

The Impact of the Development of the Digital Economy on the Development of the Real Economy

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Abstract. This paper picks information from 31 parts of China between 2013 and 2022 to look at how the growth of online business impacts the development of real-world trading. A method called entropy was used to figure out how much each marker of growth in the internet economy should count. A method called linear weighting was used to combine different factors and create an index that shows the level of growth. Once the list was made, this study used linear regression analysis to see if the online business world has any effect on real economy. The findings show that the online business greatly impacts the physical or traditional business. Continuously making the online world better can keep aiding in the growth of real, physical world. This article recommends that governments should put more money into the online economy to aid long-term growth in a positive way for real businesses.

Keywords: Digital economy, real economy, China economy.

1. Introduction

Promoting high-quality growth of the real economy is a keystone for building a modern industrial system, and an important material foundation for building a modern and powerful country. Achieving high-grade development of the real economy is an inevitable requirement for realizing Chinese-style modernization. However, the current progress of China's real economy still has practical problems such as "complete but not refined, large but not strong", "unequal distribution of resource factors", and "slow green and low-carbon improvement", which are not beneficial to the high-quality development of the real economy [1].

According to the Statistical Classification of Digital Economy and its Core Industries, digital economy refers to using data resources as a key production factor, modern information networks as an important carrier, and the effective use of information and communication technology as a vital driver of enhancing efficiency and optimizing the economic structure. a series of economic activities. As a new driving force for my country's economic development, the digital economy can not only have a primary effect on the real economy through industrial digitization and digital industrialization development, thereby boosting the real economy, but it can also help regulate supply and demand in the production process of real industries and rationalize industries. structure, thereby promoting the optimization and development of China's economic framework [2]. Since the 18th National Congress of the Communist Party of China, developing the digital economy has turned into a national strategy. General Secretary Xi Jinping has repeatedly emphasized the necessity to continuously strengthen, improve, and expand China's tech-driven economy, promote the in-depth integrated growth of the digital economy and the physical economy, and expand new space for economic development. In the past ten years, the scale of China's digital economy has grown from 11 trillion yuan to 45.5 trillion yuan, and it now accounts for 39.8% of China's GDP, spawning various new industries, new business formats, and new scales. Practice has proven that the digital economy is an accelerator for the exceptional growth of the real economy, and the physical business is the foothold for the high-quality growth of the digital economy, and the organic integration of the two can form a synergistic effect of "1+1>2" [3]. As Tian Xiujuan and Li Rui state, On the one hand, the digital economy can improve productivity and promote long-term macroeconomic growth by synergizing with the real economy; on the other hand, the integration of the digital economy and the financial sector can eliminate a series

of problems such as information asymmetry, reduce funding restrictions, and thus facilitating the optimization and upgrading of the real economy structure [4].

In recent years, scholars have discussed the digital economy and the real economy. For example, Qian Pengcheng and Zuo Xiaohui examined empirically the overall effect of the online economy on the real economy and found that it has a positive role in boosting the real economy's development [5]. Pan Yaru and Long Limin examined the effects and mechanisms of the digital economy in driving the quality improvement of the real business from three dimensions of effect, mechanism and heterogeneity, and found that the digital economy has a considerable beneficial effect on the real economy, and this impact gradually increases over time [1]. Li Rong took the construction industry in Beijing as an example and found that the synergistic development of the digital economy and the construction industry can overcome its development obstacles [6]. Li Jianli and Yuan Miao believe that the organic integration and development of the digital business and the real business is an inevitable requirement for promoting high-quality development [3]. Jiang Song and Sun Yuxin believe that promoting the integration of the digital economy and the physical economy is the starting point of supply-side structural transformation [7]. Guo Han and Quan Qinhui believe that the expansion of the digital business has broadened the extension and connotation of the real business, expanded the growth potential of the real economy, changed the operation and business model of the physical economy, and effectively reorganized the factor resources in various fields of the real economy [8]. Hong Yinxing and Ren Baoping believe that data has triggered the deep synthesis of the cyber economy and the real economy and is reflected in the deep integration of technological innovation, industrial innovation, corporate organizational innovation, and ecosystem between the internet economy and the real economy [9]. Cheng Xuezhen and Gong Qinyi believe that digital technology has led to digital inclusive finance, thus promoting the outstanding growth of the real economy [10].

Based on the above literature, this article selects relevant panel data from 31 provinces between 2013 and 2022 to conduct an empirical investigation on the overall influence of the digital economy on the real business.

2. Research design

2.1. Data sources and variable selection

Taking into account data availability and usability, this article selects panel data from 31 provinces in China between 2013 and 2022. The data are all from the National Bureau of Statistics.

2.2. Explained variable

The core explained variable is the provincial growth level of the real economy (RE). According to the definition of Wang Dingxiang et al. the real economy includes all economic sectors that produce material products and spiritual products in the form of entity value, covering the primary, secondary and tertiary industries [11]. Deduct the real estate and financial industries portion. At the same time, referring to the research of Qian Pengcheng and Zuo Xiaohui, the GDP of each province is subtracted from the output of the financial industry and real estate industry, and the obtained data are logarithmically processed to obtain the explained variables [5].

2.3. Explanatory variable

The explanatory variable is the provincial development level of the digital economy (DE). In order to measure the growth level of the digital business, this study refers to the research of Pan Yaru and Long Limin, and given the accessible data, ten indicators are selected and processed through entropy value method to construct DE [1]. As shown in Table 1.

Table 1. Ten indicators

Indicator	Unit	Weights	Direction
Number of Internet fast access ports per 100 people	Number	0.0272	+
Number of Internet broadband access users per 100 people	Number	0.02739	+
Number of domain names per 100 people	Number	0.1778	+
Optical cable line length per 10,000 people	Number	0.0457	+
Average number of computers used by enterprises	Number	0.0606	+
Number of websites per 100 companies	Number	0.0049	+
Number of e-commerce transaction activities per 100 enterprises	Number	0.1154	+
Total telecommunications business volume	Hundred millions	0.1339	+
Total express business volume	Number of Packages	0.2498	+
E-commerce and total transaction volume	Hundred Millions	0.1574	+

2.4. Control variables

To control the impact of other factors on the real economy, this study draws on the variables selected by Qian Pengcheng and Zuo Xiaohui [5] and uses the same method to select the degree of fiscal decentralization, urbanization level, green coverage of built-up areas, sectoral composition, Consumption level and openness to the outside world are used as control variables.

2.5. Model settings

This article uses a linear regression model to perform an empirical analysis of the impact of the development status of the tech-driven economy on the development status of the real economy in each province. The formula is:

$$RE_{it} = \alpha_0 + \alpha_1 DE_{it} + \alpha_2 Control_{it} + \mu_{it} + \delta_{it} + \epsilon_{it} \quad (1)$$

RE is the explained variable, standing for the development level of the real economy in each province; DE is the explanatory variable, representing the development level of the digital economy; Control indicates a series of control variables; α_0 is a constant, and α_1 represents influence coefficient of the progress of the digital economy on the development of the real economy in each province. α_2 represents the influence coefficient of each control variable on the expansion of the real economy of each province; i represents 31 provinces; t represents the time from 2013 to 2022; μ, δ, ϵ represent random error terms.

2.6. Empirical analysis

2.6.1 Descriptive statistics

This article selects relevant data from 31 provinces from 2013 to 2022. After data processing, each variable sample data contains a total of 310 data. Perform descriptive statistics on each variable data, consisting of the sample number, minimum value, maximum value, mean and standard deviation of each variable. The specific results are shown in Table 2.

Table 2 shows that the sample size is 310 and there is no missing data. Among them, the minimum of the real economic growth level (RE) is 6.616, the maximum is 11.566, the average value is 9.691, and the standard deviation is 0.995, indicating that the real economic development level differs greatly between provinces. The provincial inequalities in the level of digital economy development (DE) are even more prominent. Among them, the minimum value is 0.034, the maximum value is

0.620, the average value is 0.123, and the standard deviation is 0.097. The difference between the maximum and the minimum value is significant.

Table 2. Descriptive statistics

Variable type	Indicator	Sample size	Minimum value	Maximum value	Mean	Standard diviation
Explained variable	Real economy development level	310	6.616	11.566	9.691	0.995
Explanatory variables	Digital economy development level	310	0.034	0.620	0.123	0.097
Control variables	Fiscal decentralization	310	0.069	0.931	0.472	0.194
	The level of urbanization	310	0.948	8.282	5.332	1.498
	Green coverage rate of built-up areas	310	18.10	49.80	40.18	3.668
	Industrial structure	310	0.347	0.839	0.511	0.084
	Consumption level	310	8.749	10.797	9.783	0.362
	Openness to the outside world	310	0.008	1.421	0.271	0.277

2.6.2 Regression analysis

Table 3. Regression Analysis

Variables	Real economy development level	Real economy development level
Digital economy development level	5.898*** (0.475)	4.408*** (0.450)
The level of urbanization		0.348*** (0.033)
Industrial structure		-6.198*** (0.521)
Green coverage rate of built-up areas		0.033*** (0.009)
Openness to the outside world		-0.583* (0.250)
Fiscal decentralization		0.185 (0.410)
Consumption level		0.652*** (0.139)
Constant	8.967*** (0.074)	2.823* (1.201)
Province fixed	NO	YES
Year fixed	NO	YES
Sample size	310	310
R Square	0.3316	0.7636

Comment: The numbers in parentheses represent robust standard errors, and the symbols *** and * represent $p < 0.01$ and $p < 0.1$ respectively, the same below.

Table 3 shows the exact findings of the study on regression. The first line shows the one-after-another matching results of how much more our digital economic system has grown and its effect on real-world business growth. The coefficient of online business coma on the real-world business is 5.898, which can be seen as an important and true result at a significant level of 1%. In simple words, each time the online economy goes up by 1%, it makes the real-world economy grow about 5.9%. The second column shows the general results of all factors' regression. The number that shows how the digital economy is growing is 4.408, and it's a big deal because we are sure of this result at least 99% of the time. In plain words, if the online business goes up by 1%, it will lead to a growth of 4.4% in how well real economy does. The results shown above tell us that helping the online economy to grow in different areas will be good for the growth of our own local economy.

3. Robust test

This article chooses the classic heteroskedasticity robust standard error to conduct robustness testing. Table 4 is the specific results. As shown in Table 4, the outcomes of each coefficient are consistent with the previous benchmark regression outcomes. Therefore, the robustness test proves that the conclusion is valid.

Table 4. Robust test

Variables	Real economy development level
Digital economy development level	4.408*** (0.511)
The level of urbanization	0.348*** (0.028)
Industrial structure	-6.198*** (0.494)
Green coverage rate of built-up areas	0.033*** (0.009)
Openness to the outside world	-0.583* (0.272)
Fiscal decentralization	0.185 (0.377)
Consumption level	0.652*** (0.141)
Constant	2.823* (1.252)

4. Conclusion

This paper chooses information from 31 areas in China over the years 2013 to 2022 and uses a way of studying change called regression analysis. It looks at how tech-based growth affects the level of development seen in other parts that rely on physical world trade or products, like manufacturing for example. Studies have shown that when the digital economy grows, it helps boost growth in our everyday trade. And if this online trade keeps getting even bigger, it will keep pushing forward real-world business progress too.

Based on the above conclusions, this article suggests that:

First, putting more money into building the basic setup for our internet economy to make it grow bigger. A good digital system is needed for the growth of a computer-based economy. Good roads, buildings and other useful things can be the start for fast growth of a tech-based economy. They also help to better back up high-quality progress in real life businesses.

Secondly, improving the relevant rules and structures to protect the growth of the online economy. The strong development of the online economy depends on a full system. Important areas should

hurry up and put in place the right laws and rules to guard the top-quality growth of our digital economy.

Thirdly, putting effort into growing skills to bring life and energy to the growth of the online economy. All schools and colleges must set up a skill building system for areas linked to the web market. This will bring in new talent which can then help boost growth in this type of economy.

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