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Empirical Research on the Influence of Export Market Diversification on Total Factor Productivity: Based on the Perspective of Trade Protection

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ABSTRACT

This paper mainly explores the impact of export market diversification as an important measure to deal with trade friction on firms total factor productivity. Firstly, this article focuses on the theoretical analysis of the impact mechanism, including risk diversification, reversal effect and spillover effect. Based on the sample data of Chinese manufacturing export enterprises from 2000 to 2007, this paper conducts an empirical test on the relationship between export market diversification and total factor productivity. The result indicates that export market diversification has a significant positive effect on the total factor productivity of enterprises. After considering the endogenous problem, by controlling the fixed effects, using the two-stage least square method and changing the duration of the sample for robustness analysis, the results are still consistent. In addition, the role of diversification policy in total factor productivity presents heterogeneous characteristics in terms of different types of enterprise ownership, export intensity, industry competition, trade methods, and the development degree of exporting market. Accordingly, this paper puts forward corresponding policy recommendations.

1. Introduction

At present, trade protectionism is increasing. The United States, Japan and other developed countries have imposed trade barriers on China. The outbreak of the Sino-US trade war in 2018 has further exacerbated economic downside risks facing China, and China's GDP growth rate in 2019 has dropped from 6.6% to 6%. Therefore, China urgently needs to take measures to reduce its over-reliance on certain markets and

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mitigate the negative impact of weak external demand. According to Chinese Customs statistics, the total export value in 2019 is 17.23 trillion yuan, of which the United States as China's second largest export market account for up to 16.7%, and China's top five exporting countries and regions account for 65.2% of the total export value, indicating that China's current export market structure is still relatively concentrated. Since the 1990s, China has always taken the diversification of export market as a national strategy to stabilize the risk of product export fluctuations. The 2019 "Report on the Work of the Government" has highlighted that "we should foster new strengths in international economic cooperation and competition, and work to diversify export markets." Given the current background of frequent trade frictions in China, the export fluctuation caused by external demand shocks will increase the downward pressure on China's economy. Therefore, implementing export market diversification is essential for stabilizing foreign trade and promoting steady economic growth.

Total factor productivity is not only an important measure of corporate performance, but also a variable which can reflect a country's economic development level and international competitiveness level. Whether based on a macro or micro perspective, the research on total factor productivity is of practical significance. At present, China is in a new period of economic transformation and upgrading, and international situation is becoming increasingly severe, so it is difficult to sustain the economic growth by simply increasing factor input, and innovation-driven development is fundamental. The "Report to the 19th National Congress of the Communist Party of China" has clearly pointed out that "China's economy has shifted from a stage of rapid growth to a stage of high-quality development and we should focus on increasing total factor productivity." From the micro level, the total factor productivity of an enterprise is a concrete manifestation of technological innovation capabilities, so the core of promoting high-quality economic development lies in the improvement of enterprise's total factor productivity. The diversification of export markets as a significant national measure for dealing with trade friction, aims to promote steady economic growth by stabilizing exports. However, export firms as the policy implementing subjects of the market diversification, still tend to export their commodities to the markets of some developed countries, which indicate that the diversification strategy has not been effectively implemented. Thus, exploring whether the export market diversification strategy can improve the level of Chinese enterprise's total factor productivity under the background of increasing trade protection is useful for promoting firms to implement diversification strategy, improving their own performance, and achieving high-quality economic development.

2. Literature Review and Mechanism Analysis

In recent years, a large number of scholars have focused on the influencing factors of total factor productivity. In addition, domestic and foreign researches on the diversification of export markets are quite abundant. This paper sorts out the relevant literature in turn, and summarizes the influence path of export market diversification on total factor productivity based on existing research.

2.1 Research on the Economic Effect of Export Market Diversification

On the economic effect of export market diversification, scholars mainly studied from the following aspects: Firstly, export market diversification can stabilize export fluctuations by reducing dependence on a single market[1], as export fluctuations are mainly caused by external demand shocks[2]. Companies expanding the export margin would inevitably face higher political risks and marketing costs[3], which may increase the risk of some companies failing[4]. Secondly, a series of cost changes brought about by opening up new export market can influence company's decision to enter or exit international market, and then it affects the efficiency of resource allocation among companies[5]. As an important national policy, market diversification has attracted much attention for its role in economic growth. Tongsheng Xu et al. (2008)[6] found that the increase in market development costs due to export market diversification can inhibit short-term economic growth, but in the long run, the improvement of diversification degree promotes economic growth by resisting external demand shocks.

2.2 Research on Influencing Factors of Total Factor Productivity

Many scholars have analyzed the impact of policy factors on total factor productivity at macro level, including industrial policy, trade policy, etc. China's current industrial policies are not inclusive, and government subsidies provided to inefficiency state-owned enterprises can exacerbate the mismatch of resources, which is not conducive to the improvement of total factor productivity[5]. Shenxiang Xie et al. (2017)[7] pointed out that anti-dumping barriers lead to the decline of total factor productivity of export enterprises by inhibiting its returns to scale and technological innovation. Academia generally believes that technological innovation and efficient resource allocation

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are internal factors that can promote the improvement of total factor productivity[8-10]. Some other literature hold that the uncertainty of economic policies affects companies' expectations of risks, causing companies to postpone R&D activities, which inhibits the increase in their total factor productivity[11-12]. On the other hand, some scholars concerned about the relationship between export trade and the total factor productivity starting from the micro level. Melitz (2003)[13] believed that the total factor productivity of export sector is higher than that of non-export sector, because export companies can gain advanced technology and fulfill economies of scope through international trade to stimulate productivity levels. Moreover, R&D investment is closely related to total factor productivity, which plays a positive role in promoting total factor productivity[9]. When factor market distortions and financing constraints cause the inefficient allocation of resources among enterprises, it will lead to the loss of total factor productivity[14-16].

2.3 The Influence Mechanism of Export Market Diversification on Total Factor Productivity

It can be seen from the above theories that a large number of current researches mainly focus on the influencing factors of total factor productivity and the direct economic effect of export market diversification. Research on the direct impact of export market diversification on total factor productivity is relatively scarce. In general, total factor productivity of China' enterprises can be stimulated through export market diversification strategy[8]. Xuefeng Qian et al. (2014)[17] concluded that there is a U-shaped relationship between total factor productivity and the diversification of export market, and China is currently on the left side of the U-shaped line. Based on existing research, three influence channels of this paper is proposed, so as to provide theoretical support for research in this field.

2.3.1 Risk Diversification Effect

In the process of implementing trade protection policy in developed countries, restricted export enterprises are confronted with weak market demand and export fluctuation, which can easily lead to distortions in the configuration of enterprises' factors, thereby it will hinder the level of productivity of enterprises[15]. Massol et al. (2014)[1] and Yabo Li (2018)[18] pointed out that market diversification can significantly reduce export volatility by diversifying risks. Therefore, it is easier to achieve economies of scale through the strategy of export market diversification[4], which is positively correlated with corporate performance, so companies will have sufficient funds for R&D expenditures. In addition, exchange rate appreciation and increased volatility risks not only bring about uncertainty in external market demand, but also reduce corporate R&D investment, thereby inhibiting corporate long-term productivity progress. An empirical study by Qiren Liu et al. (2017)[19] found that export market diversification is conducive to alleviating the adverse impact of exchange rate fluctuations on corporate R&D activities. The effectiveness of export market diversification in reducing export volatility is restricted by many factors, such as the scale of export[18], choice of export market[20], export duration[21] and institutional environment[22], etc. Export trade to developing countries has significantly promoted the improvement of total factor productivity in the eastern and central China[8]. Thus, it is conjectured that opening up new markets can promote the increase of total factor productivity under the risk diversification mechanism, but the actual effect may be uncertain, which is heterogeneous due to the differences in the institutional environment of the target market and the types of enterprises.

2.3.2 Reverse Effect

On the one hand, exporting products to multiple markets means that companies are facing diversified needs and fiercer competition. At the same time, they must pay high risk research costs and marketing costs to adapt to the needs of the destination country's market and related legal systems[4]. Fiercer competition and increasing costs can drive companies to carry out technological innovation[23]. The development of R&D activities is an important way to improve the technological level of enterprises, seeking to stimulate total factor productivity[24]. On the other hand, although the competitive pressure caused by export expansion has stimulated the innovation vitality of high-productivity enterprises, not all enterprises can overcome strong competitive shock[25]. Furthermore, the efficiency of R&D investment transformed into total factor productivity will be restricted by external factors, including government subsidies[16], credit allocation[24], etc. As highlighted by Ping Li et al.(2010)[26], the cost of imitation will increase further due to the intensification of competition, so low-productivity companies with higher financing constraints face the risk of bankruptcy. It is very likely to be forced to withdraw from the industry so that resources flow to high-productivity enterprises, and resource allocation is optimized to increase the total factor productivity of entire industry [13].

2.3.3 Spillover Effect

Companies can learn advanced experiences from other

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countries and gain technology spillover through export trade, which can accelerate their own technological innovation. Grossman and Helpman (1991)[27] believed that their firms' R&D innovation can be successfully promoted by imitating and absorbing the top technologies or knowledge of developed countries. Requester in the international market often have higher demands for product quality, so they tend to provide technical guidance or employee training to supply companies, which can improve the productivity of export companies[28]. Advanced technology and management experience in foreign markets can be diffused through international trade, which is conducive to stimulating the technological innovation efficiency and increasing the total factor productivity of export companies. Technological progress of the inferior export enterprise in turn drives first-mover enterprises to undertake new R&D activities, thereby realizing a virtuous circle. From the perspective of technology dissemination of foreign market to export companies, it is easier for companies to achieve technology spillover effect by expanding export destinations.

3. Models, Variables and Data

3.1 Model Setting

First of all, in order to examine the relationship between export market diversification and total factor productivity, this paper sets the following basic econometric model for regression based on existing theories and empirical research:

$$\ln TFP_{it} = \beta_0 + \beta_1 \ln gjexpnum_{it} + \beta_2 \ln scale_{it} + \beta_3 \ln age + \beta_4 \ln kl_{it} + \beta_5 \ln profit_{it} + \beta_6 tradereexch_{it} + \beta_7 \ln exp_{it} + \beta_8 izjpje_{it} + \beta_9 \ln rzys_{it} + \varepsilon_{it}$$

Where i and t represent company and year respectively. Specific explanations of the remaining variables are described below.

3.2 Variable Selection

3.2.1 Explained Variable: Total Factor Productivity (ln *TFP*)

In this section, the log value of total factor productivity is used as the dependent variable. First, we use the method proposed by Levinsohn and Petrin (2003) to calculate total factor productivity. The specific calculation process is as follows:

$$v_t = \alpha_0 + \alpha_l l_t + \alpha_k k_t + \omega_t + \eta_t = \alpha_l l_t + \phi_k(k_t, m_t) + \eta_t$$

Among them, $\phi_k(k_t, m_t) = \alpha_0 + \alpha_k k_t + \omega_t(k_t, m_t)$, t denotes time periods. v_t denotes value added. l_t, k_t and m_t denote labor input, capital input and intermediate input. The capital variables and output variables involved in the calculation process are measured by the value of fixed assets and industrial added value, and intermediate industrial input are used as a proxy variable, while fixed asset investment price index, the ex-factory price index of industrial producer and the purchase price index of fuel and power industrial producers are adopted to convert the above three variables (using 2000 as the base period). The total number of employees in the enterprise is used as a measure of labor input. The corresponding data are from Chinese Industrial Enterprise Database and National Statistics Bureau Website.

3.2.2 Core Explanatory Variable: Diversification of Export Market (ln *gjexpnum*)

We draw on and improve the practice of Huiwen Yi et al.(2014)[29], using logarithm of the number of export countries plus one as a measure of the export market diversification, in order to avoid too many missing values in the regression process.

3.2.3 Control Variables

In this paper, we selected the additional independent variables based on the previous research as follows:

(1) $\ln scale$ represents the size of enterprise, which is measured by the natural logarithm of the number of employees in the company.

(2) $\ln age$ represents the age of the enterprise, subtracting the year of establishment of the enterprise from the current year and add one, then taking the logarithm to get it.

(3) $\ln kl$ is the capital to labor ratio of the enterprise, which is obtained through deflating the annual average net value of fixed assets by using the fixed asset investment price index based on the year 2000 , and then dividing by the number of employees.

(4) $\ln profit$ represents corporate profit rate, which uses total profit divided by total assets, in order to measure enterprise's business performance.

(5) $tradereexch$ is trade-weighted real effective exchange rate. Previous studies have shown that fluctuations in the exchange rate level lead to changes in the relative prices of two countries' commodities, which affect the export behavior of enterprises. We use the approach proposed by Mi Dai and Bingzhan Shi (2013)[30] to calculate the effective exchange rate at the enterprise level according to the trade weight, the specific formula is as follows:

$$tradereexch_{it} = 100 \times \prod_{i=1}^{n} \left(\frac{e_{kt}}{e_{k0}} \times \frac{P_{CHt}}{P_{kt}}\right)^{w_{ikt}}$$

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Where e_{kt} represents the nominal exchange rate between RMB and k national currency at time t under indirect pricing method, this means that 1 unit of RMB is converted e_{kt} units of. k national currency, so the increase of e_{kt} under this measurement method indicates the appreciation of RMB; e_{k0} is the base period exchange rate, with 2000 as the base period. P_{CHt} and P_{kt} represent the consumer price index of China and the k country respectively, with 2000 as the base period. w_{ikt} is the trade share between the company i and the country k. The data are from the China Customs Import and Export Database, the UNCTAD database of the United Nations Conference on Trade and Development website and Penn World Table 7.1.

(6) $\ln exp$ is export trade value.

(7) *izjpje* represents the total price of imported intermediate products. The import of intermediate products can bring technology spillover effects to enterprises, which can help enterprises to increase their total factor productivity. In addition, the import of intermediate products to a certain extent can drive the export of enterprises.

(8) *rzys* is financing constraints. Companies facing a higher degree of financial constraints may reduce R&D investment, thereby inhibiting total factor productivity. This paper uses the proportion of company's total liabilities in total assets to measure the degree of financing constraints. The larger the value of the financing variable, the stronger the ability to raise funds and the lower the risk of capital interruption.

3.3 Data Description

China Industrial Enterprise Database and Customs Import and Export Database are used to collect the sample data from 2000 to 2007. We merge the two databases by firm name, and the matching samples were processed as follows: Excluding samples of companies with less than 8 employees. Eliminating the sample with zero or negative value in any of the annual average balance of net fixed assets, total assets, industrial intermediate input, fixed assets, total industrial output value, and industrial added value. Eliminating enterprises samples whose age is less than or equal to 0. Excluding samples with industry codes 06-11 and 44-46, and only retained manufacturing enterprises with export behavior.

4. Empirical Results and Analysis

4.1 Benchmark Regression

This paper first uses least squares method (OLS) to perform a full sample regression, whose regression results are shown in the first column of Table 1. Following upward, the second column reports the regression results after controlling for industry fixed effects, region fixed effects, and year fixed effects to eliminate the time trend of variables. The total factor productivity level has an inverse causal relationship with the choice of enterprise export behavior, including the choice of export markets quantity. In order to further improve the robustness of the results and avoid the endogenous problems caused by the two-way causality between variables, this paper selects the one-period lag of the number of export countries as an instrumental variable and uses the two-stage least squares method (2SLS) to perform a regression test, whose results are recorded in the third column of Table 1. It is difficult to observe the impact of export diversification on companies that have exited the export market due to the discontinuity of corporate export behavior. In order to reduce the possibility of bias in sample estimation coefficients caused by it, this article only retains samples of companies that have export behaviors for five consecutive years or more during the sample period for OLS regression, and the results are shown in column 4 of Table 1.

As illustrated in Table 1, the coefficient of the number of export countries in the OLS regression is significantly positive. Whether to control the fixed effects, to use the 2SLS method or to conduct a robustness test with a duration sample, the coefficient of the export diversification variable is still positive, and all pass the significance test at the 1% level. It means the increase in the export market diversification can obviously promote the improvement of enterprises total factor productivity. Overall, companies exporting products to more countries can improve their productivity level, which can be fulfilled through diversification of volatility risks, competitive incentives and technology spillovers.

Among the control variables in this paper, the estimated coefficients reflecting the internal characteristics of the enterprise are significantly positive, including enterprise scale, enterprise age and capital-labor ratio, which may benefit from firm's rich production experience and stronger resource organization ability, and the improvement of technical efficiency also contribute to higher productivity. The impact of external financing level and corporate profit rate on total factor productivity presents a positive effect, indicating that companies with strong financing capabilities and good operating performance can freely increase R&D funding to improve productivity, but the variable coefficients of these two variables in the fixed effects regression are significantly negative, which may be due to the unreasonable allocation of corporate funds, because the use of ample funds for projects with relatively poor growth results in low resource allocation efficiency. In addition, it can be found that trade-weighted real effective

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exchange rate level significantly promote the improvement of corporate productivity. Although the negative impact of external demand hinders the realization of the scale effect in corporate exports, the decline in product competitiveness forces companies to increase productivity through innovation. Thus, the actual effect of the exchange rate on productivity depends on the relative strength of price effect and reversal effect. Moreover, the total amount of imported intermediate products and export trade value are positively associated with total factor productivity.

On the whole, the coefficients of 2SLS regression variables are basically the same as the results of OLS regression, only the coefficients of enterprise age estimation are different. The results of OLS regression using duration samples are still robust and consistent with the results of OLS regression in full sample regression.

Table 1. Benchmark Regression Results

Independent variables	Total factor productivity			
	OLS	*FE*	2*SLS*	*OLS*2
ln *gjexpnum*	0.055***	0.045***	0.046***	0.056***
	(23.12)	(10.28)	(13.89)	(15.92)
ln *scale*	0.273***	0.122***	0.270***	0.255***
	(147.3)	(26.46)	(113.9)	(85.07)
ln *age*	0.015***	0.281***	-0.034***	0.047***
	(5.516)	(61.66)	(-8.658)	(9.999)
ln *kl*	0.170***	-0.012***	0.192***	0.212***
	(123.4)	(-4.123)	(109.9)	(97.81)
ln *rzys*	0.021***	-0.013***	0.025***	0.054***
	(9.359)	(-4.445)	(8.734)	(15.14)
ln *izjpje*	0.005***	0.006***	0.007***	0.007***
	(17.32)	(10.61)	(16.34)	(13.40)
tradereexch	0.045***	-0.002	0.037***	0.053***
	(9.735)	(-0.263)	(6.055)	(6.110)
ln *profit*	0.014***	-0.006***	0.024***	0.025***
	(17.65)	(-8.533)	(24.18)	(20.47)
ln *exp*	0.060***	0.097***	0.080***	0.093***
	(53.66)	(53.44)	(50.89)	(47.63)
C	2.110***	3.088***	1.900***	1.387***
	(84.20)	(70.19)	(56.62)	(30.67)
Industry effect	NO	YES	YES	NO
Region effect	NO	YES	YES	NO
Year effect	NO	YES	YES	NO
N	271784	271784	164111	101507
R2	0.1951	0.08312	0.2217	0.2524
F	7320.0	1790.3		3807.3

Notes: *, **, *** Significant at the 10%, 5%, and 1% levels. The t value of the estimated coefficient are in parentheses, same below.

4.2 Analysis of Heterogeneity

Considering that the relationship between export market diversification and the level of total factor productivity shown by different types of enterprises may be heterogeneous, we conduct group inspections on the samples, which were divided based on the type of enterprise ownership, the level of industry competition, export intensity, export trade methods and the development degree of export market.

4.2.1 Regression Results of Different Ownership Types

Table 2. Regression results of different ownership types

Independent variables	(1) State-owned enterprise	(2) Foreign enterprise	(3) Private enterprise
ln *gjexpnum*	0.042***	0.065***	-0.032***
	(5.356)	(21.91)	(-6.329)
ln *scale*	0.318***	0.253***	0.284***
	(64.53)	(99.75)	(70.76)
ln *age*	-0.097***	0.060***	0.048***
	(-15.17)	(15.21)	(8.554)
ln *kl*	0.158***	0.182***	0.121***
	(32.26)	(109.1)	(38.06)
ln *rzys*	-0.124***	0.051***	-0.087***
	(-13.26)	(18.90)	(-16.02)
ln *izjpje*	0.019***	0.007***	0.013***
	(18.87)	(16.76)	(17.58)
tradereexch	0.028**	0.020***	0.073***
	(2.205)	(2.849)	(9.889)
ln *profit*	-0.001	0.012***	0.052***
	(-0.272)	(11.88)	(30.16)
ln *exp*	0.060***	0.063***	0.083***
	(17.04)	(44.75)	(33.34)
C	2.102***	2.068***	2.047***
	(29.07)	(57.35)	(43.82)
N	30065	178303	51073
R^2	0.2740	0.1927	0.1989
F	1260.2	4729.2	1408.3

There are differences in the resources available to enterprises of different ownership types and their ability to withstand external shocks. Based on this, we divide the overall sample into state-owned enterprises, foreign-owned enterprises, and private enterprises according to ownership types, and carry out grouping tests to examine the role of export market diversification in enterprise productivity, whose results are recorded in columns 1-3 of Table 2 respectively. The results indicate that the level of total factor productivity increases with the expansion of the scope of export in state-owned enterprises and foreign-owned enterprises, but the regression coefficient of the export diversification in private enterprise group is significantly negative. This may be driven by more

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government subsidies, stronger financing capabilities and more reasonable choices of export market direction in state-owned enterprises, while private enterprises have a higher proportion of small and medium-sized enterprises, whose problem of financing difficulties is particularly prominent. As private companies lack the accumulation of export experience and are vulnerable to political risks in the new market, which result in the loss of total factor productivity.

4.2.2 Regression Results of Different Export Intensities

In view of the fact that the proportion of export trade volume of enterprises in overall sales may affect the relationship between export behavior and the total factor productivity of enterprises, this paper uses median export intensity within the sample as the boundary to divide the sample data into two groups of high and low for regression. From columns 1 and 2 of Table 3, it can be found that increased export diversification is accompanied by higher total factor productivity regardless of the export intensity of a company. In a comprehensive comparison, export market diversification has a more positive effect on total factor productivity in a sample of high export intensity. This result reflects to a certain extent that export trade is not the main channel to improve their business performance for companies with low export intensity, so there is not enough incentive to open up new markets, and the technology spillover effects obtained are limited. However, enterprises with high export intensity rely more on export trade and have sufficient motivation to integrate resources from multiple markets to achieve better resource allocation, making the effect of implementing market diversification strategies more obvious.

4.2.3 Regression Results of the Degree of Competition in Different Industries

It is likely that company's behavioral decision is affected by the competitive environment of the company's industry when it faces negative shock from external demand. Therefore, this paper is based on the degree of industry competition for group estimation. Therefore, we examine whether the effect of export market diversification on productivity varies with the degree of industry competition. In this section, Herfindahl-Hirschman Index (HHI) is used to measure the intensity of industry competition and a higher HHI indicates that the industry in which the company is located is less competitive. The regression results are illustrated in the third and fourth columns of Table 3, indicating that the estimated coefficients of export diversification variables are significantly positive in both groups. The results also show that the firms located in a less competitive industry have lower total factor productivity. As companies enter more export markets, they face more fierce competition than before and industry competition further aggravate the survival risks of firms, which result in a stronger desire to maintain competitive advantage and promote productivity through technological innovation. It can be said that the compelling effect of competition caused by the export market diversification is more obvious in companies with higher levels of industry competition.

Table 3. Regression results of different export intensity and industry competition

Independent variables	Export intensity		The degree of industry competition	
	Low intensity	High intensity	High competition	Low competition
ln *gjexpnum*	0.032***	0.038***	0.068***	0.036***
	(8.177)	(16.71)	(21.26)	(10.76)
ln *scale*	0.245***	-0.214***	0.220***	0.304***
	(97.39)	(-81.97)	(86.60)	(119.2)
ln *age*	-0.004	0.029***	0.022***	0.012***
	(-1.123)	(9.396)	(6.018)	(3.187)
ln *kl*	0.133***	-0.066***	0.135***	0.184***
	(65.00)	(-41.48)	(73.25)	(95.08)
ln *rzys*	-0.050***	-0.015***	0.010***	0.028***
	(-14.53)	(-6.453)	(3.287)	(8.567)
ln *izjpje*	0.020***	-0.009***	0.001	0.008***
	(45.83)	(-25.79)	(1.616)	(18.71)
tradereexch	-0.043***	0.022***	0.049***	0.032***
	(-7.407)	(3.867)	(7.987)	(4.847)
ln *profit*	0.027***	-0.006***	0.014***	0.014***
	(24.49)	(-7.834)	(13.11)	(12.04)
ln *exp*	0.102***	0.684***	0.068***	0.055***
	(64.93)	(291.3)	(43.55)	(36.05)
C	2.485***	-3.427***	2.394***	2.045***
	(78.83)	(-99.12)	(70.24)	(58.73)
N	135880	135904	141747	144292
R^2	0.2379	0.5004	0.1430	0.2280
F	4711.5	15125.6	2627.2	4733.4

4.2.4 Regression Results of Different Export Trade Methods

We examine whether the effect of export market diversification on total factor productivity is related to the way companies trade. To accomplish this, we filter out samples of companies that only engage in general trade and

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companies that only engage in processing trade for group regression, and the estimated results are listed in the first and second columns of Table 4. The results show that total factor productivity increases with the expansion of the scope of exports in enterprises engaged in general trade, if the firm is engaged in processing trade, export market diversification can inhibit the improvement of total factor productivity. The reason may be that enterprises engaged in processing trade mainly rely on cheap labor to obtain weak processing profits, and they lack the enthusiasm for R&D innovation and technological improvement compared with general trading enterprises, which makes it difficult to realize learning effect and return to scale in exports. Therefore, the cost of entering new markets is higher than the benefits for enterprises engaged in processing trade, resulting in a low level of productivity.

4.2.5 Regression Results of the Degree of Development of Different Exporting Markets

The relationship between export market diversification and total factor productivity may be different due to the different choices of the export market geographic direction. In order to eliminate the bias of the estimated coefficients caused by frequent entry and exit of enterprises from the international market, this article adopts enterprises sample that have been exporting for five consecutive years or more and divides the sample into two types according to the degree of export market development, and then we perform a group estimation. As illustrated in the third column of Table 4, the coefficient of export market diversification is not significant. This shows that the increase in total factor productivity caused by enterprise's export expansion to developed countries is not obvious. At the same time, regression results of the sub-sample of enterprises exporting to developing countries, the variable coefficient of the number of exporting countries is positive, and it has passed the significance test at the 10% level. This may be because of the improvement in total factor productivity caused by the technology spillover effects obtained from developed markets has been offset by the negative impact of the deteriorating trading environment. Furthermore, when companies begin to open up markets in developing countries, it can reduce their reliance on developed countries' technology and help stimulate their motivation for independent innovation. At the same time, it can reduce the risk of export fluctuations, which is conducive to the improvement of business performance. These all contribute to the improvement of total factor productivity. As the conclusion shows, expanding the export share of enterprises to developing countries is effective in improving total factor productivity.

Table 4. Regression results of different trade methods and the degree of development of export market

Independent variables	Export trade method		The degree of development of export market	
	General trade	Processing Trade	Export to developed countries	Export to developing countries
ln *gjexpnum*	0.011***	-0.020***	0.007	0.066*
	(2.878)	(-3.309)	(0.711)	(1.730)
ln *scale*	0.277***	0.248***	0.244***	0.282***
	(108.2)	(47.04)	(46.05)	(15.34)
ln *age*	0.002	0.036***	0.033***	0.014
	(0.671)	(4.633)	(3.980)	(0.545)
ln *kl*	0.099***	0.168***	0.174***	0.163***
	(46.44)	(48.93)	(46.84)	(10.72)
ln *rzys*	-0.043***	0.087***	0.060***	-0.0001
	(-12.14)	(18.09)	(10.80)	(-0.004)
ln *izjpje*	0.035***	0.034***	0.008***	0.018***
	(65.60)	(21.86)	(8.781)	(4.972)
tradereexch	0.051***	0.183***	-0.010	0.019
	(9.456)	(9.833)	(-0.485)	(0.423)
ln *profit*	0.021***	-0.011***	0.011***	0.024***
	(18.52)	(-6.038)	(5.299)	(3.024)
ln *exp*	0.051***	0.073***	0.046***	0.018*
	(33.01)	(25.97)	(15.82)	(1.833)
C	2.658***	1.018***	2.589***	2.738***
	(83.26)	(11.52)	(27.51)	(10.60)
N	124554	44285	36570	2448
R^2	0.1867	0.2066	0.1330	0.1575
F	3176.2	1280.7	623.2	50.66

5. Conclusions and Policy Recommendations

From the perspective of theoretical analysis, the implementation of export market diversification strategy can promote the improvement of total factor productivity through multiple channels such as diversifying the risks of export fluctuations, obtaining technology spillover effects, and forcing enterprises to conduct R&D and innovation. However, the inability of enterprises to bear the fixed costs of opening up new markets and competitive pressures will hinder the improvement of total factor productivity.

Based on the matching data of the China Customs Import and Export Database and the Industrial Enterprise Database, this paper selects a sample of manufacturing export enterprises from 2000 to 2007 to empirically test the relationship between export market diversification and corporate total factor productivity. The study finds that the degree of export market diversification has a sig-

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nificant positive impact on the total factor productivity of enterprises. After considering the endogenous problem, the regression results are still robust. The results of heterogeneity analysis indicate that the positive effect of export market diversification on total factor productivity is stronger in state-owned enterprises and foreign-owned enterprises, enterprises with higher export intensity, enterprises engaged in general trade, and enterprises with fierce competition in the industry. Among private enterprises and enterprises that only engage in processing trade, the increased diversification of export markets hinders the growth of total factor productivity. In addition, only exporting to developed markets cannot effectively promote total factor productivity.

In view of the conclusions of this paper, it is believed that China should continue to adhere to the export market diversification strategy to promote the improvement of firms total factor productivity and economic growth in the current environment where trade frictions are frequent and economic transformation is imminent. Secondly, due to the positive effect of export market diversification on total factor productivity is not applicable to private enterprises, China cannot blindly encourage all enterprises to adopt export market diversification strategy. At the same time, efforts should be made to improve financing environment for small and medium-sized enterprises, in order to alleviate the negative impact caused by corporate insufficient funds. Moreover, the government should focus on general trade exports and building a good business environment. Finally, considering that the marginal expansion of exports to developing countries has a more significant effect on the improvement of total factor productivity, firms should pay attention to the choice of export geographic direction, and the government should give appropriate policy guidance.

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