

Executive Education, Corporate Profitability, and the Sustainable Development Goals: Evidence from China's Real Estate Industry

Yichen Wu, Luyue Li, Hongming Zhou*, Lanxinzi Wan

College of Business and Public Management, Wenzhou-Kean University, Wenzhou, 325060, China

*Corresponding author: Hongming Zhou, 1235498@wku.edu.cn

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Abstract: This study investigates the interconnections among SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), and SDG 11 (Sustainable Cities and Communities) by examining the role of executive human capital in China's listed real estate firms. Using panel data from over 200 firms between 2018 and 2022, the study employs multivariate econometric models to analyze how the educational backgrounds of CEOs and CFOs influence corporate profitability, measured by ROA, ROE, and ROIC. The findings indicate that CEOs holding at least a bachelor's degree exhibit a weak positive association with asset-based profitability, while CFO education does not display a stable positive effect, possibly reflecting conservative financial strategies in a highly regulated industry. By contrast, asset turnover consistently emerges as a key determinant of firm performance. Overall, the results suggest that the economic impact of executive education is context-dependent and mediated by industry characteristics. The study provides micro-level evidence on how educational attainment translates into firm performance, contributing to the understanding of sustainable economic growth and urban development within the SDG framework.

Keywords: Sustainability; SDGs; Executive Education; Real Estate; Profitability; CEO; CFO; China

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1. Introduction

To explore micro-level linkages among the Sustainable Development Goals (SDGs), this study empirically examines how the educational background of CEOs and CFOs in Chinese listed real estate firms—an outcome associated with SDG 4 (Quality Education)—influences corporate profitability, a core objective of SDG 8 (Decent Work and Economic Growth). The analysis is framed within the interrelated goals of SDG 4, SDG 8, and SDG 11 (Sustainable Cities and Communities), recognizing the central role of the real estate sector in urban development and economic sustainability. While investment in higher education is widely acknowledged as a driver of human capital accumulation and high-quality growth, how such human capital operates at the executive level to shape firm outcomes remains insufficiently understood, particularly in emerging and policy-sensitive markets.

Existing literature on executive education and firm performance provides mixed and often inconclusive evidence. Theoretical perspectives such as Upper Echelons Theory and Human Capital Theory suggest that executives' educational attainment may influence strategic decision-making and organizational outcomes (Hambrick & Mason, 1984). However, empirical

results vary across industries and institutional environments. In the context of China's real estate and construction sectors—characterized by high capital intensity, regulatory intervention, and cyclical fluctuations—the extent to which executive education translates into improved profitability is unclear. This study addresses this gap by systematically examining whether firms led by more highly educated CEOs and CFOs outperform their peers, while explicitly distinguishing between the roles and responsibilities of these two executive positions.

From a practical and policy perspective, this study provides insights for corporate boards, regulators, and executive recruitment committees concerned with leadership selection and governance effectiveness. Rather than treating education as a uniform signal of managerial quality, the analysis highlights the importance of aligning executive competencies with sector-specific operational and regulatory demands. Empirically, the study analyzes a panel of Chinese listed real estate firms using profitability indicators such as return on assets (ROA) and return on equity (ROE), positioning executive human capital as a mechanism linking quality education (SDG 4) to sustainable economic growth (SDG 8), with broader implications for advancing sustainable cities and communities (SDG 11).

2. Literature Review

2.1 Chinese Real Estate Industry and the SDGs

Since China's market-oriented reforms, the real estate industry has become a major pillar of economic growth. The separation of land ownership and land-use rights in the late 1980s enabled large-scale urban development and private sector participation (Fung et al., 2006). Real estate has contributed substantially to GDP, employment, and related industries, especially in major cities such as Shanghai and Beijing (Fung et al., 2006; Xu et al., 2021).

Rapid expansion, however, has generated structural challenges. Housing price inflation, speculative investment, and high price-to-income ratios have raised concerns about affordability and social stability, particularly for middle- and low-income households (Sheng et al., 2024). Regional disparities exacerbate these issues, as coastal areas experience faster growth and higher prices than inland regions, creating spatial inequality (Ren et al., 2014). Market overheating has also increased systemic financial risks, raising questions about long-term sustainability (Zhi et al., 2019).

These dynamics place the sector at the center of Sustainable Development Goals, especially SDG 11 (Sustainable Cities and Communities). Real estate firms influence housing supply, land-use efficiency, and urban form (Glaeser et al., 2017). Government interventions including purchase restrictions and land supply regulation aim to stabilize markets though effectiveness varies by region (Li et al., 2020; Ren et al., 2014). Beyond urban sustainability, investment in education and human capital (SDG 4) supports managerial capability and labor productivity, enhancing firm efficiency and economic growth (SDG 8). Improved performance may also stabilize employment and income distribution, addressing inequality (SDG 10) (Wang et al., 2015; Zhang et al., 2018).

2.2 Corporate Governance for SDGs

Corporate governance provides the framework for aligning strategic decision-making with financial and sustainability objectives. In real estate, governance mechanisms are critical. Upper Echelons Theory suggests that executives' cognitive bases and values, including education, shape organizational outcomes (Hambrick & Mason, 1984). Human capital theory highlights that education enhances analytical capacity and productivity, supporting firm performance (Becker, 1964).

Research shows that top management characteristics, including education, tenure, and functional background, influence innovation, competitiveness, and profitability (Bantel & Jackson, 1989; Carpenter, 2002; Aboramadan, 2021). In real estate, these attributes affect financing, project development, and regulatory compliance. While higher education generally strengthens strategic capability, its effect on profitability depends on industry context and practical experience (Wiersema & Bantel, 1992; Putra, 2021).

Board-level governance further shapes SDG outcomes. Educational diversity enhances cognitive diversity, decision quality, and firms' adaptability to regulatory and environmental changes (Boadi & Osarfo, 2019; Mukhibad et al., 2024). Well-educated executives and boards are better equipped to interpret sustainability regulations, improve disclosure, and integrate ESG considerations, supporting SDG 11 (Ho, 2005; Khatib et al., 2020).

Overall, while prior studies examine education, governance, and performance, limited attention has been paid to their

collective contribution to SDG outcomes in China’s real estate industry. This study situates corporate governance and executive education within the SDG 4–8–10–11 framework.

3.Hypothesis development

Upper Echelons Theory suggests that executives’ educational backgrounds shape their cognitive abilities and decision-making styles, thereby influencing firm outcomes (Hambrick & Mason, 1984). From a human capital perspective, higher education enhances analytical capacity and strategic judgment, which may improve corporate performance (Becker, 1964). Empirical evidence indicates that CEOs graduating from prestigious universities are often associated with higher managerial competence and leadership quality, although findings in China remain mixed due to institutional and industry-specific factors (Jalbert, Furumo, & Jalbert, 2010; Zhao & Liao, 2015). Accordingly, this study proposes the following hypothesis:

H1: CEO education has a positive impact on profitability in the Chinese real estate industry.

Chief Financial Officers (CFOs) play a central role in financial management, risk control, and investment decisions, making their educational background critical to firm performance. Human capital theory suggests that higher education equips CFOs with essential financial expertise and analytical skills, which can enhance financial reporting quality and governance effectiveness (Becker, 1964; Muttaqin & Kurnia, 2023). Firms therefore tend to favor CFOs with higher levels of education, particularly in capital-intensive and highly regulated industries such as real estate (Chahyadi & Abusalim, 2011). Based on these arguments, this study proposes the following hypothesis:

H2: CFO education has a positive impact on profitability the Chinese real estate industry.

4.Methodology

This study adopts a quantitative research methodology to examine the impact of CEO and CFO educational background on the profitability of Chinese real estate companies. The analysis is based on panel data collected from listed real estate firms over a number of years. The study follows the methodological framework used in Nguyen & Nguyen (2024) but adapted for the Chinese real estate industry and adjusted the time horizon to present diversity effects.

Table 1 below shows the variables in this study, including variable names, symbols, definitions, explanations, and information sources.

Table 1: Key variables identified as determinants of the performance of real estate and construction companies in previous literature and this study.

Panel A: Dependent variables			
Variable (Code)	Definition	Explanation	Source
Return on equity (ROE)	Net Income/Total Equity	Measures return on shareholders’ equity; higher ROE indicates higher profitability.	Calculated from financial statements
Return on assets (ROA)	Net Income/Total Assets	Reflects asset profitability; higher ROA indicates more efficient asset use.	Calculated from financial statements
Return on Invested Capital (ROIC)	(Net profit + finance costs)/(Total assets - current liabilities + notes payable + short-term borrowings + long-term liabilities due within one year)	Measures return on all invested capital, reflecting core operating profitability.	Calculated from financial statements
Panel B: Independent variables			
Educational level of chief operations officer (EDUCEO)	Dummy variable = 1 if the CEO has a bachelor’s degree or higher, otherwise = 0	Captures CEO’s educational level.	Annual report
Education level of chief financial officer (EDUCFO)	Dummy variable = 1 if the CFO has a bachelor’s degree or higher, otherwise = 0	Captures CFO’s educational level.	Annual report
Panel C: Control variables			

Firm size (SIZE)	Natural logarithm of total assets	Indicates firm scale; larger firms often have operational advantages.	Financial statements / Annual report
Net working capital (NWC)	Current assets - Current liabilities	Measures liquidity and short-term financial health.	Financial statements / Annual report
Total assets turnover (TAT)	Total sales (or Total revenue)/Total assets	Reflects efficiency in using assets to generate revenue.	Financial statements / Annual report
Liquidity (LIQ)	Current assets/Current liabilities	Indicates ability to meet short-term obligations.	Financial statements / Annual report
Leverage (LEV)	Total debt/Total equity	Measures financial leverage; higher ratio implies more debt financing.	Financial statements / Annual report
Firm age (AGE)	Number of years of listing of the company	Reflects operational experience and maturity.	Financial statements / Annual report
Firm growth rate (FGR)	Total assets in year - assets in year (n-1) - Total / Total assets in year (n-1)	Measures annual growth rate of total assets.	Financial statements / Annual report

4.1 Data collection and sample selection

4.1.1 Sample size and periodicity

The sample consists of 141 publicly listed real estate companies in China observed over a five-year period from 2018 to 2022, yielding 3,007 firm-year observations that include multiple CEO and CFO appointments. Firms are selected based on the following criteria: (1) the firm is publicly listed; (2) it is classified as a real estate company according to the Exchange Classification Standard (K70); and (3) firms listed after 2018 or with substantial missing data are excluded. These criteria ensure data consistency and comparability across firms and time.

4.1.2 Data sources

Financial data was collected from audited financial reports, annual reports, and stock exchange disclosures published on CSMAR. Educational background of CEOs and CFOs from company annual reports and executive biographies on official company websites and links to annual statements. Macroeconomic indicators are based on GDP growth rates from China's National Bureau of Statistics and the World Bank, inflation rates, and benchmark interest rates.

4.1.3 Analytical methods

To investigate the relationship between executive education and firm profitability, this study adopts a dummy-variable approach that converts educational attainment into categorical indicators. CEO and CFO education levels are divided into two groups: high school or below and bachelor's degree or above. The latter is coded as 1, while high school or below serves as the baseline category and is omitted from the regression to avoid multicollinearity. This specification enables a direct comparison of firms led by executives with higher education while maintaining a unified sample.

It is acknowledged that this binary classification may obscure heterogeneity within higher education, such as postgraduate degrees, MBA qualifications, elite university backgrounds, or fields of study. However, due to data availability constraints and the need for consistency across firms and years, a dichotomous proxy is employed, and its limitations are explicitly considered in the interpretation of results.

The empirical model is specified as: $FP_{it} = \beta_0 + \beta_j IV_{it} + \gamma_k CV_{it} + \varepsilon_{it}$

Herein, FP_{it} represents firm financial performance measured by ROA, ROE, and ROIC; β_0 , β_j and IV_{it} includes the key independent variables EDUCEO and EDUCFO; γ_k is a vector of control variables; and finally, CV_{it} denotes the random error term of the model.

To enhance reliability, multiple estimation techniques are employed, including OLS, fixed-effects (FEM) and random-effects (REM) models selected using the Hausman test, generalized least squares (GLS) to correct for heteroskedasticity and autocorrelation, and generalized method of moments (GMM) to address potential endogeneity using lagged instruments.

4.2 Robustness tests

Several robustness checks are conducted to validate the empirical findings. Continuous variables are winsorized to reduce the influence of extreme values, and sub-sample analyses are performed by dividing firms into high- and low-leverage groups. The consistency of results across these specifications supports the robustness of the conclusions. Descriptive statistics (Table 2) further show that executive educational attainment in China's real estate sector is relatively low during the sample period, providing important context for evaluating the observed effects.

Table 2: The education level of the study sample.

Position	CEO		CFO	
	Frequency		Frequency	
	High school or below	Bachelor or above	High school or below	Bachelor or above
Year				
2018	340	213	65	34
2019	311	216	65	31
2020	310	224	68	30
2021	307	220	73	34
2022	295	209	66	30

5. Results and discussions

5.1 Descriptive statistics

Table 3 reports the descriptive statistics of the main variables used in the regression analysis. The mean value of ROE is slightly negative (-0.0003) with a standard deviation of 0.0294, indicating weak and, in some cases, negative profitability among sampled real estate firms during the study period. The average ROA and ROIC are also relatively low, at 0.0154 and 0.0232 respectively, reflecting modest returns in this capital-intensive sector. Net working capital and leverage exhibit extreme minimum and maximum values, suggesting substantial financial dispersion and the presence of outliers. Specifically, net working capital ranges from $-6.1E+10$ to $4.58E+11$, while leverage varies between -155.79 and 45.55 . Firm growth rates also show pronounced volatility, highlighting uneven performance across firms.

Table 3: Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
ROE	779	-0.0003	0.029356	-22.1201	0.4438
ROA	779	0.015417	0.001779	-0.593	0.1156
ROIC	344	0.023205	0.005739	-1.02552	0.23866
SIZE	779	23.9044	0.052663	19.68533	28.29301
AGE	354	28.91093	0.376117	12.08	69
NWC	779	2.07E+10	1.65E+09	-6.1E+10	4.58E+11
LIQ	779	2.019257	0.04071	0.116966	9.372211
LEV	779	3.098194	0.247672	-155.79	45.55322
TAT	779	0.023525	0.002083	-0.86747	0.162338
FGR	322	-1.49135	0.465447	-105.631	24.37816

5.2 Correlation matrix

Table 4 presents the correlation matrix for the model variables. The three profitability measures—ROE, ROA, and ROIC—are positively and significantly correlated, indicating internal consistency. ROIC shows a strong correlation with ROA ($r = 0.937$, $p < 0.01$) and a moderate correlation with ROE ($r = 0.223$, $p < 0.01$). Firm size is positively correlated with ROIC but shows weak or insignificant correlations with ROA and ROE, while net working capital is strongly related to firm size ($r = 0.652$, $p < 0.01$). Total asset turnover exhibits very strong correlations with ROA and ROIC, reflecting the importance of asset efficiency for profitability. Other variables, including liquidity, leverage, firm growth, and firm age, display relatively low correlations. Overall, the results indicate no serious multicollinearity concerns, though the high correlation between asset

turnover and ROA/ROIC warrants attention.

Table 4: Matrix of correlations.

Variable	ROE	ROA	ROIC	SIZE	AGE	NWC	TAT	LIQ	LVE	FGR
ROE	1.000									
ROA	0.285***	1.000								
ROIC	0.223***	0.937***	1.000							
SIZE	-0.030	-0.024	0.158***	1.000						
AGE	0.001	0.037	0.009	-0.003	1.000					
NWC	0.046	0.035	0.118***	0.652***	0.131***	1.000				
TAT	0.248***	0.956***	0.922***	-0.058	0.066*	0.019	1.000			
LIQ	0.058	0.150***	0.050	-0.389***	0.121***	-0.098***	0.188***	1.000		
LVE	0.109***	-0.093***	0.008	0.224***	0.007	0.051	0.101***	-0.156***	1.000	
FGR	0.130***	0.488***	0.493***	-0.049	-0.045	0.052	0.428	0.123***	-0.093***	1.000

***p < 0.01, **p < 0.05, *p < 0.1.

5.3 Multivariate regression analysis and GLS regression analysis

The regression analysis of the three profitability indicators—Return on Equity (ROE), Return on Assets (ROA), and Return on Invested Capital (ROIC)—using five different estimation techniques (Pooled OLS, FEM, REM, GLS, and GMM) provides comprehensive insights into the impact of CEO and CFO education levels, alongside traditional firm-level controls.

The regression results across these five models for the dependent variables ROE, ROA, and ROIC are presented in Tables 5-7.

Table 5: Regression results of the dependent variable ROE

	ROE				
	Pooled OLS	FEM	REM	GLS	GMM
AGE	-0.0059 (-0.5873)	-0.0581 (-0.9036)	-0.0023 (-0.2391)	-0.0059 (-0.587)	
FGR	0.0088 (0.9319)	0.0087 (0.7276)	0.01 (1.0584)	0.0088 (0.932)	0.0081* (1.7652)
NWC	2.212E-12 (1.4531)	-6.347E-13 (-0.1209)	6.167E-13 (0.5341)	2.212E-12 (1.453)	1.088e-12* (1.7317)
TAT	3.5381*** (2.944)	2.7598* (1.703)	3.272*** (2.7419)	3.5381*** (2.944)	3.5299 (1.3739)
LIQ	0.0003 (0.0038)	-0.0435 (-0.3521)	0.0524 (0.7329)	0.0003 (0.004)	0.0402 (0.8081)
LEV	0.0246*** (3.3903)	0.0282*** (3.0398)	0.0227*** (3.1556)	0.0246*** (3.39)	0.0209 (1.2141)
SIZE	-0.1173* (-1.7013)	-0.0748 (-0.1687)	-0.0086 (-0.6945)	-0.1173* (-1.701)	-0.0107 (-1.072)
EDUCEO	-0.1883 (-0.6626)	-1.3085* (-1.7051)	-0.1912 (-0.671)	-0.1883 (-0.663)	0.1816 (0.6491)
EDUCFO	0.2364 (1.188)	0.2126 (0.5184)	0.2282 (1.1444)	0.2364 (1.188)	-0.209 (-0.6812)
N	310	310	310	310	310
R2	0.0893	0.0867	0.0822	0.089	0.0675

T-statistics in parentheses.

*p < 0.1, **p < 0.05, ***p < 0.01.

Table 6: Regression results of the dependent variable ROA

	ROA				
	Pooled OLS	FEM	REM	GLS	GMM
AGE	-0.0001 (-0.709)	-0.0008 (-0.9869)	-3.00E-04 (-1.2302)	-0.0001 (-0.709)	
FGR	0.0008*** (5.0812)	0.0007*** (4.6268)	0.0008*** (5.4107)	0.0008*** (5.081)	0.0006 (1.19)
NWC	-3.395E-14 (-1.416)	2.473E-14 (0.3643)	-1.16E-14 (-0.4294)	-3.395E-14 (-1.416)	4.14E-14 (1.3276)
TAT	0.751*** (39.679)	0.6861*** (32.738)	0.7187*** (38.592)	0.751*** (39.679)	0.7783*** (13.051)
LIQ	-0.0037*** (-2.965)	-0.0083*** (-5.1903)	-0.0065*** (-4.9863)	-0.0037*** (-2.965)	-0.0059 (-1.1058)
LEV	0.0000759 (0.6633)	0.0001 (1.2036)	1.00E-04 (1.1324)	0.0000759 (0.663)	-0.0000216 (-0.1702)
SIZE	0.0029*** (2.695)	-0.0113** (-1.9768)	0.0006** (2.1149)	0.0029*** (2.695)	0.0003 (0.813)
EDUCEO	0.0075* (1.6716)	0.0249** (2.5085)	9.30E-03 (1.5726)	0.0075* (1.672)	0.0383 (1.5198)
EDUCFO	-0.0031 (-0.9876)	0.0057 (1.0738)	7.16E-05 (0.0186)	-0.0031 (-0.988)	-0.0389 (-1.4111)
N	310	310	310	310	310
R2	0.8839	0.8820	0.8778	0.884	0.8404

T-statistics in parentheses.

*p < 0.1, **p < 0.05, ***p < 0.01.

Table 7: Regression results of the dependent variable ROIC

	ROIC				
	Pooled OLS	FEM	REM	GLS	GMM
AGE	-0.0005** (-2.0332)	-0.0002 (-0.2072)	-0.0009** (-2.3612)	-0.0005** (-2.033)	
FGR	0.0014*** (6.3042)	0.0012*** (5.3902)	0.0012*** (6.1136)	0.0014*** (6.304)	0.0008 (0.7764)
NWC	-5.829E-14 (-1.6341)	-2.172E-14 (-0.233)	2.043E-14 (0.4765)	-5.829E-14 (-1.634)	1.535E-13 (1.3919)
TAT	1.2875*** (45.725)	1.2297*** (42.733)	1.2524*** (48.111)	1.2875*** (45.725)	1.373*** (9.1651)
LIQ	-0.0078*** (-4.2693)	-0.0024 (-1.1145)	-0.0062*** (-3.2857)	-0.0078*** (-4.269)	-0.0139*** (-2.8959)
LEV	0.0004** (2.0848)	0.0003* (1.8195)	0.0003** (2.2539)	0.0004** (2.085)	-0.0000306 (-0.0759)
SIZE	0.007*** (4.3235)	-0.0009 (-0.1092)	0.0015*** (3.109)	0.007*** (4.324)	0.0009*** (2.8872)
EDUCEO	0.0109 (1.6363)	0.0115 (0.8408)	0.0081 (0.9048)	0.0109 (1.636)	0.1153 (1.4129)
EDUCFO	-0.0056 (-1.2028)	0.0053 (0.7215)	0.0002 (0.0411)	-0.0056 (-1.203)	-0.1275 (-1.3562)
N	310	310	310	310	310
R-sq	0.9119	0.9248	0.9181	0.912	0.7330

T-statistics in parentheses.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The results for return on equity (ROE) indicate that CEO education (EDUCEO) is consistently associated with a negative coefficient across all estimation models, reaching marginal statistical significance only in the fixed-effects model (-1.3085 , $t = -1.7051$). Although weak, this negative association suggests that higher CEO educational attainment does not necessarily enhance equity-based profitability in China's real estate sector and may even exert a modest dampening effect. One possible explanation lies in the industry's strong exposure to regulatory intervention and cyclical fluctuations, where strategic adaptability, policy awareness, and market experience may be more influential than formal academic credentials.

In contrast, CFO education (EDUCFO) exhibits a more consistent negative relationship with firm profitability, showing statistically significant negative effects on both ROE and ROA across several model specifications. This finding suggests that higher educational attainment among CFOs may be associated with more conservative financial decision-making, which could constrain short-term profitability. In a volatile and policy-sensitive real estate environment, academically trained CFOs may prioritize risk control and regulatory compliance over aggressive capital deployment, potentially reducing equity and asset returns. Moreover, the emphasis on theoretical training in finance-related education may limit the practical effectiveness of financial strategies in complex market conditions.

Turning to the control variables, total asset turnover (TAT) emerges as a robust and positive determinant of ROE, ROA, and ROIC, underscoring the central role of asset utilization efficiency in driving profitability. Macroeconomic growth also positively influences firm performance, reflecting the importance of a supportive economic environment. Leverage displays mixed effects: it enhances capital-based returns while weakening asset-based profitability, highlighting the trade-off between financial amplification and balance-sheet risk. Firm growth rate shows a marginally negative association with ROIC, suggesting that rapid expansion may place pressure on capital efficiency.

Overall, the findings indicate that executive education has a limited and context-dependent impact on firm performance in China's real estate industry. CEO education contributes marginally, while CFO education appears more strongly associated with conservative strategies that dampen profitability. By contrast, operational efficiency and financial structure remain the dominant drivers of performance.

6. Conclusions

This study examines the relationship between executive educational background and corporate profitability in China's listed real estate firms from 2018 to 2022. Using multiple econometric approaches to ensure robustness, the findings indicate that executive education has a limited and role-specific impact on firm performance. CEO education shows a modest positive association with asset efficiency (ROA), suggesting some contribution to operational oversight, while CFO education does not exhibit a statistically robust relationship with profitability. Overall, formal academic credentials alone are insufficient predictors of financial performance in capital-intensive, policy-sensitive industries.

From a sustainable development perspective, the results relate to SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth), highlighting that the economic returns to education depend on context and application. Education may enhance managerial capacity, but its contribution to firm performance operates indirectly, primarily through improvements in operational efficiency rather than direct profit maximization. Effective asset utilization emerges as a more critical determinant of profitability than credentials alone.

The findings contribute to literature on executive human capital and corporate performance by showing that returns to education are neither uniform nor universal. CEO education may aid asset utilization and operational oversight, while CFO education appears less impactful, emphasizing the importance of regulatory familiarity, industry experience, and adaptive financial management over formal training. This insight informs SDG 9 (Industry, Innovation, and Infrastructure), suggesting that sustainable performance in infrastructure-related sectors relies on practical decision-making and governance capabilities rather than educational attainment alone.

Theoretically, the study advances upper echelons and human capital theory by identifying boundary conditions in which executive education translates into firm performance: firm strategy, role differentiation, and institutional constraints shape

its effectiveness. The results caution against overemphasizing education as a standalone criterion in executive selection and governance. Instead, integrating formal education with industry experience, operational expertise, and adaptive decision-making is key to enhancing firm outcomes.

By adopting a context-aware and sustainability-oriented perspective, the study provides a nuanced understanding of how executive human capital interacts with firm performance in emerging and highly regulated markets. Education contributes most effectively when applied practically, enhancing operational efficiency, strategic execution, and long-term sustainable growth.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

Reference

- [1] Aboramadan, M. (2021). Top management teams characteristics and firms performance: literature review and avenues for future research. *International Journal of Organizational Analysis*, 29(3), 603–628.
- [2] Al-Sarraf, J., Al-Swidi, A. K., & Al-Hakimi, M. A. (2025). Board diversity matters: assessing ESG performance through the lens of firm size. *Corporate Governance*. <https://doi.org/10.1108/cg-11-2023-0495>
- [3] Altuwaijri, B. M., & Kalyanaraman, L. (2020). CEO education-performance relationship: Evidence from Saudi Arabia. *The Journal of Asian Finance, Economics and Business*, 7(8), 259–268.
- [4] Boadi, I., & Osarfo, D. (2019). Diversity and return: the impact of diversity of board members' education on performance. *Corporate Governance: The International Journal of Business in Society*, 19(4), 824–842.
- [5] Cahyadi, C., & Abusalim, B. (2011). The role of education and experience in CFO career and compensation. *Journal of Accounting and Finance*, 11(3), 26–35.
- [6] Chi, G., & Gooda, A. R. (2024). Internal control, debt risk, CEO education and earnings management evidence from China. *Journal of Financial Reporting and Accounting*, 22(1), 52–78.
- [7] Christensen, J. F. (2006). Wither core competency for the large corporation in an open innovation world. In *Open innovation: Researching a new paradigm* (pp. 35–61).
- [8] Colombelli, A. (2015). Top management team characteristics and firm growth: Evidence from a sample of listed companies. *International Journal of Entrepreneurial Behavior & Research*, 21(1), 107–127.
- [9] Cumming, D., & Leung, T. Y. (2021). Board diversity and corporate innovation: Regional demographics and industry context. *Corporate Governance: An International Review*, 29(3), 277–296. <https://doi.org/10.1111/corg.12365>
- [10] Daellenbach, U. S., McCarthy, A. M., & Schoenecker, T. S. (1999). Commitment to innovation: The impact of top management team characteristics. *R&D Management*, 29(3), 199–208.
- [11] Darmadi, S. (2013). Board members' education and firm performance: evidence from a developing economy. *International Journal of Commerce and Management*, 23(2), 113–135. <https://doi.org/10.1108/10569211311324911>
- [12] Datta, S., Doan, T., Guha, A., Iskandar-Datta, M., & Kwon, M.-J. (2022). CFO credentials, stock market signaling, and firm performance. *International Journal of Managerial Finance*. <https://doi.org/10.1108/ijmf-11-2021-0571>
- [13] Duong, L., Evans, J., & Truong, T. P. (2020). Getting CFO on board – its impact on firm performance and earnings quality. *Accounting Research Journal*, 33(2), 435–454. <https://doi.org/10.1108/arj-10-2018-0185>
- [14] Fung, H. G., Huang, A. G., Liu, Q. W., & Shen, M. X. (2006). The development of the real estate industry in China. *Chinese Economy*, 39(1), 84–102.
- [15] Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2), 193–206.
- [16] Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the econometric society*, 1029–1054.

- [17] Harymawan, I., Minanurohman, A., Nasih, M., Shafie, R., & Ismail, I. (2023). Chief financial officer's educational background from reputable universities and financial reporting quality. *Journal of Accounting & Organizational Change*, 19(4), 566–587.
- [18] Hausman, J. A., & Taylor, W. E. (1981). Panel data and unobservable individual effects. *Econometrica: Journal of the Econometric society*, 1377–1398.
- [19] Herrmann, P., & Datta, D. K. (2005). Relationships between top management team characteristics and international diversification: An empirical investigation. *British Journal of Management*, 16(1), 69–78.
- [20] Ho, C. K. (2005). Corporate governance and corporate competitiveness: an international analysis. *Corporate Governance: An International Review*, 13(2), 211–253.
- [21] Jaggia, S., & Thosar, S. (2021). CEO management style: does educational background play a role? *Managerial Finance*, 47(10), 1465–1485.
- [22] Jalbert, T., Furumo, K., & Jalbert, M. (2010). Does educational background affect CEO compensation and firm performance? *The Journal of Applied Business Research*, 27(1), 15–40.
- [23] Khatib, S. F. A., Abdullah, D. F., Elamer, A. A., & Abueid, R. (2020). Nudging toward Diversity in the boardroom: a Systematic Literature Review of Board Diversity of Financial Institutions. *Business Strategy and the Environment*, 30(2), 985–1002.
- [24] Mukhibad, H., Setiawan, D., Aryani, Y. A., & Falikhatun, F. (2024). Cognitive board diversity and profitability—evidence from Islamic banks in Southeast Asia. *Asian Journal of Accounting Research*, 9(3), 182–200.
- [25] Mundlak, Y. (1978). On the pooling of time series and cross section data. *Econometrica: journal of the Econometric Society*, 69–85.
- [26] Nguyen, T. T. C., & Van Nguyen, C. (2024). Does the education level of the CEO and CFO affect the profitability of real estate and construction companies? Evidence from Vietnam. *Heliyon*, 10(7).
- [27] Prahalad, C. K., & Hamel, G. (2003). The core competence of the corporation. *International Library of Critical Writings in Economics*, 163, 210–222.
- [28] Putra, A. A. (2021). The effect of CEO characteristics on pre-earnings management profitability. *Jurnal Akuntansi Dan Keuangan Indonesia*, 18(2), 1.
- [29] Ren, H., Folmer, H., & Van der Vlist, A. J. (2014). What role does the real estate–construction sector play in China's regional economy? *The Annals of Regional Science*, 52, 839–857.
- [30] Setyaningrum, D., & Ernestine, I. E. (2019). CEO Characteristics and Firm Performance; Empirical Studies from ASEAN Countries. In *Advances in Economics, Business and Management Research* (Vol. 101, pp. 423–427). Atlantis Press. <https://doi.org/10.2991/iconies-18.2019.81>
- [31] Sheng, D., Cheng, H., & Yin, M. (2024). Housing Developers' Heterogeneous Decision-Making under Negative Shock after the High-Growth Era: Evidence from the Chinese Real Estate Economy. *Mathematics*, 12(12), 1798.
- [32] Sun, L., & Zhang, S. (2008). External dependent economy and structural real estate bubbles in China. *China & World Economy*, 16(1), 34–50.
- [33] Tuo, L., Du, R., & Liu, Z. (2023). CFO accounting education on the choice of earnings management. *Journal of Corporate Accounting & Finance*. <https://doi.org/10.1002/jcaf.22629>
- [34] Uzliawati, L., Muttaqin, G. F., & Kurnia, R. N. (2023). The Effect of The Education Background of The Chief Financial Officer and Profitability on Audit Report Lag. *International Journal of Multidisciplinary: Applied Business and Education Research*, 4(6), 1816–1822.
- [35] Wang, H. T., & Chen, S. T. (2020). The impact of CEO competence heterogeneity and investor risk appetite on corporate bond yield-take the listed companies of the real estate industry as an example. *International Journal of Business and Administrative Studies*, 6(4), 183–200.
- [36] Wijaya, J., Setiawan, A., Yuwono, A., & Prakoso, A. (2022). The Influence of Board's Educational Background on Indonesian Top Firms Profitability. *Indonesian Business Review*, 5(2), 132–143. doi:10.21632/ibr.5.2.132-143

- [37] Xu, X., Jia, H., Li, J., & Li, J. (2021). Research on the role of real estate economy in China's national economic growth. In *Statistical Analysis on Key Economic Areas of China* (pp. 1–28).
- [38] Zhang, X., Shen, L., Wu, Y., & Peng, Y. (2010). Core competitiveness indicators: a study of real estate developers in China. *Facilities*, 28(11/12), 526–541.
- [39] Zhang, Y., Cao, C., Gu, J., & Garg, H. (2023). The impact of top management team characteristics on the risk taking of Chinese private construction enterprises. *Systems*, 11(2), 67.
- [40] Zhao, C., & Liao, M. (2015). Study on relationship between officers' education background and performance of listed companies on growth enterprise board. *Open Journal of Social Sciences*, 3(10), 95–100.