Financial Economics Research; Vol.3, No.2; 2026
E-ISSN: 3006-3663 P-ISSN: 3006-3655
DOI: https://doi.org/10.70267/fer.250302.6078
Published by: Zeus Press

The Impact of New Quality Productive Forces on Firm Performance and Its Mechanisms

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Abstract

This study takes Chinese A-share listed firms in the Shanghai and Shenzhen stock markets from 2015 to 2024 as the research sample, constructs a panel data model, and empirically examines the impact of new quality productive forces on firms' short-term operating performance and long-term value performance. It further analyzes the underlying mechanisms, robustness, and heterogeneity characteristics. The results show that, first, new quality productive forces have a significantly positive effect on firm performance, and this conclusion remains robust after a series of robustness tests, including the use of instrumental variable approaches and alternative measurements of core variables. Second, mechanism analysis indicates that R&D investment and digital capability serve as important transmission channels through which new quality productive forces affect firm performance. Specifically, new quality productive forces improve firm performance by promoting increased R&D investment and enhancing digital technological innovation capability. Third, heterogeneity analysis reveals that the performance-enhancing effect of new quality productive forces is particularly pronounced in non-heavily polluting industries. At the regional level, a clear gradient pattern is observed: the promoting effect is stronger for firms located in regions with higher levels of economic development than those in less developed regions, and it is more significant for firms in the eastern region than in the central and western regions. This study extends the literature on the microeconomic consequences of new quality productive forces to a certain extent and provides new empirical evidence for understanding the mechanisms through which technological innovation and the optimized allocation of production factors contribute to firm value creation. Meanwhile, it offers practical implications for guiding firms to accurately seize development opportunities associated with new quality productive forces and for assisting governments in implementing differentiated policies.

Keywords

new quality productive forces, firm performance, digital capability, R&D investment

1. Introduction

At present, a new round of technological revolution and industrial transformation is deepening. Emerging technologies represented by artificial intelligence, big data, and quantum information continue to achieve breakthroughs, driving the development of productive forces into a new stage characterized by new quality productive forces as the core driving force. In September 2023, General Secretary Xi Jinping first proposed the concept of "new quality productive forces" during an inspection in Heilongjiang Province, emphasizing

the need to "vigorously develop strategic emerging industries such as new energy, new materials, advanced manufacturing, and electronic information, accelerate the development of future industries, and expedite the formation of new quality productive forces" [1]. In January 2024, during the eleventh collective study session of the Political Bureau of the CPC Central Committee, he further pointed out: "In simple terms, new quality productive forces are those in which innovation plays a leading role, break away from the traditional models of economic growth and productivity development, exhibit characteristics of high technology, high efficiency, and high quality, and conform to the new development philosophy as an advanced form of productive forces" [2]. Subsequently, the 2024 Government Work Report also explicitly proposed "accelerating the development of new quality productive forces" and "promoting green and low-carbon development" [3]. As a significant leap in the form of productive forces, new quality productive forces are increasingly permeating various fields of economic and social development and have become a key driver for enterprise transformation, upgrading, and high-quality development. Against this background, a systematic analysis of the impact of new quality productive forces on firm performance is of great significance for deepening relevant theoretical research and providing empirical evidence for high-quality firm development.

Following the introduction of the concept of new quality productive forces, the academic community has begun to examine its economic consequences at the micro firm level. Existing studies generally argue that new quality productive forces represent an advanced form of productivity characterized by technological breakthroughs, innovative allocation of production factors, and industrial structure upgrading. By enhancing resource allocation efficiency and innovation capability, they can improve firm performance. Ha jinhua et al. [4] find that firms can cultivate new quality productive forces through network embeddedness, which facilitates technological breakthroughs and the optimal allocation of production factors, thereby significantly improving firm performance. From the perspective of financial performance, new quality productive forces exert a significant impact on firm value and exhibit a clear threshold effect under different levels of profitability [5]. Some studies analyze this issue from the perspective of firm development capability, suggesting that new quality productive forces can enhance firms' growth capacity and operational stability by improving resource utilization efficiency and optimizing the structure of resource allocation, thereby indirectly improving operating performance [6].

Overall, the existing literature has laid an important foundation for understanding the economic effects of new quality productive forces. Current studies mainly proceed along three lines. First, they explore the conceptual connotation and theoretical foundations of new quality productive forces, providing systematic definitions of their formation logic and core characteristics. Second, they analyze the mechanisms through which new quality productive forces operate, particularly from the perspectives of resource allocation efficiency, technological innovation capability, and industrial structure upgrading. Third, they evaluate the economic impact of new quality productive forces using outcome variables such as firm value, resilience, and growth. However, current research remains relatively fragmented in terms of perspectives and analytical frameworks, often focusing on single dimensions or specific contexts. The comprehensive effects and multidimensional economic consequences of new quality productive forces at the firm level still require further in-depth investigation. Moreover, some studies focus primarily on macroeconomic or industry-level analyses, and systematic micro-level empirical evidence at the firm level remains insufficient.

In view of these research gaps, this study selects Chinese A-share listed firms in the Shanghai and Shenzhen stock markets as the research sample and systematically examines the impact of new quality productive forces on firm performance and its underlying mechanisms. Compared with existing studies, the marginal contributions of this paper are threefold. First, in terms of research content, this study investigates the impact of new quality productive forces on firm performance at the micro level and further explores the mechanisms from the perspectives of R&D investment and digital capability, thereby extending the research on the economic consequences of new quality productive forces. Second, in terms of methodology, this study employs panel data of Chinese A-share listed firms over multiple years for empirical analysis and strengthens the reliability of the conclusions through various robustness and endogeneity tests, providing new empirical evidence for understanding the microeconomic effects of new quality productive forces. Third, in terms of research perspective, this study incorporates both short-term operating performance and long-term value performance into a unified analytical framework, offering a more comprehensive examination of the role of new quality productive forces in firm development and enriching the literature on the relationship between new quality productive forces and firm performance.

2. Theoretical Analysis and Research Hypotheses

2.1 New Quality Productive Forces and Firm Performance

New quality productive forces are innovation-driven and represent an advanced form of productivity that breaks away from traditional growth models. They are characterized by high technology, high efficiency, and high quality, and are generated by revolutionary technological breakthroughs, innovative allocation of production factors, and deep industrial transformation and upgrading [7, 8]. For firms, the enhancement of new quality productive forces is mainly reflected in the improvement of labor quality, the upgrading of means of production, and the expansion of objects of labor. Through the optimized combination of these elements, overall efficiency is improved, as evidenced by the continuous growth of total factor productivity. This transformation may promote both short-term profitability and long-term value through multiple channels. The following analysis examines the mechanisms through which new quality productive forces enhance firm performance from the perspectives of stakeholder theory, strategic management theory, and dynamic capability theory.

From the perspective of stakeholder theory, new quality productive forces help improve the relationships between firms and multiple stakeholders, thereby enhancing firm performance. The development of new quality productive forces requires firms to place greater emphasis on attracting and cultivating high-quality talent, which increases employees' human capital value and labor productivity [9]. At the same time, the green attributes of new quality productive forces promote green technological innovation, reduce environmental compliance costs, and expand green consumption markets, thereby generating higher sales revenue. The increased information transparency and strengthened responsibility fulfillment brought about by new quality productive forces help enhance the trust of stakeholders such as investors and consumers, which is reflected in improved firm market value [10]. The development of new quality productive forces can directly improve resource utilization efficiency and enhance collaborative effects with stakeholders such as employees and society, thereby promoting firm performance [6]. In addition, new quality productive forces encourage firms to strengthen safety production and quality management, safeguard consumer rights, reduce operational risks, and provide stable expectations for stakeholders, thereby laying a solid foundation for sustained improvements in firm performance [11].

From the perspective of strategic management theory, new quality productive forces themselves constitute strategic resources for firms to build differentiated competitive advantages, and their cultivation and accumulation directly shape firms' competitive positions. By integrating new types of production factors—such as digital technologies, green technologies, and high-quality human capital—into the traditional factor system, firms can occupy unique niches in industrial competition and directly obtain higher pricing power and profit margins. This strategic uniqueness, formed through the integration of new production factors, can directly enhance firms' market value and profitability [12]. The development of digital new quality productive forces also directly strengthens the resilience of industrial chains, as reflected in improved stability and sustained growth capacity in response to market fluctuations [13]. Strategic accumulation of production factors contributes to short-term sales growth through new product development and market expansion, while also ensuring long-term excess returns by establishing technological barriers.

From the perspective of dynamic capability theory, new quality productive forces themselves embody firms' higher-order capabilities to integrate, build, and reconfigure resources in response to environmental changes. The enhancement of dynamic capabilities enables firms to more accurately perceive technological changes and more efficiently allocate resources, and these advantages are directly translated into improved operational efficiency and financial performance. Firms' learning capabilities developed within competitive and cooperative networks, as an important component of new quality productive forces, can enhance their ability to adapt to environmental changes, thereby improving both financial and non-financial performance [14]. Strengthening internal learning orientation and external network relationships enables firms to better leverage new quality productive forces in dynamic environments, thereby directly promoting performance growth [15].

Based on the above analysis, this study proposes the following hypothesis:

H1: New quality productive forces have a significantly positive impact on firm performance. Specifically, the higher the level of new quality productive forces, the better the firm's short-term operating performance and long-term value performance.

2.2 New Quality Productive Forces, Digital Capability, and Firm Performance

Digital capability refers to a firm's ability to integrate internal and external resources and achieve value creation. It is typically reflected in the firm's comprehensive capabilities in optimizing business processes, restructuring business models, and innovating value creation mechanisms [16, 17]. In the process through which new quality productive forces enhance firm performance, digital capability plays a crucial mediating role. The cultivation and improvement of digital capability are not only intrinsic requirements for the development of new quality productive forces but also important pathways for realizing their value transformation.

Driven by technological innovation as its core engine, the development of new quality productive forces systematically promotes the enhancement of firms' digital capabilities. On the one hand, the revolutionary technological breakthroughs underlying new quality productive forces require firms to continuously deepen the research, development, and application of digital technologies, thereby accelerating the construction of digital infrastructure and the formation of digital integration capabilities [18]. On the other hand, new quality productive forces emphasize the innovative allocation of production factors, encouraging firms to incorporate data as a key production factor throughout the entire production and operation process. This accelerates the deep integration of digital technologies with traditional business activities, thereby improving firms' information perception, operational efficiency, and coordination capabilities in a digital environment [19]. Therefore, improvements in the level of new quality productive forces directly drive the cultivation and upgrading of firms' digital capabilities.

The enhancement of digital capability further promotes improvements in firm performance. In the short term, digital capability helps reduce operational costs and improve efficiency by optimizing business processes and enhancing resource allocation efficiency, thereby improving profitability and operational performance. Digital product innovation, digital process innovation, and digital service innovation—key manifestations of digital capability—significantly contribute to firms' current operating performance and can be translated into higher sales revenue and returns on assets [20, 21]. In the long term, digital capability fosters business model innovation and expands new growth opportunities, providing sustained momentum for firm value creation. Meanwhile, digital technologies enhance firms' ability to cope with market uncertainty, improving operational resilience and long-term sustainability, which ultimately manifests in continuous improvements in firm value [22].

Based on the above analysis, this study proposes the following hypothesis:

H2: New quality productive forces enhance firm performance by improving firms' digital capability.

2.3 New Quality Productive Forces, R&D Investment, and Firm Performance

R&D investment serves as the material foundation for firms' technological innovation activities and constitutes a core resource supporting technological breakthroughs and industrial upgrading. In the process of enhancing firm performance, R&D investment provides a crucial transmission channel. The technological breakthroughs and innovative allocation of production factors embodied in new quality productive forces can only be transformed into actual productive capacity through sustained R&D investment.

With technological innovation as its core, the development of new quality productive forces inevitably promotes continuous increases in firms' R&D investment. From the perspective of capability support, the efficiency improvements and value creation brought about by new quality productive forces provide stronger profit guarantees for firms to expand R&D investment, enabling them to allocate sufficient resources to technological advancement [23]. From the perspective of development momentum, the optimization of factor combinations and deep industrial upgrading driven by new quality productive forces generate sustained endogenous motivation for firms to transform technological breakthroughs into sustainable competitive advantages through R&D investment [23]. Therefore, improvements in new quality productive forces jointly promote increased R&D investment from both resource availability and strategic orientation, making technological innovation an endogenous driver of firm development.

R&D investment is a key driving factor that enables firms to convert innovation resources into performance outcomes. Continuous R&D investment can significantly enhance firms' innovation performance, particularly in industries such as manufacturing that require long-term technological accumulation, where the effect of

R&D investment on firm performance is more pronounced [24]. Cross-country studies also indicate that R&D-intensive firms enjoy clear advantages in profitability, and high-quality patent portfolios can be effectively transformed into economic returns for firms [25]. More fundamentally, sustained R&D investment enables firms to evolve from mere market participants into technology leaders. By establishing inimitable technological barriers and knowledge assets, firms generate forward-looking endogenous growth momentum, thereby achieving sustained performance growth in a highly competitive market environment [26].

Based on the above analysis, this study proposes the following hypothesis:

H3: New quality productive forces promote improvements in firm performance by increasing firms' R&D investment.

3. Research Design

3.1 Sample Selection and Data Sources

This study uses Chinese A-share listed firms in the Shanghai and Shenzhen stock markets from 2015 to 2024 as the initial sample. The sample is processed according to the following criteria: (1) observations with missing data or significant errors are excluded; (2) firms labeled as ST or *ST, as well as firms in the financial industry, are excluded. After these procedures, a total of 24,253 observations are obtained. To mitigate the influence of extreme values, all continuous variables are winsorized at the 1% and 99% levels. Data for core variables—including new quality productive forces, firm performance, and control variables—are obtained from the CSMAR and Wind databases.

3.2 Variable Definitions

3.2.1 Independent Variable

To measure firms' new quality productive forces, this study draws on the approaches of Song Jia et al. [27] and Zhang Xiu'e et al. [28]. Based on data availability, the evaluation indicators are integrated and adjusted to construct a firm-level evaluation index system for new quality productive forces, as shown in Table 1. The entropy method is then employed to calculate the variable "new quality productive forces."

Table 1: Evaluation Index System of New Quality Productive Forces at the Firm Level

Primary Dimension	Secondary Dimension	Tertiary Indicator	Measurement
New-type labor	Employee quality	Proportion of R&D personnel	(Number of R&D personnel / Total employees) × 100
		Proportion of highly educated personnel	(Number of employees with postgraduate degrees or above / Total employees) × 100
	Managerial quality	Green awareness of executives	ln (frequency of green development keywords in annual reports + 1)
		Overseas background of executives	Equals 1 if any executive has overseas experience; otherwise 0
New-type labor objects	Ecological environment	Environmental governance score	E score of Huazheng ESG rating, assigned values from 1 to 9
	Future development	Fixed asset ratio	(Fixed assets / Total assets) × 100
		Capital accumulation rate	(Increase in owners' equity during the year / Owners' equity at the beginning of the year) × 100
New-type means of production	Technological means	Innovation level	ln (number of granted patents + 1)
	Digital means	Degree of digitalization	ln (frequency of digital-related keywords in annual reports + 1)
		Intangible asset ratio	(Intangible assets / Total assets) × 100
	Green means	Green technology level	ln (number of granted green patents + 1)
		Proportion of green patents	(Number of granted green patents / Total granted patents) × 100

3.2.2 Dependent Variables

Firm performance should not only be reflected in short-term operating capability but also encompass long-term value creation capacity, including future development, technological innovation, and managerial improvement. Analyzing firm performance from both long-term value and short-term operations not only aligns with the multidimensional evaluation requirements in theory but is also consistent with dynamic capability theory, which emphasizes firms' development paths in opportunity recognition, resource integration, and organizational reconfiguration. This perspective helps to more clearly reveal the evolutionary logic from cognitive transformation and capability accumulation to performance outcomes.

Long-term value performance. This study uses total factor productivity (TFP_LP) as the proxy. Total factor productivity not only captures the driving effects of technological breakthroughs and innovative allocation of production factors but also reflects the systemic improvements arising from the optimized combination of advanced labor and new-type means of production. It is therefore highly consistent with firms' long-term strategic goals of achieving high-quality development. In the context of national policies promoting the development of new quality productive forces, TFP, due to its sensitivity to technological innovation, factor reallocation, and industrial upgrading, can accurately reflect the substantive performance improvements achieved by firms under policy support. Hence, it serves as an important indicator for measuring the long-term value performance of manufacturing firms [29, 30]. The LP method and OP method are two commonly used approaches for estimating TFP. This study adopts the LP method to calculate TFP and uses it as the core indicator in the baseline regression.

Short-term operating performance. This study uses return on equity (ROE) as the proxy. ROE directly reflects a firm's ability to generate net profits from its own capital and serves as an important reference for investors in evaluating short-term profitability as well as for managerial decision-making. In the process of transformation and upgrading driven by new quality productive forces, whether through optimization of production processes or restructuring of organizational systems, the outcomes are ultimately reflected in ROE. Previous literature commonly employs indicators such as ROE and return on assets (ROA) to measure firm operating performance, as they comprehensively capture firms' overall profitability [31].

3.2.3 Mechanism Variables

Based on the preceding theoretical analysis, this study selects two mechanism variables. First, digital capability, following Huang Bo et al. [32], is measured as the natural logarithm of the number of digital patent applications plus one. The cultivation of new quality productive forces relies on technological innovation capability, and core technology patents directly reflect firms' innovation capacity. These patents provide technological support for the development of new quality productive forces and reduce the risk of mismatch between innovation input and output. Core technology patents not only represent technological advancement but also reflect firms' proactive attitude and practical engagement in developing new quality productive forces, as well as their ability to optimize resource allocation and mobilize high-quality human capital. Through the continuous accumulation and application of core technology patents, firms can gradually establish a comprehensive system of new quality productive forces and gain sustained competitive advantages in a highly competitive market. Second, R&D investment, following Guo Tianyong and Sun Guangyu [33], is measured as the ratio of R&D expenditure to operating revenue. This indicator more accurately reflects firms' emphasis on technological innovation and the intensity of resource input. R&D investment constitutes the material foundation for firms' innovation activities and provides continuous resource support for the development of new quality productive forces. Such investment not only involves financial inputs but also drives the aggregation of high-quality R&D personnel, the intelligent upgrading of production equipment, and the continuous optimization of production processes. Through sustained and stable R&D investment, firms can effectively allocate innovation resources to key core technological areas, thereby reducing the risk of disconnection between technological achievements and market applications. Compared with output-based indicators such as patent applications, R&D investment, as a leading input variable, can better signal firms' future potential for technological breakthroughs.

3.2.4 Control Variables

Drawing on the approaches of Li Dingzhao and Bao Yarong, Zhang Zhiwei et al., and Tao Xiaolong et al. [34-36], this study includes variables that may affect firms' new quality productive forces as control variables.

Specifically, eight firm-level control variables are selected: (1) **Firm basic characteristics:** listing age (ListAge) and prior loss (Loss); (2) **Financial characteristics:** firm size (Size), leverage (Lev), liquidity ratio (Liquid), and fixed asset ratio (Fixed); (3) **Corporate governance characteristics:** board size (Board) and proportion of independent directors (Indep).

The definitions and measurements of all variables are presented in Table 2.

Table 2: Variable Definitions

	Variable	**VARIABLES**	**Measurement**
Dependent variables	Long-term value performance	TFP_LP	Estimated total factor productivity using the LP method
	Short-term operating performance	ROE	Net profit / Total equity
Independent variable	New quality productive forces	Npro	Calculated using the entropy method
Mechanism variables	Digital capability	Digital	ln (number of digital patent applications + 1)
	R&D investment	R&D	R&D expenditure / Operating revenue
Control variables	Firm size	Size	Natural logarithm of total assets
	Leverage	Lev	Year-end total liabilities / Year-end total assets
	Liquidity ratio	Liquid	Current assets / Current liabilities
	Listing age	ListAge	ln (current year − year of establishment + 1)
	Prior loss	Loss	Equals 1 if net profit in the previous year < 0; otherwise 0
	Board size	Board	Natural logarithm of number of directors
	Proportion of independent directors	Indep	Number of independent directors / Total number of directors
	Fixed asset ratio	Fixed	Net fixed assets / Total assets

3.3 Model Specification

To test the proposed hypotheses, this study constructs the following models:

$$TFP\_LP_{i,t}=\alpha_0+\alpha_1 Npro_{i,t}+\Sigma\gamma Controls_{i,t}+\delta_{stkcd}+\mu_{year}+\varepsilon_{i,t} \quad (1)$$

$$ROE_{i,t}=\alpha_0+\alpha_1 Npro_{i,t}+\Sigma\gamma Controls_{i,t}+\delta_{stkcd}+\mu_{year}+\varepsilon_{i,t} \quad (2)$$

$$R\&D_{i,t}=\alpha_0+\alpha_1 Npro_{i,t}+\Sigma\gamma Controls_{i,t}+\delta_{stkcd}+\mu_{year}+\varepsilon_{i,t} \quad (3)$$

$$Dig_{i,t}=\alpha_0+\alpha_1 Npro_{i,t}+\Sigma\gamma Controls_{i,t}+\delta_{stkcd}+\mu_{year}+\varepsilon_{i,t} \quad (4)$$

In the models, subscript i denotes the firm (identified by stock code), and t denotes the year. $TFP\_LP_{i,t}$ represents the total factor productivity of firm i in year t, while $ROE_{i,t}$ denotes the return on equity of firm i in year t. $R\&D_{i,t}$ refers to the R&D investment of firm i in year t, and $Dig_{i,t}$ captures the digital capability of firm i in year t. $Controls_{i,t}$ represents a set of control variables for firm i in year t. δ denotes firm fixed effects, μ represents year fixed effects, and ε is the random error term. According to the hypotheses proposed above, the coefficients α_1 in Models (1) and (2) are expected to be positive. Models (3) and (4) are used to test the underlying mechanisms.

4. Empirical Analysis

4.1 Descriptive Statistics

Table 3 reports the descriptive statistics. The core explanatory variable, new quality productive forces (Npro), has a mean of 12.9676, a standard deviation of 6.5732, a minimum of 2.5158, and a maximum of 33.1242, indicating substantial variation in the level of new quality productive forces across firms. Regarding the dependent variables, return on equity (ROE) has a mean of 0.0543, with a minimum of −0.5294 and a maximum of 0.2990, suggesting considerable heterogeneity in profitability among sample firms, with some

firms experiencing substantial losses. Total factor productivity (TFP_LP) has a mean of 9.0615 and a standard deviation of 1.0517, with values ranging from 6.9637 to 11.9975. The relatively concentrated distribution indicates limited variation in production efficiency across firms.

At the level of control variables, firm size (Size) ranges from 20.1934 to 26.3264, with a mean of 22.3813, indicating a relatively even distribution of firm sizes. Leverage (Lev) ranges from 0.0616 to 0.8590, suggesting significant variation in capital structure across firms, with some firms having low financial leverage while others face higher debt pressure. The liquidity ratio (Liquid) ranges from 0.3487 to 13.9741, indicating that some firms have relatively weak short-term solvency while others maintain ample liquidity. Listing age (ListAge) ranges from 0.6931 to 3.4340, with a mean of 2.2245, showing a relatively concentrated distribution. The dummy variable for prior loss (Loss) has a mean of 0.1021, indicating that approximately 10.21% of sample firms reported losses in the previous year. Board size (Board) ranges from 1.6094 to 2.6391, with a mean of 2.1043, reflecting variation in board size across firms. The proportion of independent directors (Indep) ranges from 33.33% to 57.14%, with a mean of 37.80%, generally complying with regulatory requirements. The fixed asset ratio (Fixed) ranges from 0.0029 to 0.6499, with a mean of 0.2093, indicating significant differences in asset structure across firms.

Table 3: Descriptive Statistics of Variables

VARIABLES	N	Min	Max	Mean	p50	SD
Npro	24253	2.5158	33.1242	12.9676	12.4775	6.5732
ROE	24253	-0.5294	0.2990	0.0543	0.0636	0.1108
TFP_LP	24253	6.9637	11.9975	9.0615	8.9362	1.0517
Size	24253	20.1934	26.3264	22.3813	22.1914	1.2597
Lev	24253	0.0616	0.8590	0.4129	0.4068	0.1930
Liquid	24253	0.3487	13.9741	2.4313	1.7285	2.1854
ListAge	24253	0.6931	3.4340	2.2245	2.3026	0.7835
Loss	24253	0.0000	1.0000	0.1021	0.0000	0.3028
Board	24253	1.6094	2.6391	2.1043	2.1972	0.1944
Indep	24253	0.3333	0.5714	0.3780	0.3636	0.0529
Fixed	24253	0.0029	0.6499	0.2093	0.1820	0.1471

4.2 Baseline Regression

The baseline regression results are reported in Table 4. Column (1) uses return on equity (ROE) as a proxy for firms' short-term operating performance, while column (2) uses total factor productivity (TFP_LP) as a proxy for long-term value performance. Both models include control variables and are estimated using a fixed-effects model. The results in column (1) show that the coefficient of new quality productive forces (Npro) is 0.0005 and is significantly positive at the 1% level, indicating that new quality productive forces significantly enhance firms' short-term profitability. Column (2) shows that the coefficient of Npro on TFP_LP is 0.0016, also significantly positive at the 1% level, suggesting that new quality productive forces positively affect firms' production efficiency. These findings indicate that new quality productive forces improve firm performance by promoting technological innovation, optimizing resource allocation, and enhancing production efficiency.

The adjusted R^2 of both models is 0.936, indicating strong explanatory power. Overall, the baseline regression results demonstrate that new quality productive forces have a significantly positive impact on both short-term operating performance and long-term value performance, thereby providing initial support for Hypothesis H1.

Table 4: Baseline Regression Results

VARIABLES	(1)	(2)
	ROE	TFP_LP
Npro	0.0005***	0.0016***
	(3.3840)	(3.2864)
Size	0.0513***	0.6054***
	(24.2075)	(92.5377)
Lev	-0.3197***	-0.0268
	(-36.5194)	(-0.9925)
Liquid	-0.0082***	-0.0267***

VARIABLES	(1)	(2)
	ROE	TFP_LP
	(-12.2938)	(-12.8879)
ListAge	-0.0237***	-0.0212**
	(-7.0934)	(-2.0568)
Loss	-0.0258***	-0.0740***
	(-11.5765)	(-10.7467)
Board	-0.0053	-0.0222
	(-0.6456)	(-0.8807)
Indep	-0.0269	-0.0092
	(-1.0977)	(-0.1220)
Fixed	-0.1728***	-0.9923***
	(-16.1852)	(-30.1044)
Constant	-0.8362***	-4.1215***
	(-16.6795)	(-26.6352)
Firm Fixed	YES	YES
Year Fixed	YES	YES
Observations	24,253	24,253
R-squared	0.488	0.946
Adj. R^2	0.936	0.936

Note: *, *, and * denote significance at the 10%, 5%, and 1% levels, respectively; t-values are reported in parentheses. The same applies below.*

4.3 Mechanism Analysis

To examine the mechanisms through which R&D investment and digital capability affect the relationship between new quality productive forces and firm performance, this study follows Jiang Ting [37] and conducts mechanism tests. The results are presented in Table 5. Column (1) uses R&D intensity (R&D) as the mechanism variable, while column (2) uses digital capability (Digital). Both regressions include control variables.

The results in column (1) show that the coefficient of Npro is 0.0001 and is significantly positive at the 1% level, indicating that improvements in new quality productive forces significantly promote firms' R&D investment intensity. Column (2) shows that the coefficient of Npro on digital capability is 0.0172, also significantly positive at the 1% level, suggesting that new quality productive forces significantly enhance firms' digital capability. These findings indicate that new quality productive forces, on the one hand, strengthen firms' R&D investment intensity by promoting technological innovation and R&D activities; on the other hand, they accelerate digital transformation and improve digital capability. Therefore, Hypotheses H2 and H3 are supported.

Table 5: Mechanism Test Results

VARIABLES	(1)	(2)
	R&D	Digital
Npro	0.0001***	0.0172***
	(3.7420)	(13.8567)
Size	-0.0024***	0.4826***
	(-4.7644)	(27.8581)
Lev	-0.0142***	-0.0868
	(-6.7683)	(-1.2146)
Liquid	0.0002	-0.0166***
	(1.5019)	(-3.0816)
ListAge	0.0034***	-0.1280***
	(4.2472)	(-4.7423)
Loss	0.0015***	-0.0335*
	(2.8771)	(-1.8653)
Board	0.0028	-0.0217
	(1.4435)	(-0.3318)
Indep	0.0029	0.0295

VARIABLES	(1)	(2)
	R&D	Digital
	(0.5084)	(0.1507)
Fixed	0.0185***	0.0885
	(7.0768)	(0.9920)
Constant	0.0907***	-8.3506***
	(7.5634)	(-20.4233)
Firm Fixed	YES	YES
Year Fixed	YES	YES
Observations	22,256	22,256
R-squared	0.874	0.878
Adj. R^2	0.856	0.856

4.4 Endogeneity Tests

4.4.1 Instrumental Variable Approach

To mitigate potential endogeneity issues in the baseline regression—such as reverse causality and omitted variable bias—this study employs an instrumental variable approach and conducts two-stage least squares (2SLS) estimation using two instruments.

First, the development of new quality productive forces is typically gradual and path-dependent, and its impact on firm performance may involve a time lag. Following Li Hongkai [38], this study uses the one-period lag of new quality productive forces (L.Npro) as an instrumental variable. Given the persistence and path dependence of new quality productive forces, the lagged term is highly correlated with the current level of Npro, while its direct impact on current firm performance is limited after controlling for firm and year fixed effects. Therefore, it helps alleviate potential endogeneity concerns. The first-stage regression results are reported in Table 6. In the model using a one-period lagged instrumental variable, the coefficient of the instrumental variable is 0.7319 and is significantly positive at the 1% level, indicating that the instrument is valid and does not suffer from weak instrument problems. In the second-stage regression, the fitted values of Npro obtained from the instrumental variable remain significantly positive at the 1% level for both ROE and TFP_LP, indicating that the conclusion that "new quality productive forces significantly promote firm performance" remains robust after addressing endogeneity issues.

Table 6: Instrumental Variable Results (Lagged Variable)

VARIABLES	(1)	(2)	(3)	(4)
	first	second	first	second
	Npro	ROE	Npro	TFP_LP
LNpro	0.7319***		0.7319***	
	(154.4275)		(154.4275)	
Npro		0.0012***		0.0125***
		(7.5641)		(15.1581)
Size	0.4072***	0.0267***	0.4072***	0.6547***
	(13.0176)	(34.6988)	(13.0176)	(161.5582)
Lev	-0.4062*	-0.1985***	-0.4062*	0.3748***
	(-1.7253)	(-34.9578)	(-1.7253)	(12.5245)
Liquid	-0.0401**	-0.0044***	-0.0401**	-0.0362***
	(-1.9894)	(-8.9580)	(-1.9894)	(-14.1043)
ListAge	-0.6176***	-0.0170***	-0.6176***	0.0151**
	(-12.5933)	(-14.1837)	(-12.5933)	(2.3836)
Loss	-0.2314**	-0.0949***	-0.2314**	-0.1848***
	(-2.2978)	(-39.0808)	(-2.2978)	(-14.4396)
Board	0.2123	0.0007	0.2123	-0.1489***
	(1.0755)	(0.1519)	(1.0755)	(-5.9373)
Indep	0.3708	0.0160	0.3708	-0.2352***
	(0.5399)	(0.9689)	(0.5399)	(-2.6955)
Fixed	-1.0608***	-0.0301***	-1.0608***	-1.1186***
	(-4.9867)	(-5.8399)	(-4.9867)	(-41.2270)
Constant	-7.7716***	-0.4346***	-7.7716***	-5.2071***

VARIABLES	(1)	(2)	(3)	(4)
	first	second	first	second
	Npro	ROE	Npro	TFP_LP
	(-10.0473)	(-23.1541)	(-10.0473)	(-52.6323)
Firm Fixed	YES	YES	YES	YES
Year Fixed	YES	YES	YES	YES
Observations	19,309	19,309	19,309	19,309
R-squared	0.602	0.224	0.602	0.754
Adj. R^2	0.601	0.224	0.601	0.754

Second, following Su Taoyong et al. [39], this study constructs another instrumental variable: the mean level of new quality productive forces for firms within the same year–province–industry group (meanNpro). Given the presence of spillover effects, a firm's level of new quality productive forces is correlated with that of other firms in the same group, while the latter is unlikely to directly affect the focal firm's performance. Thus, this variable satisfies both the relevance and exogeneity conditions of a valid instrument. In the mean-based IV model reported in Table 7, the coefficient of the instrumental variable in the first stage is 0.9712 and is significantly positive at the 1% level, indicating no under-identification or weak instrument problems. In the second stage, the coefficients of the instrumented Npro on ROE and TFP_LP are 0.0009 and 0.0086, respectively, both significant at the 1% level. These results further confirm that the positive effect of new quality productive forces on firm performance remains robust after controlling for endogeneity.

Table 7: Instrumental Variable Results (Mean-Based Instrument)

VARIABLES	(1)	(2)	(3)	(4)
	first	second	first	second
	Npro	ROE	Npro	TFP_LP
meanNpro	0.9712***		0.9712***	
	(124.4421)		(124.4421)	
Npro		0.0009***		0.0086***
		(5.3154)		(9.9214)
Size	0.9263***	0.0260***	0.9263***	0.6566***
	(28.2248)	(37.7563)	(28.2248)	(177.2326)
Lev	-1.0029***	-0.1905***	-1.0029***	0.3661***
	(-4.0285)	(-38.2400)	(-4.0285)	(13.6418)
Liquid	-0.0745***	-0.0045***	-0.0745***	-0.0379***
	(-3.6825)	(-11.0666)	(-3.6825)	(-17.4067)
ListAge	-0.5602***	-0.0165***	-0.5602***	0.0052
	(-12.0251)	(-17.2767)	(-12.0251)	(1.0049)
Loss	-0.0046	-0.0938***	-0.0046	-0.1947***
	(-0.0419)	(-43.2581)	(-0.0419)	(-16.6601)
Board	0.8660***	-0.0005	0.8660***	-0.1437***
	(4.1195)	(-0.1255)	(4.1195)	(-6.3476)
Indep	0.2881	0.0099	0.2881	-0.2363***
	(0.3912)	(0.6727)	(0.3912)	(-2.9815)
Fixed	-1.4191***	-0.0395***	-1.4191***	-1.1490***
	(-6.3176)	(-8.7543)	(-6.3176)	(-47.2169)
Constant	-20.0799***	-0.3960***	-20.0799***	-5.2313***
	(-24.3259)	(-23.7667)	(-24.3259)	(-58.2801)
Firm Fixed	YES	YES	YES	YES
Year Fixed	YES	YES	YES	YES
Observations	24,542	24,542	24,542	24,542
R-squared	0.447	0.218	0.447	0.749
Adj. R^2	0.447	0.217	0.447	0.749

4.4.2 Propensity Score Matching (PSM)

Firms with different levels of new quality productive forces may also differ significantly in other aspects, which could affect firm performance and lead to sample self-selection bias. Following Guo Wei and Kang Wenyi [40], this study employs propensity score matching (PSM) to mitigate this endogeneity issue. Specifically, (1) the sample is divided into a treatment group and a control group based on the median value

of new quality productive forces; (2) the eight control variables used in this study are treated as covariates, and kernel matching is applied to match the treatment and control groups, ensuring that the matched samples exhibit no significant differences in observable characteristics other than new quality productive forces; (3) the main effects are re-estimated using the matched sample, with the results reported in Table 8. The regression coefficient of new quality productive forces (Npro) on ROE is 0.0006, and that on TFP_LP is 0.0013, both remaining significantly positive. These results further confirm the robustness of the baseline regression findings.

Table 8: Propensity Score Matching Results

VARIABLES	(1)	(2)
	ROE	TFP_LP
Npro	0.0006***	0.0013**
	(3.2497)	(2.4662)
Size	0.0543***	0.5952***
	(21.8577)	(77.1901)
Lev	-0.3099***	-0.0311
	(-31.2856)	(-1.0134)
Liquid	-0.0088***	-0.0284***
	(-11.5134)	(-12.0246)
ListAge	-0.0275***	-0.0182
	(-7.4591)	(-1.5943)
Loss	-0.0251***	-0.0708***
	(-10.0296)	(-9.1223)
Board	0.0014	-0.0269
	(0.1508)	(-0.9554)
Indep	-0.0388	0.0606
	(-1.4272)	(0.7197)
Fixed	-0.1655***	-0.9771***
	(-13.9879)	(-26.6196)
Constant	-0.9078***	-3.9213***
	(-15.5006)	(-21.5850)
Firm Fixed	YES	YES
Year Fixed	YES	YES
Observations	19,681	19,681
R-squared	0.481	0.941
Adj. R^2	0.929	0.929

4.5 Robustness Tests

First, excluding specific years. Considering that the COVID-19 pandemic may have had a potential impact on the relationship between new quality productive forces and firm performance, this study excludes observations from 2019 to 2021 to eliminate pandemic-related disturbances and re-estimates the model. As shown in Panel A of Table 9, the coefficient of Npro remains significantly positive at the 1% level. This indicates that the positive effect of new quality productive forces on firm performance remains robust even after excluding the potential impact of the COVID-19 shock. These results further confirm the robustness of the findings.

Second, clustered robust standard errors. After incorporating firm and year fixed effects in the baseline regression, standard errors are clustered at the firm level to account for within-firm correlation. The results, reported in Panel B of Table 9, show that the coefficient of the core explanatory variable remains significantly positive, indicating that the baseline results are robust.

Third, adding province fixed effects. To control for potential regional differences in new quality productive forces, province fixed effects are further included in the regression. As shown in Panel C of Table 9, the coefficients of Npro are 0.005 and 0.0017, both significantly positive, consistent with the baseline results and confirming the robustness of the conclusions.

Table 9: Robustness Test Results

VARIABLES	Panel A: Excluding Specific Years		Panel B: Clustered Robust Standard Errors		Panel C: Adding Province Fixed Effects	
	(1)	(2)	(1)	(2)	(1)	(2)
	ROE	TFP_LP	ROE	TFP_LP	ROE	TFP_LP
Npro	0.0006***	0.0016***	0.0005***	0.0016***	0.0005***	0.0017***
	(3.0966)	(2.5878)	(3.5818)	(3.2519)	(3.3317)	(3.5091)
Size	0.0444***	0.6028***	0.0513***	0.6054***	0.0497***	0.6052***
	(18.7567)	(78.0395)	(15.4796)	(55.4247)	(23.4136)	(92.4296)
Lev	-0.2923***	-0.0085	-0.3197***	-0.0268	-0.3182***	-0.0253
	(-28.4391)	(-0.2523)	(-23.0483)	(-0.7028)	(-36.3444)	(-0.9378)
Liquid	-0.0080***	-0.0246***	-0.0082***	-0.0267***	-0.0084***	-0.0264***
	(-9.9346)	(-9.4157)	(-12.5761)	(-9.7114)	(-12.5649)	(-12.7588)
ListAge	-0.0240***	-0.0127	-0.0237***	-0.0212*	-0.0238***	-0.0218**
	(-6.3884)	(-1.0365)	(-7.5798)	(-1.8483)	(-7.1219)	(-2.1194)
Loss	-0.0323***	-0.0847***	-0.0258***	-0.0740***	-0.0252***	-0.0739***
	(-11.9352)	(-9.5650)	(-7.6427)	(-8.7282)	(-11.3093)	(-10.7617)
Board	-0.0141	-0.0805**	-0.0053	-0.0222	-0.0052	-0.0265
	(-1.4478)	(-2.5375)	(-0.5294)	(-0.7910)	(-0.6319)	(-1.0533)
Indep	-0.0405	-0.1329	-0.0269	-0.0092	-0.0237	-0.0344
	(-1.3883)	(-1.3939)	(-0.9548)	(-0.1112)	(-0.9704)	(-0.4572)
Fixed	-0.1758***	-0.9529***	-0.1728***	-0.9923***	-0.1749***	-0.9821***
	(-13.9414)	(-23.1322)	(-13.5559)	(-20.7232)	(-16.3940)	(-29.8665)
Constant	-0.6705***	-3.9480***	-0.8362***	-4.1215***	-0.8019***	-4.1006***
	(-11.9035)	(-21.4579)	(-11.3184)	(-16.6809)	(-15.9501)	(-26.4612)
Firm Fixed	YES	YES	YES	YES	YES	YES
Year Fixed	YES	YES	YES	YES	YES	YES
Province Fixed	NO	NO	NO	NO	YES	YES
Observations	16,667	16,667	24,253	24,253	24,253	24,253
R-squared	0.523	0.945	0.488	0.946	0.491	0.946
Adj. R^2	0.930	0.930	0.936	0.936	0.937	0.937

4.6 Heterogeneity Analysis

Significant differences exist in the levels of new quality productive forces and firm performance across firms, regions, and industries. Accordingly, the economic effects of developing new quality productive forces may exhibit substantial heterogeneity. This study conducts subgroup analyses to examine heterogeneity in the impact of new quality productive forces on firm performance, based on whether firms belong to heavily polluting industries, regional economic development levels, and geographic location.

4.6.1 Heterogeneity across Heavily Polluting Industries

The sample is divided into two groups: heavily polluting industries and non-heavily polluting industries. Separate regressions are conducted for each group, with results reported in Table 10. For firms in non-heavily polluting industries, the coefficients of new quality productive forces on short-term operating performance and long-term value performance are 0.0006 and 0.0015, respectively, both significant at the 1% level. In contrast, for firms in heavily polluting industries, the effects of new quality productive forces on both performance measures are not statistically significant. These results indicate that firms in non-heavily polluting industries can significantly enhance performance through the development of new quality productive forces, whereas firms in heavily polluting industries do not experience significant improvements in short-term performance, nor significant changes in long-term performance. Firms in heavily polluting industries generally face higher environmental regulatory pressure and pollution control costs, rely more heavily on traditional production factors, and exhibit stronger path dependence in technological innovation and digital transformation. As a result, they must simultaneously address environmental compliance and technological upgrading when developing new quality productive forces, facing higher transformation costs and institutional constraints. By contrast, firms in non-heavily polluting industries possess greater flexibility and innovation space in resource

allocation and technology application, enabling them to more effectively translate new quality productive forces into improved operating performance.

Table 10: Heterogeneity Analysis: Heavily Polluting vs. Non-Heavily Polluting Industries

VARIABLES	Heavily Polluting Industries		Non-Heavily Polluting Industries	
	(1)	(2)	(3)	(4)
	ROE	TFP_LP	ROE	TFP_LP
Npro	0.0003	-0.0002	0.0006***	0.0015***
	(0.7207)	(-0.1267)	(3.3525)	(2.8456)
Size	0.0526***	0.5334***	0.0504***	0.6079***
	(6.9739)	(27.3957)	(22.0662)	(85.6152)
Lev	-0.3543***	-0.4525***	-0.3118***	0.0294
	(-13.3393)	(-6.5983)	(-33.5269)	(1.0161)
Liquid	-0.0095***	-0.0380***	-0.0080***	-0.0257***
	(-4.1669)	(-6.4224)	(-11.4276)	(-11.7724)
ListAge	-0.0332***	0.0113	-0.0203***	-0.0199*
	(-2.8405)	(0.3753)	(-5.7650)	(-1.8107)
Loss	-0.0293***	-0.0579***	-0.0248***	-0.0752***
	(-4.5275)	(-3.4686)	(-10.4257)	(-10.1568)
Board	0.0028	0.0138	-0.0049	-0.0302
	(0.1117)	(0.2106)	(-0.5644)	(-1.1235)
Indep	0.0530	0.1468	-0.0358	-0.0331
	(0.7597)	(0.8151)	(-1.3682)	(-0.4068)
Fixed	-0.1456***	-0.8570***	-0.1807***	-1.0238***
	(-5.0636)	(-11.5426)	(-15.4711)	(-28.1998)
Constant	-0.8676***	-2.3770***	-0.8249***	-4.1865***
	(-4.7590)	(-5.0493)	(-15.3659)	(-25.0954)
Firm Fixed	YES	YES	YES	YES
Year Fixed	YES	YES	YES	YES
Observations	2,492	2,492	21,742	21,742
R-squared	0.481	0.962	0.491	0.945
Adj. R^2	0.935	0.935	0.935	0.935

4.6.2 Heterogeneity by Economic Development Level

This study uses the logarithm of regional GDP per capita as a proxy for the level of economic development and divides the sample into two groups: regions with high economic development and regions with low economic development. The regression results are reported in Table 11. For the high economic development group, the coefficients of new quality productive forces on short-term operating performance (ROE) and long-term value performance (TFP_LP) are 0.0007 and 0.0021, respectively, both significant at the 1% level. In contrast, for the low economic development group, the effects of new quality productive forces on both performance measures are not statistically significant. These results indicate that in regions with higher levels of economic development, firms can effectively improve their performance by developing new quality productive forces, whereas in less developed regions, this promoting effect has not yet materialized. Regions with higher levels of economic development typically possess more advanced digital infrastructure, a stronger concentration of innovation factors, and more mature market mechanisms, enabling firms to more effectively translate new quality productive forces into actual outputs. In contrast, regions with lower levels of economic development are relatively constrained in terms of technological absorption capacity, human capital endowment, and industrial supporting systems. As a result, firms in these regions face higher technological barriers and institutional frictions in promoting the transformation toward new quality productive forces, which weakens their positive impact on firm performance.

Table 11: Heterogeneity Analysis by Economic Development Level

VARIABLES	High Economic Development		Low Economic Development	
	(1)	(2)	(3)	(4)
	ROE	TFP_LP	ROE	TFP_LP
Npro	0.0007***	0.0021***	0.0002	0.0008
	(3.3100)	(3.0989)	(0.7102)	(1.1601)
Size	0.0514***	0.5843***	0.0540***	0.6311***

VARIABLES	High Economic Development		Low Economic Development	
	(1)	(2)	(3)	(4)
	ROE	TFP_LP	ROE	TFP_LP
	(17.4206)	(63.2642)	(17.0878)	(66.0629)
Lev	-0.2875***	0.0589	-0.3611***	-0.1765***
	(-23.6864)	(1.5499)	(-27.8051)	(-4.4964)
Liquid	-0.0086***	-0.0238***	-0.0079***	-0.0294***
	(-9.5833)	(-8.5176)	(-7.6359)	(-9.4017)
ListAge	-0.0216***	-0.0107	-0.0265***	-0.0109
	(-4.7976)	(-0.7595)	(-5.0234)	(-0.6819)
Loss	-0.0176***	-0.0668***	-0.0260***	-0.0698***
	(-5.6197)	(-6.7963)	(-8.0206)	(-7.1297)
Board	0.0015	-0.0204	-0.0067	-0.0023
	(0.1322)	(-0.5633)	(-0.5661)	(-0.0649)
Indep	-0.0031	0.0962	-0.0373	-0.1580
	(-0.0894)	(0.8796)	(-1.0572)	(-1.4814)
Fixed	-0.1851***	-1.1239***	-0.1427***	-0.8027***
	(-12.2221)	(-23.7165)	(-9.2712)	(-17.2541)
Constant	-0.8831***	-3.7259***	-0.8645***	-4.6856***
	(-12.5491)	(-16.9228)	(-11.5933)	(-20.7896)
Firm Fixed	YES	YES	YES	YES
Year Fixed	YES	YES	YES	YES
Observations	12,434	12,434	11,631	11,631
R-squared	0.521	0.950	0.497	0.947
Adj. R^2	0.938	0.938	0.938	0.938

4.6.3 Regional Heterogeneity

The sample is further divided into three groups: eastern, central, and western regions. Separate regressions are conducted for each group, with results reported in Table 12. The results show that the coefficient of new quality productive forces is significantly positive in the eastern region, whereas it is not statistically significant in the central and western regions. This suggests that the development of new quality productive forces significantly enhances firm performance in the eastern region, while its effect remains insignificant in the central and western regions. This pattern can be attributed to the more mature level of marketization in the eastern region, as well as its more favorable industrial structure and innovation environment, which facilitate the cultivation and transformation of new quality productive forces into actual performance gains. By contrast, the central and western regions are relatively disadvantaged in terms of infrastructure, human capital, and industrial support systems. Firms in these regions may face higher transformation costs and market frictions when promoting new quality productive forces, thereby limiting their performance-enhancing effects.

Table 12: Regional Heterogeneity Analysis

VARIABLES	Eastern Region		Central Region		Western Region	
	(1)	(2)	(3)	(4)	(5)	(6)
	ROE	TFP_LP	ROE	TFP_LP	ROE	TFP_LP
Npro	0.0007***	0.0022***	0.0002	-0.0005	-0.0003	0.0014
	(3.8776)	(3.8646)	(0.5086)	(-0.3742)	(-0.6148)	(0.9558)
Size	0.0562***	0.6118***	0.0409***	0.5487***	0.0335***	0.6034***
	(22.5385)	(81.3427)	(6.9105)	(30.1386)	(5.9046)	(30.6841)
Lev	-0.3144***	0.0139	-0.3089***	0.1171	-0.3113***	-0.3606***
	(-30.1739)	(0.4423)	(-13.3089)	(1.6398)	(-13.7335)	(-4.5832)
Liquid	-0.0085***	-0.0227***	-0.0083***	-0.0326***	-0.0076***	-0.0456***
	(-10.8889)	(-9.5979)	(-4.7024)	(-6.0036)	(-3.9979)	(-6.8702)
ListAge	-0.0251***	-0.0271**	-0.0203**	0.0185	-0.0190**	0.0003
	(-6.4623)	(-2.3116)	(-2.0691)	(0.6139)	(-2.0589)	(0.0100)
Loss	-0.0201***	-0.0649***	-0.0391***	-0.0589***	-0.0305***	-0.1174***
	(-7.5280)	(-8.0530)	(-6.7435)	(-3.3064)	(-5.5343)	(-6.1412)
Board	0.0065	-0.0195	-0.0369*	-0.0280	-0.0034	0.0172
	(0.6749)	(-0.6754)	(-1.7015)	(-0.4200)	(-0.1514)	(0.2221)

VARIABLES	Eastern Region		Central Region		Western Region	
	(1)	(2)	(3)	(4)	(5)	(6)
	ROE	TFP_LP	ROE	TFP_LP	ROE	TFP_LP
Indep	0.0008	0.1157	0.0009	-0.3908*	-0.1438**	-0.4181*
	(0.0272)	(1.3296)	(0.0133)	(-1.9210)	(-2.2615)	(-1.8940)
Fixed	-0.1902***	-1.0854***	-0.1685***	-0.7493***	-0.1084***	-0.8083***
	(-14.6671)	(-27.7620)	(-5.8692)	(-8.4794)	(-4.4553)	(-9.5674)
Constant	-0.9812***	-4.2998***	-0.5494***	-2.8912***	-0.4075***	-4.0125***
	(-16.6565)	(-24.2049)	(-3.9886)	(-6.8199)	(-2.9626)	(-8.4044)
Firm Fixed	YES	YES	YES	YES	YES	YES
Year Fixed	YES	YES	YES	YES	YES	YES
Observations	17,687	17,687	3,545	3,545	3,016	3,016
R-squared	0.494	0.948	0.495	0.944	0.942	0.942
Adj. R^2	0.932	0.932	0.932	0.932	0.932	0.932

5. Conclusions and Implications

Using panel data of Chinese A-share listed firms from 2015 to 2024, this study examines the impact of new quality productive forces on firms' short-term operating performance and long-term value performance, along with the underlying mechanisms, robustness, and consistency of the results. The main findings are as follows. First, new quality productive forces significantly enhance firm performance. This conclusion remains robust after excluding specific years, applying clustered robust standard errors, and altering fixed-effects specifications. Second, mechanism analysis shows that R&D investment and digital capability play important roles in the relationship between new quality productive forces and firm performance. This indicates that new quality productive forces improve firm performance by enhancing firms' innovation transformation capacity and digital technological capability. Third, heterogeneity analysis reveals that the performance-enhancing effect of new quality productive forces is more pronounced in non-heavily polluting industries and varies across regions. Specifically, the effect is stronger in regions with higher levels of economic development than in less developed regions, and it is more significant for firms in the eastern region than for those in the central and western regions.

Based on these findings, the following implications are proposed. First, firms should accelerate the cultivation of new quality productive forces, actively adapt to the new wave of technological transformation, and improve the quality of innovation. By adhering to innovation-driven development and vigorously promoting new quality productive forces, firms can effectively enhance their value creation capacity. Second, firms should recognize that R&D investment and digital capability serve as key bridges linking new quality productive forces to firm performance. On the one hand, firms should continuously increase R&D investment and establish in-depth collaborations with universities and research institutions to enhance innovation efficiency and technological breakthroughs. On the other hand, firms should accelerate digital transformation by building professional teams and improving information management systems, thereby strengthening overall digital capability and creating favorable conditions for the cultivation and application of new quality productive forces. Third, from the perspective of government policy, it is necessary to develop and improve policy systems that support the development of new quality productive forces. Particular attention should be paid to providing targeted support for firms in heavily polluting industries, strengthening assistance for environmental technology upgrading, and promoting the simultaneous achievement of green transformation and improved firm performance. In addition, given the imbalance in regional development, differentiated regional policies should be implemented to facilitate the accumulation and application of new quality productive force elements in central and western regions as well as in less developed areas, thereby promoting coordinated and high-quality regional economic development.

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Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgment

This paper is an output of the science project.