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# *Studies on How New Quality Productivity Drives High-Quality Development of Enterprises*

**Chenxi Wu**[1,a,*]

[1]*School of Business, Macau University of Science and Technology, Macau, 999078, China*
*a. 1210002879@student.must.edu.mo*
**corresponding author*

***Abstract:*** New quality productivity plays an important role at the macro level, such as in society. But can its impact be observed at the micro level, such as within enterprises? This study builds an enterprise-level index for new quality productive forces and empirically examines its impact on high-quality development in organizations using financial information from A-share listed companies from 2012 to 2022. The empirical findings demonstrate that, at the 1% level, new quality productive forces significantly improves high-quality development in businesses. Robustness tests are performed to further support this finding, which involve substituting the dependent variable and removing anomalous years. To lessen the possibility of endogeneity problems resulting from missing factors or inaccurate measurements in explanatory variables, this study employs the instrumental variable method to mitigate these problems, yielding consistent estimation results. In the current societal context, the findings provide recommendations for further enterprise development. Enterprises should actively enhance technological innovation, improve talent development plans, and optimize management structures to ultimately achieve high-quality development.

***Keywords:*** New Quality Productivity, Total factor productivity, High-quality development.

## 1. Introduction

The concept of "New Quality Productivity" is an emerging idea that emphasizes innovation as the driving force, with a focus on liberation and development. The most distinctive feature that sets new quality productive forces apart from traditional productivity is its core reliance on technological innovation [1]. This concept embodies high efficiency, high quality, and high technology. Innovation is positioned as the primary driver of corporate development, forming productivity rooted in high technology. Technological innovation fundamentally reshapes the basic elements of productivity and propels enterprises towards more advanced and sophisticated states [2]. Enterprises, as the micro-foundations of economic operations, serve as crucial carriers of technological innovation and are key players in new quality productive forces.

As a crucial component of superior development of economics, the high-quality development of enterprises plays an essential role. It encompasses world-class competitiveness, reliability of quality with continuous innovation, brand influence, and advanced quality management concepts and methods [3]. Firstly, enterprises should possess international competitiveness, influence, and driving force. They must maintain a competitive edge across various economic cycles, consistently lead in economic efficiency, risk prevention, corporate governance, management standards, and talent

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development, and continuously succeed and create value in both domestic and international markets. Secondly, enterprises must adhere to a "quality first" approach, enhancing the quality of agricultural products, industrial products, as well as services and engineering. Thirdly, enterprises should create globally influential brands that align with the trend of personalized and diversified consumer demands. Finally, in order to fully increase the efficiency and quality of their products, businesses must implement cutting-edge quality management techniques and technology, creating a unique quality management system.

Productivity that satisfies the criteria for superior development in the new era is known as new quality productive forces. Emphasizing the increase of fresh, high-quality productivity along the course of economic and social development is essential to promoting high-quality development. According to Shi and Xu, the creation of new high-quality productivity can raise technological standards even higher, encourage industrial modernization and transformation, and eventually lead to high-quality economic growth [4]. As a manifestation of new quality productivity, digital new quality productivity offers fresh basic components for the basis of superior economic growth [5]. According to Shen, new quality productivity is a particular kind of advanced productivity in the modern period, with ongoing advancements in digital technology driving changes in production techniques and so enabling the creation of high-quality products and services [6]. New quality productive forces and superior development are inextricably linked; in fact, it is the primary motivator and fundamental prerequisite for encouraging superior development [7].

New productive forces not only play an important role at the macroeconomic level, such as in society, but also at the microeconomic level, such as in enterprises. These new productive forces are characterized by high efficiency, high quality, and advanced technology [8]. They drove enterprises to improve production efficiency, reduce costs, enhance competitiveness, and promote innovation, technological progress, and organizational reform. Traditional industrial structures were transformed and upgraded by new productive forces, which also spearheaded the technological innovation-driven comprehensive industry revitalization and encouraged the growth of high-tech and strategically important emergent industries. They provided traditional industries with new technologies and production models, enhance enterprise competitiveness, and drive the shift from low-end to high-end, achieving quality benefits and energy savings [9]. Essentially, new productive forces equate to competitiveness, with advanced productive forces forming core competitiveness. They enabled enterprises to seize strategic high ground, grasp industrial competitive advantages, and nurture and grow strategic emerging and future industries. They empowered emerging industries to build core competitiveness, thereby creating world-class brands and enterprises [10]. The development of new productivity enhanced the efficiency and coordination of industrial and supply chains through technological innovation and the application of new technologies [11]. Therefore, effectively developing and applying new productive forces has become crucial for the high-quality and sustainable development of enterprises.

This paper's marginal contributions in relation to previous research is a multitude of elements impact enterprise new quality productive forces, which serves as a catalyst for enterprise development. A theoretical model connecting enterprise new quality productivity and high-quality development is constructed in this study through empirical research, whereas most studies have been qualitative. An empirical examination of A-share listed businesses from 2012 to 2022 is also conducted.

## 2. Method

### 2.1. Data Source

The research sample for this paper is the Chinese A-share listed businesses' data from 2012 to 2022. Among the primary contents of the data are: (1) Data describing the new quality productivity of

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enterprises, which is obtained by selecting and calculating from the annual financial statements of A-share listed companies. (2) Information demonstrating the high-quality development of businesses, which is collected, organized, and calculated from relevant data in the CSMAR database. (3) Data for the control variables in this paper, which is sourced from the Wind database, with appropriate processing of the raw data. After processing, 31116 sample observations were obtained.

## 2.2. Variable Selection

### 2.2.1. Explained Variable

It has been established empirically that total factor productivity (TFP), which measures the overall productivity of all the components that make up an enterprise, is a key metric for assessing the high-quality development of businesses. The measurement technique developed by Levinsohn and Petrin, sometimes known as the LP method, is the main source of information in this article [12].

### 2.2.2. Explanatory Variable

New quality productive forces (Npro), as an emerging concept, is still in development, and its quantitative standards vary. This article builds the indicators for new quality productivity using the entropy technique and the quantitative requirements put forth by Song [13]. Table 1 displays the following indicators.

Table 1: Enterprise new quality productive forces index.

| Name | Definition | Weight |
|---|---|---|
| Labor force | / | / |
| Living labor 1 | Proportion of R&D staff salary | 26 |
| Living labor 2 | Proportion of R&D personnel | 2 |
| Living labor 3 | Proportion of highly educated personnel | 3 |
| Materialized labor 1 | Proportion of fixed assets | 1 |
| Materialized labor 2 | Percentage of manufacturing expenses | 1 |
| Means of production | / | / |
| Key & Core technology 1 | R&D depreciation and amortization ratio | 24 |
| Key & Core technology 2 | Proportion of R&D leasing costs | 13 |
| Key & Core technology 3 | Proportion of R&D direct revenue | 27 |
| Key & Core technology 4 | Proportion of intangible assets | 1 |
| Soft technology 1 | Total assets turnover | 1 |
| Soft technology 2 | Inverse of the equity multiplier | 1 |

### 2.2.3. Control Variable

This work chooses a collection of control variables (Controls), such as company size, financial leverage, ownership concentration, return on assets, and the growth rate of operating revenue, considering the possible influence of other factors on the correctness of the empirical results, as indicated in Table 2 below.

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Table 2: Definition of a control variable.

| Variable name | Variable symbol | Variable definition |
|---|---|---|
| Firm size | Size | Natural logarithm of the number of employees |
| Financial leverage | Leverage | Total liabilities / total assets |
| Concentration of ownership | Share | Share of top ten shareholders |
| Return on assets | Roa | Ratio of net profit to total assets |
| Growth rate of revenue | Growth | Growth rate of operating income |

### 2.3. Method Introduction

Based on the earlier theoretical research, to investigate the impact of new quality productivity on the superior development of businesses, this paper structures a multiple regression model for baseline regression testing.

$$\mathbf{TFP_{i,t} = \beta_0 + \beta_1 Npro_{i,t} + \sum Controls_{i,t} + \delta_I + \theta_F + \varepsilon_{i,t}} \quad (1)$$

Here, $i$ represents the firms, $t$ represents the year, and $TFP_{i,t}$ is the total factor productivity of enterprise $i$ in year $t$. $Npro$ is the core explanatory variable, $Controls$ represents the set of control variables, $\delta_I$ denotes industry fixed effects and $\theta_F$ denotes firms fixed effects. $\varepsilon$ denotes the arbitrary error term. $\beta_1$ is the main regression coefficient under investigation in this paper.

## 3. Result and Discussion

### 3.1. Statistical descriptions

The statistical descriptions for every variable are displayed in Table 3. The TPF has a mean value of 8.413, a maximum value of 13.144, and minimum value of 4.204, implying a significant difference in total factor productivity across different enterprises. Additionally, the maximum and minimum values of the core explanatory variable Npro also show considerable variation, indicating that the sample size selected in this study is quite extensive.

Table 3: Statistical descriptions for each major variable.

| Variable | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|
| TFP | 8.413 | 1.079 | 4.204 | 13.144 |
| Npro | 5.196 | 2.671 | 0.06 | 32.995 |
| Leverage | 0.43 | 0.303 | -0.195 | 31.467 |
| Size | 7.694 | 1.28 | 1.946 | 13.253 |
| Share | 0.578 | 0.152 | 0.013 | 1.012 |
| Roa | 0.04 | 0.142 | -2.285 | 12.211 |
| Growth | 0.23 | 6.023 | -0.999 | 944.1 |

### 3.2. Regression Results

Table 4 displays the results of the baseline regression. The direct analysis results for the firms' new quality productivity and overall factor productivity are displayed in Column (1). The regression results with fixed effects and control variables included are displayed in columns (2) and (3), respectively. Following the concurrent inclusion of control variables, industry and individual fixed

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effects, the regression outcomes are shown in Column (4). High-quality development and new quality productivity of businesses are positively correlated, as shown in Column (4). as evidenced by the coefficient of new quality productivity of enterprises, which is 0.0212 and considerably positive at the 1% level.

Table 4: Baseline Regression.

| Variable | (1) TFP | (2) TFP | (3) TFP | (4) TFP |
|---|---|---|---|---|
| Npro | 0.0331*** | 0.0365*** | 0.0183*** | 0.0212*** |
| | (16.62) | (17.44) | (10.73) | (11.42) |
| Leverage | | | 0.142*** | 0.0762*** |
| | | | (13.33) | (7.24) |
| Size | | | 0.519*** | 0.503*** |
| | | | (109.12) | (89.92) |
| Share | | | -0.246*** | -0.359*** |
| | | | (-8.12) | (-11.26) |
| Roa | | | 0.394*** | 0.358*** |
| | | | (20.74) | (19.51) |
| Growth | | | 0.00203*** | 0.00245*** |
| | | | (4.09) | (4.85) |
| Constant term | 8.121*** | 8.370*** | 4.377*** | 4.689*** |
| | (449.20) | (103.97) | (103.67) | (55.37) |
| Fixed effects | NO | YES | NO | YES |
| $N$ | 31116 | 31116 | 31116 | 31116 |
| $R^2$ | 0.0151 | 0.095 | 0.2525 | 0.316 |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
t statistics in parentheses

## 3.3. Robustness Analysis

### 3.3.1. Replace the Explained Variable

Enterprises' total factor productivity (TFP) can be measured in a variety of ways. The OP method, OL method, and GMM method are other often employed techniques in addition to the LP approach. Since the OP approach is superior in comparison, it is used in this study in place of the explained variable. Table 5 displays the results of the regression. The data in Column (5) indicates that the new quality productive forces of enterprises have a noticeable coefficient at the 1% level, which is 0.0374. The preceding conclusion—that new quality productivity has a beneficial influence on the high-quality development of businesses—is supported by this finding.

Table 5: Robustness analysis-Replace variables and remove abnormal year.

| Variable | (5) TFP (OP Method) | (6) TFP |
|---|---|---|
| Npro | 0.0374*** | 0.0220*** |
| | (20.23) | (10.41) |
| Constant term | 4.945*** | 5.045*** |
| | (58.47) | (36.69) |

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Table 5: (continued).

| | | |
|---|---|---|
| Control variable | YES | YES |
| *N* | 31116 | 19841 |
| $R^2$ | 0.178 | 0.316 |

### 3.3.2. Remove Abnormal Year

The study's sample years were marked by a notable impact on enterprise development because to the COVID-19 epidemic. Regression analysis was repeated and the enterprise data from 2020 to 2022 were removed to lessen the impact of unusual years on the study findings. Results are displayed in Table 5's Column (6). According to the regression results, the new quality productivity of firms has a coefficient of 0.022, which, at the 1% level, is statistically positive, and is greater than the regression coefficient of 0.0212 in Table 4. This implies that new quality productivity has an additional positive influence on the development of businesses high-quality after removing the anomalous years.

### 3.3.3. Endogeneity test

To lessen the possibility of endogeneity problems stemming from missing data or inaccurate measurements in explanatory variables, this study adopts the instrumental variable approach. Lagged first and second orders of the explanatory variables are respectively chosen as instrumental variables. According to the analysis results in Table 6, all the chosen instrumental variables' coefficients are noticeably positive, and the F-test values are much greater than 10, indicating exogeneity and strong relevance of these instrumental variables.

Table 6: Robustness analysis-Endogeneity test.

| **Variable** | **Lagged by one period** | | **Lagged by two period** | |
|---|---|---|---|---|
| | **First stage** | **Second stage** | **First stage** | **Second stage** |
| | **(7)** | **(8)** | **(9)** | **(10)** |
| | **Npro** | **TPF** | **Npro** | **TPF** |
| Npro | | 0.020** | | 0.025** |
| | | (3.22) | | (3.24) |
| Instrumental variables | 0.859*** | | 0.753*** | |
| | (69.00) | | (41.47) | |
| Constant term | 1.376*** | 3.572*** | 2.439*** | 3.573*** |
| | (7.92) | (24.50) | (7.64) | (21.01) |
| N | 16,615 | 16,615 | 13,524 | 13524 |
| $R^2$ | 0.7635 | 0.6063 | 0.6206 | 0.6062 |
| F test | 4762.16*** | | 1719.87*** | |

## 4. Conclusion

The surge in new high-quality productivity has given firms new momentum for high-quality development. High efficiency, superior quality, and cutting-edge technology distinguish new quality productivity from traditional productivity, propelling businesses into higher and more developed stages of growth. In China's modernization initiatives, encouraging the establishment of high-quality firms is also an important strategic priority. Considering this, examining how new quality productive forces spurs the superior growth of firms is very practical. Therefore, using financial information

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from A-share listed companies, this study examines how new quality productivity affects an enterprise's total factor productivity. According to the study, high-quality firm development is strongly encouraged by new, high-quality productivity. This finding holds true even when endogeneity is taken into consideration. Subsequent robustness tests reveal that changing the dependent variable has minimal impact on the outcomes, yet the significance of the conclusion is retained. Furthermore, data that takes out anomalous years shows how the COVID-19 epidemic has negatively impacted enterprise development. The conclusion is further supported by the regression results, which show that the influence of new quality productivity on superior development of firms is considerably more obvious when these years are excluded.

The findings of this study provide the following recommendations for accelerating high-quality development in enterprises:

Firstly. Strengthen Technological Innovation and Foster an Innovative Ecosystem for New Quality Productivity. Technological innovation is the main engine driving firm development and a critical component of new quality productivity. To do this, businesses must invest more in R&D, particularly in high-tech and core technology areas. This can be achieved by establishing dedicated R&D funds, technology innovation centers, R&D laboratories, and innovation incubators to provide a conducive environment and resource support for R&D teams.

Secondly. Enterprises should employ various channels to attract and cultivate high-end talent and develop comprehensive talent development plans. Targeted recruitment strategies should be devised to meet the needs of different positions and roles, ensuring that new hires can quickly integrate into the enterprise and utilize their expertise effectively. During daily operations, enterprises can enhance employees' professional skills and overall competence through internal training and job rotation programs. Additionally, enterprises should strengthen collaborations with universities and research institutions by establishing joint laboratories or research projects, thereby promoting the sharing and transfer of scientific achievements.

Thirdly. Enterprises should optimize their production management structures by incorporating advanced management concepts and production tools. Production and management processes can become more digital and intelligent by utilizing cutting-edge technology like big data and artificial intelligence and accelerating the digital transformation process, thereby continually improving production efficiency and product quality. Furthermore, promoting green development and emphasizing environmental protection and sustainable development are essential. Implementing green production practices, green design, and developing eco-friendly products and services can help establish a healthy corporate image. Through these measures, enterprises can foster the application of new quality productivity, enhance overall competitiveness, and attain high-quality development.

## References


[1] *Zhou Wen, Xu Lingyun. On New Quality Productivity: Connotations, Characteristics, and Key Focus Areas. Reform, 2023(10):1-13.*

[2] *Jiang Yongmu, Xue Weiran. System Framework and Path Design of New Quality Productivity Theory Promoting High-Quality Development. Business Economics and Management: 1-12 [2024-05-25].*

[3] *Zhao Jianbo, Shi Dan, Deng Zhou. Connotation Study of High-Quality Development. Economic and Management Research, 2019, 40(11):15-31.*

[4] *Shi Jianxun, Xu Ling. The Strategic Significance and Implementation Path of Accelerating the Formation of New Quality Productivity. Research on Financial and Economic Issues, 2024, (01):3-12.*

[5] *Ren Baoping, Wang Ziyue. Logic and Path of Digital New Quality Productivity Promoting High-Quality Economic Development. Journal of Xiangtan University (Philosophy and Social Sciences Edition), 2023, (06):23-30.*

[6] *Shen Kunrong, Jin Tongyao, Zhao Qian. Empowering High-Quality Development with New Quality Productivity. Nanjing Social Sciences, 2024, (01):37-42.*

[7] *Jia Ruoxiang, Wang Jiyuan, Dou Hongtao. Promoting Regional High-Quality Development with New Quality Productivity. Reform, 1-10 [2024-03-25].*

DOI: 10.54254/2754-1169/94/2024OX0217

*[8] Song Donglin, Lv Meixuan. Dialectical Thinking on New Quality Productivity and High-Quality Development of State-Owned Enterprises. Social Science Front, 2024(05):256-261.*

*[9] Wang Peng, Zhang Luyang. New Quality Productivity: A New Driving Force for Enterprise High-Quality Development. Enterprise Management, 2024(01):15-18.*

*[10] Huang Shanming. On the Productivity Foundation of the Evolution of Regional Core Competitiveness. Yunnan Social Sciences, 2004(4):47-50.*

*[11] Zhu Hongren. Playing the Main Role of Enterprises to Accelerate the Development of New Quality Productivity. Enterprise Management, 2024(03):6-8.*

*[12] Levinsohn, J., & Petrin, A. Estimating Production Functions Using Inputs to Control for Unobservables. The Review of Economic Studies.*

*[13] Song Jia, Zhang Jinchang & Pan Yi. Research on the Impact of ESG Development on Enterprise New Quality Productivity: Empirical Evidence from Chinese A-Share Listed Companies. Contemporary Economic Management.*