

Confucian Culture and Enterprise Total Factor Productivity

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Abstract: Enterprise total factor productivity is one of the important indicators to measure enterprise efficiency and innovation ability. This paper takes the a-share listed companies from 2005 to 2022 as the research sample, and empirically tests the influence of Confucian culture on the total factor productivity of enterprises. It is found that Confucian culture can significantly improve the total factor productivity of enterprises. Therefore, combined with the conclusion of this paper, it is suggested that enterprises should pay attention to inheriting and carrying forward the essence of Confucian culture in their operation and management, so as to realize long-term sustainable development and innovation-driven transformation.

Keywords: Confucian culture ,Total factor productivity, Informal institution

1. Introduction

China has now entered the ranks of middle-income countries. The existing economic development model driven by the release of demographic dividend, high investment growth and high export growth makes it difficult for us to break out of the "middle-income trap". We must devote ourselves to improving the efficiency of resource allocation, opening up the circulation channels of resources among enterprises, industries and regions, and promote the economic growth from speed to quality [1]. In particular, the level of total factor productivity is an important reflection of the growth mode from extensive to intensive, which can be a more comprehensive measure of high-quality economic development. For the first time, the report to the 19th National Congress of the Communist Party of China put forward the concept of "total factor productivity" in its report to the Party Congress, stressing the need to "promote reform in the quality, efficiency and driving force of economic development, and improve total factor productivity". The two sessions in 2021 also clearly pointed out that "we should strengthen the financial, legal and other guarantees of the real economy, and enable the high-quality development of the real economy". As China's economic development enters the new normal, it must rely on innovation to promote the improvement of total factor productivity in order to form a new driver of economic growth [2]. Therefore, it is particularly important to discuss how to improve the total factor productivity of enterprises and promote the high-quality development of the economy at present.

Some studies study the growth effect on total factor productivity in terms of market competition [3], digital finance [4] government policies, etc. [5], industrial agglomeration[6], digital transformation [7][8]but ignore the influence of informal systems such as culture on them. Culture is

the soul of a country and a nation, which has a significant and far-reaching impact on the social and economic development. Since the 18th CPC National Congress, the CPC Central Committee with Comrade Xi Jinping at its core has attached great importance to the inheritance and development of traditional culture. It is clearly proposed that the fine traditional Chinese culture should be promoted to the "gene of the Chinese nation" and transformed into a powerful spiritual force to realize the great rejuvenation of the Chinese nation. For Chinese society, Confucianism is the most extensive and far-reaching traditional cultural symbol. In addition, Confucian culture also has an important influence on the shaping of entrepreneurship and leadership style. Confucianism emphasizes the moral quality and norms of conduct, which affects the decision-making and management mode of entrepreneurs to some extent. The Confucian culture emphasizes the values of loyalty and integrity, and emphasizes the harmony between family and society, which will encourage entrepreneurs to pay more attention to employee welfare and social responsibility. Within the enterprise, it may be the concept of teamwork and common development. Therefore, companies may be inspired and influenced by Confucian culture values when building a team culture and enhancing employee cohesion, thereby improving productivity and overall performance.

Based on the above logic, a question that remains to be answered is: what impact will Confucian culture have on the total factor productivity of contemporary Chinese enterprises? To answer this question, this paper uses empirical research methods to explore the historical value of Confucian culture and investigate the relationship between it and total factor productivity. This work is helpful to expand the unique Oriental cultural perspective in the field of "culture and finance", and also provides a certain theoretical basis for carrying forward the excellent traditional Confucian culture.

2. Theoretical analysis and research hypothesis

Confucian culture originated from Confucius in the Spring and Autumn Period, and his thoughts played an important role in Chinese history. Since the promulgation of Emperor Wudi of the Han Dynasty to "dethrone all schools of thought and respect Confucianism alone", Confucianism has always been regarded as the orthodox thought by the feudal rulers, which has had a profound influence on the historical process and social changes of China. Confucian culture permeates into all levels of Chinese society, from the bottom to the people to the elite, becoming the ethics of "daily use without knowing"[9]. This influence is imperceptible, shaping the social development, national quality and value orientation.

The Confucianism advocated by Confucius, with "benevolence, righteousness, propriety, wisdom and faith" as the core, gradually formed a complete ideological system through the inheritance and development of his successors such as Mencius and Xunzi [10]. In the "contention of a hundred schools of thought" in the pre-Qin period, Confucianism experienced twists and turns, and even suffered the blow of burning books and burying Confucianism. However, after Emperor Wudi of the Han Dynasty adopted Dong Zhongshu's proposal of "Spring and Autumn Unity" and "dethrone all other schools of thought and respected Confucianism", Confucianism began to occupy a dominant position in Chinese society and lasted for more than two thousand years. In the Wei and Tang dynasties, metaphysics was once prevalent, but the regime of the Tang Dynasty was still dominated by Confucianism, and the moral behavior norms such as "Three Cardinal Principles and Five Constants" had a decisive influence on the whole society. In the Song Dynasty, Confucianism merged with Buddhism and Taoism, forming the Neo-Confucianism — Cheng and Zhu Neo-Confucianism, which became the main philosophical thought at that time. The Ming and Qing Dynasties were the flourishing times of Confucianism, and the influence of Confucian culture in the society was further deepened. Even in contemporary China, Confucian culture still plays an important role. For a long time, Chinese society has been deeply influenced by Confucianism, which has become a basic moral code that people consciously follow [9]. It not only shapes the thinking mode and behavior preference

of the Chinese people, but also penetrates into the operation and management of modern enterprises through the entrepreneur group, and has become an important spiritual pillar of China's modernization process. Therefore, Confucian culture is considered to be the "root" and "source" of Chinese culture, and has exerted an indelible influence on the cultural psychology, moral ethics, world outlook, outlook on life and values of the Chinese nation. At the opening meeting of the International Academic Symposium commemorating the 2565th anniversary of the birth of Confucius and the fifth General Assembly of the International Federation of Confucianism, Xi Jinping said that Confucianism is a theory that is suitable for governing the world, achieving the prosperous times, stabilizing the society and transforming the world. The problems in contemporary enterprise management can be traced back to the tradition of our culture to find solutions to the practical difficulties.

2.1. Analysis based on the logic of alleviating the agent problem

When studying the influence of Confucian culture on the total factor productivity of enterprises, we need to deeply analyze how the agency conflict suppresses the total factor productivity. Agent conflict refers to a conflict of interest or inconsistent goal between the agent (e. g. senior management) and the owner (e. g. shareholder) within the enterprise. The principal-agent theory provides a theoretical framework, and the theory proposed by Jensen and Meckling [11] mainly involves the shareholders and management, and the agency relationship between shareholders and creditors. The generation of agency problems and the representation in corporate governance are explained.

Agent conflict may lead to the following problems, thus affecting the productivity of the enterprise: First, the imbalance of resource allocation, and the interests of the inconsistency between shareholders and management. Management may lean more toward short-term benefits, while shareholders are more focused on achieving long-term value. This may lead to management bias in making investment decisions rather than maximizing the interests of shareholders. Management may overinvest in projects to expand the enterprise, but these projects may not be the optimal choices, thus wasting the resources of the enterprise. In addition, in terms of risk preference, shareholders may be more inclined to invest in high-risk and high-return projects, because they can get greater returns from corporate profits, while creditors are more concerned with the stability and solvency of the enterprise. This can lead to tension between shareholders and creditors, and even affect the financing ability and costs of enterprises. Management may also make decisions that are not in the interests of shareholders, resulting in decision conflicts. They will focus too much on their own interests and ignore the long-term interests of the enterprise [12]. This decision bias may lead to problems in strategic planning and implementation, which can affect productivity gains. Agent conflicts may also lead to problems of information asymmetry because management may be unwilling or will not disclose all information to shareholders. This may lead to a lack of understanding of the real situation of the enterprise, which enables shareholders to effectively supervise and manage the operation of the enterprise. Lack of transparency and information disclosure may hinder the effective shareholder supervision of enterprises, thus increasing the probability of agency problems [13]. These problems may lead to the waste of resources, decision-making mistakes, increased risk and the decline of governance efficiency, and then affect the productivity level of enterprises. Therefore, the effective management and resolution of agency conflicts is one of the keys to improve enterprise productivity.

Further, Confucian culture pays attention to the maintenance of traditional etiquette and authority, and emphasizes the "rites of father and son". The dissemination of this idea is conducive to the establishment of a clear hierarchical order and authority system within the enterprise. Employees know their responsibilities and roles clearly, and the guiding role of the management in the decision-making process will be more clear. This clear authority system may reduce the occurrence of agency problems, and then reduce the agency cost of enterprises. "The gentleman does his own way"

emphasizes the middle mean. This attitude makes the management more stable and heavy, and will not easily make impulsive decisions ", which may reduce the probability of agency problems. By avoiding conflicts, enterprises can better maintain the internal harmonious atmosphere and reduce the generation of agency costs. Confucian culture also advocates collectivism ideas, such as "self-serving" and "harmony is the most precious", to emphasize the harmony and common interests of the team. This is conducive to strengthening the cooperation and trust between employees, and forming a close team relationship. In such an environment, employees are more willing to share information, collaboration, and reduce the occurrence of agency problems. At the same time, the concept of collectivism also emphasizes the common interests, encourages employees to think about the interests of the whole team, and reduces the possibility of agency behavior. Therefore, the hierarchical order, the mean mean and collectivism thought in Confucian culture may alleviate the agency cost of enterprises, which is reflected in reducing the probability of agency problems, enhancing the stability of management and reducing the conflict between employees, and then reducing the agency cost of enterprises.

2.2. An analysis based on the logic of improving innovation ability

The relevant theories of research innovation and economic development can be traced back to the economic development theory proposed by Schumpeter in 1942[14], which emphasized the role of "creative destruction" in promoting the development of capitalist economy. Since then, in the endogenous economic growth theory, research and innovation activities have been regarded as the main factor determining technological progress and long-term growth drivers. Companies achieve this goal by reducing production costs, improving product quality, or creating new products [15][16]. According to Schumpeter's economic growth theory, the innovation of enterprises may lead to the flow of production factors from low productivity enterprises to high productivity enterprises, forcing low productivity enterprises to withdraw from the market, thus improving the productivity level of the whole industry [17][18][19]. However, based on the above theory, the increase of investment in enterprise innovation can effectively improve the total factor productivity of enterprises.

And the Confucian culture is rich in innovative ideas. Confucianism emphasizes the importance of knowledge, pays attention to learning and education, and advocates continuous progress."Is it not a pleasure to learn and to review or practice from time to time what has been learned?"Highlights the importance of continuous learning and practice. In enterprises, the spirit of continuous learning and continuous improvement is the key to driving innovation. This idea encourages employees to pursue the continuous improvement of knowledge and skills in the enterprise, and provides a talent base for innovation."Never do to others what you do not want others to do to you" also guides enterprises to respect employees and care about their needs and opinions, constantly improve the working environment and employee welfare in the process of innovation, and establish a good corporate culture and interpersonal relationship. This cultural atmosphere of caring for employees will stimulate the creativity and innovation consciousness of employees, and inject vitality into enterprise innovation. For the problem of agency, the Analects of Confucius also said: "the gentleman is not Zhou, the villain is not Zhou", emphasizing the quality of integrity and modesty. In an enterprise, leaders should set an example by constantly improving their character and ability, rather than comparing with others. This integrity and modest leadership style will win the respect and trust of employees, eventually establishing an efficient teamwork and innovative atmosphere. Confucianism emphasizes moral ethics and pays attention to individual responsibility and social responsibility. Such values help to build a good corporate culture and improve team teamwork and responsibility. Confucian culture contributes to the development of corporate innovation by developing innovative teams, emphasizing interpersonal relationships, and encouraging leaders to treat employees with

benevolence. This innovative idea ultimately has a positive impact on the total factor productivity of the enterprise. By improving the quality of employees, promoting teamwork and innovation practice, the enterprise has more competitive and sustainable development potential, which is directly conducive to the improvement of the factor productivity of the enterprise. Based on the above analysis, this paper puts forward the following hypothesis:

Hypothesis: Confucian culture has a promoting effect on the total factor productivity of enterprises

3. Research design

3.1. Sample selection and data source

In this paper, the a-share listed companies from 2005 to 2022 are selected as the research sample. The relevant data involving the listed companies are all from the National Taian CSMAR database. As convention, the sample data is processed as follows: delete the financial and ST companies; delete the companies with missing data and obvious abnormal data; shrink the main continuous variables at 1% and 99% to eliminate the influence of extreme values. After the above treatment, 20,445 sample observations were finally obtained.

3.2. Model setting and variable definition

$$TFP_{i,t} = b_0 + b_1Cul_{i,t} + Control_{i,t} + Year + Ind + \varepsilon_{i,t}$$

Model (1) for the benchmark model of this paper, the specific variables are defined as follows: the explanatory variables for total factor productivity TFP measured by FE method, the core explanatory variables for Confucian culture Cul, using 200 km around the enterprise Confucian academy plus 1 natural log, Control represents the control variables, including enterprise size (Size), asset-liability ratio (lev), cash ratio (cashr), profitability (roa), board size (bm) and proportion of independent directors (CI). Year and Ind are the controlled year and industry effect, respectively, and ε is the random error term.

Table 1: Variable definitions

Variable name	variable symbol	Variable definition
Total factor productivity	TEP	The determination was performed by the FE method
Confucian culture	Cul	The number of Confucian academies within 200km plus one natural log
scale	size	Log of total assets plus one
asset-liability ratio	lev	Total liabilities / total assets
cash ratio	cashr	Cash and cash equivalents / current liabilities
profitability	roa	Net income / total assets
Board size	bm	The number of board members
The proportion of independent directors	CI	(Number of independent directors / total number of the board of directors) 100%

4. Empirical test

4.1. Basic regression analysis results

Table 2 reports the regression results of foreign direct investment on enterprise total factor productivity, which verifies the influence of Confucian culture on enterprise total factor

productivity.(1) is listed as the regression result of not adding the annual and industry effect, (2) is listed as the regression result of adding the control variable but not controlling the annual and industry effect, and (3) is listed as the regression result of adding the control variable and controlling the annual and industry effect.

In all the above regression results, the coefficient of *clt* is significantly positive, and all are significant at the statistical level of 1%, indicating that with the addition of control variables or control accuracy and industry effect, the research hypothesis 1 is valid, indicating that Confucian culture can effectively improve the total factor productivity of enterprises. Also, the adjusted R for column (2) and column (1) compared to column (3)2Significantly improved, in line with the design idea of the gradual regression method. In terms of control variables, the coefficient of *size* is significantly positive at the level of 1%, indicating that the scale effect brought by the expansion of the enterprise assets can significantly improve the total factor productivity of the enterprise. The coefficient of *roa* is significantly positive at 1%, indicating that the high profitability of enterprises has a positive impact on the total factor productivity; the Capital coefficient is significantly negative at 1%, indicating that the unreasonable resource allocation will have a negative impact on the total factor productivity of enterprises, and the capital utilization efficiency of enterprises has an important influence on the total factor productivity. The other control variables results generally agree with the estimates of the existing relevant literature and comply with the expected results.

Table 2: Benchmark regression

variable	(1)	(2)	(3)
Cul	0.066*** (8.576)	0.008*** (7.054)	0.006*** (4.926)
Size		0.917*** (492.273)	0.906*** 413.564
lev		0.053*** (4.815)	0.037** 2.487
cash		-0.003** (2.189)	-0.004*** (2.688)
roa		0.978*** (109.209)	0.979*** (89.65)
bm		-0.009 (-1.462)	-0.014 (-1.537)
Capital		-0.123*** (-60.509)	-0.124*** (-47.852)
Bsize		-0.001 (-0.863)	0.004*** -2.996
rind		-0.009 (-0.327)	0.006 -0.193
_cons	10.699*** (244.794)	-9.262*** (-226.378)	-9.144*** (-203.310)
Year	N O	N O	Y es
Industry	N O	N O	Y es
N	20445	20445	20445
Adj.R ²	0.004	0.581	0.982

4.2. Robustness test

To increase the robustness of the conclusions, three measures were replaced in this study. The following tests were performed:

Replace independent variables. Reduce the number of Confucian academies. Take the number of Confucian academies within 100 km of the listed company location plus the natural logarithm of 1 as the independent variable; replace the dependent variable. TFP _ FE as the dependent variable model assumes that the effect of individual characteristics is fixed and not associated with observations. Therefore, replacing the dependent variable from TFP _ FE to TFP _ OLS can test the robustness of the model to unobserved variables. Third, change the sample range. Considering the impact of the epidemic on the economic impact, this paper selected the sample before 2020 to return again. From Table 3, the conclusion of this paper is still valid under the above robustness test.

Table 3: The robustness test

variable	(1)	(2)	(3)
	TFP_FE	TFP_OLS	TFP_FE
clt	0.004*** (4.135)	0.003** (2.355)	0.004*** (3.774)
sz	0.907*** (503.739)	0.881*** (441.753)	0.907*** (418.84)
tlta	0.038*** (3.112)	-0.014 (-1.036)	0.035** (2.419)
cashr	-0.002* (-1.681)	0.004** (2.338)	-0.004** (-2.443)
roa	0.983*** (102.629)	0.965*** (90.505)	0.978*** (87.56)
bm	-0.028*** (-3.557)	0.019** (2.192)	-0.029*** (-3.055)
CI	-0.124*** (-59.307)	-0.137*** (-71.345)	-0.124*** (-49.750)
Bsize	0.003** (2.501)	0.002 (1.58)	0.003** (2.382)
rind	0.00707 (0.27)	0.0325 (1.10)	-0.00749 (-0.26)
_cons	-9.115*** (-227.044)	-9.062*** (-194.335)	-9.103*** (-196.476)
Year	Y es	Y es	Y es
Industry	Y es	Y es	Y es
N	20445	20445	16445
Adj.R ²	0.983	0.979	0.982

4.3. Heterogeneity test

4.3.1. Heterogeneity analysis of enterprise size

The size of an enterprise often reflects its economic strength, market position and resource allocation. Large-scale enterprises usually have more capital, technology and human resources, and have more competitiveness and influence. By contrast, small businesses may be more flexible and more quick to adapt to market changes. In this paper, the sample enterprises are divided into two groups: large and small according to the median scale of the benchmark, and explore the heterogeneous influence of Confucian culture on enterprise total factor productivity under different scales. As can be seen from the columns (1) - (2) of Table 4, in small-scale enterprises, the regression coefficient of Confucian culture is significantly positive at the 5% level, but there is no significant relationship in large-scale enterprises, that is, the influence of Confucian culture on the total factor productivity of enterprises is more prominent in large-scale enterprises. This may be because large-scale enterprises themselves have a high efficiency of resource integration and innovation level, and the marginal effect of Confucian culture on such enterprises is not obvious.

4.3.2. Heterogeneity based on agency costs

The agency cost directly affects the agency relationship between shareholders and management, as well as between shareholders and creditors. The influence of Confucian culture on the total factor productivity of enterprises may produce different effects under different agency cost levels. This is because the Confucian culture emphasizes the values of loyalty, responsibility and integrity, which can to some extent reduce agency costs and improve the efficiency of agency relationships. With low agency costs, the cooperation between shareholders and management may be closer, and management is more likely to manage the business with a long-term perspective, rather than just pursuing short-term benefits. This helps to improve the total factor productivity of enterprises. Based on this, this paper measures the agency conflict of enterprises by the management expense ratio, and divides it into two groups: high agency expense and low agency expense according to the median management expense ratio. It can be seen from Table 4 column (3) - (4) that in enterprises with higher agent conflict, the regression coefficient of Confucian culture is significantly positive at 1%, but there is no significant relationship in enterprises with lower agent conflict, that is, the influence of Confucian culture on enterprise total factor productivity is more prominent in enterprises with higher agent conflict.

Table 4: shows the heterogeneity analysis based on agency costs and enterprise size

variable	(1)	(2)	(3)	(4)
	large-scale	small-scale	High proxy conflict	Low proxy conflict
	scale		general expenses	
clt	0.001 (0.915)	0.004** (2.495)	0.006*** (4.359)	0.000 (0.292)
sz	0.893*** (379.991)	0.869*** (167.96)	0.902*** (313.48)	0.902*** (447.238)
tlta	0.056*** (5.791)	-0.01 (-0.561)	0.022 (1).201	0.031** (2.41)

Table 4: (continued).

cashr	0.012*** (5.08)	-0.005*** (-2.825)	-0.004** (-2.425)	0.005*** (2.913)
roa	0.856*** (88.72)	1.112*** (30.738)	1.138*** (29.03)	0.861*** (84.546)
bm	0.006 (0.919)	-0.027** (-2.146)	-0.069*** (-6.142)	0.006 (0.715)
CI	-0.165*** (-41.398)	-0.107*** (-37.562)	-0.107*** (-35.463)	-0.160*** (-37.833)
Bsize	0.001 (1.155)	0.003* (1.708)	0.002 (0.94)	0.002* (1.924)
rind	-0.011 (-0.359)	0.025 (0.641)	-0.002 (-0.052)	0.009 (0.255)
Year	Y es	Y es	Y es	Y es
Industry	Y es	Y es	Y es	Y es
N	10223	10223	10223	10223
Adj.R ²	0.977	0.939	0.974	0.986

5. Conclusion

The results of this paper have some implications. China has experienced more than 40 years of rapid development, but the current domestic factor input has shown a downward trend. Resource factor dividend and labor dividend, the two traditional factor endowment structures supporting China's economic growth, are gradually weakening, and the variability trend of GDP is gradually becoming consistent with the growth rate of total factor productivity. A series of data show that the traditional extensive development model, which relied heavily on factor input in the past, is difficult to continue to promote sustained economic growth, so China's economic development has reached an important turning point. Relying on improving total factor productivity to promote high-quality economic development has become an inevitable choice for us to break through the bottleneck of development.

5.1. Pay attention to the inheritance and development of Confucian culture.

The success of modern enterprise management can not be separated from the role of corporate culture, which is a collection of core values, belief system and code of conduct within the organization. The Confucian culture advocates continuous learning and self-improvement, and the pursuit of all-round personal development. In an enterprise, such values can encourage employees to continue to learn, improve their skills, promote the innovation and progress of the organization, and promote the competitiveness and sustainable development of the enterprise. In addition, Confucian culture pays attention to the idea of the gentleman governing the country and the gentleman doing business, emphasizing that leaders should lead an example and convince others by virtue. In enterprises, this

idea can shape a corporate culture with high moral standards and leadership, encourage leaders to pay more attention to the development and well-being of employees, adopt a moderate and democratic leadership style, and promote the participation and growth of employees. Establish a team atmosphere of mutual trust and cooperation. This helps to alleviate the agent contradiction and reduce the conflict between the agent and the principal.

5.2. Strengthen the connection between enterprises and academies

Confucian academies are important places for the inheritance of ancient Chinese knowledge, which pay attention to the breadth and depth of knowledge. Through cooperation with the academy, the enterprise can obtain high quality knowledge resources, including Confucianism, classics and traditional culture, enterprises can draw lessons from Confucian values, into the enterprise culture, to guide employee behavior and decision-making, help enterprises to cultivate employees with comprehensive quality and values, form good professional ethics and enterprise values. This helps to build teams with common ideas and goals. What needs to be paid attention to by enterprises is that the cooperation between enterprises and Confucian academies should pay attention to the principle of equality, mutual benefit and mutual respect, so as to achieve real win-win cooperation. In addition, the influence of Confucian culture on factor productivity also needs to be considered comprehensively in combination with other modern management theories and practices, as different enterprises and cultural backgrounds may differ.

5.3. Improve the key of the total factor productivity:

Confucian culture is only a factor affecting the factor productivity of enterprises, while the actual factors affecting the factor productivity are very complex and are subject to the comprehensive effect of various internal and external factors. This paper finds that in addition to the influence of Confucian culture, there are also other key elements that need to be paid attention to, such as the overall size of the enterprise, the level of agency costs. The government can continue to improve the business environment, formulate a series of fiscal and financial support policies, simplify the administrative examination and approval procedures, and encourage enterprises to increase investment in R & D, technology introduction, innovation and entrepreneurship to reduce the start-up and operating costs. In addition, the government should establish a stable, transparent and predictable legal system, strengthen intellectual property protection and law enforcement, and provide a favorable environment for enterprises to invest and develop.

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