefficient=-0.015, t=-2.65) after controlling for this mediating variable. The heterogeneity test of capital intensity shows that there is no significant association in high-intensity enterprises, while the inhibitory effect in low-intensity enterprises is 3.2 times that of the control group, revealing the moderating role of resource endowment differences on governance effects.

The conclusions of this study provide the following insights for enterprises to optimize their governance structure: for low capital intensity enterprises, independent R&D budget committees can be established and special audit mechanisms for innovation input can be strengthened to counterbalance CFO's short-term financial orientation; high capital intensity enterprises can explore the synergistic mechanism between CFO and strategic directors to improve the efficiency of fixed asset utilization; at the government level, it is necessary to improve innovation policy toolkits such as R&D tax credits and guide enterprises to balance short-term performance and long-term competitiveness through institutional design such as mandatory disclosure of R&D ratio. Future research can further explore the heterogeneous impact of CFO's professional background, or analyze the dynamic adaptability of governance structure in the context of digital transformation.

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