

The Impact of Subsidies on Export Behavior: Evidence from Jiangsu Manufacturing Enterprises

Lu Xu*

School of Economics and Management, Nanjing University of Science and Technology, Nanjing, China

*Corresponding author: 1171134060@qq.com

Abstract. A study is conducted on the causal relationship between subsidies and export scale of 16938 manufacturing enterprises in Jiangsu Province that were continuously operating in the Chinese industrial enterprise database from 2012 to 2014, using propensity score matching method and multiple difference method. The results indicate that subsidies have a positive impact on the export behavior of manufacturing enterprises in Jiangsu, that is, subsidies are beneficial for enterprises to expand their export volume and make export decisions. In addition, subsidies have a more significant promoting effect on the export behavior of enterprises that continuously receive subsidies than those that receive subsidies for the first time. Government subsidies can effectively improve the export behavior of manufacturing enterprises in Jiangsu, but the conditions for the government to increase the export scale of enterprises are limited. Therefore, building the competitiveness of enterprises is a necessary condition for Jiangsu manufacturing enterprises to enter the international market.

Keywords: Subsidizing PSM-DID Export Behavior Manufacturing Enterprise.

1. Introduction

China's manufacturing industry is an important pillar industry of the medium to high economy and holds a significant position in the global manufacturing industry. Meanwhile, with the advancement of reform, opening up, and globalization, China's manufacturing industry has undergone a transformation from scale expansion to quality improvement, continuously improving its position and role in the global manufacturing industry. As an important engine of the Chinese economy, the manufacturing industry in Jiangsu Province has developed rapidly and has become an important manufacturing base in China and even globally. According to the Jiangsu Statistical Yearbook, from 2005 to 2015, the manufacturing industry in Jiangsu Province developed rapidly, with a continuous increase in the number of enterprise units. In the past decade, there have been nearly 20000 more enterprises, indicating a strong growth momentum. Except for 2013, the total output value of the manufacturing industry has been increasing year by year, from 207.995 billion yuan in 2005 to 2467.681 billion yuan in 2015, and the industry has expanded tenfold.

In recent years, the global economic situation has been complex and ever-changing, with an increasing tendency towards international trade protectionism, which has brought certain challenges to the export of Jiangsu's manufacturing industry. However, Jiangsu's manufacturing exports still maintain strong resilience and competitive advantages, responding to changes in the external environment by exploring new markets, adjusting product structures, and improving technological levels.

Therefore, it can be concluded that the government's subsidy policies have played an important role in promoting China's export trade. This article aims to analyze the impact of subsidies on the exports of manufacturing enterprises in Jiangsu, mainly focusing on whether the enterprises export and the export volume.

2. Literature review

In the actual implementation process of policies, many factors such as institutional environment, government regulatory capacity for subsidy issuance and use, etc. may have a negative impact on this conclusion. Therefore, it is necessary to conduct empirical testing of the effectiveness of subsidies rather than relying on empirical research.

It is worth noting that some early scholars believed that subsidies were beneficial to the export behavior of enterprises regarding the relationship between subsidies and enterprise exports. Eckaus (2006) and Girma (2009) conducted empirical analysis on the impact of government subsidies on enterprise export trade, and the results both support the conclusion that government subsidies promote the development of enterprise export trade. Su Zhendong et al. (2012) investigated the correlation between productive subsidies and export behavior of enterprises, and found that productive subsidies have a positive impact on the export activities of both potential and incumbent export enterprises. Overall, productive subsidies have indeed had a positive promoting effect on the export behavior of Chinese manufacturing enterprises.

However, some scholars also believe that government subsidies have no impact on the export behavior of enterprises, and may even have a restraining effect. According to Bernard and Jensen's (2004) study, government fiscal subsidies implemented in various states of the United States do not have a significant impact on the export participation of potential businesses. However, for non export-oriented enterprises, government subsidies cannot promote them to start exporting. Zhang Jie et al. (2015) argue that government subsidies, as tangible hands, are not conducive to improving the quality of export products for enterprises. Helmers and Trofimenko (2010), starting from the complexity of the actual distribution process of subsidies, pointed out the potential negative effects of government subsidies that should not be underestimated.

By sorting and summarizing the above literature, the research direction of this article is guided. At the same time, by reviewing the relevant research of domestic scholars, it can be found that most of the current research on the export effect of subsidies is using the Chinese industrial enterprise database before 2010. In the enterprise database, there were more than 19000 Jiangsu manufacturing enterprises subsidized by the Jiangsu provincial government in 2014, with a subsidy amount of almost 51.6 million yuan. The number of enterprises receiving subsidies and the subsidy amount are constantly increasing. Based on the above analysis, this study will expand existing research from the following three aspects:

- (1) Focusing on manufacturing enterprises in Jiangsu Province with large export scale and good development prospects, with strong researchability;
- (2) Using the latest and high-quality Chinese industrial enterprise database data from 2012 to 2013, with sufficient sample size;
- (3) Using pairing method to overcome endogeneity problems, analyze the impact of subsidies on the export behavior of Jiangsu manufacturing enterprises, with a focus on the export scale and export decision-making behavior of enterprises.

3. Model construction and indicator description

3.1. Model construction

Accurately measuring the impact of subsidies on the export behavior of manufacturing enterprises in Jiangsu is not an easy task, and one important reason is that whether Jiangsu manufacturing enterprises receive subsidies is not a random event. Firstly, subsidies are influenced by the export behavior of enterprises, making it easier for the government to provide subsidies to exporting enterprises. In addition, subsidies and the export behavior of enterprises may be jointly influenced by third-party factors. For example, enterprises with research and development activities may be more susceptible to government subsidies and have a greater tendency to export. Therefore, whether Jiangsu manufacturing enterprises will accept subsidies is a non random event and an endogenous

variable. Therefore, this article learns from the research methods of previous scholars and intends to use the propensity score matching difference-in-difference method to overcome endogeneity problems.

Studying whether government subsidies have a promoting effect on enterprise exports cannot directly compare the differences in export behavior of subsidized enterprises before and after government subsidies, but should adopt a causal inference framework. Drawing on the research of Heckman (1997) and Smith&Todd (2005), the treatment variable s_i is defined, where t is a dummy variable that determines whether a company receives government subsidies. If company i receives government subsidies during period t , it is considered as a treatment group $sub_{it}=1$, otherwise it is considered as a control group $sub_{it}=0$; The result variable y is defined as the export variable of the enterprise, where y^1 and y^0 represent exports under subsidy or not. The average processing effect (ATT) of subsidies on the enterprise's exports can be defined as equation (1):

$$ATT = E(y_{it}^1 - y_{it}^0 | sub_{it}=1) = E(y_{it}^1 | sub_{it}=1) - E(y_{it}^0 | sub_{it}=1) \tag{1}$$

In equation (1), $E(y_{it}^1 | sub_{it}=1)$ represents the export situation of the subsidized enterprise while receiving subsidies, and $E(y_{it}^0 | sub_{it}=1)$ represents the export situation of the exporting enterprise without receiving subsidies.

In real economic life, the export situation of subsidized and unsubsidized enterprises may not be the same when both are not subsidized, and the ability of enterprises to receive subsidies will also be affected by various factors, such as their own market survival ability and business performance. Therefore, the main approach to solving this problem is to perform propensity score matching.

For the propensity score matching (PSM) method used, first calculate the conditional probability of each enterprise receiving government subsidies based on their covariates, which is the propensity score value (PS value); Then, based on the PS value of the enterprise, match according to different standards to estimate the average processing effect (ATT) of government subsidies on enterprise exports, which is calculated using equation (1). Although the PSM method can make the observable covariate X_{it} of enterprises as similar as possible, there may still be some unobservable factors that are not affected by time changes, such as laws and regulations. Therefore, before government subsidies are issued, there may be significant differences in exports between the processing group enterprises and the control group enterprises, which are allowed in the Difference in Differences (DID) method due to individual effects of enterprises that do not change over time. Therefore, considering the combination of double difference method and propensity score matching method can comprehensively evaluate the impact of government subsidies on enterprise exports. The specific estimation equation is as follows:

$$y_{it} = \beta_0 + \beta_1 sub_i + \beta_2 Post + \beta_3 sub_i \times Post + \varepsilon_{i,t+s} \tag{2}$$

In equation (2), $Post$ is a time dummy variable, $Post=0$ represents the period before the enterprise receives subsidies, $Post=1$ represents the period after the enterprise receives subsidies, 0 is a constant term, and is a random perturbation term. Indicates the difference between the treatment group and the control group before the subsidy occurred; Indicates the changes in a company's exports over time; To test the effectiveness of subsidies, variable D is defined in the empirical analysis section to represent the interaction term, β_3 measuring the true impact of subsidies on the exports of manufacturing enterprises in Jiangsu. If $\beta_3 > 0$, it indicates that subsidized enterprises are more conducive to exports compared to non subsidized enterprises. In this case, the ATT of subsidies on enterprise exports can be expressed using equation (3):

$$ATT^{[PSM-DID]} = [E(y_{i,t+s}^1 - y_{i,t-1}^1 | sub_{it}=1)] - [E(y_{i,t+s}^0 - y_{i,t-1}^0 | sub_{it}=0)] \tag{3}$$

In summary, this article will first use pairing methods to form a random sample, so that the observable factors X_{it} of subsidized and unsubsidized enterprises are as similar as possible, thereby overcoming endogeneity issues. Then, in the paired random sample, equation (2) will be used for multiple regression analysis to control for unobservable factors and time fixed effects.

3.2. Date

The data for this study comes from the "China Industrial Enterprise Database" from 2012 to 2014. The sample size of the industrial enterprise database is very large, mainly requiring data on exports, subsidies, and variables that affect subsidies and exports of manufacturing enterprises in Jiangsu Province.

According to relevant literature, the main variable selected is the logarithm of the value of enterprise exports, $\ln ex$. In order to make the data $\ln ex$ effective for enterprises with export value EX of 0, $\ln ex = \ln (EX+1)$; Dex is a dummy variable, with export enterprise set to 1, otherwise set to 0; Sub refers to selecting the subsidy income indicator from the Chinese industrial enterprise database as the standard for measuring whether a company accepts subsidies. The dummy variable for whether a company receives subsidies is sub, with 1 for the subsidizing company and 0 for others; Post is a time dummy variable, with a year greater than 2012 being 1, otherwise it is 0. In addition, the core explanatory variable D is introduced, with the treatment group set to 1 and the control group set to 0. Other variables that affect subsidies and exports are selected based on relevant literature indicators as follows:

(1) The production scale SIZE of the enterprise. According to the New New Trade Theory, the larger the scale of an enterprise, the easier it is to achieve economies of scale, and the lower the production costs of the enterprise, which will be more conducive to its exports; At the same time, the larger the production scale of a company, the greater its impact on the economy, and the stronger its lobbying ability towards the government, making it easier to receive subsidies. This article uses the logarithmic value of the total assets index of enterprises in the Chinese industrial enterprise database to measure it.

(2) The asset liability ratio DEBT of the enterprise. Enterprises with high debt to asset ratios may face greater financial risks and debt repayment pressures. When considering whether to provide subsidies, the government may take into account the financial stability and debt paying ability of enterprises. If the asset liability ratio of a company is high, the government may consider that the company has already borne a significant debt burden and has high financial risks, and therefore may be unwilling to provide subsidies. Enterprises with lower asset liability ratios may have stronger financial strength and stability. When selecting subsidy recipients, the government may be more inclined to choose enterprises with lower debt levels to ensure the safety and effectiveness of capital investment. This is because companies with lower asset liability ratios may have a better ability to cope with market fluctuations or economic uncertainty, and are also better able to undertake additional resource investments. Therefore, the asset liability ratio of enterprises may have an impact on whether the government provides subsidies to them. A high debt to asset ratio may increase the government's concern about financial risks of enterprises, while a low debt to asset ratio may enhance the government's recognition of the financial strength and stability of enterprises. This article adopts the ratio of the total year-end liabilities to total assets of enterprises in the database as the measurement standard.

(3) Return on Assets (ROA) of the enterprise. A high return on assets indicates that a company's asset utilization efficiency is relatively high. When considering subsidies, the government usually focuses on the performance and benefits of enterprises. If the asset return rate of a company is high, it indicates that the company can effectively convert assets into profits and has good business capabilities and competitiveness. In situations where resources are limited, the government may be more willing to support companies that have already demonstrated good business performance. In addition, high asset returns may reflect a company's innovation and technological strength. The government usually considers factors that promote innovation and enhance industrial competitiveness in subsidy decisions. If the ROA of a company is high, it indicates that the company has achieved success in utilizing its own technological and innovative advantages. The government may tend to provide subsidies to such enterprises to encourage their further development and promote the innovation capabilities of the industry. This article uses the ratio of year-end net profit indicators to total assets in the database as the measurement standard.

(4) The human capital level of the enterprise HC. Although a high level of human capital indicates that the higher the per capita wage, the lower the competitiveness of the enterprise's export prices, and is not suitable for export, a high level of human capital also reflects the quality and ability of the enterprise's employees. When considering subsidies, the government usually focuses on talent development and skill enhancement for enterprises. If a company has a high level of human capital, it indicates that its employees possess high professional knowledge and skills, which can bring higher production efficiency and competitiveness to the company. The government may tend to support enterprises that focus on cultivating human capital to promote the improvement of labor quality and economic development. This article uses the average salary obtained by dividing the total salary by the total number of employees, and measures it by taking the natural logarithm of the average salary.

(5) The financing constraints of FCS for enterprises. According to the research by Yu Hongxia et al. (2011), the greater the financing constraints of a company, the less likely it is to overcome fixed and variable export costs, and thus the less likely it is to export: the greater the financing constraints of a company, the easier it may be for the government to subsidize it in order to alleviate financing constraints. This article uses the ratio of year-end accounts receivable to total sales of enterprises to calculate.

(6) The holding situation of the enterprise is Private. Firstly, the proportion of national capital, foreign capital, and personal capital investment to paid in capital in the database is used to generate the national capital proportion (state), foreign capital proportion (foreign), and personal capital proportion (private). Next, according to Hsieh&Song's (2015) approach, a dummy variable Private is added. If the personal capital proportion is greater than 0.25, it is defined as a private enterprise with a value of 1, otherwise it is defined as 0. Generally speaking, the more state-owned capital there is, the stronger the domestic market monopoly power of the enterprise, the less likely it is to export, and the easier it is to obtain subsidies. The more foreign capital a company has, the stronger its motivation to use China as an export platform, and the easier it is to export; At the same time, there is a competition for attracting investment by the Jiangsu Provincial Government. The more foreign investment a company has, the easier it is to obtain preferential policies and receive subsidies.

Table 1. Statistics of indicator data for variables

variable	Obs	median	S.D	min	max
D	50814	.491	.5	0	1
ln ex	50814	2.73	4.644	0	17.323
dex	50814	.265	.441	0	1
Post	50814	.667	.471	0	1
sub	50814	.174	.379	0	1
SIZE	50814	11.034	1.212	7.091	17.6
DEBT	50814	.569	.257	-1.104	5.677
ROA	50814	.132	.268	-1.599	14.577
HC	50814	3	.918	-1.832	10.821
FCS	50814	.196	.25	-1.384	16.006
state	50814	.01	.092	0	1
foreign	50814	.093	.272	0	1
private	50814	.576	.468	0	1
Private	50814	.592	.491	0	1

Considering that new enterprises enter and old enterprises exit the enterprise database every year, it is obviously unreasonable to analyze all enterprises together. Therefore, the following screening is carried out: firstly, delete the enterprises that entered and exited in the past three years, and retain the enterprises that continued to operate from 2012 to 2014; The second step is to select 8767 enterprises that have not received government subsidies for three years as the control group; The third step is to

select 819 companies that did not receive government subsidies in 2012 and have been receiving government subsidies since 2013 as the processing group.

4. Empirical analysis

Before matching, regression analysis was conducted on the export behavior data of manufacturing enterprises in Jiangsu Province collected from the Chinese industrial enterprise database from 2012 to 2014 to study the impact of subsidies on the export scale of enterprises and whether they engage in export behavior. In the baseline regression analysis of Table 2, it can be seen that in the regression before treatment, the coefficients between all independent variables (SIZE, DEBT, ROA, HC, FCS, Private) and the dependent variables (lnex and dex) are statistically significant, indicating that their impact on the dependent variable is significant. In addition, the overall model fitting degree is also high, with R2 values ranging from 0.07 to 0.10. By observing columns (1) to (3), it can be concluded that the correlation coefficient of sub has a significant positive effect on the export volume of enterprises, and it increases year by year, indicating that subsidies have a promoting effect on increasing the export volume of enterprises, and the covariates are significantly positive; Observing columns (4) to (6), it can be found that subsidies have a positive effect on the explanation of whether a company exports or not. However, the impact of subsidies on whether a company exports or not is relatively small compared to the impact on export volume. R2 is also relatively small relative to export volume, indicating that the explanatory power of the variable on the dependent variable dex is small, but there is still a certain degree of explanatory power.

Table 2. Baseline regression analysis before processing

	(2012) lnex	(2013) lnex	(2014) lnex	(2012) dex	(2013) dex	(2014) dex
sub	0 (.)	0.827*** (4.53)	1.121*** (15.59)	0 (.)	0.0929*** (5.32)	0.115*** (16.66)
SIZE	0.436*** (11.37)	0.352*** (9.08)	0.327*** (8.53)	0.0246*** (7.16)	0.0167*** (4.87)	0.0142*** (4.19)
DEBT	-0.511*** (-3.50)	-0.665*** (-4.73)	-0.620*** (-4.50)	-0.0571*** (-3.90)	-0.0712*** (-5.25)	-0.0672*** (-4.97)
ROA	-0.977*** (-4.16)	-1.143*** (-6.47)	-0.874*** (-5.46)	-0.124*** (-4.61)	-0.134*** (-7.89)	-0.107*** (-7.18)
HC	0.820*** (17.48)	0.781*** (18.44)	0.732*** (17.44)	0.0776*** (17.16)	0.0740*** (18.31)	0.0682*** (17.21)
FCS	-1.192*** (-4.35)	-1.380*** (-10.48)	-1.542*** (-11.46)	-0.0834*** (-4.10)	-0.0889*** (-6.81)	-0.108*** (-8.22)
Private	-1.488*** (-20.36)	-1.337*** (-18.65)	-1.183*** (-16.12)	-0.142*** (-19.91)	-0.124*** (-18.06)	-0.110*** (-15.76)
_cons	-3.017*** (-7.64)	-1.945*** (-4.85)	-2.117*** (-5.28)	-0.0888** (-2.47)	0.00207 (0.06)	-0.0122 (-0.34)
N	16938	16938	16938	16938	16938	16938
R ²	0.096	0.091	0.098	0.078	0.076	0.086

4.1. Matching balance test

To ensure the accuracy and reliability of propensity score matching results in this article, Zhou Shimin et al. (2013) found that the nearest neighbor matching method has good robustness in large sample data. Therefore, this article uses the Logit model to estimate propensity scores and perform nearest neighbor matching. Table 3 shows the balance test results. From Table 3, it can be seen that all the standardized biases of covariates have significantly decreased, and the accompanying probabilities of the t-statistic are all greater than 10%, indicating that there is no significant difference in the matching variables between the treatment group and the control group after sample matching.

Secondly, the absolute standard deviation of each matching variable after matching is less than 5%. Based on the 20% standard value of Rosenbaum and Rubin (1985), we can conclude that the matching results in this paper are effective, and the sample matching also satisfies the assumption of balance. Therefore, the selected matching variables and methods are appropriate.

After PSM, benchmark regression analysis was conducted again as shown in Table 4. By comparing the benchmark regression before and after matching, it can be found that the situation is basically similar in the processed regression. Although some coefficients have changed in value, they still have statistical significance, and the overall model's fitting degree has slightly improved compared to the regression before processing.

Table 3. Balance test results of matching variables

Variable	Sample	Mean		%bias	%reduct bias	T-test	
		Treated	Controls			t	P> t
SIZE	U	11.355	10.918	34.8	96.9	36.28	0.000
	M	11.354	11.341	1.1		0.83	0.404
DEBT	U	0.54776	0.57641	-11.1	79.2	-11.10	0.000
	M	0.54775	0.5537	-2.3		-1.90	0.057
ROA	U	0.10121	0.14261	-16.4	82.9	-15.41	0.000
	M	0.12122	0.10829	-2.8		-2.70	0.007
HC	U	3.3048	2.8908	46.7	96.9	45.77	0.000
	M	3.3042	3.3183	-1.6		-1.26	0.206
FCS	U	0.18641	0.20005	-5.8	67.3	-5.42	0.000
	M	0.18638	0.18191	1.9		1.80	0.071
Private	U	0.44707	0.64463	-40.5	97.4	-40.64	0.000
	M	0.4471	0.4419	1.1		0.86	0.391

Table 4. Benchmark regression analysis after matching

	(2012)	(2013)	(2014)	(2012)	(2013)	(2014)
	<i>ln ex</i>	<i>ln ex</i>	<i>ln ex</i>	<i>dex</i>	<i>dex</i>	<i>dex</i>
<i>sub</i>	0	0.612***	1.265***	0	0.0725***	0.125***
	(.)	(3.03)	(8.69)	(.)	(3.83)	(9.06)
SIZE	0.722***	0.506***	0.484***	0.0430***	0.0261***	0.0240***
	(9.70)	(6.84)	(10.48)	(6.14)	(3.76)	(5.47)
DEBT	-1.189***	-1.010***	-1.555***	-0.121***	-0.107***	-0.160***
	(-3.31)	(-2.99)	(-8.13)	(-3.58)	(-3.39)	(-8.80)
ROA	-2.532***	-2.621***	-1.927***	-0.269***	-0.280***	-0.217***
	(-4.49)	(-5.22)	(-6.52)	(-5.07)	(-5.94)	(-7.72)
HC	0.431***	0.606***	0.750***	0.0427***	0.0577***	0.0711***
	(4.36)	(5.90)	(12.02)	(4.59)	(5.99)	(11.98)
FCS	-1.744***	-1.272***	-2.114***	-0.0964**	-0.0660*	-0.155***
	(-3.45)	(-3.11)	(-10.41)	(-2.03)	(-1.72)	(-8.05)
Private	-1.694***	-1.385***	-1.286***	-0.164***	-0.117***	-0.118***
	(-9.33)	(-7.94)	(-12.78)	(-9.59)	(-7.17)	(-12.32)

<i>_cons</i>	-4.157*** (-5.22)	-2.675*** (-3.45)	-3.291*** (-6.69)	-0.114 (-1.53)	-0.0130 (-0.18)	-0.0659 (-1.41)
<i>N</i>	3104	3462	9287	3104	3462	9287
<i>R2</i>	0.099	0.084	0.106	0.077	0.064	0.083

4.2. Joint support inspection and Common trend testing

When conducting propensity score matching double difference (PSM-DID) analysis, the common support test is an important test step. It is performed by comparing the mean difference of covariates between the treatment group and the control group before matching. If there is no significant difference in covariates between the treatment group and the control group before matching, it is considered that they are similar in common support, which means that after propensity score matching, the comparison between the treatment group and the control group is more credible. The purpose of the joint support test is to eliminate potential confounding factors and ensure that the estimated effects obtained during PSM-DID analysis are accurate and reliable. Therefore, only when the sample PS values of the processing group and the control group have a large common support area, can subsidized enterprises find matching enterprises that have not received subsidies. As shown in the joint support test results in Figure 1, only a small number of enterprises fell outside the area of joint support, so the matching result shows that the joint support hypothesis is met.

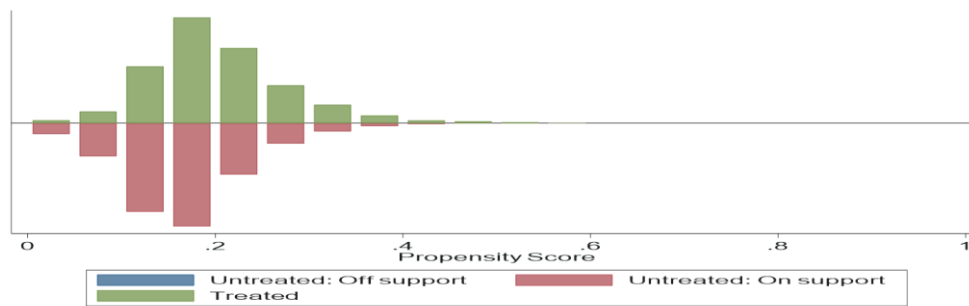
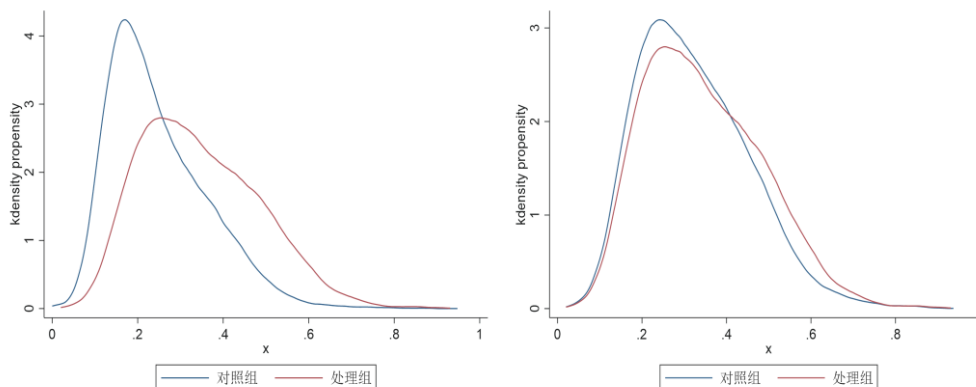


Fig. 1 Common Support Inspection

Meanwhile, by observing the nuclear density maps of the treatment group and the control group in propensity scores in Figure 2, it was found that after matching, the nuclear density maps of the treatment group and the control group overlapped more, that is, the interval between the nuclear density curves decreased, indicating that the matching process successfully reduced the difference in propensity scores between the treatment group and the control group to a certain extent. This also means that the matched samples have more common support.



(a) Before matching

(b) After matching

Fig. 2 Kernel density test chart

This article uses data from continuously operating manufacturing enterprises in Jiangsu Province from 2012 to 2014 to conduct a common trend test, and the test results are shown in Figure 3. As

shown in Figure 3, it can be seen that the evolution trend of the average export value of enterprises in the treatment and control groups before subsidies is basically consistent. However, after implementation, the evolution trend of the two groups of enterprises diverges, indicating that the treatment and control groups selected in this article meet the assumption of a common trend.

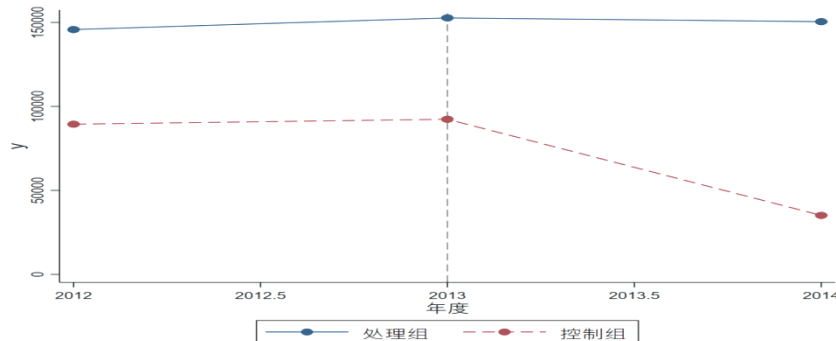


Fig. 3 Common Trend Test

4.3. Empirical results

Table 5 presents the benchmark regression results based on the entire sample. As this study has already controlled for the industry and city of the research object in data selection, each column controls for the fixed effects of the year. The first and second columns show the regression results without the inclusion of control variables, and it can be observed that the coefficient of D is significantly positive at the 1% level. Columns (3) and (4) show the estimated results after adding control variables. It can be observed that the estimated coefficients of D are 1.031 and 0.106, respectively, and they are significantly positive at the 1% level, indicating that subsidies have a significant promoting effect on the export scale of manufacturing enterprises in Jiangsu Province and whether to export. In contrast, subsidies have a greater impact on the export scale of enterprises.

In addition, it can be found that the correlation coefficient of Private is significantly negative at the 1% level, indicating that the government has a promoting effect on the export behavior of non private enterprises, that is, it has a better promoting effect on the export behavior of foreign and state-owned enterprises. The government provides subsidies to foreign investment in order to attract foreign investors to invest in the country. Subsidies can reduce the costs for foreign-funded enterprises in the country, provide a more competitive investment environment, and promote foreign investment inflows. In addition, the government provides subsidies to state-owned enterprises to support and promote the development of the state-owned sector. State owned enterprises often bear the responsibilities of national strategic industries, important infrastructure, and public services. The government increases their competitiveness, improves operational conditions, or promotes technological upgrades through subsidies, which in turn have a positive promoting effect on the export behavior of enterprises.

Table 5. Benchmark Regression

	(1) <i>ln ex</i>	(2) <i>dex</i>	(3) <i>ln ex</i>	(4) <i>dex</i>
<i>D</i>	1.562*** (21.90)	0.153*** (22.81)	1.031*** (15.32)	0.106*** (16.40)
<i>DEBT</i>			-0.597*** (-4.64)	-0.065*** (-5.24)
<i>ROA</i>			-1.012*** (-6.59)	-0.123*** (-8.16)
<i>HC</i>			0.778*** (20.59)	0.073*** (20.64)
<i>FCS</i>			-1.344*** (-8.56)	-0.091*** (-6.96)
<i>Private</i>			-1.344*** (-20.74)	-0.126*** (-20.45)
<i>Constant</i>	1.962*** (44.30)	0.190*** (45.48)	-2.759*** (-7.24)	-0.074** (-2.21)
obs	50,814	50,814	50,814	50,814
<i>R</i> ²	0.010	0.010	0.094	0.079
Year fixed effect	YES	YES	YES	YES

5. Conclusion

In the current severe international situation of rising protectionism and the trend of "anti globalization" in some developed countries, China's economy is facing a difficult period of transition from high-speed development to high-quality development. In such a challenging domestic and international situation, how the Jiangsu Provincial Government can promote the upgrading and transformation of manufacturing enterprises and enhance the international competitiveness of Jiangsu's manufacturing industry and even China's manufacturing industry is a major challenge, and it is also of great significance. In the face of the new situation, this article is based on the micro database of Chinese industrial enterprises, and selects 16938 enterprises that have been continuously operating in the manufacturing industry in Jiangsu Province from 2012 to 2014, with a total of 50814 observations over three years, for research. PSM-DID empirical analysis is used to analyze the impact of government subsidies on the export behavior of Jiangsu Province's manufacturing industry. This study indicates that whether manufacturing enterprises in Jiangsu Province can obtain government subsidies is not a random event, but rather that non private enterprises are more likely to receive subsidies among different types of enterprises. Through analysis, it was found that subsidies have a promoting effect on the export behavior of manufacturing enterprises in Jiangsu Province. Enterprises that receive subsidies have a significantly higher export level compared to those that do not receive subsidies. This indicates that government subsidies have to some extent stimulated the export activities of enterprises and provided strong support for them to expand into international markets. The promotion effect of receiving subsidies for the first time is 0.612, and the promotion effect after receiving subsidies continuously is 1.265. The promotion effect of receiving subsidies continuously is greater than that of receiving subsidies for the first time.

The matching results of this article also indicate that the promotion effect of receiving government subsidies for the first time on whether a company exports is 0.0725, and the promotion effect of continuous subsidies is 0.125. It can also be found that continuous subsidies have a stronger promotion effect on potential export oriented companies that receive subsidies for the first time.

From the above conclusion, it can be concluded that government subsidies can also effectively increase the export potential of enterprises. Although research results show that subsidies mainly increase the trade volume of exports through breadth, government subsidies still have a certain

promoting effect on helping enterprises to go global and become export enterprises. In summary, although subsidies have a certain promoting effect on the export behavior of manufacturing enterprises in Jiangsu Province, it can be seen that it is very limited. Therefore, on the basis of the booming export development of Jiangsu Province's manufacturing industry today, with the support of government subsidies, how more enterprises can continue to increase export sales volume and consolidate international status after entering the international market depends more on the competitiveness of the enterprise itself. From the correlation coefficients of the control variables in regression analysis, it can be seen that various factors of the enterprise itself are also important influencing factors on the export volume of the enterprise. From the policy perspective of the Jiangsu Provincial Government, government subsidies should focus more on cultivating the sustainable development capabilities of manufacturing enterprises, enhancing their core competitiveness, and thus continuously strengthening the micro foundation of sustainable export development for manufacturing enterprises in Jiangsu Province.

References

- [1] Xie Hongjun, Zhang Zhengchu. Trade liberalization, private benefits, and management efficiency: theory and Chinese experience [J] *World Economy*, 2023, 46 (1): 216-244 [2]
- [2] Zhang Jie, Zhai Fuxin. Government subsidies, market competition, and export product quality [J] *Research on Quantitative Economics, Technology and Economics*, 2015, 32 (4): 71-87 [14]
- [3] Su Zhendong, Hong Yujuan, Liu Luyao. Has government productive subsidies promoted the export of Chinese enterprises— Microeconomic analysis based on panel data of manufacturing enterprises [J] *Managing the World*, 2012 (5): 24-42 [15]
- [4] Shen Xiaoming, Tan Zaigang, and Wu Chaohui . The impact and adjustment of subsidy policies on agricultural listed companies [J] *China Rural Economy*, 2002 (6): 20-23
- [5] Zhang Yang . Has government subsidies improved the quality of export products for Chinese manufacturing enterprises *International Trade Issues*, 2017 (4): 27-37
- [6] Mao Qilin, Fang Senhui. Innovation driven and the complexity of export technology for Chinese manufacturing enterprises [J] *World Economic and Political Forum*, 2018 (2): 1-24
- [7] Li Xiufang, Shi Bingzhan. Does subsidy improve the quality of export products for enterprises? [J]. *Journal of Zhongnan University of Economics and Law*, 2013 (4): 139-148
- [8] Goldberg, P. ; Khandelwal, A. ; Pavcnik, N. and Topalova, P. "Trade Liberalization and New Imported Inputs. " *The American Economic Review*, 2009, 99(2) , pp. 494 – 500 .
- [9] Gorg, H. ; Henry, M. and Strobl, E. "Grant Support and Exporting Activity. " *Review of Economics and Statistics*, 2008, 90(1) , pp. 168 – 174 .
- [10] Hallak, J.C. and Schott, P. K. "Estimating Cross-Country Differences in Product Quality. " *Quarterly Journal of Economics*, 2011, 126(1) , pp. 417 – 474 .
- [11] Harris, R . and Robinson, C. "Industrial Policy in Great Britain and its Effect on Total Factor Productivity in Manufacturing Plants, 1990 – 1998. " *Scottish Journal of Political Economy*, 2004, 51(4) , pp. 528 – 543 .
- [12] Hovakimian, G. "Determinants of Investment Cash Flow Sensitivity. " *Financial Management*, 2009, 38(1) , pp. 161 – 183 .
- [13] Brandt, L. ; Van Biesebroeck, J. and Zhang, Y. "Creative Accounting or Creative Destruction? Firm-Level Productivity Growth in Chinese Manufacturing. " *Journal of Development Economics*, 2012, 97(2) , pp. 339 – 351 .
- [14] Chen, B. and Ma, H. "Import Variety and Welfare Gain in China. " *Review of International Economics*, 2012, 20 (4) , pp. 807 – 820
- [15] Damijan, J. P. and Kostevc, C. "Learning from Trade Through Innovation: Causal Link Between Imports, Exports and Innovation in Spanish Microdata. " *Oxford Bulletin of Economics and Statistics*, 2015, 77(3) , pp. 408 – 436 .

- [16] JaeBin Ahn, Amit K. Khandelwal, Shang-Jin Wei. The role of intermediaries in facilitating trade[J]. *Journal of International Economics*. 2011, 84(1). 73-85.
- [17] Elliott, R.J.R. ; Jabbour, L. and Zhang, L. Y. "Firm Productivity and Importing: Evidence from Chinese Manufacturing Firms. " *Canadian Journal of Economics*, 2016, 49(3) , pp. 1086 – 1124
- [18] Ethier, W. "National and International Returns to Scale in the Model Theory of International Trade. " *The American Economic Review*, 1982, 72(3) , pp. 389 – 405 .