

Analysis of the Impact of Chinese Wood Product Manufacturers' Exports

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Abstract

Since the end of the last century, exports from the Chinese wood processing sector have experienced very rapid growth and played an increasingly important role in the world's wood product trade market. Based on data from Chinese wood product companies for 1998 to 2007, an empirical analysis of the factors influencing wood product exports was conducted using a panel Tobit model. We discovered that companies in the eastern regions can export more easily compared with those in the midland and western areas; larger companies enjoy more favorable export conditions, with more advantageous outcomes during risk taking and higher sunk costs; enterprises with a higher proportion of foreign capital tend to export more, as do enterprises whose capital originates principally from Hong Kong, Macao, or Taiwan; the original equipment manufacturer or original design manufacturer still predominates in the wood processing industry; exporting made negative influence for wood processing enterprises' performance during that time; capital density makes no impact on wood processing enterprises' exports; and, finally, companies' registered addresses have no direct connection with exports of wood processing enterprises.

Since the end of the last century, exports from the Chinese wood processing sector have experienced very rapid growth and played an increasingly important role in the world's wood product trade market. Moreover, enterprises involved in export have rapidly increased in number and have established many product-specific distribution centers. According to the United Nations (UN) Comtrade Database, between 2000 and 2010, the total value (in US dollars) of Chinese wood product exports increased from \$7.606 billion to \$46.317 billion (a 5.09-fold increase), with an average annual increase of 20.22 percent. Meanwhile, the main products exported from the Chinese wood processing sector i.e., wood furniture, plywood, and paper and paper products, increased in value from \$1.668, \$0.189, and \$1.406 billion to \$16.157, \$3.402, and \$9.561 billion, respectively, during 2000 to 2010. This represents respective increases of 8.69-, 17-, and 5.8-fold, with respective average annual rates of increase of 26.27, 40.51, and 21.92 percent; all of these were higher than the average level of 20.22 percent increase across all wood product exports. Furthermore, the Chinese wood processing sector has played an increasingly important and crucial role in the worldwide wood products market. As early as 2002, export values of Chinese wood furniture exceeded those of Germany, and they exceeded those of Italy in 2005, thereby becoming the largest wood furniture exporter. In 2010, the value of Chinese wood

furniture exports accounted for 32.60 percent of the total value of the world's wood furniture exports; in 2005, the value of Chinese plywood exports exceeded those of Indonesia and Malaysia, rendering China the world's largest plywood-exporting country. In 2010, the value of Chinese plywood exports represented 29.00 percent of the world's total plywood exports value. Statistics pertaining to wood processing companies with sales of RMB 5 million yuan or above, taken from a nonlisted company database (China Stock Market & Accounting Research [CSMAR] Solution developed by GTA Information Technology), indicate that between 1998 and 2007, the number of wood product companies increased from 5,880 to 18,784, and export companies increased in number from 984 to 3,336. Additionally, according to national input and output tables, in which a noncompetitive input and output

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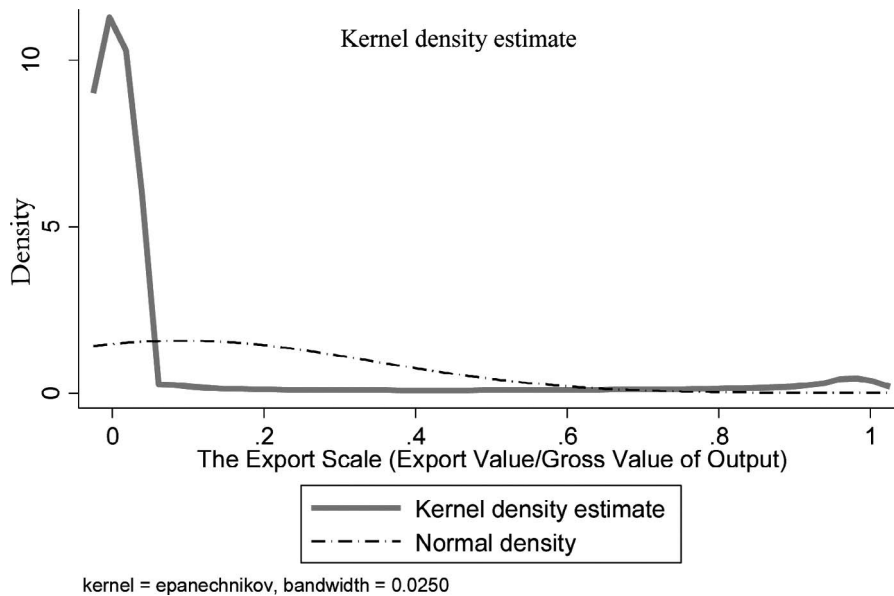


Figure 1.—Distribution of the export scale according to proportion of exports.

model was used to estimate the contribution exports had on growth in the wood processing sector, this contribution reached 44.55 percent (between 1997 and 2010), following the contribution of capital. Particularly prior to 2007, exports represented the foremost driving force in the wood processing sector. From the perspective of final demand, exports played a vital role in the rapid development of the wood processing sector. Thus, we want to know which factors affect wood processing enterprises' exports. However, little related research has appeared in the literature. We believe that this research question deserves more attention, especially because Chinese wood processing enterprises have produced and traded the most wood products. Therefore, we aimed to ascertain the factors and mechanisms influencing exports from the Chinese wood processing sector.

We observed that the preexisting literature principally focused on the quantity and scale of, and changes in, the wood processing products trade; the methods used were mainly statistical, with enterprise data and empirical analyses conducted on the basis of rarely used econometric models. Moreover, conclusions mainly focused on summaries, predictions, and trends. The majority of the articles were qualitative, which makes it difficult to determine the factors influencing exports and their impacts (Liu et al. 2006, Fan and Song 2010, Chen and Li 2012, Zhang et al. 2012). However, when analysis is not limited to the wood processing sector, there is abundant material, both macroanalysis and microanalysis, focusing on the influence of exporting (e.g., the neoclassical, endogenous growth and heterogeneous trade theories), all of which provide relatively complete and appropriate interpretative and analytical frameworks concerning export decisions. Whereas macroanalysis focuses on intermediate industrial or regional levels and microanalysis on the enterprise level, the current literature more frequently involves a combination of different theories and tends to include trait factors in addition to ordinary factors (Cole et al. 2010, Manova 2013, Melitz and Redding 2014).

In this article, we introduce the econometric methodology, describe the data and variables, report the empirical results, and analyze the decisive factors and mechanisms involved in Chinese wood product company exports.

The Econometric Methodology

To study the factors influencing exports of wood product companies, we devised the following model, drawing from Bernard et al. (2007), Pla-Barber and Alegre (2007), and Liu and Zhang (2009):

$$EX_{it} = \alpha + \beta_1 \cdot X_{it}^1 + \beta_2 \cdot X_{it}^2 + \beta_3 \cdot X_{it}^3 + \beta_4 \cdot X_{it}^4 + \beta_5 \cdot X_{it}^5 + \beta_6 \cdot X_{it}^6 + \varepsilon_{it} \quad (1)$$

where EX_{it} , referring to the value of a company's (or enterprise's) exports, which are indexed by Equation 1, is the proportion of the total production value comprised by exports (companies with no exports = 0, and companies for whom all products are exported = 1). As described in Figure 1, many companies are clustered around 0 and 1, such that there is significant deviation from a normal distribution. However, the data meet the criteria of "censored data"; therefore, the Tobit model¹ is an appropriate choice. Equation 2 directly measures export value. Because the export value of some companies is 0, they are classified as "zero exports." Therefore, if we use the natural logarithm, we will arrive at a value of " $-\infty$ " when the export value is 0; therefore, "export value + 1" should be used to avoid the result of " $-\infty$." These methods were inspired by the research of Xin and Xu (2010), Dai et al. (2011), and Chen et al. (2013).

¹ Tobin (1958) initially used probit regression specific to censored data. This represents the earliest Tobit model; a large body of subsequent evidence has shown that the Tobit model resolves the issue of inconsistency in censored data. Several novel Tobit models have subsequently been devised that optimize and improve the original model (Lin and Cheng 2011, Wichitaksorn and Tsurumi 2013).

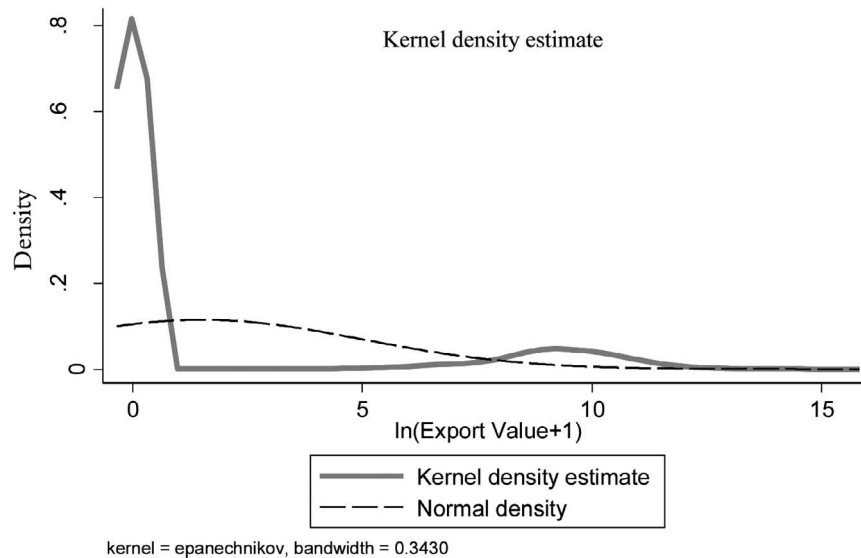


Figure 2.—Distribution of export value measured by natural logarithm taken by “export value + 1.”

According to the specific distribution pattern depicted in Figure 2, we also observed that significant skewness still existed, again rendering the Tobit model the most appropriate choice. X^1 to X^6 represent a company’s location, scale, capital structure, enterprise performance, capital density, and registered address, respectively. The variable ε represents errors, subscript i indicates the specific enterprise, and subscript t indicates time. In the next section, we will elaborate the reasons why we chose these variables as explanatory variables in this study.

Using the Tobit model method, we briefly explain the process of estimation, taking export proportion (EXP) as the dependent variable for an example. The Tobit model divides observations into three groups: one uncensored observation group and two censored observation groups. The observed value of a specific value with the censored dependent variable EXP can be calculated using the following formula:

$$EXP_{it} = \begin{cases} 0, & \text{if } EXP_{it}^* = 0 \\ EXP_{it}^* = \alpha + \sum_{k=1}^k \beta_k X_{itk} + \delta_{it}, & \text{if } EXP_{it}^* \in (0, 1) \\ 1, & \text{if } EXP_{it}^* = 1 \end{cases} \quad (2)$$

Here, the X vector represents the combination of factors influencing wood product companies’ exports, and it actually refers to the combination of factors denoted by X^1 to X^6 in the previously described formula for EX_{it} . The estimation of EXP_{it} involves three steps. In the first step, the middle part of the formula is estimated using ordinary least squares regression or a similar method. The second step involves estimating and observing the probability of censoring based on the value of the independent variable, and then estimating that likelihood using the probability value. The third step involves combining the estimates based upon the value of the independent variable and generating the expected value for all observations. Specific derivation and estimation methods are described in Long (1997). For the present article, the maximum likelihood method was used for estimation. Although we

used unbalanced panel data, at the enterprise level between 1998 and 2007 (although the data from 2004 could not be used because they lacked key indicators), the panel Tobit model can also be used for estimation and might generate more effective estimation results (He and Fan 2013, Wang and Xiao 2013).

Data and Variables

The data used in this article were sourced from the GTA’s statistics database for 1998 to 2007 on nonlisted companies, which include companies with annual sales of >RMB 5 million, in the timber processing, wood furniture, and paper and paper products manufacturing industries. According to data from the National Industrial Censuses, the total proportion of industrial outputs from enterprises with annual sales of >RMB 5 million was 79.16 and 85.02 percent in 2004 and 2008, respectively. In terms of representativeness, these are the best available enterprise data.² The total effective sample size is 62,048, while the number of enterprises is 30,604, so each group only has 2.027 years on average.

Based on the existing trade theories and literature, we find that there are many factors that affect wood processing enterprises’ exports, such as firm heterogeneity (Melitz 2003, Khandelwal and Topalova 2011, De Loeck and Warzynski 2012, Manova 2013, Yang and He 2013, Melitz and Redding 2014). Among the various interpretations of firm heterogeneities, most literature focuses on the difference of productivity levels. Actually, firm heterogeneities also include the differences of scale, geographic location, and enterprise performance. All these factors may influence exports. We may take

² We devised the following exclusion criteria: (1) the added value is negative; (2) the value corresponding to the number of employees is 0; (3) productivity is not positive; (4) the proportion of principal business income is not between 0 and 1; (5) the proportion of intermediate input is not between 0 and 1; and (6) the proportion of export values is not between 0 and 1. Additionally, data from 2004 were omitted from added-value and export value calculations; other samples lacking data for key variables were also excluded.

Table 1.—Name, type, and description of variables.

Name	Type ^a	Description
Export proportion	I	Expressed as the proportion of the gross industrial output value attributable to exports
Export quota		Expressed using the natural logarithm of “export value + 1”
Location	II	Divided into three regions: eastern, midland, and western areas, corresponding to 3, 1, and 2, respectively
Enterprise scale		The total production value of a company, i.e., the natural logarithm of the gross industrial output value
Capital structure		Indexed by the size of the labor force, specifically the natural logarithm of the labor force
		National capital proportion of the initial capital of the company (paid-in capital) ^b
		Collective capital proportion of the initial capital of the company (paid-in capital)
		Legal person capital proportion of the initial capital of the company (paid-in capital)
		Individual capital proportion of the initial capital of the company (paid-in capital)
		Hong Kong, Macao, or Taiwan capital proportion of the initial capital of the company (paid-in capital)
		Foreign capital proportion of the initial capital of the company (paid-in capital)
Operational state		Administrative expense proportion of the gross industrial output value (reflects the administrative level and costs of a company)
		Main business income proportion of the gross industrial output value (reflects a company’s business interests and core business operation level)
		Net profit ratio of the main business income, calculated as follows: Net profit = Main business income – Main business expenses – Tax + Other business income – Other business expenses – Selling expenses – Financial costs + Nonbusiness income – Nonbusiness expenses + Investment profit – Income tax (indexes the profitability of a company)
		Intermediate input proportion of the gross industrial output value. Industrial intermediate input refers to an industrial enterprise’s outsourced raw material, fuel, dynamic and physical products, service fees paid to others for one-off services in the reported period, and fundamental indicators of added industrial value. To an extent, this figure indexes a company’s capacity to produce added value.
Capital density		Reflected by labor capital in total fixed assets
Registered address		Divided into three levels: county, above county, and below county, corresponding to 1, 3, and 2, respectively

^a I = dependent variables; II = independent variables

^b Paid-in capital (contributed capital) refers to capital contributed to a corporation by investors through purchase of stock from the corporation (primary market), not through purchase of stock in the open market from other stockholders (secondary market). It includes share capital (i.e., capital stock) as well as additional paid-in capital. The paid-in capital account does not reflect the amount of capital contributed by any specific investor. Instead, it shows the aggregate amount of capital contributed by all investors. In this article, the definition of paid-in capital refers to the capital contributed to a company by investors when the company was built. Refer to Wikipedia: http://en.wikipedia.org/wiki/Paid_in_capital.

enterprise scale as an example. In general, it is assumed that larger companies may prefer to export because they have adequate capital and advanced technologies, which can take a share in the international market. Similarly, small companies may not prefer to export. However, that is not true from our investigation in the wood industrial clusters. Furthermore, the company database of nonlisted GTA Information Technology (CSMAR Solution) shows that a number of small companies also export through original equipment manufacturer (OEM) or original design manufacturer (ODM) with the orders from international markets. This reality makes us wonder how enterprise scale affects exports of wood processing companies. Consequently, this research takes enterprise scale as a factor that influences export. Furthermore, the geographic location also affects exports. It is obviously easier for the companies in the southeast coastal regions to export, owing to the low cost of shipping from China’s mainland market to international markets. Moreover, enterprise performance determines the productivity levels that crucially influence exports. Hence, we select the following variables as the influential factors to study their impact on export: enterprise performance including administrative expense proportion, main business income proportion, net profit ratio, and intermediate input proportion. In addition, the effect of capital structure on exports is particularly considered, which is different from the previous research. Generally, foreign enterprises or Hong Kong-, Macao-, and Taiwan-funded enterprises are familiar with the international market. Thus, the possi-

bility of exporting by these enterprises is larger. By contrast, state-owned enterprises (SOEs) and collective enterprises may tend to sell to the domestic market because they have accumulated the market resources. In particular, SOEs often have good relationships with local government, which makes it easier for them to take a place in the domestic market. Thus, SOEs and collective enterprises have more possibilities to choose from in the domestic market. What’s more, private enterprises are significantly different from foreign companies and SOEs. They may integrate advantages and disadvantages of the latter companies. Private enterprises have uncertainty in exports, which deserves further discussion. Thus, these concerns lead us to take the effect of capital structure in the analysis. In addition, capital intensity is also considered when we analyze the effects on exports.

Table 1 details the methods used to generate the variables and definitions.

Table 2 describes the results of the descriptive statistical analysis of the variables. According to Table 2, in the whole samples, the proportion of samples with exports is only 9.19 percent. The proportion of samples located in eastern, midland, and western areas is 63.37, 26.56, 10.07 percent, respectively. The proportion of samples with their registered address from above the county level, the county level, and below the county level is 6.01, 12.53, and 81.46 percent, respectively. The proportion of capital structure with average value of national capital proportion; collective capital proportion; legal personnel capital proportion; individual capital proportion; Hong Kong, Macao, or

Table 2.—Descriptive statistics for the study variables.

Variable	Group	Avg.	SD	Min.	Max.	Observations
Export proportion	Overall	0.0919	0.2529	0	1	<i>N</i> = 62,048
	Between		0.2446	0	1	<i>n</i> = 30,604
	Within		0.0805	-0.7205	0.9276	T-bar = 2.027
Export quota	Overall	1.5134	3.4638	0	15.472	<i>N</i> = 62,048
	Between		3.2350	0	15.472	<i>n</i> = 30,604
	Within		1.1908	-8.2776	10.851	T-bar = 2.027
Western area	Overall	0.1007	0.3009	0	1	<i>N</i> = 62,048
	Between		0.2997	0	1	<i>n</i> = 30,604
	Within		0.0084	-0.6993	0.8507	T-bar = 2.027
Eastern area	Overall	0.6337	0.4818	0	1	<i>N</i> = 62,048
	Between		0.4831	0	1	<i>n</i> = 30,604
	Within		0.0137	-0.0329	1.4337	T-bar = 2.027
Enterprise size (taking the logarithm of gross industrial output value)	Overall	9.8115	1.1433	2.3396	16.2043	<i>N</i> = 62,048
	Between		1.1133	2.3396	16.2043	<i>n</i> = 30,604
	Within		0.3438	6.5645	13.2993	T-bar = 2.027
Enterprise scale (taking the logarithm of labor force)	Overall	4.6979	0.9670	0	9.5366	<i>N</i> = 62,048
	Between		0.9462	0	9.4249	<i>n</i> = 30,604
	Within		0.2566	0.4778	8.1360	T-bar = 2.027
National capital proportion	Overall	0.0754	0.2506	00	1	<i>N</i> = 62,048
	Between		0.2444	0	1	<i>n</i> = 30,604
	Within		0.0699	-0.7996	0.9504	T-bar = 2.027
Collective capital proportion	Overall	0.1524	0.3347	0	1	<i>N</i> = 62,048
	Between		0.3046	0	1	<i>n</i> = 30,604
	Within		0.1319	-0.7365	1.0413	T-bar = 2.027
Legal personnel capital proportion	Overall	0.2290	0.3913	0	1	<i>N</i> = 62,048
	Between		0.3607	0	1	<i>n</i> = 30,604
	Within		0.2034	-0.6599	1.1179	T-bar = 2.027
Individual capital proportion	Overall	0.4331	0.4720	0	1	<i>N</i> = 62,048
	Between		0.4484	0	1	<i>n</i> = 30,604
	Within		0.1978	-0.4558	1.3220	T-bar = 2.027
Hong Kong, Macao, or Taiwan capital proportion	Overall	0.0629	0.2260	0	1	<i>N</i> = 62,048
	Between		0.2137	0	1	<i>n</i> = 30,604
	Within		0.0721	-0.8121	0.9518	T-bar = 2.027
Foreign capital proportion	Overall	0.0472	0.1948	0	1	<i>N</i> = 62,048
	Between		0.1851	0	1	<i>n</i> = 30,604
	Within		0.0662	-0.8417	0.9222	T-bar = 2.027
Administrative expense proportion	Overall	0.0436	0.0517	0	0.7852	<i>N</i> = 62,048
	Between		0.0521	0	0.7852	<i>n</i> = 30,604
	Within		0.0208	-0.3342	0.5041	T-bar = 2.02745
Main business income proportion	Overall	0.8765	0.1524	0.0017	1	<i>N</i> = 62,048
	Between		0.1403	0.0040	1	<i>n</i> = 30,604
	Within		0.0775	0.1406	1.4429	T-bar = 2.027
Net profit rate	Overall	0.0210	0.0997	-1.9308	3.3333	<i>N</i> = 62,048
	Between		0.0974	-1.8458	1.2460	<i>n</i> = 30,604
	Within		0.0495	-1.1361	2.5794	T-bar = 2.027
Intermediate input proportion	Overall	0.7429	0.1196	0	0.9999	<i>N</i> = 62,048
	Between		0.1128	0.0001	0.9999	<i>n</i> = 30,604
	Within		0.0635	0.0497	1.2940	T-bar = 2.027
Capital density (labor capital)	Overall	70.056	187.164	0.0050	15,912.8	<i>N</i> = 62,048
	Between		180.375	0.0050	10,121.6	<i>n</i> = 30,604
	Within		86.7556	-5,223.1	10,638.7	T-bar = 2.027
Below county level	Overall	0.8146	0.3886	0	1	<i>N</i> = 62,048
	Between		0.3760	0	1	<i>n</i> = 30,604
	Within		0.0864	-0.0604	1.6896	T-bar = 2.027
Above county level	Overall	0.0601	0.2376	0	1	<i>N</i> = 62,048
	Between		0.2301	0	1	<i>n</i> = 30,604
	Within		0.0508	-0.7971	0.9351	T-bar = 2.027

Taiwan capital proportion; and foreign capital proportion is 7.54, 15.24, 22.90, 43.31, 6.29, and 4.72 percent, respectively. This shows that export enterprises are not the majority. Wood processing companies registered in the eastern area are mainly below the county level. Table 2 also shows that the capital structure is a uniform distribution.

Empirical Results

The estimation results, obtained using the Stata software package (ver. 12.0, StataCorp LP, College Station, TX), are delineated in Table 3, where Models 1 and 2 represent estimation results according to a random-effects panel Tobit model, with export proportion and export quota as the

Table 3.—Estimation results of the quantitative model.^a

	Coefficient (SE)			
	Model 1 (export proportion)		Model 2 (export quota)	
	National capital proportion	Foreign capital proportion	National capital proportion	Foreign capital proportion
Constant	-2.8351*** (0.0714)	-1.8257*** (0.0700)	-45.5897*** (1.0062)	-31.732*** (0.9875)
Western area	-0.0475* (0.0267)	-0.0475* (0.0267)	-1.3808*** (0.3804)	-1.3808*** (0.3804)
Eastern area	0.2224*** (0.0162)	0.2224*** (0.0162)	2.7336*** (0.2276)	2.7336*** (0.2276)
Company size (1) ^b	0.0530*** (0.0063)	0.0530*** (0.0063)	1.5325*** (0.0893)	1.5325*** (0.0893)
Company size (2)	0.1113*** (0.0073)	0.1113*** (0.0073)	1.5970*** (0.1029)	1.5970*** (0.1029)
National capital proportion		-1.0094*** (0.0369)		-13.857*** (0.5144)
Collective capital proportion	0.1606*** (0.0325)	-0.8488*** (0.0269)	2.3867*** (0.4594)	-11.470*** (0.3728)
Legal personnel capital proportion	0.2609*** (0.0308)	-0.7485*** (0.0236)	3.6589*** (0.4340)	-10.198*** (0.3260)
Individual capital proportion	0.2192*** (0.0310)	-0.7902*** (0.0231)	3.2583*** (0.4363)	-10.572*** (0.3193)
Hong Kong, Macao, or Taiwan capital proportion	1.0039*** (0.0358)	-0.0056 (0.0226)	13.8067*** (0.4993)	-0.0503 (0.3171)
Foreign capital proportion	1.0094*** (0.0369)		13.8571*** (0.5144)	
Administrative fees proportion	0.4724*** (0.1075)	0.4724*** (0.1075)	6.9442*** (1.5373)	6.9442*** (1.5373)
Main business income proportion	0.2736*** (0.0312)	0.2736*** (0.0312)	2.1787*** (0.4347)	2.1787*** (0.4347)
Net profit ratio	-0.0902* (0.0488)	-0.0902* (0.0488)	-1.9742*** (0.6895)	-1.9742*** (0.6895)
Intermediate input proportion	0.0599* (0.0353)	0.0599* (0.0353)	0.8956* (0.4969)	0.8956* (0.4969)
Capital density	8.95e-06 (0.000017)	8.95e-06 (0.00002)	0.0004 (0.0002)	0.0004 (0.0002)
Below county level	0.0989*** (0.0192)	0.0989*** (0.0192)	1.3836*** (0.2720)	1.3836*** (0.2720)
Above county level	0.0469 (0.0291)	0.0469 (0.0291)	0.8466** (0.4113)	0.8466** (0.4113)
/sigma_u	0.8599*** (0.0079)	0.8599*** (0.0079)	11.7281*** (0.1137)	11.7281*** (0.1137)
/sigma_e	0.3127*** (0.0033)	0.3127*** (0.0033)	4.5707*** (0.0475)	4.5707*** (0.0475)
Rho	0.8832 (0.0028)	0.8832 (0.0028)	0.8681 (0.0032)	0.8681 (0.0032)
Log likelihood	-20,471.694	-20,471.694	-48,072.643	-48,072.643
Wald χ^2 (16)	3,133.58***	3,133.58***	3,710.06***	3,710.06***
No. of observations (Obs.)	62,048	62,048	62,048	62,048
No. of groups	30,604	30,604	30,604	30,604
Obs. per group: min.	1	1	1	1
Obs. per group: max.	9	9	9	9
Obs. per group: avg.	2	2	2	2

^a Significant at * $P < 0.1$, ** $P < 0.05$, and *** $P < 0.01$.

^b Estimations of company sizes 1 and 2 use natural logarithms derived from gross industrial output value and labor force size, respectively.

dependent variables. Regarding the overall estimation results of the models, the standard errors of individual effects and random perturbation terms are relatively low in the four groups of estimation results (as described in Table 3). Moreover, all of the rho values exceed 0.85, which indicates that changes in individual effects can account for the majority of the change in the proportion of exports of wood product companies. Therefore, the heterogeneity of the companies accounts for the majority of differences in the value of their exports. The test results for the likelihood ratio indicate that the null hypothesis, namely, that individual effects do not exist, should therefore be rejected, i.e., the random-effects Tobit model³ is a relatively rational model, and the log-likelihood values indicate that the

goodness of fit of all models is relatively high. Moreover, the Wald test results are all highly significant ($P < 0.01$), which indicates that the model possesses good interpretative power.

Regardless of whether the proportion of exports or the export quotas were used as the dependent variable, all of the estimation results indicate relatively high significance levels for the main explanatory variables. The estimation results of Models 1 and 2 are essentially consistent. Thus, based on these results, we can find the following.

1. In terms of the location of companies, we divide territories into eastern, midland, and western regions. Comparing the east with the midland, the coefficient equals 0.2224 and 2.7336, in Models 1 and 2, respectively ($P < 0.01$). Companies in the east can export more easily compared with those in the west. Owing to the large number of sub-industries within the wood processing sector, companies are widely distributed across almost every city and province nationwide. Nevertheless, they tend to be more concentrated in coastal areas, as evidenced by the numerous wood product distribution centers that exist in this area. Chinese trading reforms were initiated in eastern and southern coastal areas, where the reduced distance to the international market provided export opportunities,

³ In addition, the reason that we use the random-effects model of panel data is that the sample belongs to a typical wide section and short time dimension of panel data. The time span of the sample is 1998 to 2007, the complete sequence has 9 years considering the lack of critical data in 2004. However, this research uses a total of 62,048 samples, and the enterprise number is 30,604, so there are only 2.027 years in each group on average. For this kind of data structure of panel data, using a fixed-effects model will lead to the loss of hundreds of degrees of freedom, and the results of the model will cause large deviations, so random-effects models are used in this article.

- thereby contributing to the obvious location advantage of eastern versus midland and western areas.
2. Regardless of whether it is indexed by total production value or by the total number of employees, the coefficient of company size is significant ($P < 0.01$), indicating that larger companies enjoy more favorable export conditions, with more advantageous outcomes during risk taking and higher sunk costs. However, Chinese wood product companies are currently relatively small and therefore have a marked capacity for further growth.
 3. In terms of the companies' capital structure,⁴ although other capital types play a more active role in a company's exports compared with a company with national capital, those capital types play a negative role in a company's exports compared with a company with foreign capital, with the exception of a company with capital from Hong Kong, Macao, or Taiwan, which does not have a significant impact (i.e., possesses a negative coefficient). This indicates that enterprises with a higher proportion of foreign capital tend to export more wood processing products, as do enterprises whose capital originates principally from Hong Kong, Macao, or Taiwan. There is no significant difference between those two types of capital. The results are consistent with the theoretical expectations, foreign direct investment enterprises are more likely to choose to export with the reason that they are more familiar with international markets and their demand.
 4. In terms of enterprise performance, the proportion of administrative expenses and the principal business income were both significant ($P < 0.01$), with positive coefficients, including for intermediate input proportion (albeit only as a trend, at $P < 0.1$). The coefficient for net profit was negative. The estimation results derived from Models 1 and 2 were significantly different. Generally, higher management levels and relatively centralized business products are important in facilitating company exports; intermediate input proportion also plays an active role in exports, but the question remains of why, with a higher intermediate input proportion, a company's ability to create added value diminishes. Because OEM and ODM productions still predominate in companies' wood product exports, independent innovation and brands are still poorly represented. Finally, net profit has a negative impact on exports, indicating that OEM and ODM can only generate very modest processing profits during the less-important profit-making stage; export profit from OEM or ODM has diminished, and wood product companies depending on this revenue face significant challenges.⁵ As a whole, the OEM or ODM still predominate in the wood processing industry; exporting has a negative influence for wood processing enterprises' performance.
 5. Capital density has no impact on wood processing enterprises' export.
 6. In terms of companies' registered addresses, the coefficient of the variable of below the county level is significant at $P < 0.01$, and the results of Models 1 and 2 are largely consistent; however, whereas the coefficient of the variable of above the county level is not significant in Model 1, it is significant in Model 2. The positive coefficients indicate that companies registered either below or above the county level are more likely to export compared with those registered at the county level. In other words, exports of wood processing enterprises have no direct connection with companies' registered addresses. It is usually assumed that wood product exporters are located in towns, such as Henglin Town, Changzhou City, Jiangsu Province (the principal export hub for laminated wood flooring); Dalingshan Town and Houjie Town, Dongguan City, Guangdong Province (the principal production and export base for wood furniture); or Guanhu Town, Pizhou City, Jiangsu Province (one of several production and export hubs). Additionally, enterprises below the county level accounted for more than 90 percent of the total number of companies in 2007 (according to the selected data, 10,202 of 11,210 total wood product companies, or 91.01%, were below the county level), thereby constituting the majority of exporters. In contrast, larger enterprises were usually registered above the county level and located in cities, which conferred higher operational costs and exportation of higher-end products. For these enterprises, exporting

⁵ However, some researchers interpret this as follows: Chinese companies have suffered from delayed payments for sales in the domestic market, thereby adding pressure to their capital chain. Certain companies therefore choose to export, even though this compromises profit margins in comparison with the domestic market (exports to the international market mainly focus on OEM or ODM products, with their attendant, modest processing profits, owing to profit exploitation by large foreign buyers, purchasers, and multinational enterprises who control international sales terminals or brands), to ensure collection of payment according to letter of credit (L/C) and free on board (FOB) terms, and to avoid any delays in payment. Therefore, although garnering modest processing profits compared with domestic sales, Chinese companies can also benefit from greatly reduced sales costs in the world market. For certain companies, for whom development in the domestic market is difficult, net profits from exports are greater than those from domestic sales due to factors that include time costs. Compared with large companies with considerable market power, smaller enterprises usually face stricter financial limits and higher credit costs such that establishing themselves in the domestic market is problematic (Zhang et al. 2008, Liu and Zhang, 2009). However, we observed that processing profits were subject to continuous decline. In our investigation of the laminated wood flooring industry of Henglin Town, Jiangsu Province, the lumber and wood furniture industries of Jiashan, Zhejiang Province, and the plywood industries of Linyi, Shandong Province, and Pizhou, Jiangsu Province, in the second half of 2011, a large number of wood product companies did not possess independent export rights. Therefore, they were forced to export through traders or international purchasers, who usually generate extensive charges during procurement, resulting in even more modest profits. Many enterprise managers either became disillusioned with the situation and consequently inactive in the exports market, or they selected relatively reliable and stable purchasers. This accords with the conclusions of the present article. Currently, increasing numbers of wood product companies are considering aiming their business only at the domestic market.

⁴ The capital structure is how a firm finances its overall operations and growth by using different sources of funds. In this article, the capital structure was the source of capital when the company was built. Refer to Investopedia: <http://www.investopedia.com/terms/c/capitalstructure.asp>.

to the international market was more straightforward, commensurate with their ability to resist risks and absorb costs, such that they tended to take a more active role in choosing their exports because they could adapt to changes in the demands of the international market.

Conclusions

Based on data pertaining to Chinese wood product companies' exports between 1998 and 2007, we conducted an empirical analysis of the factors influencing their exports with a panel Tobit model. We observed the following results. First, companies in the eastern regions can export more easily compared with those in the midland and western areas. Second, larger companies enjoy more favorable export conditions, with more advantageous outcomes during risk taking and higher sunk costs. Third, enterprises with a higher proportion of foreign capital tend to export more, as do enterprises whose capital originates principally from Hong Kong, Macao, or Taiwan. Fourth, the OEM or ODM still predominate in the wood processing industry; exporting had a negative influence for wood processing enterprises' performance during that time. Fifth, capital density has no impact on wood processing enterprises' exports. And finally, companies' registered addresses have no direct connection with export of wood processing enterprises.

Based on our analysis of the influences on wood product companies pertaining to exports, we have ascertained the following. First, although clarifying the factors that influence exports is useful, whether a company should export and how the wood processing sector should develop overall are more important questions. Currently, the health of the Chinese wood processing sector is closely intertwined with that of the global wood processing sector. However, the global financial crisis seriously affected the Chinese wood processing sector in 2008, thereby prompting research, including the present study, pertaining to the sector's development and transformation. For its own benefit, the wood processing sector should actively participate in international markets. Yet, the major focus should be on development, creativity, and competitiveness and not solely on the promotion of exports. Second, the wood processing sector had already demonstrated substantial recovery in the 2 years following the financial crisis: imports and exports have already increased to, or even exceeded, the pre-crisis level and continue to develop. However, raw material and labor costs continue to increase, and trade barriers and conflicts with developed countries frequently occur. Economic transformation has been promoted across the entire country, from the Central Government to local authorities. Therefore, the present conditions represent a "golden period" characterized by rapid developments in the wood processing sector, and they will not be easily replicated. Exports, which once provided the principal momentum for the rapid growth of the industry, should be reevaluated today with respect to their role in promoting growth and in future developments. We should not only seek to further clarify the factors that influence wood product companies' exports but also seek to use them optimally to enable exports to better serve the further development of the wood processing industry in China.

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