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Productivity Effects of TVE Privatization

The Case Study of Garment and Metal-Casting Enterprises in the Greater Yangtze River Region

Tetsushi Sonobe and Keijiro Otsuka

9.1 Introduction

Until the 1980s, China's miraculous economic growth had been led by publicly owned township and village enterprises (TVEs), which may be more accurately termed township- and village-*run* enterprises, or TVREs (Chen, Jefferson, and Singh 1992; Jefferson, Rawski, and Zheng 1996; Otsuka, Liu, and Murakami 1998).[1] In the 1990s, however, the private sector emerged to become the leading sector of the economy in China. In the southeastern part of Jiangsu province, where the successful record of economic development based on TVREs in the 1980s was dubbed the "Sunan Model of Industrial Development," the privatization of TVREs was taking place in the late 1990s. Further, the growth rate of the Zhejiang province, which depended consistently on the growth of the private sector beginning in the 1980s, outweighed that of most other provinces, including Jiangsu, in the 1990s (Zhang 1999).

By now it is well known that privatization has been taking place rapidly and widely in China, but it is much less well known whether, and to what extent, privatization has improved resource allocation and productivity.[2] The major question addressed in this study is, what are the productivity

1. Note that TVEs include both TVREs and private enterprises.
2. An exceptional and pioneering study is Li and Rozelle (2000).

effects of TVE privatization? If the recent privatization results in the improvement of production efficiency, then why did it not take place earlier? Also, it is interesting to ask why TVREs prospered in Jiangsu in the 1980s. These issues are critically important in understanding the growth performance of the Chinese economy in the 1990s and in assessing its future growth potential for the early decades of the twenty-first century.

As a first step toward a fuller understanding of the effects of TVE privatization on productivity, this study looks at the garment and metal-casting enterprises in the Greater Yangtze River Region, extending from the suburbs of Shanghai to the western border of Anhui province. Among the common and important characteristics of TVREs in the suburbs of Shanghai and southern Jiangsu are their dependence on state-owned enterprises (SOEs) in technology, management, and marketing (Otsuka, Liu, and Murakami 1998). Some TVREs used to be cooperative TVEs or "branch factories" of urban SOEs; managers were sent from SOEs and the profits were shared between them in accordance with their investment shares (Fudan University Economic Research Center 1988). "Putting-out contracts" frequently were made, not only between SOEs and their branches but also between SOEs and independent TVREs. Moreover, TVREs often purchased second-hand machines used by SOEs and employed retired SOE workers in order to acquire the technology and management know-how of the SOEs (Murakami, Liu, and Otsuka 1994, 1996). It seems that township and village governments supported such transactions and cooperation through their direct involvement in enterprise management.[3]

Our maintained hypothesis is that this cooperation between TVREs and SOEs was mutually beneficial, at least in the light industries during the 1980s.[4] TVREs faced largely unregulated management environments, but lacked technology, management know-how, and marketing capacity. In contrast, the management of SOEs was tightly regulated, even though they had decent management, technology, and marketing knowledge. In the 1990s, two major changes seem to have taken place, which eroded the advantage of the TVRE-SOE cooperation. First, TVREs absorbed the production knowledge and capacity of SOEs, so that the payoff to maintaining cooperative relationships with SOEs gradually declined (Liu and Otsuka 1998). Second, a free-market system developed, so that direct government support for inter-enterprise transactions, particularly face-to-face transactions between TVREs and SOEs in our context, tended to lose significance (Li 1996; Hsiao et al. 1998; Jin and Qian 1998; Chen and Rozelle 1999). Therefore, we hypothesize that privatization in the late 1990s re-

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3. This view is consistent with the justification of TVREs by Che and Qian (1998), who argue that the advantage of local government ownership lies in reduction of state predation.
4. Lin and Yao (2001) contend that the development of the SOE sector tended to help the development of the TVE sector in the light industries, whereas the opposite was the case in the heavy industries.

sulted in significant improvements in production efficiency by enhancing management incentives without sacrificing marketing efficiencies.

The organization of this paper is as follows. In the next section, our sampling scheme is explained, and the basic statistics of our sample enterprises, such as the growth rate of valued-added, are presented. In section 9.3, we examine the changing importance of subcontracting transactions with SOEs and the changing distribution of stock ownership by the local government vis-à-vis private owners. Then we assess the impacts of privatization on productivity by estimating a function that explains the growth rate of per-worker value-added, separately for the garment and metalcasting industries, in section 9.4. The implications of this study are discussed in the final section.

9.2   Data

To analyze the determinants and consequences of TVRE privatization, we use data collected by a rural-enterprise survey conducted in 1999 and 2000 in the Greater Yangtze River Region, from the suburbs of Shanghai to about 650 kilometers upstream. The study includes five counties in the suburbs of Shanghai, nineteen counties in the south of the Yangtze River in Jiangsu province, and twenty-nine counties between the Yangtze and the Huai He rivers in Anhui province. These areas are connected by an expressway that goes from Shanghai along the Yangtze River to Nanjing, the capital city of Jiangsu, crosses the river from south to north, and then goes west up to and beyond Hefei, the capital city of Anhui. The sample enterprises were selected randomly from the enterprise lists compiled by the local governments of twenty-eight counties selected randomly from the fifty-three counties. The garment and casting samples consist of seventy-eight and eighty enterprises, respectively.

We chose specific industries for our case studies, partly because the productivity impacts of privatization cannot be assessed unless we can reasonably assume identical production function parameters among sample enterprises. We chose the Greater Yangtze River Region because the influence of SOEs in Shanghai, a center of the state industrial sectors in China, tends to decline with distance from Shanghai, so there are sufficient geographical variations of the influence of SOEs. The garment and the casting industries were chosen partly because they have numerous enterprises over wide areas and partly because their dependence on SOEs is so different: As of 2000, the metal-casting enterprises depend wholly on SOEs in both input and output transactions, whereas the garment enterprises are far more independent of SOEs.

The retrospective survey of enterprises provides information on production and costs as well as on changing distributions of ownership shares during the 1995–1998 period, and information on equipment and market-

Table 9.1   **Average Annual Growth Rates of Real Value-Added by Study Area, 1995–1998 (%)**

	Shanghai (1)	Southeast Jiangsu (2)	Southwest Jiangsu (3)	Anhui (4)	Total (5)
Garment industry					
Growth rate	8.8	9.4	13.5	25.9	15.4
No. of observations	8	14	18	16	56
Casting industry					
Growth rate	–13.0	2.2	–3.2	7.5	1.1
No. of observations	4	14	20	20	58

ing channels in 1995 and 1998. Table 9.1 shows the growth rate of real value-added of the sample enterprises and the number of observations by area. In this study, value-added was calculated as the gross value of output minus material cost, energy cost, and payments to shipping agencies and wholesalers. We applied the method of double deflation to the survey data on nominal value-added, in order to obtain real value-added at the 1998 price.[5] The data of real value-added in both 1995 and 1998 are only complete for fifty-six enterprises in the garment industry and fifty-eight in the casting industry, particularly because of the entry of new enterprises after 1995.[6] For descriptive exposition, we classified the study areas into four regions: the suburbs of Shanghai, southeast Jiangsu, southwest Jiangsu, and Anhui.

Southeast Jiangsu is a traditionally fertile granary area and is close to Shanghai. With these geographical advantages, the economy in this area started to grow rapidly with the development of TVREs, as soon as the central government began the economic reforms of the late 1970s. By the early 1990s, the successful TVRE-led development strategy pursued in this area became widely known under the name "Sunan Model of Industrial Development." Since the early 1990s, however, the Sunan model has been chal-

5. The price indexes of products of the Garment and Other Fiber Products industry and the Smelting and Pressing of Ferrous Metals industry, assessed at the factory gate by the State Statistical Bureau (various years), were used as deflators for garment and casting products, respectively. Since price data on shipping and marketing services are not available, we applied the same deflator as the output to these services. As deflators for materials in the garment and the casting industries, we used the factory price index of products of the Textile industry and the Smelting and Pressing of Ferrous Metals industry, respectively. As a deflator for energy cost, we used the electricity price data in the case of the garment sample and the coal price data in the case of the casting sample, both of which are provided by the State Statistical Bureau (various years).

6. Each sample includes several new entrants established in 1995, 1996, or 1997. Those firms established in 1998 were excluded from the sample. The production data in the first year of operation of new entrants were not used in the analysis because variables in the first year have incomparably greater variances than those in subsequent years.

lenged by another model of industrial development formed in and around the city of Wenzhou in Zhejiang province, where the economy has been catching up with southeast Jiangsu despite starting from a much lower level of development (Zhang 1999; Sonobe, Hu, and Otsuka 2002a). In this "Wenzhou Model of Industrial Development," high economic growth is driven by private enterprises and "disguised" TVREs, which were essentially private but disguised themselves as TVREs because private enterprises were treated unfavorably by various regulations.

TVREs were also developed in southwest Jiangsu, including in Nanjing. Probably because Nanjing is the capital of Jiangsu province, there were a larger number of SOEs and urban collective enterprises in this area than in southeast Jiangsu. Accordingly, the relative importance of the TVRE sector was smaller in this area than in southeast Jiangsu. In Anhui, where manufacturing was least developed among the areas we study, the share of the SOE sector in gross industrial output was greatest, although the absolute size of the SOE sector was much smaller than in the other areas of study.[7] It is interesting to note that the share of private enterprises and self-employed, small-scale family enterprises in Anhui province was greater than in the other areas we study in 1995 and earlier.[8] This is consistent with the hypothesis that the development of the private sector predominated in poor areas with few SOEs because local governments in those areas could not afford to establish a large number of TVREs in cooperation with SOEs.

As shown in table 9.1, the average size of enterprises, in terms of their real value-added, grew in all areas in the garment sample but declined in Shanghai and southwest Jiangsu in the casting sample from 1995 to 1998.[9] One factor that made the casting industry stagnant or declining was the antipollution regulation in urbanized areas. The regulation was most stringent in Shanghai, where the municipal government prohibited the expansion and renewal of foundries. Customers shifted orders away from foundries in Shanghai to other areas where environmental regulations were looser, especially to southeast Jiangsu. As a result, casting enterprises in southeast Jiangsu had a much better growth record than their counterparts in southwest Jiangsu as well as in Shanghai. However, casting enterprises in Anhui were growing even faster. In the garment sample, the average growth rate increases with distance from Shanghai. Thus, in both the casting and garment samples, enterprises in Anhui were growing faster than in any other areas we study. This suggests that patterns of compara-

7. Data of industrial output and its composition by sector, aggregated at the provincial level, are available from the statistical bureaus of Jiangsu and Anhui provinces (various years).

8. The self-employed enterprises are those with seven or fewer workers.

9. In a discussion of growth performance, attention should be paid to effects of business cycles.

tive advantage in the coastal and central regions were changing significantly within labor-intensive industries (such as the garment industry) and polluting industries (such as the casting industry).

A unique feature of our enterprise survey is that it traces the changing distribution of ownership within each sample enterprise since its establishment. Officially registered ownership types (such as TVRE, shareholding, joint share, foreign joint venture, and private) could be misleading, as the episodes of numerous "disguised" TVREs in Wenzhou suggest. Such enterprises also existed in Jiangsu, according to our own survey. Moreover, such categorization offers no information on increases in private ownership shares if the registered ownership type of the enterprise remains the same. Thus, for the purpose of measuring the extent of privatization, it is more desirable to use continuous indicators of ownership rather than categorical variables. In practice, the privatization of an enterprise begins with an estimate of the capitalized value of its assets. Then, the shares of various owners (e.g., the township government, which invested primarily at the time of the enterprise's establishment, and the enterprise itself, which reinvested profits) are determined according to their previous investments and services. Hence, the ownership distribution becomes clear after capitalization. To trace the ownership distribution before capitalization, we simply relied on the subjective assessment of key informants, who were usually general managers.

As shown in table 9.2, we classified owners into five types: (1) local government, (2) SOEs, (3) workers, (4) joint ventures with foreign enterprises, and (5) private owners. In this classification, SOEs include urban collective enterprises. Private owners include, most importantly, the general manager and other leaders within the enterprise, and a relatively small number of individuals and enterprises outside the enterprise except SOEs and joint ven-

Table 9.2   **Changing Distribution of Ownership Shares, 1995–1998 (%)**

	Local Government (1)	SOEs (2)	Workers (3)	Foreign and Joint Ventures (4)	Private Owners (5)	Total (6)
Garment industry						
1995	59.6	5.0	0.5	11.3	23.6	100
1996	54.9	5.3	0.5	11.5	27.7	100
1997	42.5	6.4	2.4	12.0	36.7	100
1998	28.6	5.5	2.7	12.0	51.2	100
Casting industry						
1995	77.4	4.1	0.6	2.0	15.9	100
1996	65.7	5.0	1.5	3.3	24.5	100
1997	48.7	6.3	4.6	2.8	37.6	100
1998	28.5	7.1	9.2	2.1	53.1	100

tures. In the garment sample, there were a number of enterprises that had experienced partial privatization before 1995, as reflected in private ownership of as high as 23.6 percent. In the casting sample, most enterprises were 100 percent owned in 1995 by the local government, at least nominally; there were also a small number of completely private enterprises, most of which were outgrowths of self-employed, family enterprises. Thus, the average ownership share of local governments was much higher in the casting sample in 1995. In both samples, however, the pace of privatization accelerated, and the average ownership share of local governments decreased to less than 30 percent and that of private owners increased to more than 50 percent in 1998. Presumably, this is not a mere coincidence but a result of the increasing pressure that the central government put on local governments to fully privatize their TVREs.

In the literature on ambiguous property rights in China, a central question is why TVREs could achieve remarkable growth performance in the 1980s and the early 1990s, despite the disincentive effect of the ambiguous ownership of TVREs on enterprise management. A plausible answer to this question is that the market in this period in China was characterized by high transaction costs, which could be reduced by the intervention of local governments (Li 1996; Hsiao et al. 1998; Jin and Qian 1998; Chen and Rozelle 1999). We emphasize that such transaction costs were particularly high when transactions were made with SOEs (although that is not mentioned in this literature). As free-market transactions developed, however, it is likely that the government support for transactions and the cooperation between TVREs and SOEs gradually have lost significance. If this is the case, privatization ought to increase the production efficiency of rural enterprises. In order to examine the relevance of these arguments, we look more carefully at the production data in the next two sections.

9.3   Privatization and Growth in the Garment Industry

Garment enterprises in our sample produce a variety of products ranging from cheap underwear to expensive and technically difficult products such as men's suits. In view of the presumed importance of marketing channels, we classify these products into original products, which are designed and marketed by the sample enterprises themselves, and those produced under subcontracting with large enterprises, such as SOEs and foreign joint ventures. Although many of the sample enterprises in southeast Jiangsu used to be cooperative TVEs or branch factories of SOEs in Shanghai before free-market transactions were developed, they are now transacting with a number of SOEs and other enterprises. While subcontracting has several forms, such as "putting out" and original equipment manufacturing (OEM), we do not distinguish them because such distinctions are prac-

Table 9.3   **Composition of Sales Revenue, Garment Industry, 1995 and 1998 (%)**

		Subcontracting		
	Original Products	With SOEs	With Other Enterprises	Total
1995				
Shanghai	23.8	22.9	53.3	100
Southeast Jiangsu	18.0	45.6	36.4	100
Southwest Jiangsu	26.8	32.1	41.1	100
Anhui	29.4	49.0	21.6	100
Total	24.9	39.0	36.1	100
1998				
Shanghai	23.7	17.9	58.4	100
Southeast Jiangsu	15.7	37.2	47.1	100
Southwest Jiangsu	25.4	28.3	46.3	100
Anhui	26.4	38.7	34.9	100
Total	23.1	32.0	44.9	100

tically impossible for some sample enterprises. Instead, we distinguish subcontracting with SOEs from subcontracting with other types of enterprises.

Table 9.3 shows the composition of original products, and subcontracting with SOEs and other enterprises, in sales revenues by study area in 1995 and 1998. Compared with Zhejiang province, in our study areas the garment enterprises, especially those in southeast Jiangsu, have high skills and use expensive equipment to produce high-quality products, but they are behind in establishing their own marketing networks. Consistent with this argument, the proportion of original products to sales revenue in southeast Jiangsu in 1995 is as low as 18 percent, and that of subcontracting with SOEs is as high as 45.6 percent. One possible explanation for such marked differences between this area and Zhejiang is that the garment enterprises in southeast Jiangsu could afford to invest in expensive machines by taking advantage of their geographical proximity to Shanghai to receive subcontracting orders from SOEs and foreign ventures. Although the garment enterprises in Anhui did not have an advantage in this respect, they did have high shares of subcontracting with SOEs because they tended to follow the Sunan model; that is, they had a high propensity to subcontract with relatively small local SOEs and urban collectives.

Table 9.4 compares the ownership shares of the local government between enterprises heavily dependent on SOE subcontracting and the other sample enterprises. In 1995, SOE subcontracting accounted for more than half of the sales revenue at twenty-four sample enterprises; they had a much higher average ownership share of the local government and a lower average share of private owners than the other sample enterprises. This suggests that the local government's involvement in enterprise manage-

Table 9.4   **Ownership Share by Transaction Mode, Garment Industry, 1995 and 1998 (%)**

	Enterprises with >50% SOE Subcontracting in 1995 (1)	Enterprises with ≤50% SOE Subcontracting in 1995 (2)	Total (3)
1995			
Local government's			
ownership share	73.1	49.2	59.6
Private share	15.5	29.6	23.6
1998			
Local government's			
ownership share	27.9	28.5	28.6
Private share	55.1	48.3	51.2
No. of observations	24	32	56

ment was helpful in making and maintaining subcontracting contacts with SOEs in 1995. By 1998, however, there was a reversal in the relationship between ownership pattern and transaction mode, in which those enterprises heavily dependent on SOE subcontracting tended to have lower government shares and higher private shares. This reversal is consistent with our maintained hypothesis that the local government's support for subcontracting with SOEs lost its significance in this industry during the period under study.

Privatization, which clarifies ambiguous property rights by increasing managers' ownership shares, would enhance the profit-seeking incentives of managers. If the local government's support for subcontracting with SOEs lost its importance, then privatization would improve production efficiency without sacrificing transaction efficiencies. To date, however, few empirical studies have assessed the productivity effects of TVRE privatization or even confirmed its existence. On the contrary, some theoretical studies presume that the productive efficiency of a rural enterprise does not depend on the type of enterprise ownership (e.g., Weitzman and Xu 1994). One exception is the pioneering work by Li and Rozelle (2000); they find that although positive productivity effects exist, they are not realized right after privatization but with adjustment lags of a few years.[10]

To assess the productivity effect of privatization, we specify a growth function of the following general form:

(1) $G(V) = f[G(K), G(L), PS_{1995}, \Delta PS_{1996}, \Delta PS_{1997}, \mathbf{X}]$,

where $G(V)$, $G(K)$, and $G(L)$ are growth rates of real value added, real capital stock, and the number of workers, respectively, from 1995 to 1998; PS_{1995}

10. Their use of dummy variables to represent the privatization is questionable in view of the continuous process of privatization.

is the ownership share of private owners in 1995, which is intended to capture the effect of privatization that took place before 1996; ΔPS_{1996} and ΔPS_{1997} are increases in the share of private owners during the entire year of 1996 and 1997, respectively; and $\mathbf{X}$ is a vector of other independent variables. To estimate the real capital stock, we first estimate nominal net investment from the survey data on the nominal capital stock, and then use the factory price index of machinery products as our deflator.[11] The estimated real values of net investments are added to the real value of the initial investment to obtain the real values of the capital stock in 1995 and 1998.

Since the dependent variable in equation (1) is the growth rate of value-added rather than physical quantity, it is affected not only by production efficiency but also by transaction efficiency. If privatization enhanced production efficiency without sacrificing transaction efficiency, then it would have a significantly positive effect on output growth. To the extent that the role of the local government in supporting TVE-SOE transactions was important, however, privatization would reduce transaction efficiency and cancel part of the positive productivity effect. We focus on the privatization that took place before 1998 because it is unlikely that privatization in 1998 immediately affected the productivity growth during the 1995–1998 period. Vector $\mathbf{X}$ includes the proportion of SOE-subcontracting to sales revenue in 1995, three provincial dummies (with southwest Jiangsu being the default), the road distance from Shanghai, the road distance from the nearest exit of the expressway, and the years of operation. If subcontracting with SOEs helped a TVE learn technology, marketing, or management from SOEs, the proportion of SOE subcontracting would have a positive effect on labor productivity growth.

To avoid possibly serious multicollinearity between $G(K)$ and $G(L)$, and to control for the effect of enterprise specific unobservables, we modify equation (1) into the following estimable form:

$$(2) \qquad G(V/L) = a_0 + a_1 PS_{1995} + a_2 \Delta PS_{1996} + a_3 \Delta PS_{1997} + a_4 \mathbf{X}$$
$$+ a_5 G(K/L) + u,$$

where u is an error term. Since the growth rate of the capital-labor ratio, $G(K/L)$, on the right-hand side of equation (2) is likely to be endogenous, we instrument it with $\ln(L)$, $\ln(K/L)$, and $\ln(V/L)$ in the base year (i.e., 1995) and the growth rate of average annual wage earnings per worker in the county during the 1995–1998 period.[12] Although there is a possibility

11. Through our survey, we obtained nominal values of initial investments in equipment at the time of enterprise establishment, and nominal stock values of equipment in 1995 and 1998. We assumed that equal amounts of nominal net investment were made each year between enterprise establishment and 1995 and between 1995 and 1998. In this way, we estimated annual values of nominal net investment.

12. The data of average labor earnings by county were taken from the statistical bureaus of Shanghai municipality and of Jiangsu and Anhui provinces (various years).

Table 9.5   **Estimates of Growth Functions, Garment Industry, 1995–1998**

	$G(K/L)$ 3SLS (1)	$G(V/L)$ 3SLS (2)	$G(V/L)$ OLS (3)
PS_{1995}	0.019	−0.077	−0.132
	(0.135)	(0.115)	(0.152)
ΔPS_{1996}	0.029	0.783**	0.780**
	(0.284)	(0.254)	(0.319)
ΔPS_{1997}	0.023	0.069	0.076
	(0.225)	(0.207)	(0.252)
Proportion of SOE subcontracting in 1995	−0.162	−0.196*	−0.309**
	(0.114)	(0.108)	(0.127)
Shanghai dummy	0.393*	−0.132	0.210
	(0.230)	(0.203)	(0.258)
Southeast Jiangsu dummy	0.065	−0.099	−0.040
	(0.157)	(0.142)	(0.176)
Anhui dummy	0.286	0.408*	0.581*
	(0.243)	(0.213)	(0.273)
ln(distance from Shanghai)	−0.0003	−0.001	−0.001
	(0.001)	(0.001)	(0.001)
ln(distance from highway)	0.004*	−0.002	−0.001
	(0.002)	(0.002)	(0.002)
ln(years of operation)	0.171**	−0.011	0.106*
	(0.055)	(0.050)	(0.062)
$G(K/L)$		0.667**	
		(0.149)	
Growth rate of average wages	0.649		1.076
	(0.862)		(1.001)
$\ln(L_{1995})$	0.042		−0.008
	(0.052)		(0.061)
$\ln(K_{1995}/L_{1995})$	−0.320**		−0.219**
	(0.068)		(0.078)
$\ln(V_{1995}/L_{1995})$	−0.061		−0.088
	(0.053)		(0.062)
Constant	−0.686	0.428	0.006
	(0.424)	(0.225)	(0.490)
R^2	0.505	0.508	0.486

Notes: The sample size is 56. Numbers in parentheses are standard errors.
**Significant at the 1 percent level (one-sided test).
*Significant at the 5 percent level.

that the choice of the extent of privatization by the local government is affected by the labor productivity growth of the enterprise, ΔPS and PS are treated as exogenous variables at this stage of our study.

Table 9.5 reports three-stage least squares (3SLS) estimates of the capital-labor ratio (K/L) growth function and the labor productivity (V/L) growth function. For comparison, the ordinary least squares (OLS) estimates of the reduced form are also shown. In column (1), the K/L ratio

level in 1995 has a negative and significant effect on its subsequent growth, serving as an instrumental variable. The years of operation have a positive and significant effect on the K/L ratio growth, which suggests that older enterprises tended to have had large labor employment before 1995 and then hastened to adjust their labor and capital inputs to the soaring wage rate during the study period. The private ownership share as of 1995 and the subsequent privatization do not have any significant effect on the K/L ratio growth in the garment sample.

In columns (2) and (3), privatization in 1996 has a positive and significant effect on the growth of labor productivity, which strongly supports the hypothesis that privatization improves production efficiency. In both columns, the productivity effect of privatization in 1997 is positive but insignificant. These results are consistent with the finding by Li and Rozelle (2000) that the productivity effect is realized not right after privatization but with an adjustment time lag of a few years. The result, that the proportion of SOE subcontracting has a negative and significant effect on labor productivity growth, suggests that the sample enterprises already had absorbed technologies and management know-how from SOEs by the sample period, and that transactions with technologically more advanced enterprises, such as foreign joint ventures, or the establishment of own marketing channels were becoming important for productivity growth. As shown in column (2), the estimate of the coefficient, a_5, of $G(K/L)$ in equation (2) is 0.667. This is reasonably close to the sample average of $(1 - \text{labor share})$, where the labor share is measured as the ratio of nominal wage payments to nominal value-added.

9.4   Privatization and Growth in the Casting Industry

Unlike subcontracting in the garment industry, casting subcontracting was done almost exclusively with SOEs, especially those in and around Shanghai. Even in the case of original products manufactured and sold freely by TVEs, major buyers were mostly SOEs, and suppliers of important inputs, such as coal and pig iron, were also SOEs. Thus, transactions and cooperation with SOEs were indispensable for casting enterprises. Moreover, the quality of cast products is difficult to observe visually, especially in the case of complicated shapes and large sizes. Hence, the cost of inter-enterprise transactions tended to be high in this industry, even though free-market transactions were developed in the 1990s. Therefore, it is likely that the role of the local government in supporting transactions with SOEs was greater in this industry than in the garment industry.

According to table 9.6, original products accounted for a large part of sales revenue in Anhui but much less in areas closer to Shanghai. Enterprise managers told us that original products tended to be parts for light consumer goods and relatively simple machines, such as small pumps and

Table 9.6   **Composition of Sales Revenue, Casting Industry, 1995 and 1998 (%)**

	Original Products	Subcontract	Total
1995			
Shanghai	15.0	85.0	100
Southeast Jiangsu	33.0	67.0	100
Southwest Jiangsu	57.6	42.4	100
Anhui	64.3	35.7	100
Total	51.0	49.0	100
1998			
Shanghai	15.5	84.5	100
Southeast Jiangsu	25.3	74.6	100
Southwest Jiangsu	59.5	40.5	100
Anhui	60.0	40.0	100
Total	48.4	51.6	100

Table 9.7   **Ownership Share by Transaction Mode, Casting Industry, 1995 and 1998 (%)**

	Enterprises with >50% Original Products in 1995 (1)	Enterprises with ≤50% Original Products in 1995 (2)	Total (3)
1995			
Local government's ownership share	79.0	75.8	77.4
Private share	15.8	16.1	15.9
1998			
Local government's ownership share	36.4	20.6	28.5
Private share	46.4	59.8	53.1
No. of observations	29	29	58

tractor engines, while parts for heavy equipment, such as huge engines for large ships, were produced under subcontracts with SOEs. The heavy concentration of large SOEs in Shanghai and its immediate vicinity seems to explain the finding from table 9.6 that the proportion of subcontracting decreases as the distance from Shanghai increases. As shown in table 9.7, the ownership structure of original product-oriented enterprises was similar to that of subcontracting-oriented enterprises in 1995. In 1998, the difference in ownership structure between these two types of enterprises was a little greater than in 1995, but it was not statistically significant.

Table 9.8 reports the estimation results of the K/L ratio function and the labor productivity growth function for the casting sample. This table is organized in the same way as table 9.5 except that the proportion of SOE-subcontracting to sales revenue in table 9.5 is replaced by the proportion of

Table 9.8   **Estimates of Growth Functions, Casting Industry, 1995–1998**

	$G(K/L)$ 3SLS (1)	$G(V/L)$ 3SLS (2)	$G(V/L)$ OLS (3)
PS_{1995}	−0.298*	0.0005	−0.104
	(0.145)	(0.199)	(0.242)
ΔPS_{1996}	0.069	0.421*	0.480
	(0.182)	(0.249)	(0.304)
ΔPS_{1997}	0.339*	−0.435*	−0.166
	(0.189)	(0.238)	(0.315)
Proportion of original product	−0.069	0.014	−0.002
in 1995	(0.103)	(0.137)	(0.172)
Shanghai dummy	−0.042	−0.309	−0.294
	(0.393)	(0.522)	(0.272)
Southeast Jiangsu dummy	0.134	0.023	0.117
	(0.186)	(0.250)	(0.310)
Anhui dummy	0.444**	0.425*	0.618*
	(0.166)	(0.207)	(0.277)
ln(distance from Shanghai)	−0.258	−0.196	−0.294
	(0.163)	(0.208)	(0.272)
ln(distance from highway)	−0.011	0.097	0.084
	(0.046)	(0.062)	(0.077)
ln(years of operation)	0.110*	−0.056	−0.015
	(0.065)	(0.087)	(0.108)
$G(K/L)$		0.533*	
		(0.256)	
Growth rate of average wages	0.749		0.616
	(0.583)		(0.975)
$\ln(L_{1995})$	0.111**		0.072
	(0.039)		(0.066)
$\ln(K_{1995}/L_{1995})$	−0.138*		0.021
	(0.065)		(0.109)
$\ln(V_{1995}/L_{1995})$	−0.202*		−0.224
	(0.091)		(0.152)
Constant	−0.767	0.769	0.890
	(0.960)	(1.177)	(1.603)
R^2	0.397	0.302	0.254

Notes: The sample size is 56. Numbers in parentheses are standard errors.

**Significant at the 1 percent level.

*Significant at the 5 percent level.

original products in table 9.8. In column (1), the private ownership share as of 1995 had a negative and significant effect on the growth of the K/L ratio during the 1995–1998 period, whereas privatization that took place in 1997 had a positive and significant effect on the K/L ratio growth. These results suggest that privatized enterprises at first reduced excess capital more than labor but then increased it as production efficiency was expected to improve. The Anhui dummy has a positive and significant effect on the K/L ratio growth; this is likely to be a reflection of the tendency toward geo-

graphical growth convergence. The K/L ratio, labor productivity, and labor employment size in 1995 in column (1), which are excluded from column (2), have positive and significant effects on the subsequent growth of the K/L ratio. Hence they serve as instrumental variables.

The most important result shown in table 9.8 is that privatization in 1996 had a positive and significant effect on labor productivity growth, even though the productivity effect of privatization was weaker in the casting industry than in the garment industry. Interestingly, privatization in 1997 has a negative and significant effect on labor productivity growth. These results are consistent with our arguments that the temporarily detrimental effect of privatization on transaction efficiency was more substantial in the casting industry than in the garment industry, and that the productivity effect of privatization was realized with time lags. The Anhui dummy has a positive and significant effect on labor productivity as well as on K/L ratio growth, which supports the hypothesis that the center of gravity in the casting industry was shifting from the coastal region, such as the suburbs of Shanghai, to the central region, including Anhui province.

9.5   Concluding Remarks

In this study, we find that privatization of TVREs has been taking place rapidly in the Greater Yangtze River Region since the middle of the 1990s. Although this rapid privatization was due partly to the policy of the central government, we argue that it was related closely to the increasing importance of free-market transactions which made the intervention of local governments in the management of TVREs less productive. Thus, we advance the hypothesis that the recent privatization improved the production efficiency of enterprises. Our hypothesis clearly is supported by the three-stage estimation of the capital-labor ratio growth and labor productivity growth functions for both the garment and metal-casting industries. This indicates that productivity was enhanced significantly by privatization with a few years' time lag. The estimation results suggest that the productivity effect of privatization was greater in an industry where products and materials were more efficiently sold and bought in free markets.

At this point, we must emphasize that in all likelihood, our analysis has identified mere short-run effects of privatization on productivity. In the longer run, privatization will have greater effects on productivity than estimated in this study, as free markets of products and materials develop. In our observation, enormous differences still exist between private enterprises in Zhejiang province and the Greater Yangtze River Region. First, current competition among enterprises in Zhejiang province centers around the production of differentiated, improved products, often with brand names, and the establishment of a nationwide marketing network. In Jiangsu, however, competition through brand names and the establishment of own marketing networks began late and has taken place only

among a small number of leading enterprises. Second, closely related industries tend to be clustered in Zhejiang province in order to enjoy the so-called "localization economies" arising from information externalities, the division and specialization of labor among enterprises, and possibly the formation of skilled labor markets (see, e.g., Zhang 1999; Sonobe, Hu, and Otsuka 2002a,b). Such industrial clusters seem to have been formed gradually through free-market competition over the last two decades. In contrast, industrial clusters have been less developed in the Greater Yangtze River Region except in the Sunan area near Shanghai. It is likely that in the longer run, the improvement of products and marketing capacity and the geographical concentration of industries will take place in the Greater Yangtze River Region as well.

The upshot is that we have to distinguish carefully between the short-run effects of privatization, which would have arisen from improved management incentives, and its longer-run effects, which would arise from investments in the development of improved products and the establishment of marketing systems, as well as from the formation of industrial clusters. Our result, that the short-run incentive effect of privation is significantly positive, strongly indicates that privatization can be a driving force leading to the continued improvement of productivity over long periods, so far as privatization enhances market competition among enterprises across wide areas.

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Comment   Yun-Wing Sung

This paper draws on a unique data set on TVEs of the garment and metal-casting enterprises in the Great Yangtze River Region from 1995 to 1998, and presents evidence that productivity of TVEs was significantly en-

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hanced by privatization. Despite ambiguous property rights (TVEs are owned by lower-level local governments), TVEs achieved remarkable growth in the 1980s and early 1990s. However, since the early 1990s, the growth performance of TVEs deteriorated sharply and fell behind that of private enterprises. Privatization of TVEs occurred on a large scale in the mid-1990s.

The contrasting performance of TVEs in two different periods of China's reform era remains a puzzle in transition economics that has not been studied adequately. Sonobe and Otsuka explain the puzzle by the "plausible hypothesis" that, in the first stage of the reform era, China's market was characterized by high transaction costs, which could be reduced by the intervention of local governments. Such transaction costs were particularly high when transactions were made with SOEs. However, as China's market matured with economic reforms, government support for transactions between TVEs and SOEs lost its significance. The plausible hypothesis is very interesting in transition economics as it provides a credible argument that gradualism is superior to a big bang.

While the article has presented persuasive evidence that productivity of TVEs was significantly enhanced by privatization since 1995, it provides only an indirect test of the plausible hypothesis. The authors argue that, as transactions with SOEs account for a bigger share of sales in the metal-casting industry than the garment industry, reduction of transaction costs through government intervention should be more significant in the metal-casting industry. The test shows that privatization has a weaker effect on productivity in metal casting than in garment. This result is consistent with the plausible hypothesis because privatization would reduce transaction efficiency more substantially in metal casting than in garment. However, as the casting industry is quite different from the garment industry, there can be many other explanations of the weaker effect of privatization on productivity in metal casting. The test of the plausible hypothesis is not conclusive.

The plausible hypothesis is very interesting, but also difficult to test. As the data set only involves two industries during 1995–1998, conclusive testing of the plausible hypothesis is not possible. A longer time span, more industries, or both would be required.

Despite the inconclusive test of the plausible hypothesis, the article is valuable in a lot of ways. The enterprise survey is very carefully done. For instance, it traces the changing distribution of ownership of capital stock for each sample enterprise. To tackle the problem that private TVEs had an incentive to be politically correct by disguising themselves under collective ownership, the authors also rely on the subjective assessment of key informants, usually general managers. The survey also has detailed information on composition of sales by mode of transaction (i.e., original product versus subcontracting with SOEs), which provides some data for indirectly

testing the plausible hypothesis. As a whole, the article is a very valuable contribution to the literature on transition economics.

Comment   Yang Yao

This paper provides an empirical assessment of the productivity effects of TVE privatization in China. The results are illuminating and provide useful policy implications. Although privatization has converted almost all the TVEs and most of the small and medium SOEs into private firms, the word "privatization" is still a kind of taboo in Chinese mainstream publications, so empirical studies on privatization are still scant both inside and outside China. The evidence provided by this paper thus is both timely and informative. It is especially interesting that privatization is found to be the most effective for firms that are more involved in free-market transactions. Privatization in China has taken a bottom-up approach and has been induced by economic forces. There have been both theories and anecdotal evidence showing that the spontaneous privatization in China has been induced by market liberalization of the Chinese economy, but there has been no systematic evidence to prove it. This paper's finding partly fills the gap by providing indirect evidence (direct evidence would have shown that firms more involved in free-market transactions are more likely to be privatized, which is not done in this paper).

While the paper is well done, I would like to point out two areas that further work can improve upon.

The authors have a large data set, but they use only two sectors for their study, which seriously limits the sample size. The authors argue that they have done so because different industries use different technologies. However, this issue can be taken care of by estimating a different production function for each industry and then adding industrial dummies in their analysis.

The authors use the change of the private share in a firm as the indicator of the extent of privatization of the firm. There are several issues surrounding this definition. First, there are both initially private and privatized TVEs in the sample. By the authors' definition of privatization, an initially private firm has a value of zero for this variable. This considerably weakens the implications of this variable because it actually measures an adjustment of the ownership structure in the firm regardless of the direction of the adjustment. A possible improvement is to assign a value of 1 to those initially private firms so the direction of the adjustment is pinned down toward privatization. Second, the starting year of 1995 is not the

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starting year for privatization, I suppose, at least not for most firms. As a result, the current definition of privatization would be biased for firms that had started privatization before 1995, pretty much like those initially private firms. Third, the lack of an effect of privatization in the year 1996–1997 may just be a reflection of the problem, since in those two years privatization might well have finished so there is not much variation in the data.