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Commercial Credit and Corporate Productivity

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ARTICLE INFO	ABSTRACT
	As an important form of informal finance, commercial credit is widely used among enterprises. Does commercial credit promote the total factor productivity of enterprises? According to the theoretical literature and the reality, using the large sample data of Chinese industrial enterprises, the paper empirically tests the impact of commercial credit on the productivity of enterprises from three aspects: the provision and acquisition of commercial credit and the net commercial credit. The study finds that the provision of commercial credit reduces the productivity level of enterprises; the acquisition of commercial credit fails to promote productivity; while the net commercial credit as a short-term financial buffer for enterprises can alleviate the financing constraints, faced by enterprises, especially private enterprises, which help to increase their productivity levels . In addition, the study found that the higher the marketization process in the region, the more favorable the commercial credit is to the improvement of the production efficiency of private enterprises.

1. Introduction

Schumpeter [1] believes that financial development as an engine of economic growth is mainly reflected in two aspects: one is financial development reduces the transaction costs of investment, increases the liquidity of financial resources in the real economy, thus injecting financial capital resources into the entire economy. The other is the development of finance has improved the allocation efficiency of financial resources, which in turn has driven the rational flow of production factors and improved the production efficiency of the real economy. The improvement of productivity is the inexhaustible driving force and the ultimate source of economic growth. In China's more than 30 years of rapid development, a notable feature is the rapid development of economy with the lag of financial development or financial repression.

Financial development lag or financial repression has had a extremely negative impact on the development of Chinese enterprises [2-3]. Under the background that the formal financial system can not meet the development needs of enterprises, a large number of studies have discussed the important role of informal institutional arrangements to ease the financing constraints of enterprises, such as relationship networks, private lending, foreign direct investment, industry agglomeration, commercial credit and so on. Commercial credit is the short-term creditor-debt relationship formed by deferred payment or advance receipts, which is equivalent to a short-term financing given to the buyer's enterprise by the seller's enterprise. Commercial credit plays an important role in the development of Chinese enterprises. According to the statistics of industrial enterprises, the ratio of providing commercial credit to the total assets of enterprises is 10% between 2004 and 2007, and the proportion of accepting commercial credit to the total assets of enterprises is 8%.

A large number of scholars have made in-depth research on the motives and functions of commercial credit, but there are relatively few literature on the impact of commercial credit on the real economy. Fisman [4] created a precedent, based on survey data of manufacturing firms in five African countries, it found commercial credit can significantly improve production efficiency. Guariglia and Mateut [5] based on data analysis of 609 British manufacturing listed companies from 1980 to 2000, found that commercial credit has a positive effect on inventory investment, and explains the role of commercial credit in the actual operation of enterprises. Regarding China's research, Yu [6] studied the impact of commercial credit on the growth of private enterprises with the sample of private listed enterprises from 2006 to 2010. Zhang et al. [3] analyzed the effect of commercial credit on the growth of fixed assets of enterprises. Sun et al. [7] studied whether commercial credit can become an effective financing channel for enterprises. There are few studies on how commercial credit affects productivity directly in China, and the samples used are mostly based on listed companies. For example, Shi and Zhang [8] used data analysis of 176 listed companies in China from 1999 to 2006, and found that commercial credit can increase the level of input of production materials and promote the efficiency of scale by alleviating financing constraints. Since listed companies have more extensive financing channels than non-listed companies, they can obtain external funds through the issuance of stocks, which may lead to sample bias; and the sample size is limited and cannot represent most enterprises in China. In addition, similar literature have studied the impact of commercial credit gains on productivity as measured by accounts payable, and less on the impact of commercial credit supply on productivity.

Compared with the previous literature, this paper has the following innovations: Firstly, from the supply and demand of commercial credit and the net amount of commercial credit, this paper makes a comprehensive study of whether the use of commercial credit improves the productivity of enterprises, and refines the impact of different types of commercial credit on productivity. To provide some empirical evidence for understanding the role of informal finance in the development of private economy in the context of transition. Second, this paper uses a large sample of industrial enterprise databases, covering more than 300,000 enterprises in China, and nearly 40 companies in the dichotomous industry. Its output value accounts for 95% of China's total, which can be used as an effective sample for enterprises analysis in china and avoid the problem of sample selectivity deviation caused by the use of listed company data in previous literature.

2. Research Hypothesis

Commercial credit is a credit act formed by a business with business transactions due to deferred payment or advance receipts. Business credit includes two aspects of supply and demand, that is, to provide business credit and obtain business credit. In the process of production and operation, the enterprise becomes the provider of commercial credit by authorizing the downstream purchaser to delay payment, and also obtains the commercial credit provided by the upstream supplier due to the default of the account, and becomes the winner of the commercial credit. When a manufacturer provides commercial credit (measured by accounts receivable), it may also obtain commercial credit from its suppliers (measured by accounts payable). If the manufacturer provides and obtains commercial credit at the same time, the difference between obtaining commercial credit and providing commercial credit becomes the net commercial credit. From the perspective of funds, the net commercial credit can act as a short-term fund of the enterprise in a certain sense. The actual amount of funds obtained by the enterprise is the difference between the accounts payable and the accounts receivable corresponding to the credit.

2.1 Provision of Commercial Credit

Fisman and Raturi [9] proposed the competition hypothesis of commercial credit. They believe that commercial credit is a competitive means for suppliers. When encountering more competitors in the same industry, customers can easily find alternative suppliers. In order to avoid losing

customers, suppliers often lock their customers by providing commercial credit, maintain and strengthen the relationship with customers through different credit conditions to maximize their market share. The expansion of product sales has led to an increase in revenue and profits, enabling companies to upgrade their equipment, increase investment and production, and thus increase production efficiency. In addition, the provision of commercial credit as a preferential condition can expand market demand, and the increase in demand for product market is an important source of productivity improvement. Based on the above analysis, the research hypothesis 1a is proposed:

Hypothesis 1a: The provision of commercial credit by firms is conducive to raising productivity levels, that is, providing commercial credit is positively correlated with productivity.

Of course, in the face of market competition, companies with weak market power will often provide commercial credit. Providing commercial credit means that funds cannot be recovered in time, and capital turnover is hindered, which may hinder the production development of enterprises. In addition, enterprises providing commercial credit will face certain bad debt costs, resulting in the loss of bad debts due to the inability to recover the purchase price. At present, China's legal system is still not sound enough, the protection of creditors' rights in commercial credit relations is weak, the efficiency of law enforcement is low, the risk of default and breach of contract is high, causing great losses to enterprises.

Compared with state-owned enterprises, private enterprises are more difficult to obtain the preferential policies of the product market and factor market provided by the government (such as government procurement contracts), and they are in a relatively weak competitive position. Larger market competition pressure will encourage private enterprises to provide commercial credit to customers. And get a certain degree of competitiveness. For companies that have difficulty obtaining bank loans, the cost of providing commercial credit will be higher. Accordingly, the hypothesis 1b is put forward:

Hypothesis 1b: Business credit is not conducive to productivity improvement, that is, business credit is negatively correlated with productivity, and the degree of negative correlation of private enterprises is greater than that of state-owned enterprises.

2.2 Acquisition of Commercial Credit

Financing constraints affect inventory investment and R&D of enterprises. A company subject to financing cannot make optimal decisions about its operations when funds are insufficient, which may distort its resource allocation and reduce productivity. For enterprises that obtain commercial credit, commercial credit can serve as a short-term financing method for enterprises, which can alleviate the financing constraints of enterprises. Once the funds are alleviated, the company will increase fixed investment and R&D investment, expand the scale of the enterprise, and improve the production efficiency of the enterprise. In addition, obtaining commercial credit may shorten the waiting time in production, thereby increasing production capacity. Fisman [4] found that enterprises in developing countries face serious credit constraints, affecting the inventory investment of enterprises, resulting in insufficient inventory. Enterprises must wait for the completion of product sales before they enter the next production cycle to recover the purchase price and purchase raw materials. It will reduce the production efficiency of enterprises; the existence of commercial credits can allow enterprises to obtain raw materials through payables without waiting for the next production cycle, thereby improving the production efficiency of enterprises. In addition, some studies suggest that companies that establish long-term contractual relationships can use other resources for investment, increase the stability of their financing status, and reduce the cost and uncertainty of waiting for investment, if they are convinced that they can obtain commercial credit. Based on this, the research hypothesis 2a is proposed:

Hypothesis 2a: Obtaining commercial credit is conducive to increasing productivity, that is, obtaining commercial credit is positively correlated with productivity levels.

The cost of obtaining commercial credit is sometimes not lower than bank loans. Especially in the seller's market, suppliers conduct commercial credit through price discrimination. The longer the default period, the higher the amount of money the customer needs to pay, and the private enterprise in China. Under the credit discrimination of banks, in order to develop, they have to resort to higher-cost commercial credit. On the other hand, the author visited the company and learned that the commercial credits between enterprises are more for the purchasers because the funds are really tight and are unable to pay in cash. Therefore, enterprises with difficult capital turnover often use more commercial credit to maintain normal production operations. Based on this, the research hypothesis 2b is proposed:

Research hypothesis 2b: The more commercial credit obtained, the lower the productivity of the enterprise, that is, the negative correlation between commercial credit and productivity.

In addition, a company may also receive commercial credit from suppliers while providing business credit to its customers. From the perspective of capital purely, the

net credit obtained by the company minus the commercial credit provided is the part of the enterprise that is actually relieved. In theory, the demand for funds by private enterprises is more urgent, and this part of the funds is undoubtedly a charity for private enterprises, alleviating corporate funds, accelerating the normal operation of funds, and promoting enterprise production. Based on this, the research hypothesis 3 is proposed:

Research hypothesis 3a: The net commercial credit can promote the productivity growth of enterprises, and the effect on private enterprises is more obvious than that of state-owned enterprises.

3. Models, Variables and Data Description

3.1 Model Setting

Based on the research ideas of Gatti and Love [10], this paper incorporates commercial credit into the regression model of productivity influencing factors and obtains the equation:

$$lnTFP_{it} = \alpha_i + \beta TC_{it} + \gamma X_{it} + mincat + ind + year + \varepsilon_{it}$$

Among them, I and t denote enterprise and time (year), lnTFP represents the productivity of the enterprise, TC is the commercial credit, including the provision of commercial credit (represented by AR) and the acquisition of commercial credit (represented by AP), and the net commercial credit (Represented by NTC), α_i for the individual effect of the enterpris, min cat, ind and year are the region where the enterprise is located (control system background), industry and year. X is a control variable, including: corporate free capital (CF), bank loan (Loan), company size (Scale), business time (Age).

3.2 Variable Measurement

3.2.1 Measurement of Production Efficiency TFP

This paper uses the LP [11] method to calculate the productivity of enterprises, because the method uses the intermediate product input as the adjustable factor input when the enterprise is impacted by the productivity, and solves the endogenous problem of the enterprise investment to a certain extent, and is widely used in productivity research Use industrial added value to measure output, and use factory price index of industrial products to deflated. The net asset value of the fixed assets is used to measure the capital investment. The labor is measured by the number of employees in the whole year. The total amount of intermediate goods is used as the intermediate input variable. The capital and intermediate inputs are reduced by fixed assets investment price index and raw materials, fuel and power purchase price index based on 1997 respectively.

3.2.2 Measurement of Explanatory Variables

The key explanatory variables in this paper are commercial credit (TC), including vendor commercial credit provision (AR), commercial credit acquisition (AP), and commercial credit net (NTC). Drawing on the methods of Bougheas et al. [12] and Zhang et al. [3], using the accounts receivable/sales revenue to measure commercial credit provision, using accounts payable/sales revenue to measure commercial credit acquisition, (accounts payable - Accounts receivable) / sales revenue measures the net commercial credit.

The control variables include enterprise's own capital, bank loan, enterprise scale and operating time. Among them, the free capital (CF) variable refers to Guariglia et al. [13], using (profit + depreciation) / sales income measurement. In terms of the amount of bank loans, we use the method of Zhang et al. [3] for reference to select the annual interest expenditure of a single enterprise, because the interest rate in China fluctuates relatively small in a relatively short period of time, and the interest payment of enterprises can directly reflect the situation of enterprises getting loans, using the net interest expenditure of enterprises divided by sales. Sales are indirectly measured. Scale is the logarithmic value of total assets and Age, which is equal to the variable year minus the year of establishment plus.

3.3 Data Sources and Statistical Analysis

This paper uses the data of China's industrial enterprises published by the National Bureau of Statistics. Since the accounts payable for key variables have only been published since 2004, the data for the four years from 2004 to 2007 were selected as the final research samples, and the samples were screened preliminarily by using Cai and Liu [14] elimination methods. On the basis of this, in order to control the estimation bias caused by the outliers, the sample also excludes the 1% extreme value of the regression variable used (that is, the retention is between 1% and 99%). In addition, the focus of this paper is to compare state-owned enterprises with private enterprises, and further exclude other sample companies of ownership, and finally get 492,417 observation samples, of which 33,710 are sampled by state-owned enterprises and 458,707 are private enterprises.

Table 1 reports statistical indicators of major variables, with an average of 0.182 for accounts receivable (AR),

0.134 for accounts payable and - 0.050 for commercial credit. Table 2 further distinguishes the mean value of sample variables between state-owned enterprises and private enterprises. From table 2, we can see that the average productivity of state-owned enterprises is 6.863, which is lower than the average productivity of private enterprises 7.193, that is, the average production efficiency of state-owned enterprises in industrial enterprises is lower than that of private enterprises.

Table 1. Descriptive statistics of the main variables

	Obs	**Mean**	**Sd.**	**Min.**	**Max.**
lnTFP	492417	6.886	1.055	-1.995	13.7
AR	492417	0.182	0.174	0	0.765
AP	492417	0.134	0.155	0	0.739
NTC	492417	-0.050	0.193	-0.765	0.739
CF	492417	0.143	0.191	-0.122	1.329
Loan	492417	0.009	0.019	0	0.807
Scale	492417	9.512	1.305	4.4659	20.15
Age	492417	8.721	8.565	1	51

Table 2. Mean of the main variables

	State		**Private**	
	Obs	Mean	Obs	Mean
lnTFP	33710	6.863	458707	7.193
AR	33710	0.104	458707	0.187
AP	33710	0.095	458707	0.137
NTC	33710	-0.010	458707	-0.050
CF	33710	0.072	458707	0.148
Loan	33710	0.025	458707	0.008
Scale	33710	11.090	458707	9.396
Age	33710	21.550	458707	7.778

Whether providing commercial credit (AR) or obtaining commercial credit (AP), the average value of private enterprises is greater than that of state-owned enterprises. However, in the comparison of net commercial credit, the average value of private enterprises is slightly smaller than that of state-owned enterprises. According to the internal cash flow measured by CF, it can be seen that the average internal cash flow of private enterprises is higher than that of state-owned enterprises. The average bank loan value shows that state-owned enterprises have obtained more loans than private enterprises. Both the scale and the average operating years show that state-owned enterprises are higher than private enterprises.

Table 3. Commercial credit statistics of different types of enterprises

	Accounts payable		**Accounts receivable**	
	AP=0	AP>0	AR=0	AR>0
Private	20.12%	79.88%	8.58%	91.42%
State	20.46%	79.54%	12.67%	87.33%

In Table 3, AP=0 means no commercial credit is obtained, and AR=0 means no commercial credit is provided. It can be seen that no matter whether it is a private enterprise or a state-owned enterprise, nearly 80% of the accounts payable by the enterprise are more than zero, indicating that these enterprises in the course of operation to obtain commercial credit from suppliers, and about one-fifth of the enterprises did not obtain commercial credit. In terms of obtaining commercial credit, the difference between private enterprises and state-owned enterprises is very small. 20% of enterprises do not use commercial credit; but in providing commercial credit, private enterprises provide higher proportion of external commercial credit than state-owned enterprises. It is 91% and 87%.

Table 4. Distribution of commercial credit used by enterprises during 2004-2007

2004			**2005**		
	AP=0	AP>0		AP=0	AP>0
AR=0	5.32	5.06	AR=0	4.13	5.02
AR>0	10.93	78.69	AR>0	14.46	76.38
2006			**2007**		
	AP=0	AP>0		AP=0	AP>0
AR=0	4.53	4.86	AR=0	4.27	4.67
AR>0	15.94	74.68	AR>0	15.88	75.19

4. Empirical Results

In general, panel data regression uses fixed effects to control the endogenous problems caused by unobserved factors. However, the sample data used in this paper have a small time span and a large number of cross-sectional observations. If this kind of data is estimated with the commonly used panel data, it will overestimate the standard error and then underestimate the significance of the coefficient. Therefore, we need to adjust the standard error clustering [15]. So this paper will mainly rely on the regression results of OLS_Robust, and also report the results of

fixed effect (FE) to increase robustness.

4.1 Total Sample Regression

The first two columns in Table 5 show the impact of providing commercial credit on productivity. The AR coefficient is significantly negative, indicating that providing commercial credit reduces the productivity level of enterprises. For suppliers, providing commercial credit will crowd out the company's own funds, which is not conducive to the effective allocation of funds; if the company is difficult to obtain support from external funds (such as bank loans), it will even affect the normal production and operation of the company. This conclusion supports the research hypothesis 1b, which is also consistent with the views of Yu and Pan [16].

The third and fourth are listed as the impact of obtaining commercial credit on productivity, and the coefficient of AP is also negative under the two regression methods, indicating that the more commercial credits used, the lower the level of production efficiency. We believe that companies will be more inclined to delay the payment due to shortage of funds. The more arrears, the greater the financial difficulties and the lower production efficiency. Danielson and Scott [17] Supporting access to commercial credit is often a manifestation of corporate financial strain. The regression results verify the hypothesis 2b.

The fifth and sixth columns are the impact of net commercial credit on productivity, and the results using fixed effects and individual cluster regression are significantly positive. We believe that the net commercial credit is measured by the short-term financing obtained through commercial credit in the same period of the enterprise. The coefficient is significantly positive, indicating that commercial credit can be used as a financing method for enterprises to ease the financing constraints of enterprises.

The coefficient of own funds and bank loans is significantly positive, and the former coefficient is smaller than the latter, indicating that the productivity of enterprises is less affected by internal funds than external bank loans.

Table 5. Effect of commercial credit on production efficiency

Var.	Ols_Robust	FE	Ols_Robust	FE	Ols_Robust	FE
AR	-1.257***	-1.215***				
	(0.009)	(0.012)				
AP			-1.206***	-0.912***		
			(0.011)	(0.012)		
NTC					0.209***	0.150***
					(0.007)	(0.010)
CF	0.708***	0.433***	0.711***	0.438***	0.763***	0.451***
	(0.021)	(0.003)	(0.021)	(0.004)	(0.023)	(0.004)
Loan	0.957***	0.619***	0.963***	0.615***	1.115***	0.639***
	(0.218)	(0.032)	(0.220)	(0.032)	(0.272)	(0.032)
Scale	0.494***	0.371***	0.495***	0.356***	0.478***	0.332***
	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)
Age	0.046***	0.224***	0.032***	0.220***	0.034***	0.230***
	(0.001)	(0.005)	(0.002)	(0.005)	(0.002)	(0.005)
Constant	1.893***	2.727***	1.936***	3.368***	1.900***	3.271***
	(0.022)	(0.481)	(0.022)	(0.340)	(0.022)	(0.501)
Industry effect	control	control	control	control	control	control
District effect	control	control	control	control	control	control
Annual effect	control	control	control	control	control	control
Obs	492417		492417		492417	
R²	0.513		0.507		0.488	
Within R²		0.150		0.144		0.135
Between R²		0.337		0.308		0.256
Overall R²		0.333		0.304		0.253

Note: The values in parentheses are the standard deviation of the coefficients, ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively.

That is, corporate productivity is more sensitive to bank loans. Since our accounts payable variables have only been published since 2004, the study sample interval for this section is 2004-2007, and this period is in the monetary policy tightening phase, and the number of bank loans has declined. In this case, Businesses are more sensitive to bank loans, as the impact of bank lending on productivity increases or even exceeds internal cash flows. In addition, the coefficient of the scale variable is significantly positive, indicating that the larger the company size, the higher the production efficiency. The results also show that the productivity of enterprises is less affected by the length of business hours.

4.2 Distinguishing Ownership Types

For companies with different ownership types, the productivity effects of corresponding commercial credits also differ. We further distinguish between state-owned enterprises and private enterprises, and observe how the productivity effects of commercial credit differ among different ownership companies.

Table 6 reports the results of individual cluster regression. We find that whether it is providing commercial banks or obtaining commercial credit, the coefficients of state-owned enterprises and private enterprises are significantly negative, and the absolute value of state-owned enterprises is smaller than that of private enterprises. The net commercial credit of state-owned enterprises is positive, but the significance is poor, while the private enterprises are significantly positive. This shows that commercial credit can indeed act as a financing buffer for private enterprises, and the net commercial credit obtained can be regarded as a kind of Short-term financing channels provide a certain amount of financial support for the development of private enterprises.

The coefficient of the scale variable is small between the state-owned enterprises and the private enterprises, and both are significantly positive, and the absolute value of the coefficient is large, indicating that there is a scale effect in both state-owned enterprises and private enterprises. However, the coefficient of the business life variable is quite different between the two enterprises. Among them, the coefficient of the state-owned enterprise is significantly negative, while the private enterprise is significantly positive, but the absolute values of the two factors are small. This shows that the productivity level of state-owned enterprises may not

Table 6. Differentiate ownership type (OLS_Robust regression results)

Var.	State			Private		
AR	-1.063***			-1.268***		
	(0.038)			(0.009)		
AP		-1.089***			-1.203***	
		(0.048)			(0.011)	
NTC			0.058**			0.230***
			(0.026)			(0.007)
CF	0.860***	0.845***	0.917***	0.690***	0.694***	0.743***
	(0.206)	(0.203)	(0.220)	(0.020)	(0.020)	(0.021)
Loan	0.454***	0.457***	0.487***	1.266***	1.277***	1.507***
	(0.050)	(0.051)	(0.058)	(0.116)	(0.117)	(0.133)
Scale	0.544***	0.546***	0.537***	0.491***	0.490***	0.474***
	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
Age	-0.032***	-0.040***	-0.037***	0.068***	0.051***	0.056***
	(0.005)	(0.005)	(0.006)	(0.002)	(0.002)	(0.002)
Constant	1.947***	1.957***	1.905***	1.852***	1.912***	1.862***
	(0.080)	(0.081)	(0.083)	(0.023)	(0.023)	(0.023)
Industry effect	control	control	control	control	control	control
District effect	control	control	control	control	control	control
Annual effect	control	control	control	control	control	control
Obs	33,710	33,710	33,710	458,707	458,707	458,707
R^2	0.619	0.618	0.605	0.497	0.490	0.472

Note: The values in parentheses are the standard deviation of the coefficients, ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively.

show a significant improvement trend with the growth of enterprises, but it has a slightly weaker trend; while private enterprises have the opposite performance, the coefficient of business years is significantly positive. However, the absolute value is small, and there is a weak learning growth trend in the productivity changes of private enterprises. Companies with longer operating periods may have higher productivity, because private enterprises have stronger learning ability and can continuously improve productivity over time. In contrast, state-owned enterprises do not grow with business hours. And significantly improve the level of production efficiency.

Table 7 reports the results of the regression of the sample of state-owned enterprises and private enterprises by the fixed-effect panel model. Regardless of whether it is providing commercial banks or obtaining commercial credit, the coefficients of state-owned enterprises and private enterprises are significantly negative, and the absolute value of state-owned enterprises is smaller than that of private enterprises. Consistent with the results of using individual cluster analysis. The coefficient of net commer-

cial credit of state-owned enterprises has not passed the 1% significance level, and the coefficient is very small (0.008), while the coefficient of private enterprises is still significantly positive (0.171), indicating that the fixed-effect regression results also indicate commercial credit. As a short-term financing method, it can alleviate the financing constraints of enterprises. This effect is more reflected in private enterprises, while the performance of state-owned enterprises is not obvious.

4.3 Analysis of the Role of the Marketization Process

Will this positive impact of commercial credit on the productivity of private enterprises change with the development of marketization? In this regard, this section ranks the average marketization process indices of each region from 2004 to 2007, which are marked as high, medium and low marketization processes (including those with high marketization process including Guangdong, Zhejiang, Shanghai, Ten regions in Jiangsu, Fujian, Tianjin, Beijing, Shandong, Liaoning, and Chongqing; the

Table 7. The impact of commercial credit on production efficiency (FE regression results)

Var.	State			Private		
AR	-0.743***			-1.265***		
	(0.046)			(0.013)		
AP		-0.678***			-0.932***	
		(0.044)			(0.013)	
NTC			0.008			0.171***
			(0.0355)			(0.011)
CF	0.539***	0.531***	0.552***	0.422***	0.429***	0.441***
	(0.026)	(0.026)	(0.026)	(0.004)	(0.004)	(0.004)
Loan	0.270***	0.269***	0.268***	1.039***	1.035***	1.097***
	(0.046)	(0.046)	(0.046)	(0.049)	(0.049)	(0.049)
Scale	0.295***	0.295***	0.272***	0.372***	0.355***	0.332***
	(0.015)	(0.015)	(0.015)	(0.003)	(0.003)	(0.003)
Age	0.030*	0.024	0.030*	0.232***	0.231***	0.240***
	(0.017)	(0.017)	(0.017)	(0.005)	(0.005)	(0.005)
Constant	4.910***	4.898***	5.069***	3.159***	3.220***	3.455***
	(0.342)	(0.342)	(0.344)	(0.319)	(0.502)	(0.324)
Industry effect	control	control	control	control	control	control
District effect	control	control	control	control	control	control
Annual effect	control	control	control	control	control	control
Obs	33,710	33,710	33,710	458,707	458,707	458,707
firms	18,239	18,239	18,239	226,200	226,200	226,200
Within R^2	0.114	0.113	0.102	0.197	0.186	0.170
Overall R^2	0.334	0.340	0.301	0.183	0.191	0.192

Note: The values in parentheses are the standard deviation of the coefficients, ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively.

regions in the middle of the marketization process include Sichuan, Hebei, Anhui, Hubei, Hainan, Henan, Hunan, Jiangxi, Guangxi, and Jilin; the rest are Areas with relatively backward marketization, including Heilongjiang, Inner Mongolia, Shanxi, Yunnan, Shaanxi, Guizhou, Ningxia, Gansu, Xinjiang, Qinghai and Tibet, eleven regions.), and then according to equation (1) for each group Returning to test the difference in the impact of commercial credit on the productivity of state-owned enterprises and private enterprises in different institutional contexts.

Table 8 reports the groupings of different marketization processes. The productivity of the two types of ownership is affected by the net commercial credit. The results of state-owned enterprises show that the coefficient of commercial credit is not significant in the three regions; while the results of private enterprises show that the middle and high regions of the commercial credit marketization process can significantly promote productivity, only in the low region is not significant, and The absolute value of the coefficient of the high area is greater than that of the middle area, indicating that the positive promotion effect of commercial credit on the productivity of private enterprises will be enhanced with the development of the marketization process. This finding is similar to the conclusions of Zhang et al. [18]. They believe that the development of the marketization process has led to the shift of corporate R&D investment sources to commercial credit. In other words, the more developed the marketization process, the commercial credit between

enterprises is more conducive to the improvement of the production efficiency of private enterprises.

In addition, in areas with low marketization, corporate productivity is more sensitive to bank loans, especially for private enterprises. The relative performance of state-owned enterprises is not obvious. In addition, under different marketization levels, the influence of enterprise age factors on firm productivity is also different. The more the marketization process is, the more significant the coefficient of the variable Age is, and the larger the absolute value is. Among them, the coefficient of state-owned enterprises in the high area Age is 0.066, and the 5% significance level is 0.005 in the central area and not significant, and -0.024 in the low area is not significant; similarly, the private enterprise in the high area of Age The coefficient is 0.236, the middle zone is 0.155, and the high zone is 0.189, both of which pass the 1% significance level. It shows that the productivity of enterprises will increase with the increase of business time. Such changes are more obvious in areas with high marketization, especially in private enterprises.

5. Conclusions and Implications

Financing difficulties have become the bottleneck of enterprise development, but the private economy can maintain rapid development at a high level of production efficiency in the case of financing discrimination. How to solve this mystery? This paper attempts to analyze the impact of commer-

Table 8. Grouping regression in different marketization process areas

	State			Private		
	High	Medium	Low	High	Medium	Low
NTC	0.065	0.099	-0.074	0.206***	0.105***	0.018
	(0.065)	(0.063)	(0.068)	(0.012)	(0.026)	(0.046)
CF	1.395***	1.145***	1.511***	1.452***	1.044***	1.146***
	(0.091)	(0.081)	(0.107)	(0.011)	(0.016)	(0.043)
Loan	1.837**	1.030	1.972**	1.906***	2.374***	3.881***
	(0.897)	(0.828)	(0.975)	(0.125)	(0.213)	(0.605)
Scale	0.321***	0.272***	0.293***	0.399***	0.315***	0.394***
	(0.028)	(0.028)	(0.034)	(0.003)	(0.006)	(0.017)
Age	0.066**	0.005	-0.024	0.236***	0.155***	0.189***
	(0.033)	(0.030)	(0.033)	(0.006)	(0.009)	(0.022)
Constant	2.626***	5.385***	4.590***	1.941***	3.300***	2.568***
	(0.901)	(0.502)	(0.770)	(0.220)	(0.179)	(0.327)
Obs	12,673	12,985	8,052	329,819	104,228	24,660
Within R²	0.135	0.102	0.145	0.211	0.239	0.163
Overall R²	0.116	0.136	0.355	0.459	0.378	0.313
Number of firms	6,384	6,332	3,881	152,557	52,670	13,419

Note: The values in parentheses are the standard deviation of the coefficients, ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively.

cial credit on the production efficiency of enterprises from the perspective of informal credit channel of commercial credit and the sample of Chinese industrial enterprises from 2004 to 2007. In the research, this paper specifically distinguishes the mechanism of providing the supply and acquisition of commercial credit and the net effect of commercial credit on productivity, and draws the following conclusions:

For the total sample, the unilateral provision of business credit or the unilateral acquisition of business credit in 2004-2007 are not conducive to the improvement of production efficiency. We believe that in the short term, enterprises provide commercial credit to the outside world, resulting in a certain degree of capital occupation, thus hindering the improvement of their own production efficiency; the acquisition of commercial credit caused by deferred payment is often the performance of enterprise capital shortage and then inhibit the improvement of enterprise production efficiency. At the same time, the study found that the negative impact of the provision of commercial credit or the productivity of private enterprises is significantly greater than that of state-owned enterprises. However, as a short-term financing method for enterprises, the net commercial credit can alleviate the financing dilemma faced by enterprises to a certain extent, and thus improve their production efficiency. This phenomenon occurs more in private enterprises. In addition, the promotion of commercial credit to the productivity of private enterprises can show an increasing trend with the development of marketization process, indicating that the development of marketization process will help commercial credit play a positive role in the development of enterprises.

Generally speaking, under the circumstances of financing difficulties, the net commercial credit obtained from obtaining and providing commercial credit plays an effective buffer role for the financial constraints of enterprises, which is conducive to the development of enterprises' operation, and the improvement of institutional environment has further promoted this positive role. This study provides a reference for understanding the role of commercial credit in private enterprises, and also provides some empirical evidence for the role of informal finance in the development of enterprises to a certain extent.

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