

The Determinants of Export Performance of China's Township-Village Enterprises

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Abstract

The rapid export growth of China's township-village enterprises (TVEs) has not been well understood and explained. Using a simple analytical model and exploring a unique dataset on China's TVEs, we investigate the determinants of TVEs' export performance as measured by export intensity. We find that TVEs' export performance is negatively related to the unit labour cost and positively related to the proportion of foreign capital in TVEs' new capital investment. Our results show that transaction costs hinder TVEs' export and the government's financial support has a positive, although limited, impact on TVEs' export performance.

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1 Introduction

The export-led growth is frequently a subject of economic analysis and public policy debate. Many nations, industrial, newly industrialized and developing countries alike, have attempted to use a variety of policy instruments, such as production and R&D subsidies, exchange rate policies, financing and marketing programs, to assist their domestic firms to compete in international market. Export performance as characterized by ability of domestic firms to compete internationally depends on a number of factors that impact on a country's overall economic performance. These factors include productivity improvement and technological innovation, which in turn depend on investment and accumulation in human and physical capitals and on the institutional, structural and policy environments.

The linkage between export performance and a country's economic growth is generally supported by the empirical evidence in the literature. It has been reported that the developing countries that pursue the export-oriented trade policies enjoy a higher output growth than those embracing import-substitution policies. [Balassa (1978), Kueger (1978)]. Questions that naturally follow would be: First, what are the main factors that contribute to export performance of these domestic firms? Second, how effective are government policies in shaping the business environment in order to assist the domestic firms to compete internationally? In this paper we address these questions in the context of China's non-state-owned rural industry, consisting of the township and village enterprises (TVEs).

Based on the comparative statics analysis of a simple equilibrium model and exploring a unique set of panel data of 30 provinces and municipalities, we carry out a cross-regional analysis on TVEs' export performance and its determinants. More specifically, we model TVEs as rational economic agents that decide whether to export and by how much. This decision determines their export performance measured here by the export intensity, i.e. the ratio of export and total output. Then, we ask the question that which factors influence that decision and examine the impact of unit labor cost, foreign direct investment, transport and transaction costs, and government support.

We find that the TVEs' export intensity is negatively related to unit labor cost, indicating that a high unit labor cost hurts TVEs' export performance. Foreign direct investment is found to be an important factor contributing positively to export performance of TVEs. Foreign direct investment helps exports not only because it brings market access, product specifications, superior production technologies, and

management skills, but also provides a fence-hopping mechanism to bypass China's restrictive control on foreign trade rights. The government's financial supports to TVEs, although limited, appear to have enhanced TVEs' export performance.

The TVE sector in China offers a number of advantages as the subject of this study. First, China's successful export drive since its economic reforms initiated in late 1970s depends, to a large degree, on the effort of TVEs. However, this phenomenon has not yet been well understood and explained. Moreover, the quest to explain the phenomenal growth of export shields new lights on the determinants of export performance in general.

It is often believed that export performance is related to the effective exchange rate of a nation's currency (Fagerberg, 1988). Although such an interpretation provides some useful insight, it may lead to policy implications that currency devaluation improves domestic firms' international competitiveness automatically. Moreover, this view has overlooked other factors with which the domestic firms have certain degree of control and it cannot explain why some firms can compete and thrive in international market and others from the same country perish. To identify those factors that influence firms' export performance, we carry out this study by using the cross-regional data of China's TVEs. The impact of level and changes of exchange rate on the export intensity across regions in China is relatively moderate. Instead, the variations in factor endowments, business and public policy environments across the regions become dominant in determining the difference in TVEs' export performance.

The early literature on the determinants of exports from the LDCs focuses on the sensitivity of their export towards the demand in the developed economies. The supply side factors are often neglected in estimating the export performance of LCDs. More recent literature recognizes the importance of supply-side effects in this regard. A few studies have incorporated the supply side factors in their models (Riedel, 1988, Muscatelli et. al, 1995). These models appear to be lacking a micro-foundation of the equilibrium analysis. The demand for and supply of export are represented as the aggregates at the national level. In our study, our empirical investigation is based on an analytical model which depicts explicitly the decision making process of a rational firm that allocates its output to satisfy both foreign demand and domestic demand for the exportable.

The remainder of this paper is organized as follows: Section 2 discusses briefly the institutional background of the TVE sector in the context of China's economic transition. Section 3 develops a theoretical framework that relates TVE's export per-

formance and its determinants. The dataset and statistical methodology are described in Section 4. The empirical findings are reported in Section 5, which is followed by concluding remarks.

2 The Institutional Background

In this section, we discuss briefly the development of TVE sector and the foreign trade system in China under which TVEs operate.

2.1 What is TVE?

China's economic reform, started in the late 1970s, has brought many fundamental changes to its domestic economy. One of these changes is the emergence and rapid expansion of TVEs. As has been recognized by a growing number of scholars, a great diversity in ownership and management of TVEs makes it difficult to provide a clear-cut definition that covers all types of TVEs' operations. Weitzman and Xu (1994) and Li (1996) emphasize the ambiguous nature of TVEs' property rights arrangements, arguing that TVEs are coalition of local governments and private entrepreneurs. Chang and Wang (1994), Naughton (1994), and Che and Qian (1998) consider TVEs as organization that assigns control rights to the local government and assigns benefits rights to both the government and the nominal owners of TVEs, the rural residents in these towns and villages.

The recently enacted the Law of Township and Village Enterprises of China does not help much in clarifying this issue. In that Law, TVEs are defined as any enterprises located in the rural area and funded by the collectively owned rural economic organizations or rural residents to engage agriculture-related economic activities.¹ As we can see, the concept of TVEs contains both the ownership dimension and the locational dimension. The Law does not exclude the privately owned enterprises from that definition. In fact, in a circular issued by the State Council of China in 1984, it was explicitly stated that TVEs include four types of enterprise: enterprises owned by townships; enterprises owned by villages; cooperatives formed by groups of rural residents; and private family businesses.² While the first two categories include rem-

¹The Law was passed in October 1996 by the People's Congress of China and enacted in January 1, 1997

²The State Council of China, Circular No. 1, 1984, the Yearbook of Township and Village Enterprises, 1978-1987".

nants of the commune period's collectives, the last two types are not different in any substantial way from private firms in a market economy. On the other hand, although TVEs are considered as part of the non-state sector, substantial proportion of TVEs' output are produced by enterprises collectively owned by township governments and villages rather than by privately-owned enterprises³.

The township and village enterprises is a success story of China's economic reform. The gross value of industrial output of TVEs increased at an average annual growth rate of 22.9 percent in the period of 1978-94 after adjusting for inflation. Although growth rates were uneven across regions and over time, the overall pace was unprecedented. TVEs' output measured in terms of the gross value of industrial output in 1994 was 42 percent of the whole nation (SSB, 1995). When compared with the state-owned sector, which was often directly or indirectly assisted or protected by the government, the growth of the TVE sector looked even more impressive. In terms of both output and total factor productivity, the growth rates of TVEs were three times as high as those of SOEs in these period. According to one study, in a thirteen-year period from 1979 to 1991, the annual growth rate of total factor productivity of TVEs was 12 percent, compared with 4 percent registered for SOEs.⁴

When TVEs' output share in the domestic market expands with the growth of productivity, their products also start to enter into international markets. TVEs' export reached US\$ 25 billion in 1993, which was more than 41 percent of China's total export of US\$ 61 billion, making the export performance of TVEs a critical element in China's export capability. Table 1 shows the trend of TVEs' export, where the values of total export are exports of goods purchased by exporters and do not include re-export that is related to the outward-processing by foreign invested firms. As we can see from the table, not only has TVEs' export grown, the share of the TVEs' export in China's total export also has increased steadily.⁵ TVEs have

³The shares of gross value of industrial output of these four types of enterprises vary over time. In 1993, the share of township enterprises in the gross value of industrial output was 34.2%, village enterprises was 30.3%, and the household cooperatives and private enterprises were 6.7% and 28.8% respectively. The number of employees illustrated a somewhat different picture with corresponding proportions of 23.3%, 23.4% 7.4% and 45.9% respectively (Yearbook of TVEs, 1994).

⁴The documentation of early development of TVEs can be found in Byrd and Lin (1990) and analysis of the role of TVEs in China's economic reforms can be found in Chang and Wang (1994), McMillan and Barry (1992), Naughton (1994) and Weitzman and Xu (1994). Woo et al. (1994) make a comparison of SOEs and TVEs.

⁵For example, Krugman and Obstfeld (1994) in their textbook of international economics use China as a case to illustrate the relationship between trade liberalization and economic growth.

become one of the most powerful forces in China's export drive.

2.2 China's foreign trade system

To analyze the export performance of TVEs and its determinants, we have to understand the evolution of China's foreign trade system. As an integral part of economic reform, the state monopoly of foreign trade in the pre-reform period has been gradually dismantled, although the implementation of a free trade regime is slow and sporadic.⁶ The initial reform measures include decentralization of the export permit granting authority to lower level governments, establishment of the export contract responsibility system and introduction of competition between the state-owned foreign trade companies. The systematic direct export subsidy was not abolished until 1991 when a new round of reform measures in the foreign trade sector was introduced. These new measures are intended to create a competitive environment for export-oriented and productive enterprises. These reform measures arguably have had a positive impact on TVEs' exports, though TVEs still face substantial barriers to export.

Under the current export regime, TVE's can export their products through the following four channels: First, the traditional channel through state-owned foreign trade companies. These companies purchase products from TVE's and export them to international market. Second, through joint ventures formed with the state-owned foreign trade companies. Third, through joint ventures formed with foreign enterprises. Fourth, direct export if TVEs are large enough to be granted export licenses. The right to export directly was, and still is, not available to most of the domestic enterprises. For instance, out of a total number of 24.53 million TVE's in 1993, only 156 TVE's were granted direct export privileges. The products exported through these four channels are considered as direct export. The first two types of export channels are considered as export through the state-controlled foreign trade system and the last two are considered as self-managed export channels. Alternatively, TVE's can also be subcontractors of firms with export orders. Goods exported through the subcontracting arrangement are considered indirect export. The proportion of the direct export in total export of TVEs varied, but most were in the 60-70 percent range in the sample period.

⁶See Lardy (1992) for discussion of reforms introduced in foreign trade system in China before 1991 and the World Bank (1994) for more recent development.

3 An Analytical Framework

In this section, we first depict a simple analytical model that allows us to analyze the relationship between TVEs' export intensity and its determinants. Then, we derive some comparative statics results that will be used in our empirical investigation.

3.1 A simple model

Let us first consider the model. Assuming a representative TVE faces two segmented markets to which it can sell its products: domestic market and international market. This TVE must decide how to allocate its total output, $Q > 0$, between two markets, namely, $Q = q^d + q^w$ and $q^d > 0$ depicts the quantity of goods sold in the domestic market, $q^w > 0$ denotes the quantity of goods exported. In the domestic market, TVE faces a downward sloping inverse demand curve $p(k; q^d)$, where p and k are all positive and k captures the possible shocks on the domestic demand curve facing the TVE. Such demand curve reflects the fact that the products produced by the representative TVE in one region are imperfect substitutes for products produced by TVEs in other regions. The market imperfection may arise because of advantages in the local market of the TVE in its home-region, the attempts of the local authorities to protect their own markets, or the differences in variety and quality of their products. Perfect competition prevails in export market for TVEs' products with the on-going world price p^w , net of transaction costs. The transaction costs are broadly interpreted to include transport, marketing and other transaction related costs. The additional transaction costs to export are represented by $g \geq 0$; assuming to be constant for every unit of exported good. The marginal cost of production is characterized by diminishing returns to scale with, $c^l(Q) > 0$ and $c^m(Q) < 0$.

The profit function of the representative TVE is characterized as

$$\pi = p(k; q^d)q^d + (p^w - g)q^w - c(q^d + q^w) \quad (1)$$

By choosing q^d and q^w , the representative TVE maximizes its total profit from both the domestic sales and export. The first order conditions for profit maximization is reflected in equations (2) and (3).

$$p^l(k; q^d) - c^l(q^d + q^w) = 0 \quad (2)$$

$$p^w - g - c^m(q^d + q^w) = 0 \quad (3)$$

By solving the following first order conditions, we can derive the optimal quantities of goods sold in domestic market, q^d , and world market, q^w . For simplicity of analysis, we assume that the profit function satisfies the second-order conditions. This simple model incorporates both the supply-side factors as well as demand-side factors that determine the equilibrium output quantities sold in these two markets.

3.2 Comparative static results

Now, we turn to comparative statics of the model and analyze possible impact of factors that influence TVEs' export decision, hence, their international competitiveness. Based on these comparative statics results, we can obtain a number of unambiguous predictions about the relationships of export performance and its determinants. The comparative static results are summarized in the form of a few propositions.

From equations (2) and (3), we can see clearly that the TVEs' decision of allocating its total output depends on its marginal costs. By total differentiating the first order conditions with respect to the marginal cost, we obtain the following relations in the relevant range regarding the impact of marginal cost on firm's export decision:

$$\frac{\partial q^w}{\partial c^d} < 0 \text{ and } \frac{\partial q^d}{\partial c^d} = 0 \quad (4)$$

This result suggests that a downward shift in marginal cost increases export. Because the world price is exogenously determined and is served as the opportunity cost of the domestic sale, the price and quantity of domestic sales remain unchanged. We summarize this analytical result in the following proposition:

Proposition 1 TVEs with lower marginal cost export more than that with higher marginal cost, with all other things equal.

In addition to the direct production cost, other cost elements, such as transport and marketing expenses, should also influence the export decision of TVEs'. As described in our analytical model, export incurs more transaction costs than domestic sales, because of, but not limited to, the long distance of transport. The impact of export related transaction costs, similar to a sales tax imposed on exported goods, has a negative impact on the export decision of the TVEs as seen in the comparative statics result,

$$\frac{\partial q^w}{\partial g} < 0 \text{ and } \frac{\partial q^d}{\partial g} = 0 \quad (5)$$

This means a decrease in export transaction costs encourages export and leaves domestic sales unchanged. Therefore, we obtain the following proposition,

Proposition 2 The export transaction costs hinder the export of TVEs and encourage domestic sales with all other things equal.

In addition to the supply-side factors, the demand side factors also impact the decision of the representative TVE. Because a TVE faces two segmented markets, changes in each of the two markets may influence TVE's decision. Let's first look at the impact of domestic demand condition changes. The shocks in the domestic demand is captured by parameter k . As we see from the result of comparative static based on the first order conditions, we have

$$\frac{\partial q^w}{\partial k} > 0 \text{ and } \frac{\partial q^d}{\partial k} < 0 \quad (6)$$

Because the parameter k is negatively related to position of the domestic demand curve, an upward shift in domestic demand encourages domestic sales and discourages exports. Based on the comparative statics results, we have the following proposition

Proposition 3 The higher the domestic demand, the less the export of the TVEs, all other things equal.

The export from developing countries are said to be strongly related to the business cycles in the developed economies that are the major markets for such export. Fluctuation in the demand from this market is reflected in the changes of the export price. From the total differentiation of the first order condition, we show the following comparative statics results

$$\frac{\partial q^w}{\partial p^w} > 0 \text{ and } \frac{\partial q^d}{\partial p^w} < 0 \quad (7)$$

This means an increase in export price p^w stimulates exports at the expenses of domestic sales. So we postulate the following hypothesis

Proposition 4 The higher the export price, the more the export of TVEs, all other things equal.

An alternative interpretation is that the received world price changes can be the result of domestic currency devaluation vis a vis the currencies of major export destinations. In this case, the world prices in terms of the local currency increases, although the price level in the foreign currency remains unchanged.

From our analysis, we can see that all those factors affect a firm's export decisions unambiguously. These analytical results constitute the theoretical foundation for our empirical investigation.

4 The Empirical Implementation

In this section, we discuss the dependent variable that is used to measure TVEs' export performance before considering a number of explanatory variables in the empirical implementation that will capture the effects predicted by our theoretical analysis. Then, we specify the empirical model and discuss the possible econometric issues involved.

In this paper, we adopt export intensity as the measurement of export performance of TVEs.⁷ Export intensity, a simple and broadly used measure, measures the proportion of the total output of a firm or an industry that sells abroad. We believe that the export intensity serves us well in this study because it is simple to understand and easy to calculate. More importantly, this measure captures the basic economic forces at work. The export intensity reflects the changes of export versus domestic sales decision of TVEs characterized in our theoretical model. Hence, we use export intensity as the measure of TVEs' international competitiveness, i.e., the ratio between TVEs' export and their gross value of industrial output.

As we have discussed earlier, export of TVE's can be divided into direct export and indirect export, depending on the channels that TVEs' use to export their products. Thus, we measure the export intensity in two ways: total export intensity and direct export intensity.

In our theoretical analysis, TVEs' export decision depends on both the supply side factors, such marginal cost and transaction costs, and the demand side factors such as the world market price and domestic market demand. Now we have to construct explanatory variables that are consistent with our theoretical prediction and operational in our empirical implementation. We are going to adopt the following explanatory variables.

Unit labor cost (ULC): As is well documented in the literature, the unit labor cost after adjusting for productivity differences is one of the most important cost elements

⁷See Dominguez and Sequeira (1992), Fagerberg (1988), and Scott and Lodge (1985) among others, for discussion of alternative measures of export performance. Among these measures are the market shares in the world market of a specific product or the growth rate of the market shares.

determining the international competitiveness of an industry. In fact, the relative unit labor cost has been used as the measure for the international competitiveness (Fagerberg, 1988). Therefore, we incorporate ULC as an explanatory variable in our empirical model. Following the convention, we measure the unit labor cost as the total wage of employees of TVEs in manufacturing sector divided by the gross value of industrial output of TVEs. Since the total number of employees in the manufacturing sector of rural industry only accounts a small fraction of total labor force in the rural area and the abundant labor supply in China's rural areas, we assume that the wages of TVE's employees are determined exogenously. One can give an alternative interpretation of ULC as the reverse of labor productivity. In other words, TVEs in a particular region are more competitive internationally if the labor productivity is higher than other regions.

Educational level of the labor force (EDU): Productivity of the labor force depends on the human capital embodied in the labor force. To control the level of human capital, we introduce EDU as an explanatory variable in our regression equation. This variable measures the proportion of population in a region with at least the high- school education.

Foreign direct investment(FDI): The role played by foreign direct investment is two fold: First, foreign investment bring in much needed physical capital, technology and management skills to China's rural industry. The foreign capital in°ows, with embodied technologies and management skills, serve to improve the e±ciency of TVEs by mitigating distortions and lower the production cost, therefore, enhance TVEs' international competitiveness. Second, foreign direct investment in China's rural industry helps TVEs' to circumvent the restrictions under the half-reformed foreign trade system in China. With foreign partners, TVEs can earn the rights to export, therefore, hop the barriers to export. Moreover, FDI can improve TVEs' international competitiveness by establishing marketing channels to overseas market. Therefore, we include FDI as an explanatory variable for TVEs' international competitiveness. The ratio of foreign capital to total capital investment is used as a proxy to capture the magnitude of foreign direct investment across regions.

Government financial assistance(GOV). Government's attitude towards TVEs changes over time, depending on the situation of domestic economy and the policy shift. Unlike SOEs that have easy access to resources, TVEs receive little support from the state-owned banking system. From the very beginning of economic reform, the major policy tool of the government is the gradual relaxation of the restrictions

imposed on TVEs' economic activities. However, various levels of government did use a number of means to foster TVEs' development, particularly when the economy was in a state of stagnation. One of the instruments takes the form of the government support fund and government departmental fund earmarked for TVEs. These funds are allocated from the fiscal budgets of various levels of the government. They are mainly used as working capital or as initial seed money for certain investment projects. We consider the magnitude of such funds as an indicator of government support for TVEs. Because these funds alleviate the acute and chronic shortage of capital for TVEs' and reduce TVEs' risks in investment projects, they low the cost of capital of TVEs and therefore are beneficial to the TVEs' export. We construct a variable, GOV, to capture the government financial support to TVEs, which is the ratio of total government support funds for TVE's to the total new fixed capital investment.

Transaction cost (TRS): One of the factors hindering TVEs' export is transaction costs broadly defined. TVEs in different regions face different transaction costs. When transaction costs are high, TVEs find it harder to compete internationally because of the higher price of end product. Transaction costs may contain a number of components, including transport costs, negotiation cost, marketing cost, and information costs. It is difficult to measure precisely the magnitude of transaction cost. To capture the effect of transport cost, we use the distance between the capital cities of the provinces and Hong Kong as the proxy⁸. Because of the transaction costs are generally higher for the inland areas than the coastal regions, we add a regional dummy (REG) to control the impact of regional differences in infrastructure, and transaction costs on TVEs' export performance.

Time trend (TRD): As the theoretical result suggests, the export intensity of TVEs may change because of demand side factors. Many factors may influence the demand for TVEs' output. Most noticeably, it is the relativity of the growth rates between the domestic demand and foreign demand. Although these changes will influence all TVEs instead of TVEs in any particular region, we anticipate that over time, TVEs may sell large proportion of their good in the domestic market than to the foreign ones, because of differences in growth rate between Chinese economy and the economic growth rate of export destination countries.

The data that we use are panel data that contains operation information of TVEs

⁸In 1993, the year with the latest statistics available, the total export of China was US\$ 92 billion. Among the total export, US\$ 52 billion, 56% was exported via Hong Kong (SSB, 1994; Hong Kong Government, 1994).

from thirty provinces and municipalities in China. The data set covers eight years starting from 1987 and ending at 1994. The data sources are discussed in Appendix 2. The descriptive statistics of the variables used in the empirical investigation are summarized in Table 2. The panel data on TVEs allows us to have in a longitudinal design to shed new light on the relationship between export performance and its determinants. The basic empirical model is specified as follows.

$$X_{it} = \beta_0 + \beta_1 ULC_{it} + \beta_2 EDU + \beta_3 FDI_{it} + \beta_4 GOV_{it} + \beta_5 TRS_i + \beta_6 TRD_i + \epsilon_{it} \quad (8)$$

where i stands for regions and t stands for time period. The left hand side is TVEs' export intensity, that is the ratio of the value of the exported goods and the total output value of the TVEs and on the right-hand side are the variables that we have just discussed. As in the previous discussion, we expect the coefficient of ULC to be negative, that is to say, the lower the unit labor cost, the higher the export intensity, *ceteris paribus*. The same for the sign of coefficient for transaction cost. We expect the coefficients of education, foreign direct investment and government support to be positive. The ordinary least squares (OLS) method is used to estimate the coefficients of the explanatory variables in the empirical equation

In an economy like China, there are bound to have significant differences across regions in addition to the factors that we have explicitly included in our estimation equation. To mitigate the influence of such problems, we estimate a fixed-effect panel data regression equation as a follow-up to the simple OLS model to isolate the regional related effect that may distort the estimation of parameters. To control the fixed effects for all unobservable, time-invariant section-specific effects, we introduce the regional variable REG when running the regression. The idea is that the fixed effects may have reasonably captured the omitted factors or the part of the error terms that are correlated with included variables.

A remark should be made regarding the theoretical model and its empirical testing. The hypotheses that we have developed in the earlier section on TVEs' international competitiveness and its determinants are based on a model that characterizes individual firms' decision, but the data that we have are grouped data aggregating at the regional level. As a result, two effects may occur as has been shown by Cramer's classic study (1964): First, the parameter estimates are less efficient due to the possible loss of information. But, the fit of the regression model improves because of the data grouping. We believe that the grouped data, in this case, can provide more reliable outcome to the questions that we want to address.

5 The Results

The empirical results are reported in Tables 3 and 4. Table 3 uses total export intensity as the regressor while Table 4 uses direct export intensity as the regressor. In column 1 of Table 3, we show the estimated coefficients of the explanatory variables in the basic model of estimation without control for cross-regional fixed effects. The parameters reported in column 2 are estimated after the variable of time trend is included in the estimation equation. In column 3, we report the estimates after introducing 29 regional dummy variables into the regression equation to control the fixed regional-specific effects.

From Table 3, we can see that the explanatory power of the model of the regional differences in export intensity is significant as reflected in the adjusted R^2 . The basic model explains over 30 percent of variance of the total export intensity. The model that include the time trend improves the explanatory ability only marginally. The model that controls for the regional fixed effects explains substantially more of the variation in export intensity. This model explains approximately 84 percent of the differences in export intensity of TVEs.

When looking at the individual explanatory variables, we find the coefficients for ULC are negative in all three regression models. This result is consistent with our theoretical prediction that unit labor cost has a negative impact on the export intensity of TVEs. It suggests that the higher the unit labor cost, the lower the TVEs' export intensity. We have to notice that, after controlling the regional differences, the coefficient of unit labor cost become statistically insignificantly. The coefficients of the educational level, as the proxy of the human capital, are always positive and statistically significant from zero.

As expected, foreign direct investment has a significant impact on the export intensity. This is consistent with our theoretical prediction of the role of foreign direct investment in lowering the production costs by improving the capital, technical and management skills of TVE's, and in lowering the transaction cost of export relative to the domestic sales.

The coefficient estimates of the government support variable are positive. This finding is consistent with our prediction, suggesting that government financial support contributes positively towards the international competitiveness of TVE's. After we control the regional fixed effects by the regional dummies, the effect, although still with a positive sign, becomes statistically insignificant. One interpretation is that the financial supports from the government, although helpful to improve their export

performance, cannot solve the problem of chronic shortage of capital as long as TVE's are not able to access to the state-owned banking system.

The coefficients of transaction costs are all negative in these three regression models. This is consistent with our prediction. TVEs located in the hinterland are disadvantaged relative to those located in coastal regions, the transaction costs, including transport costs and information costs, are much higher for the former than those in the coastal provinces. Such type of transaction costs must be absorbed by TVE's when they compete in the international market, therefore, raises their cost of exporting and reduces their international competitiveness.

It is also worth reporting, although not included in Table 3, the regions with direct access to port facilities shown substantially higher export intensity as reflected in the coefficients of the regional dummy variables that are used to control the regional fixed effects. When the regional fixed effects are captured by the regional dummies, Beijing is used as the benchmark location. We find that the coefficients of the dummy variables for regions of Shanghai, Tianjin, Jiansu are all positive and statistically significant from zero. These regions have clear advantages in transport infrastructure in terms of port facilities. This result is consistent with our prediction on the effect of transaction costs. The better the transport infrastructure, the lower the transaction costs, the higher the export intensity.

To check the robustness of our model and to verify that the effect of trade system, we report the result that uses the direct export intensity as dependent variable in Table 4. As we can see that the basic results remain the same as that when the total export intensity is used as dependent variable.

When comparing the estimates from Table 3 and Table 4, we observe that the impact of the unit labor cost differs on the direct export intensity and on the total export intensity. In the case of the total export intensity, the coefficients are statistically more significant, comparing with that in the cases of direct export intensity. One interpretation comes from the export intensity measures themselves. As we have defined earlier, the difference between the total and direct export intensities are the value-added of these TVEs undertaking subcontracting work for other foreign trade enterprises. These subcontracting activities are typically more labor intensive than other enterprises, thus the selection of the subcontractors are based on the unit labor cost more than that of the direct exporters.

6 Conclusions

Export performance of domestic firms is a concern for policy makers and economists alike. Existing studies on cross-country comparison have revealed important insights on determinants of export, particularly the impact of effective exchange rate. However, the results were difficult to compare and interpret due to differences in the institutional and economic policy environments. Factors other than the exchange rates are difficult to deal with explicitly. Our study, based on cross-regional data of China's non-state rural industrial sector, attempts to conduct an analysis of international competitiveness for firms that face a relatively homogenous policy environment. We construct an analytical model with a rational economic agent who has to decide the proportion of his products to export and to sell in domestic market.

We find that TVEs' export performance is negatively related to the unit labor cost of TVEs, implying the TVEs with higher labor costs after adjusting for labor productivity are less competitive in international market. The magnitude of foreign direct investment is found to have strong impact on the export performance of TVE's. Transaction and transportation costs are found to hinder the export of TVE's.

In the early stage of the reform, TVE's were not the main concerns in Chinese government's policy formulation. Little, if any, assistance from the government was provided. Nevertheless, TVE's have achieved an impressive progress in both the domestic and international markets. As economic reform progressing, the central as well as regional governments in China started to provide some limited financial assistance to TVEs in the form of short-term loans and seed money for start-ups. We find that these supports are positively related to TVEs' export performance.

Our study is clearly related to the current literature on the export determinants of the newly industrialized economies. In this literature, the focus is on estimation of the demand elasticity, the research has produced useful insights (Muscatelli et al, 1995). The lesson is that the price elasticity plays more important role than the income elasticity as previously believed. If the export performance largely depends on the price elasticity, the price level of export and the factors that determine the cost of the exportable become important. To complement these findings, we focus on the supply-side factors that determine the international competitiveness of China's TVEs. The novelty of our study is that we explore the cross-regional data that mitigate the possible estimation bias in existing cross-nation studies.

TVE as an institutional innovation in China's economic reform process plays a major role in contributing to China's economic growth. Nevertheless, its impact

and performance in international marketplace have not yet been well documented and analyzed. This study represents our first attempt to understand TVEs economic performance and the determinants in the context of international competition. Future studies are needed to improve our understanding on the dynamic evolution of TVEs' export performance and to assess the effect of TVEs' export on domestic and regional economic development.

Appendix 1: Derivation of comparative statics

From the first order conditions for profit maximization, we have the total derivative with respect to p^w as

$$p^{00}(q^d)q^d \frac{\partial q^d}{\partial p^w} + p^0(q^d) \frac{\partial q^d}{\partial p^w} + p^0(q^d)q^d \frac{\partial q^d}{\partial p^w} - c^{00}(q^d + q^w) \left(\frac{\partial q^d}{\partial p^w} + \frac{\partial q^w}{\partial p^w} \right) = 0$$

$$1 - c^{00}(q^d + q^w) \left(\frac{\partial q^d}{\partial p^w} + \frac{\partial q^w}{\partial p^w} \right) = 0$$

Combination of these two equations produces

$$[p^{00}(q^d)q^d + 2p^0(q^d)q^d - c^{00}(q^d + q^w)] \frac{\partial q^d}{\partial p^w} = c^{00}(q^d + q^w) \frac{\partial q^w}{\partial p^w}$$

because of

$$(p^{00}(q^d)q^d + p^0(q^d)) \frac{\partial q^d}{\partial p^w} = 1$$

The second order condition of profit maximization requires that

$$p^{00}(q^d)q^d + p^0(q^d) + p^0(q^d)q^d - c^{00}(q^d + q^w) < 0$$

$$p^{00}(q^d)q^d + p^0(q^d) + p^0(q^d)q^d - c^{00}(q^d + q^w) < 0$$

The sign of $\frac{\partial q^d}{\partial p^w}$ is the same as the sign of the first derivative of the first order condition with respect to c , we have $\frac{\partial q^d}{\partial p^w} > 0$.

Appendix 2: Description of Data

All data used in this study are from official statistics compiled by government organizations. The major sources of data are Yearbooks of Township and Village Enterprises published by the Ministry of Agriculture. These yearbooks cover the statistics of TVEs on production, employment, wage, export, financial structure and investment aggregated at provincial level. The data contained in these yearbooks were reported by the TVEs across the nation to local government agencies and compiled by the central government. The sample period covers eight years starting from 1987 and ending at 1994 since only in 1987 did the Ministry of Agriculture start to compile and to publish statistics and relevant documents on the township and village enterprises in the format of yearbooks.

The dataset based on official statistics offers advantages of wide coverage both geographically and intertemporally while compared with the survey data based on a sample of TVEs used by Byrd and Lin (1990), and Woo (1994). The same is also true when compared with the case study methods used by Ma et al. (1994). However, our dataset has shortcomings of possible loss of information due to aggregation and lack of control in the data gathering process. Nevertheless, analysis of dataset based on official statistics should be complemented by studies using other data sources.

We construct the panel data series on gross value of industrial output, value of export, net fixed assets, working capital, foreign direct investment, new capital investment, and government support funds. The data collection and cleaning process produce 200 observations that are used in the empirical estimation.

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