

# Analysis of the Factors of TVE's Profitability in Xinjiang District

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This paper examines the determinants of the profitability of Xinjiang's township and village enterprises. Panel and cross-sectional analyses of profit equations are conducted among collective-owned, shareholdings, and private fund township and village enterprises. Liability-asset ratio is positively related to private township and village enterprises, but negatively related to COTVEs in most cross-sectional and all panel regressions. Management ability is positively related to profitability in the estimation results of shareholding and private fund enterprises in all regressions. Wage per capita is positively related to the profitability of shareholding enterprises, but in most regressions, it is negatively related to the profitability of collective-owned and private fund enterprises. Estimation results for enterprise size are negative in most cross-sectional and panel regressions to all ownership of township and village enterprises.

**Keywords:** rural industrialization, TVEs, profitability, liability-asset ratio

**JEL Classification Numbers:** P25, L25

## 1. Introduction

From the 1980s to the 1990s, township and village enterprises<sup>1)</sup> (TVEs) has been the key factor for the success of China's rural economic development, which has greatly influenced her economy. After 1998, the privatization boom privatized most collectively-owned TVEs. In recent years the TVE concept has nearly become passé. However, TVEs development in the western regions remains at a low level, especially, in Xinjiang. Even if its economy were achieving similar high

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<sup>1)</sup> Township and village enterprises mean the enterprises located in towns and villages that are registered with the Xinjiang Township and Village Enterprises Administration Bureau as township and village enterprises.

growth rates to equal the rest of China's economic development (From 2000 to 2005, Xinjiang's development averaged 10.3%), such development is actually biased. The development of rural economies, which concerns over half of the population, is being left behind. The total industrial output value of 2004 shows that the ratio of heavy industry is 84.9%<sup>2)</sup> (mining and quarrying is 35.5%, raw material industry is 40.4%, and manufacturing industry 9%). Light industry's share is only 15.1% (using farm products as raw materials is 14.1% and using non-farm products as raw materials is 1%).

For the sustainable development of rural economies, the promotion of rural industrialization is crucial, and solving the problems faced by TVEs is becoming an urgent issue (Zhouwei and Zongyi 2003). The problems include the factors that determine the profitability of enterprises. We can find a lot of literatures about the factor analysis of the profitability of enterprises in the coastal regions of China. Some studies argue that the profitability of public-owned enterprises has declined in China, and based upon lower productivity, the weakness of their competitive power has been exposed as market competition intensified. For example, Shiraishi (2002) estimated the profit function of public-owned enterprises including TVEs using the micro data of enterprises to clarify the profit determinants and indicated that a rise in the efficiency of public-owned enterprises increases profits. Lin and Rowe (2006) did an empirical study on the profitability determinants of China's regional SOEs. Finding any empirical studies on Xinjiang district enterprises that used micro data is difficult. This paper will address the lack of researches on the western region, clarify whether enterprises are working efficiently, and identify the obstacles to development by analyzing the structure of profit decisions. For these aims, we estimate the profit function of collectively-owned enterprises (originally identified as township and village enterprises), share-holding enterprises, and private fund enterprises.

This study contributes to the literature on Xinjiang's economy in two major ways. First, on Xinjiang's rural economy, empirical studies are rare. In this paper we used the recent micro cross-sectional and panel data and examined the profitability determinants of TVEs in Xinjiang. In this sense this empirical work supplements well previous studies on its economy. Second, as enterprises in other provinces, Xinjiang's enterprises also have different ownership structures. In this paper we focus on the influence of the liability-asset ratio and discuss the influences of the factors that decide profit among different ownership structures.

## 2. Ownership Structures of Xinjiang's TVEs

In this paper the ownership structure of TVEs is classified into eight types<sup>3)</sup>: (1)

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<sup>2)</sup> Xinjiang Statistical Yearbook, 2005.

<sup>3)</sup> Definitions are based on the "Regulations for Classifying Registration and Licensing of Enterprises by Ownership State Administration for Industry and Commerce and National Bureau of Statistics, 28 August 1998."

collective-owned township and village enterprises (COTVEs); (2) share-holding cooperative enterprises; (3) limited liability enterprises; (4) share-holding limited liability enterprises; (5) private fund enterprises; (6) joint-venture enterprises; (7) self-employed enterprises; and (8) foreign-owned enterprises.

They cover most ownership systems of Xinjiang's TVEs. Table 1 shows the three main kinds of indicators of Xinjiang's TVEs in 2005. Their characteristics are small scale; concentration on tertiary industries; and recent increases in private fund enterprises (Hasan 2005). 82% of Xinjiang's TVEs are small-scaled self-employed enterprises that their share on number of employment is 64%, and contribute half as value-added. Private fund enterprises have a relatively large share (Table 1). Almost all self-employed enterprises employ one or two workers. As mentioned below, since our samples include small- and medium-size enterprises, we exclude them from our analysis.

The debate in the relation between ownership system and corporate governance concerns the separation of property and management rights (Lin et al. 1998; Imai 2000). Compared with other types of enterprises, the property rights of private fund enterprises are comparatively clear, and the separation extent between ownership and management is comparatively low (agency cost is low). Because associated, private fund, and foreign capital enterprises share the same characteristics, we call them private fund enterprises. Based on the vaguely identified distinctiveness of collectively-owned enterprises, we consider them as a special type. Recently introduced corporate types have limited liability and a share-holding system. Such enterprises distribute dividends based on investment shares, and their ownership relationships are clear. On the other hand, owners have difficulty encouraging managers to act independently, and agency cost is needed (Murakami and Shen 2006). This places the limited liability, share-holding, and share-holding limited liability enterprises in the same group called share-holding enterprises.

**Table 1** Ownership Structure of Xinjiang's TVEs (2005)

	Share on number of the company (%)	Share on number of workers (%)	Share on value- added (%)
Sum	100	100	100
1 Collective-owned enterprises	0.41	5.27	6.52
2 Share-holding cooperative enterprises	0.03	0.39	0.15
3 Limited liability enterprises	0.25	6.54	21.55
4 Share-holding limited liability enterprises	0.01	0.42	2.17
5 Private fund enterprises	11.33	18.65	21.62
6 Associated enterprises	6.02	4.76	1.13
7 Self-employed enterprises	81.95	63.92	46.78
8 Foreign-funded enterprise	0	0.05	0.09

Source: Xinjiang Statistical Yearbook, 2006.

### 3. Hypothesis and Definition of Variables

The objective of this paper is to empirically investigate the profitability determinants of TVEs, which can be measured in various ways; the basic empirical framework involves the following specification:

$$\pi = \alpha + \beta X + \mu,$$

where  $\pi$  is TVE profitability,  $X$  is a vector of explanatory variables,  $\alpha$  is a coefficient vector accommodate with  $X$ , and  $\mu$  is a stochastic error term. Two alternative measures of profitability are used: return on total assets (roa) and profit margin on sales (pmsale). Return on total assets tells investors how much profit a company generated for each \$1 in assets. Profit margin on sales indicates the level of profit from each dollar of sales. Applying different profitability measures allows us to examine the various aspects of TVEs' profitability determination and provides a robustness check of our results<sup>4</sup>.

Factors that could affect the profitability of TVEs include the following. First, liability-asset ratio: Lin and Rowe (2006) found that liability-asset ratio negatively related to SOE's profitability. Holz (2002) found that liability-asset ratio is insignificant to the profitability of SOEs and argued that high debt incurs high interest payments and lower profits for the enterprises. This hypothesis is based on the assumption that the cost of external borrowing is higher than the cost of using the firms' own assets. The effect of the liability-asset ratio on profitability is not self evident. Does a high liability-asset ratio indeed imply low profitability for TVEs? The issue will be reexamined for TVEs using Xinjiang's new set of data.

Second: management ability also affects enterprise profitability<sup>5</sup>. The production sales ratio (S/GY) can be assumed to be its proxy variable. The higher the production sales ratio, the higher the manager's ability even if this ratio exceeds 100%, because the unsold merchandise of the first term could be sold in this term or because production might have been reduced due to such unsold inventory. This means that managers are producing with plan. This production sales ratio (S/GY) is captured as productivity in a wide sense. Therefore, the expected coefficient estimation is positive.

Third: wage per capita: as a labor cost, it will decrease profits. However, as a labor incentive, it indirectly leads to an increase of the enterprises' profits. Based on the efficiency wage hypothesis, when acting as a price-taker, the enterprise usually doesn't lower wages because such action negatively affects worker morale and decreases productivity.

Fourth: the rate of operation (M/K) is the availability (operation rate of capital) of capital in the production process. The operation rate is different depending on the type of business. We assume that it moves in the same direction in each type of

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<sup>4</sup> We specified the measures of profitability based on Lin and Rowe (2006).

<sup>5</sup> We borrow Shiraishi's (2002) approach here.

ownership system.

Fifth: labor productivity and capital productivity. Since both are productivity relative to labor and capital, the expected estimated coefficient is positive.

Sixth: the size of the company. The number of company employees is thought to be proxy variables for the size of the company. This parameter explains the influence of scale economy to profitability; therefore the expected estimated coefficient will be positive.

#### 4. The Data

The data set used in this paper is the micro data of Xinjiang TVEs taken from the Xinjiang Township and Village Enterprises Administration Bureau. All enterprises are small- or medium-sized enterprises with fewer than 500 employees. We have cross-sectional data from 139 TVEs for 2002, 198 for 2003, 352 for 2004, and 465 for 2005. We found 91 enterprises with same indexes for at least three years from the tables and made balanced panel data for the analysis. For the deflation of output, intermediate inputs, and fixed assets, we basically used the same method as Yano and Shiraishi (2004).

Table 2 presents the descriptive statistics for the major variables for the panel data: roa, pmsale, liability-asset ratio (Alratio), management ability (S/Gy), wage per capita (W/La), labor productivity (Gy/La) and capital productivity (Gy/Asset), and enterprise size (La). The mean of the return on total assets roa is 0.143 for COTVEs, which is higher than the other two types, 0.057 and 0.078, respectively. The mean of profit margin on sales is 0.061 for COTVEs, 0.049 for share-holding enterprises, and 0.035 for private fund enterprises, respectively. Liability-asset ratios are higher for COTVEs and share-holding enterprises, 0.595 and 0.581, respectively, and lower for private fund enterprises at 0.450. The mean of wage per capita is highest for private fund enterprises and lowest for COTVEs, 1.399, 1.243 and 0.999, respectively. The mean for productivity is the highest in private fund

**Table 2** Descriptive statistics for panel data

	roe	pmsale	Alratio	S/Gy	W/La	M/K	Gy/La	Gy/Asset	La
Collectively-owned enterprises (22)									
Mean	0.143	0.061	0.595	0.912	0.999	8.991	32.364	0.600	157.171
St. dev.	0.147	0.090	0.296	0.341	1.020	16.090	24.298	0.549	110.540
Share-holding enterprises (48)									
Mean	0.057	0.049	0.581	1.180	1.243	5.727	35.817	1.667	139.127
St. dev.	0.090	0.079	0.259	1.256	1.080	10.419	35.152	3.299	114.482
Private fund enterprises (19)									
Mean	0.078	0.035	0.450	0.936	1.399	7.237	39.447	2.653	97.081
St. dev.	0.099	0.022	0.312	0.110	1.038	23.974	36.318	2.166	70.555

enterprises and the lowest in COTVEs. The mean for COTVEs is 157.17, indicating that they have larger scale than the other two types.

## 5. Regression Results

We conducted cross-sectional and panel analysis based on four years of panel data from 2002 to 2005. In the panel analyses, we estimated the linear regression model by treating the omitted individual specific effects as fixed constants over time. Tables 3–8 show the results of the regressions of profitability measured by return on total assets, profit margin on sales, regressed by the liability-asset ratio, manager's ability, wage rate per capita, rate of operation, labor productivity and capital productivity, and company size. Estimation results are shown in Tables 3–8.

We summarized the estimation results in Tables 9 and 10. Each table represents the regression results of one kind of measurement of the profitability of different ownership systems.

The relationship between liability-asset ratio and profitability depends on the ownership system. Liability-asset ratio negatively affects the profitability of COTVEs, and the coefficients are highly significant in most cross-sectional and panel regressions (see Tables 3 and 6). This result indicates that COTVEs with higher liability-asset ratios were less profitable than COTVEs with lower liability-asset ratios. However, no matter which profitability measure is utilized, liability-asset ratios of share-holding enterprises and private fund enterprises are positively related to profitability (see Tables 4–5 and Tables 7–8). This indicates that the share-holding and private fund enterprises with higher liability-asset ratios are more profitable than those with smaller liability-asset ratios; the coefficients are highly significant. The average liability-asset ratios for COTVEs, share-holding enterprises, and private fund enterprises are 0.595, 0.581, and 0.450, respectively (Table 2). They are lower than the average of 0.84 for the small- and medium-sized enterprises of Guangdong, Liaoning, Hubei, and Yunnan provinces (Jiashan and Dong 2007). Xu and Ma (2006) indicated a credit crunch for TVEs and argues that capital access from banks and fund-raising is critical for TVEs. Our finding is identical to (Chaohua 2002) for Suzhou's COTVEs.

The relationship between management ability and TVE profitability also depends on ownership structure. Regardless which profitability measurement is utilized, the proxy variable of management ability of COTVEs was not stable. However, management ability of share-holding enterprises and private fund enterprises is positively relevant to profitability, and the estimation coefficients are highly significant (see Tables 3–8). This indicates that management ability is an important profitability determinant of share-holding and private fund enterprises. Doubt remains whether COTVEs can match the production of market demand. They might be forced to deal with local governments and communities. It is easy to predict that COTVEs may perform poorly, just as state-owned enterprises, due to vaguely defined property rights. Xu and Ma (2006) expressed that a self-

established sales route is the main route for marketing of products of share-holding enterprises. His idea strongly supports these estimation results.

The relationship between wage per capita and TVE profitability depends on their ownership structure. No matter which profitability measure is utilized, most estimation coefficients of wage per capita appeared negative to COTVEs and private fund enterprises in both cross-section and panel regressions (see Tables 3, 5, 6, and 8). This indicates that labor cost is one determinant that reduces the profit of COTVEs and private fund enterprises. However for share-holding enterprises, regardless of the measure of profitability, the estimation coefficients of wage per capita appeared positive and highly significant (see Tables 4 and 7), indicating that the incentive role of higher wage rates is overcome by the negative role of reducing profit.

The relationship between the rate of the operation of capital and TVE profitability also depends on their ownership structure. In most of the cross-sectional and panel regressions the estimation coefficients for rate of operation are positively relevant to profitability for share-holding and private fund enterprises; the estimation coefficients are highly significant. But for COTVEs, the estimation coefficients for rate of operation are negative (see Tables 3–8). This indicates that the M/K of share-holding and private fund enterprises strongly affects the profitability of enterprises. Even if COTVEs have capital adjustment advantages, the result is negative means that capital might be used inefficiently in these enterprises. Vaguely defined property and management rights might also be possible explanations.

The relationship between TVE productivity and profitability depends on both its ownership structure and profitability measurement. When return on total assets,  $roa$ , is estimated, the estimation coefficient of the labor productivity of share-holding enterprises is positive and highly significant in both cross-sectional and panel regressions. However, it is negative for COTVEs and private fund enterprises (see Tables 3–8). The estimation coefficients of capital productivity are positively related to the profitability of all kinds of ownership systems; Most of the estimation coefficients are highly significant. When profitability is measured by the profit margin on sales, estimation results for labor productivity appear positive for share-holding enterprises, negative for private fund enterprises, and unstable for COTVEs. The estimation results for capital productivity are unstable in both cross-sectional and panel regressions. These results reveal that high productivity appears in the profitability of share-holding enterprises. For COTVEs, even if productivity is high, sales might not proceed smoothly. Company profit doesn't appear accurately due to a vague ownership relation.

We verified the relationship between sizes of enterprises and profitability using number of employees as a proxy variable of company size. Most estimation results are negative regardless of the profitability measurement and estimation method except for the cross-sectional result for 2004 (see Tables 3–8). This indicates that enterprise size is negatively related to the profitability of Xinjiang's firms.

**Table 3** pmsale for collectively-owned enterprises

	Cross-section				Panel	
	2002	2003	2004	2005	Fixed	Random $\bigcirc$
Constant	$0.6 \times 10^{-3}$	$0.2 \times 10^{-3}$	$-0.5 \times 10^{-4}$	$0.2 \times 10^{-3}$		<b>0.012</b>
ALRATIO	-0.031**	-0.049***	-0.110***	-0.092***	0.055	<b>-0.074***</b>
S/GY	0.029**	$-0.6 \times 10^{-2}$ ***	0.141***	-0.064***	$-0.4 \times 10^{-2}$	<b><math>0.2 \times 10^{-2}</math></b>
W/La	-0.021***	0.043***	$-0.7 \times 10^{-2}$ ***	-0.017**	-0.079***	<b>-0.062***</b>
M/K	-0.012**	$-0.2 \times 10^{-2}$ ***	$-0.3 \times 10^{-2}$ ***	$-0.5 \times 10^{-2}$ ***	$-0.4 \times 10^{-3}$	<b><math>-0.3 \times 10^{-3}</math></b>
GY/La	$-0.2 \times 10^{-2}$ **	$0.9 \times 10^{-3}$ ***	$-0.4 \times 10^{-3}$ ***	$-0.1 \times 10^{-3}$	$0.4 \times 10^{-3}$	<b><math>0.6 \times 10^{-3}</math>***</b>
GY/ASSET	0.052***	$-0.9 \times 10^{-2}$ **	$-0.3 \times 10^{-2}$ *	0.012***	-0.01	<b>-0.014***</b>
LA	$-0.3 \times 10^{-3}$ ***	$0.3 \times 10^{-4}$	$-0.3 \times 10^{-4}$	$-0.4 \times 10^{-4}$	$-0.1 \times 10^{-3}$	<b><math>-0.4 \times 10^{-3}</math>***</b>
Hausman Test					CHISQ(7) = 7.9414, P-value = [0.3378]	
Adj.R <sup>2</sup>	0.393	0.715	0.561	0.368	0.474	0.337
Obs. No.	93	153	339	403	264	264

pmsale = profit margin on sale; ALRATIO = liability-asset ratio; S/GY = sale/total output; W/La = wage per capita; M/K = intermediate input/fixed assets; GY/La = total output/number of employees; GY/ASSET = total output/total assets; LA = number of employees.

\*\*\* Significant at 1% level. \*\* Significant at 5% level. \* Significant at 10% level.

**Table 4** pmsale for share-holding enterprises

	Cross-section				Panel	
	2002	2003	2004	2005	Fixed $\bigcirc$	Random
Constant	0.019***	$0.9 \times 10^{-2}$	$0.5 \times 10^{-2}$	$0.4 \times 10^{-2}$		$-0.7 \times 10^{-4}$
ALRATIO	$-0.1 \times 10^{-3}$	$0.4 \times 10^{-2}$	-0.011	$-0.5 \times 10^{-2}$	<b>0.041***</b>	0.049***
S/GY	-0.011	$0.3 \times 10^{-2}$	$0.7 \times 10^{-2}$	$0.2 \times 10^{-2}$	<b>0.029</b>	0.061***
W/La	$-0.3 \times 10^{-2}$	$0.4 \times 10^{-2}$	$-0.6 \times 10^{-2}$	0.014***	<b><math>0.8 \times 10^{-2}</math>***</b>	$0.2 \times 10^{-2}$ **
M/K	$-0.5 \times 10^{-4}$	$0.7 \times 10^{-3}$	$0.1 \times 10^{-2}$ *	0.636	<b>-0.020***</b>	$-0.1 \times 10^{-2}$ *
GY/La	$-0.7 \times 10^{-4}$	$0.4 \times 10^{-3}$	$0.4 \times 10^{-3}$	$0.7 \times 10^{-4}$	<b><math>0.2 \times 10^{-2}</math>***</b>	$0.6 \times 10^{-3}$ ***
GY/ASSET	$-0.8 \times 10^{-4}$	$-0.7 \times 10^{-2}$	$-0.8 \times 10^{-3}$	$-0.6 \times 10^{-3}$	<b>0.014***</b>	$0.3 \times 10^{-2}$ ***
LA	$-0.2 \times 10^{-4}$	$0.2 \times 10^{-3}$ *	$-0.7 \times 10^{-4}$	$0.2 \times 10^{-3}$ ***	<b><math>-0.6 \times 10^{-3}</math>***</b>	$-0.1 \times 10^{-3}$ ***
Hausman Test					CHISQ(7) = 356.95, P-value = [0.0000]	
Adj.R <sup>2</sup>	0.047	0.061	0.039	0.141	0.975	0.792
Obs. No.	78	138	243	311	336	336

pmsale = profit margin on sale; ALRATIO = liability-asset ratio; S/GY = sale/total output; W/La = wage per capita; M/K = intermediate input/fixed assets; GY/La = total output/number of employees; GY/ASSET = total output/total assets; LA = number of employees.

\*\*\* Significant at 1% level. \*\* Significant at 5% level. \* Significant at 10% level.



**Table 5** pmsale for private fund enterprises

	Cross-section				Panel	
	2002	2003	2004	2005	Fixed ○	Random
Constant			$0.3 \times 10^{-3}$	$0.2 \times 10^{-3}$		$0.2 \times 10^{-3}$
ALRATIO			0.027	0.035***	<b>0.071***</b>	-0.069***
S/GY			0.082**	0.122***	<b>0.123***</b>	0.089***
W/La			-0.024***	$-0.6 \times 10^{-2}$ ***	<b>-0.050***</b>	-0.056***
M/K			-0.016***	$0.2 \times 10^{-2}$ **	<b>0.053***</b>	$0.8 \times 10^{-2}$ **
GY/La			-0.233***	$-0.2 \times 10^{-3}$ ***	<b><math>-0.3 \times 10^{-2}</math>***</b>	$-0.2 \times 10^{-3}$
GY/ASSET			0.051***	$-0.3 \times 10^{-2}$ ***	<b><math>0.8 \times 10^{-2}</math>***</b>	$-0.1 \times 10^{-2}$
LA			$-0.2 \times 10^{-6}$	$-0.2 \times 10^{-3}$ ***	<b><math>0.1 \times 10^{-4}</math></b>	$-0.1 \times 10^{-3}$ ***
Hausman Test					CHISQ(7) = 305.74, P-value = [0.000]	
Adj.R <sup>2</sup>			0.343	0.701	0.888	0.128
Obs. No.			327	382	338	338

pmsale = profit margin on sale; ALRATIO = liability-asset ratio; S/GY = sale/total output; W/La = wage per capita; M/K = intermediate input/fixed assets; GY/La = total output/number of employees; GY/ASSET = total output/total assets; LA = number of employees.

\*\*\* Significant at 1% level. \*\* Significant at 5% level. \* Significant at 10% level.

**Table 6** roa for collectively owned enterprises

	Cross-section				Panel	
	2002	2003	2004	2005	Fixed ○	Random
Constant	$0.1 \times 10^{-2}$	$0.2 \times 10^{-3}$	$-0.3 \times 10^{-3}$	$0.3 \times 10^{-3}$		$0.6 \times 10^{-2}$
ALRATIO	-0.01	-0.168***	-0.047***	-0.122***	<b>-0.079**</b>	$-0.4 \times 10^{-2}$
S/GY	0.080***	$-0.9 \times 10^{-2}$	0.120***	0.075***	<b><math>-0.8 \times 10^{-2}</math>*</b>	$-0.1 \times 10^{-2}$
W/La	-0.046***	-0.026	$-0.9 \times 10^{-2}$ ***	$-0.9 \times 10^{-2}$	<b>-0.024*</b>	-0.037***
M/K	-0.029***	$-0.8 \times 10^{-2}$ ***	$-0.2 \times 10^{-3}$	$0.2 \times 10^{-2}$	<b><math>-0.5 \times 10^{-3}</math></b>	$-0.2 \times 10^{-3}$
GY/La	$-0.4 \times 10^{-3}$	$0.2 \times 10^{-2}$	$-0.2 \times 10^{-2}$ *	$-0.3 \times 10^{-3}$ ***	<b><math>-0.4 \times 10^{-3}</math>*</b>	$-0.4 \times 10^{-3}$ ***
GY/ASSET	0.102***	0.021***	0.022***	0.031***	<b>0.01*</b>	0.011***
LA	$-0.1 \times 10^{-3}$ **	$-0.2 \times 10^{-3}$ **	$-0.3 \times 10^{-3}$ ***	$-0.2 \times 10^{-3}$ ***	<b><math>-0.2 \times 10^{-2}</math></b>	$-0.3 \times 10^{-4}$
Hausman Test					CHISQ(7) = 7.9414, P-value = [0.003]	
Adj.R <sup>2</sup>	0.527	0.733	0.737	0.622	0.537	0.183
Obs. No.	93	153	339	403	262	262

roa = return on total assets; ALRATIO = liability-asset ratio; S/GY = sale/total output; W/La = wage per capita; M/K = intermediate input/fixed assets; GY/La = total output/number of employees; GY/ASSET = total output/total assets; LA = number of employees.

\*\*\* Significant at 1% level. \*\* Significant at 5% level. \* Significant at 10% level.

**Table 7** roa for share holding enterprises

	Cross-section				Panel	
	2002	2003	2004	2005	Fixed ○	Random
Constant	$0.4 \times 10^{-2}$	0.01	$0.4 \times 10^{-2}$	$0.4 \times 10^{-2}$		$-0.5 \times 10^{-2}$
ALRATIO	0.020**	$0.6 \times 10^{-2}$	0.021**	0.039**	<b>0.084***</b>	0.087***
S/GY	$-0.9 \times 10^{-2}$	$0.8 \times 10^{-2}$	0.013**	$0.3 \times 10^{-2}$	<b>0.216***</b>	0.212***
W/La	0.017	$0.2 \times 10^{-2}$	$-0.6 \times 10^{-2}$ **	0.015***	<b>0.014***</b>	0.011***
M/K	$0.2 \times 10^{-2}$ **	$0.2 \times 10^{-2}$	$0.2 \times 10^{-2}$	$0.3 \times 10^{-4}$	<b>0.025***</b>	0.017***
GY/La	$0.1 \times 10^{-3}$	$0.5 \times 10^{-3}$	$0.2 \times 10^{-3}$ *	$-0.2 \times 10^{-4}$	<b><math>0.4 \times 10^{-2}</math>***</b>	$0.4 \times 10^{-2}$ ***
GY/ASSET	$0.1 \times 10^{-2}$	0.021***	0.022***	0.013***	<b>0.058***</b>	0.066***
LA	$0.5 \times 10^{-4}$	$-0.2 \times 10^{-3}$ **	$-0.7 \times 10^{-5}$	$0.2 \times 10^{-3}$ ***	<b><math>-0.8 \times 10^{-3}</math>***</b>	$-0.5 \times 10^{-3}$
Hausman Test					CHISQ(7) = 320.88, P-value = [0.0000]	
Adj.R <sup>2</sup>	0.165	0.268	0.439	0.323	0.997	0.639
Obs. No.	74	131	243	311	340	340

roa = return on total assets; ALRATIO = liability-asset ratio; S/GY = sale/total output; W/La = wage per capita; M/K = intermediate input/fixed assets; GY/La = total output/number of employees; GY/ASSET = total output/total assets; LA = number of employees.

\*\*\* Significant at 1% level. \*\* Significant at 5% level. \* Significant at 10% level.

**Table 8** roa for private fund enterprises

	Cross-section				Panel	
	2002	2003	2004	2005	Fixed ○	Random
Constant			$-0.2 \times 10^{-3}$	$0.8 \times 10^{-4}$		$-0.3 \times 10^{-4}$
ALRATIO			0.095***	0.098***	<b>0.236***</b>	0.071***
S/GY			0.124***	0.167***	<b>0.106**</b>	0.042***
W/La			$-0.016^*$	$-0.012$ ***	<b><math>-0.042</math>***</b>	$-0.011$ ***
M/K			0.01***	$0.6 \times 10^{-2}$ ***	<b>0.013**</b>	0.051***
GY/La			$-0.5 \times 10^{-3}$	$-0.7 \times 10^{-3}$ ***	<b><math>-0.6 \times 10^{-2}</math>***</b>	$-0.3 \times 10^{-2}$ ***
GY/ASSET			0.033***	$0.6 \times 10^{-2}$ ***	<b>0.078***</b>	0.061***
LA			$-0.2 \times 10^{-5}$	$-0.5 \times 10^{-3}$ ***	<b><math>-0.1 \times 10^{-5}</math></b>	$-0.1 \times 10^{-4}$
Hausman Test					CHISQ(7) = 343.6, P-value = [0.000]	
Adj.R <sup>2</sup>			0.675	0.618	0.949	0.615
Obs. No.			337	382	337	337

roa = return on total assets; ALRATIO = liability-asset ratio; S/GY = sale/total output; W/La = wage per capita; M/K = intermediate input/fixed assets; GY/La = total output/number of employees; GY/ASSET = total output/total assets; LA = number of employees.

\*\*\* Significant at 1% level. \*\* Significant at 5% level. \* Significant at 10% level.

**Table 9** Estimation results for roa

	Cross-section												Panel						
	2002			2003			2004			2005			Fixed			Random			
	①	②	③	①	②	③	①	②	③	①	②	③	①	②	③	①	②	③	
C	+	+		+	+		-	+	-	+	+	+					+	-	-
ALRATIO	-	5		-1	+		-1	5	1	-1	5	1	-5	1	1	-	1	1	1
S/GY	<b>1</b>	-		-	+		<b>1</b>	5	1	<b>1</b>	+	1	-10	1	1	-	1	1	1
W/La	-1	+		-	+		-1	-5	-10	-	1	-1	-10	1	-1	-1	1	1	-1
M/K	<b>-1</b>	5		<b>-1</b>	+		-	+	1	+	1	1	-	1	5	-	1	1	1
GY/La	-	+		+	1		-10	10	-	-1	-	-1	-10	1	-1	-1	10	1	-1
GY/ASSET	1	+		1	+		1	1	1	1	1	1	10	1	1	1	1	1	1
LA	-5	+		-5	-5		-1	-	-	-1	1	-1	-	-1	-	-	-	-	-

**Table 10** Estimation results for pmsale

	Cross-section												Panel						
	2002			2003			2004			2005			Fixed			Random			
	①	②	③	①	②	③	①	②	③	①	②	③	①	②	③	①	②	③	
C	+	1		+	+		-	+	+	+	+	+					+	-	+
ALRATIO	-10	-		-1	+		-1	-	+	-1	-	1	+	1	1	-1	1	1	-1
S/GY	<b>5</b>	-		<b>-1</b>	+		<b>1</b>	+	5	<b>1</b>	+	1	-	+	1	+	1	1	1
W/La	-1	-		1	+		-1	-	-1	-5	1	-1	-1	1	-1	-1	10	1	-1
M/K	-5	-		-1	+		-1	10	-1	-1	+	5	-	1	1	-	10	5	5
GY/La	<b>-5</b>	-		<b>1</b>	+		<b>-1</b>	+	<b>-1</b>	-	+	<b>-1</b>	+	<b>1</b>	<b>-1</b>	<b>1</b>	<b>1</b>	<b>1</b>	-
GY/ASSET	<b>1</b>	-		<b>-5</b>	-		<b>-10</b>	-	<b>1</b>	<b>1</b>	-	<b>-1</b>	-	<b>1</b>	<b>1</b>	<b>-1</b>	<b>1</b>	<b>1</b>	-
LA	-1	-		+	10		-	-	-	-	1	-1	-	-1	+	1	-1	-1	-1

t values are to test (+ means estimation coefficient is positive but not significant, - means estimation coefficient is negative but not significant. 10 means significant at 10%, 5 means significant at 5%, and 1 means significant at 1%); ①, COTVEs; ②, share-holding enterprises; ③, private fund enterprises.

## 6. Conclusions

Using four years of data from 2002 to 2005, this paper examined the profitability determinants of Xinjiang's collectively-owned, share-holding, private fund township and village enterprises. Our findings are as follows. The liability-asset ratio negatively affected collectively-owned enterprises, but positively affected share-holdings and private fund enterprises. The liability-asset ratio is consistent with the finding that since Xinjiang's township and village enterprises have difficulty obtaining credit, they are facing crucial budget constraints (See Yang 2003; Gu 2005). Management ability strongly and positively affected share-

holding and private fund enterprises. Managers themselves locate sales routes, and their sales strategies are crucial for the profit-making process. This result is contrary to collectively-owned enterprises whose sales strategies are connected to local authorities. Doubt remains whether the managers are working efficiently. Labor cost negatively affected the profitability of collectively-owned and private fund enterprises, but it had a positive role on share-holding enterprises. The result holds regardless of what types of regressions were conducted (cross-sectional or panel), suggesting that transformation to a share-holding system is an efficient way to improve rural industrialization. The rate of operation positively affected profitability in share-holding and private fund enterprises, but it negatively affected the profitability of COTVEs. This is also a problematic issue for collectively-owned enterprises. The estimation coefficient of labor productivity is not stable for COTVEs or private fund enterprises. However, the coefficients of labor productivity have significantly positive signs for share-holding enterprises. This result indicates that the higher productivity of profitable share-holding enterprises is reflected by higher profitability. Capital productivity has a positive role on Xinjiang's TVEs.

For COTVEs, the coefficients of S/GA and W/La appeared unstable, and the coefficient of M/K was negative. Lack of capital and the underdevelopment of rural financing systems were severe problems in rural Xinjiang, especially when demand for capital surged with the development of TVEs. In Xinjiang local governments still tend to assign land and capital to COTVEs because they are considered collective assets. COTVEs frequently acquire more land and capital than they can use and even let it lie fallow for possible future use. In this respect, it is doubtful whether COTVEs are maximizing their profit. We confirmed that a share-holding system is an efficient ownership system. But the situation of capital processing for private fund enterprises is totally different. They mainly depended on non-government credit systems, such as pooling-funds, to raise capital. It is necessary that local governments find a way to loosen the restrictions for funding private companies.

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