NBER WORKING PAPER SERIES

PRODUCTIVITY EFFECTS OF TVE PRIVATIZATION: THE CASE STUDY OF GARMENT AND METAL CASTING ENTERPRISES IN THE GREATER YANGTZE RIVER REGION

Tetsushi Sonobe
Keijiro Otsuka

Working Paper 9621
http://www.nber.org/papers/w9621

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
April 2003

For the Twelfth Annual East Asian Seminar on Economics, Hong Kong, June 28-30, 2001. We are grateful to Yang Yao, Yun-Wing Sung, John McMillan, and Simon Johnson for helpful comments. The views expressed herein are those of the authors and not necessarily those of the National Bureau of Economic Research.

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
NBER Working Paper No. 9621
April 2003
JEL No. O1, P2

ABSTRACT

While it is by now well known that the privatization of township- and village-run enterprises (TVREs) has been rapidly and widely taking place in China, it is much less known whether and to what extent privatization has improved resource allocation and productivity. As a first step toward the fuller understanding of the effect of privatization, this study undertakes case studies of garment and casting enterprises in the Greater Yantgze River Region, where TVREs led miraculous economic growth in the 1980s. Our empirical results indicate that productivity was significantly enhanced by the recent privatization with time lag of a few years.

Tetsushi Sonobe
Foundation for Advanced Studies on
International Development
Tokyo 162-8677
sonobete@grips.ac.jp

Keijiro Otsuka
Foundation for Advanced Studies on
International Development
Tokyo 162-8677
otsuka@grips.ac.jp

I. 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 et al. 1992; Jefferson et al. 1996; Otsuka et al. 1998).[1] In the 1990s, however, private sector has emerged to be a leading sector of the economy in China. In the southeastern part of Jiangsu province, whose successful record of economic development based on TVREs in the 1980s was dubbed the "Sunan Model of Industrial Development," the privatization of TVREs has been taking place in the late 1990s. Furthermore, the growth rate of Zhejiang province, which has depended consistently on the growth of private sectors since the beginning of the 1980s, outweighed most other provinces including Jiangsu in the 1990s (Zhang 1999).

While it is by now well known that privatization has been rapidly and widely taking place in China, it is much less known whether and to what extent privatization has improved resource allocation and productivity.[2] The major issue to be addressed in this study is to assess the productivity effects of TVE privatization quantitatively. If the recent privatization results in the improvement of production efficiency, a question immediately arises as to why it did 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

[1] Note that township and village enterprises (TVEs) include both TVREs and private enterprises.
[2] An exceptional and pioneering study is Li et al. (1999).

the growth performance of the Chinese economy in the 1990s and assessing its future growth potential for the early decades of the 21st century.

As a first step toward the fuller understanding of the effects of TVE privatization on productivity, this study undertakes case studies of the garment and metal casting enterprises in the Great Yangtze River Region extending from the suburbs of Shanghai to the western border of Anhui province. Common and important characteristics of TVREs in the suburbs of Shanghai and southern Jiangsu were identified to be their dependence on SOEs in technology, management, and marketing (Otsuka, Liu, and Murakami 1998). Some TVREs used to be cooperative TVEs or "branch factory" of urban SOEs, in which managers were sent from SOEs and profits were shared between them in accordance with their investment shares (Fudan University Economic Research Center 1988). Putting-out contracts were frequently 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 SOEs (Murakami, Liu, and Otsuka 1994, 1996). It seems that township and village governments supported such transactions and cooperation through direct involvement in enterprise management.[3]

Our maintained hypothesis is that such cooperation between TVREs and SOEs was

[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.

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 have eroded the advantage of the TVRE-SOE cooperation. First, TVREs have absorbed the production knowledge and capacity of SOEs, so that payoff to maintain cooperative relationship with SOEs has gradually declined (Liu and Otsuka 1998). Second, free market system has developed, so that the direct government support for the inter-enterprise transactions, particularly face-to-face transactions between TVREs and SOEs in our context, tends to lose its significance (Li 1996; Hsiao et al. 1998; Jin and Qian 1998; Chen and Rozelle 1999). Therefore, we hypothesize that privatization in the late 1990s has resulted 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, sampling scheme is explained, and the basic statistics of our sample enterprises, such as the growth rate of valued added, are presented. After examining the changing importance of subcontracting transactions with SOEs and the changing distribution of stock ownership by the local government vis-à-vis private owners in section III, we assess the impacts of privatization

[4] Lin and Yao (2001) contend that the development of the SOE sector tended to help the development of

on productivity by estimating the function that explains the growth rate of per worker value-added, separately for the garment and metal casting industries, in section IV. Implications of this study will be discussed in the final section.

II. Data

To analyze determinants and consequences of TVRE privatization, we use data collected by a rural enterprise survey conducted in 1999 and 2000 in the Great Yangtze River Region from the suburb of Shanghai to about 650 km points upstream. The study areas include 5 counties in the suburb of Shanghai, 19 counties in the south of the Yangtze River in Jiangsu province, and 29 counties between the Yangtze and the Huai He Rivers in Anhui province. These areas are connected by an express-way which goes from Shanghai along the Yangtze River to Nanjing, the capital city of Jiangsu, crosses the river from south to north at this city, and goes west up to and beyond Hefei, the capital city of Anhui. Sample enterprises were selected randomly from the enterprise lists compiled by local governments of 28 counties selected randomly from the 53 counties. The garment and casting samples consist of 78 and 80 enterprises, respectively.

We chose specific industries for 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 Great Yangtze River Region,

---

the TVE sector in the light industries whereas the opposite was the case in the heavy industries.

because the influence of SOEs in Shanghai, a center of the state industrial sectors in China, tends to decline with the distance from Shanghai, so that sufficient geographical variations of the influence of SOEs can be observed. 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 contrasting: the metal casting enterprises wholly depend on SOEs in both input and output transactions as of 2000, whereas the garment enterprises are far more independent from SOEs.

The retrospective survey of enterprises provides information on production and costs as well as changing distributions of ownership shares during the 1995-1998 period, and information on equipment and marketing channels in 1995 and 1998. Table 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 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 of 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 complete only for 56 enterprises in the garment industry and 58 in the casting industry,

[5] The price indexes of products of the Garment and Other Fiber Products industry and the Smetling and Pressing of Ferrous Metals industry, assessed at the factory gate by the State Statistics 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 Statistics Bureau (various years).

particularly because of the entry of new enterprises after 1995.[6] For descriptive exposition, we classified the study areas into four regions: the suburb of Shanghai, Southeast Jiangsu, Southwest Jiangsu, and Anhui.

Southeast Jiangsu is a traditionally fertile granary and close to Shanghai. With these geographical advantages, the economy in this area started growing rapidly with the remarkable development of TVREs, as soon as the central government commenced the economic reform in the late 1970s. By the early 1990s, the successful TVRE-led development strategy pursued in this area became widely known under the name of the "Sunan Model of Industrial Development." Since the early 1990s, however, the Sunan Model has been challenged by another model of industrial development formed in and around Wenzhou city in Zehjiang province, whose economy has been catching up with Southeast Jiangsu starting from a much lower level of development (Zhang 1999; Tang and Cheng 2000; Sonobe, Hu, and Otsuka 2002*b*). In this "Wenzhou Model of Industrial Development," high economic growth is driven by private enterprises and "disguised" TVREs which were essentially private but disguising themselves as TVREs because private enterprises were unfavorably treated by various regulations.

TVREs were also developed in Southwest Jiangsu including Nanjing. Probably because Nanjing is the capital city of Jiangsu province, there were a larger number of SOEs

[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

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 study areas, 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 study areas.[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 study areas in 1995 and earlier.[8] This is consistent with the hypothesis that the development of the private sector was predominant in poor areas with a few SOEs because local governments in such areas could not afford to establish a large number of TVREs in cooperation with SOEs.

As shown in Table 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] A factor that made the casting industry stagnant or declining was the anti-pollution regulation in urbanized areas. The regulation was most stringent in Shanghai, where the municipality government prohibited the expansion and renewal of foundries. Customers shifted orders away from foundries in Shanghai to other areas where environmental regulations were less tight, especially to Southeast Jiangsu.

---

greater variances than those in subsequent years.

[7] Data of industrial output and its composition by sector, aggregated at the provincial level, are available from the Statistical Bureaus of Jigansu and Anhui provinces (various years).

[8] The self-employed enterprises are those with seven workers or less.

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

As a result, casting enterprises in Southeast Jiangsu had much better growth record than their counterparts in Southwest Jiangsu as well as Shanghai. Casting enterprises in Anhui, however, were growing even faster. In the garment sample, the average growth rate increases with distance from Shanghai. Thus, in both casting and garment samples, enterprises in Anhui were growing faster than in any other study areas. These comparisons suggest that patterns of comparative advantage in the coastal and central regions were significantly changing 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 than categorical variables. In practice, the privatization of an enterprise begins by estimating the capitalized value of its assets. Then, the shares of various owners (e.g., township government, which primarily invested at the time of enterprise establishment, and enterprise itself, which reinvested profits) are determined

according to their previous investments and services, and hence, ownership distribution becomes clear after capitalization. To trace the ownership distribution before the capitalization, we simply relied on the subjective assessment of key informants, who were usually general managers.

As shown in Table 2, we classified owners into five types: (i) local government, (ii) SOEs, (iii) workers, (iv) joint ventures with foreign enterprises, and (v) 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 ventures. 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, and there were 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 enterprises.

In the literature on ambiguous property rights in China, a central question is why TVREs could achieve remarkable growth performances 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). Although not mentioned in this literature, we would like to emphasize that such transaction costs were particularly high when transactions were made with SOEs. As free market transactions developed, however, it is likely that the government support for transactions and cooperation between TVREs and SOEs have gradually lost its 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 will look at the production data more carefully in the next two sections.

III. Privatization and Growth in the Garment Industry

Garment enterprises in our sample produce a variety of garment products ranging from cheap underwear to expensive and technically difficult 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 Jiangsue used to be cooperative TVEs or branch factories of SOEs in Shanghai when free market transactions were not 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 since such distinction is practically impossible for some sample enterprises. Instead, we distinguish subcontracting with SOEs from subcontracting with other types of enterprises.

Table 3 shows the composition of original products and subcontracting with SOEs and other enterprises in sales revenues by study area in 1995 and 1998. It is said that compared with Zhejiang province, garment enterprises in our study areas, 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 network. Consistent with this argument, the proportion of original products to the sales revenue in Southeast Jiangsu in 1995 is as low as 18.0 percent and that of subcontracting with SOEs is as high as 45.6 percent. A possible explanation for such differences between this area and Zhejiang is that garment enterprises in Southeast Jiangsu could afford to invest in expensive machines by taking advantage of geographical proximity to Shanghai to receive subcontracting orders from SOEs and foreign ventures. Although garment enterprises in Anhui were not advantageous in these respects, they have high shares of subcontracting with SOEs because they tended to follow the Sunan Model, in that they had a high

propensity to subcontract with relatively small local SOEs and urban collectives.

Table 4 compares the ownership share of the local government between those 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 24 sample enterprises, which 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 management 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 supports 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 profit-seeking incentives of managers. If the local government's support for subcontracting with SOEs became no longer important, privatization would improve production efficiency without sacrificing transaction efficiencies. To date, however, few empirical studies have assessed the productivity effects of TVRE privatization or confirmed even its existence. On the contrary, some theoretical studies presume that productive efficiency of a rural enterprise does not depend

on the type of enterprise's ownership (e.g., Weitzman and Xu 1994). An exception is the pioneering work by Li and Rozelle (2000), who find that although positive productivity effect exists, it is realized not right after privatization but with adjustment lags of a few years.[10]

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

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

where $G(V)$, $G(K)$, and $G(L)$ are growth rates of real value added, real capital stock, and the number of workers, respectively, during from 1995 to 1998; PS_{1995} 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 whole year of 1996 and 1997, respectively; and X is a vector of other independent variables. To estimate real capital stock, we first estimated nominal net investment from the survey data on nominal capital stock, and then used the factory price index of machinery products as deflator.[11] Estimated real values of net investments were added to

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

[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 amount 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.

the real value of initial investment to obtain real values of 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, 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 out part of the positive productivity effect. We focus on the privatization that took place before 1998 because it is unlikely that privatization in 1998 affected immediately the productivity growth during the 1995-1998 period. Vector X includes the proportion of SOE-subcontracting to sales revenue in 1995, three provincial dummies (with Southwest Jiangsu being 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, and/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 modified equation (1) into the following estimable form:

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

where u is an error term. Since the growth rate of capital-labor ratio, $G(K/L)$, on the right-hand side of equation (2) is likely to be endogenous, we instrumented 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 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 5 reports 3SLS estimates of the capital-labor ratio (K/L) growth function and the labor productivity (V/L) growth function. For comparison, the OLS estimates of the reduced form are also shown. In column (i), 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 hasten 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 (ii) and (iii), privatization in 1996 has a positive and significant effect on the growth of labor productivity, which strongly supports the hypothesis that privatization

[12] The data of average labor earnings by county were taken from the Statistical Bureaus of Shanghai

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 productivity effect is realized not right after privatization but with a few-year adjustment time lag. The result that the proportion of SOE-subcontracting has a negative and significant effect on labor productivity growth suggests that the sample enterprises had already 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, and/or the establishment of own marketing channels were becoming important for productivity growth. As shown in column (ii), the estimate of coefficient, a_5, of $G(K/L)$ in equation (2) is 0.667, which is reasonably close to the sample average of (1 – labor share), where the labor share is measured as the ratio of nominal wage payments to nominal value added.

IV. Privatization and Growth in the Casting Industry

Unlike subcontracting in the garment industry, casting subcontracting was made 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.

---

municipality and Jiangsu and Anhui provinces (various years).

Moreover, the quality of cast products is difficult to inspect visually, especially in the case of complicated shapes and large sizes, and, hence, the cost of inter-enterprise transactions tended to be high in this industry, even though free market transactions were developed in the 1990s. It is, therefore, 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 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 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 vicinity seems to explain the finding from Table 6 that the proportion of subcontracting decreases as the distance from Shanghai increases. As shown in Table 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 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 fashion as Table 7 except that the proportion of SOE-subcontracting to sales revenue in table 7 is replaced by the proportion of original products in Table 8. In column (i), 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 reduced labor employment at first but then increased as production efficiency improved. The Anhui dummy has a positive and significant effect on the *K-L* ratio growth, which is likely to be a reflection of the tendency to geographical growth convergence. The *K-L* ratio, labor productivity, and labor employment size in 1995 in column (i), which are excluded from column (ii), have positive and significant effects on the subsequent growth of the *K-L* ratio and, hence, they serve as instrumental variables.

The most important result shown in Table 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 substantially 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 such as Anhui province.

V. Concluding Remarks

In this case study, we found that privatization of TVREs has been rapidly taking place 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 argued that it was closely related to the increasing importance of free market transactions, which made the intervention of local governments in the management of TVREs less productive. Thus, we advanced the hypothesis that the recent privatization has improved the production efficiency of enterprises. Our hypothesis is clearly 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, which commonly indicates that productivity was significantly enhanced 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 transacted at 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 difference still exists between private enterprises in Zhejiang province and the Greater Yangtze River Region. First, current competition among enterprises in Zhejiang province centers round the

production of differentiated, improved products, often with brand names, and the establishment of nation-wide marketing network. In Jiangsu, however, competition through brand names and the establishment of own marketing network has begun late and taken place only among a small number of leading enterprises. Second, closely-related industries tend to be clustered in Zhejiang province 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; Tang and Cheng 2000; Sonobe and Otsuka 2002*a*, *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 Great Yangtze River Region except 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.

Upshot is that we have to carefully distinguish between the short-run effects of privatization, which would have arisen from improved management incentives, and longer-run effects, which would arise from investments in the development of improved products and the establishment of marketing system, 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.

References

Anhui Province Statistical Bureau. *Statistical Yearbook of Anhui* (various years).

Che, Jiahua, and Qian, Yingyi. "Insecure Property Rights and Government Ownership of Firms." *Quarterly Journal of Economics* 113 (May 1998): 467-96.

Chen, Hongyi, and Rozelle, Scott. "Leaders, Managers, and the Organization of Township and Village Enterprises in China." *Journal of Development Economics* 60 (December 1999): 529-57.

Chen, Kang; Jefferson, G. H.; and Singh, Inderjit. "Lessons from China's Economic Reform." *Journal of Comparative Economics* 16 (June 1992): 201-25.

Fudan University Economic Research Center. *The New Avenue for Enterprise Reform and Development: Survey Report on Horizontal Cooperation of Industrial Enterprises in Shanghai* [Qiye Gaige yu Fazhan Xinlu: Shanghai Gongye Qiye Hengxiang Lianhe Diaocha Baogaoji]. Shanghai: Fudan Daxue Chubansha, 1988.

Hsiao, Cheng; Nugent, Jeffrey; Perringne, Isabelle, and Qiu, Jicheng. "Shares versus Residual Claimant Contracts: The Case of Chinese TVEs." *Journal of Comparative Economics* 26 (June 1998): 317-37.

Jefferson, G. H.; Rawski, T. G.; and Zheng, Yuxin. "Chinese Industrial Productivity: Trends, Measurement, and Recent Developments." *Journal of Comparative Economics* 23 (October 1996): 146-80.

Jiangsu Province Statistical Bureau. *Statistical Yearbook of Jiangsu* (various years).

Jin, Hehui, and Qian, Yingyi. "Public versus Private Ownership of Firms: Evidence from Rural China." *Quarterly Journal of Economics* 113 (August 1998): 773-808.

Li, David D. "A Theory of Ambiguous Property Rights in Transition Economies: The Case of the Chinese Non-State Sector." *Journal of Comparative Economics* 23 (August 1996): 1 – 19.

Li, Hongbin, and Rozelle, Scott. "Saving or Stripping Rural Industry: An Analysis of Privatization and Efficiency in China." *Agricultural Economics* 23 (September 2000): 241-52.

Lin, J. Y., Cai, Fang, and Li, Zhou. *The China Miracle: Development Strategy and Economic Reform*. Hong Kong: Chinese University Press, 1996.

Lin, J. Y. and Yao, Y. "Chinese Rurual Industrialization in the Context of the East Asian Miracle," in J. Stiglitz and S. Yusuf (eds.), *Rethinking the East Asian Miracle*. World Bank and Oxford University Press, 2001.

Liu, Deqiang, and Otsuka, Keijiro. "Township-Village Enterprises in Garment Sector of China." In Y. Hayami (ed.), *Toward the Rural-Based Development of Commerce and Industry: Selected Experiences from East Asia*. Washington, DC: World Bank Institute, 1998.

Murakami, Naoki; Liu, Deqiang; and Otsuka, Keijiro. "Technical and Allocative Efficiency among Socialist Enterprises: The Case of the Garment Industry in China." *Journal of Comparative Economics* 19 (December 1994): 410-33.

Murakami, Naoki; Liu, Deqiang; and Otsuka, Keijiro. "Market Reform, Division of Labor, and Increasing Advantages of Small-Scale Enterprises: The Case of the Machine Tool Industry in China." *Journal of Comparative Economics* 23 (December 1996): 256-77.

Otsuka, Keijiro; Liu, Deqiang; and Murakami, Naoki. *Industrial Reform in China: Past Performance and Future Prospects*. Oxford: Clarendon Press, 1998.

Shanghai Municipality Statistics Bureau. *Statistical Yearbook of Shanghai* (various years).

Sonobe, Tetsushi, Hu, Dinghuan, and Otsuka, Keijiro. "Process of Cluster Formation in China: A Case Study of a Garment Town." *Journal of Development Studies* 39 (October 2002): 118-139. (*a*)

Sonobe, Tetsushi, Hu, Dinghuan, and Otsuka, Keijiro. "From Inferior to Superior Products: An Inquiry into the Wenzhou Model of Industrial Development in China." Manuscript. Tokyo: Foundation for Advanced Studies on International Development, 2002. (*b*)

State Statistical Bureau. *China Statistical Yearbook* (various years).

Tang, R. and Cheng, L. "The Survey of Rural Economic Development in the South East Zhejiang Province" [Zhejiang Sheng Dongnan Diqu Nongcun Jingji Fazhang De Diaocha Yanjiu] *Jingji Tizhi Gaige*113 (2000): 99-103.

Tao, Zhigang, and Zhu, Tian. "Agency and Self-Enforcing Contracts." *Journal of Comparative Economics* 28 (March 2000): 80-94.

Weitzman, M. L., and Xu, Chenggang. "Chinese Township-Village Enterprises as Vaguely Defined Cooperatives." *Journal of Comparative Economics* 18 (April 1994): 121-45.

Zhang, R. *The Systematic Review of Economic Transition in Zhejiang Rural Area* [*Zhejiang Nongcun Jingji Gaige Tixi Yanjiu*]. Hangzhou: Zhejiang Renming Chuban She, 1999.

Table 1. Average Annual Growth Rates of Real Value Added by Study Area, 1995-1998 (%)

	Shanghai (i)	Southeast Jiangsu (ii)	Southwest Jiangsu (iii)	Anhui (iv)	Total (v)
Garment industry					
Growth rate	8.8	9.4	13.5	25.9	15.4
# of observations	8	14	18	16	56
Casting industry					
Growth rate	−13.0	2.2	−3.2	7.5	1.1
# of observations	4	14	20	20	58

Table 2. Changing Distribution of Ownership Shares, 1995-1998 (%)

	Local government	SOE	Workers	Foreign and joint ventures	Private owners	Total
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
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

Table 3. Composition of Sales Revenue, the Garment Industry, 1995 and 1998 (%)

	Original products	Subcontracting		Total
		With SOEs	With other enterprises	
1995				
Shanghai	23.8	22.9	53.3	100
Southeast Jiangsu	18.0	45.6	36.4	100
Southwest Jinagsu	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 Jinagsu	25.4	28.3	46.3	100
Anhui	26.4	38.7	34.9	100
Total	23.1	32.0	44.9	100

Table 4. Ownership Share by Transaction Mode,
the Garment Industry, 1995 and 1998 (%)

	Enterprises with the proportion of SOE-subcontracting > 50% in1995 (i)	Enterprises with the proportion of SOE-subcontracting ≤ 50% in 1995 (ii)	Total (iii)
Number of observations	24	32	56
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

Table 5. Estimates of Growth Functions, the Garment Industry, 1995-98

	$G(K/L)$ 3SLS (i)	$G(V/L)$ 3SLS (ii)	$G(V/L)$ OLS (iii)
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-squared	0.505	0.508	0.486

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

* Significant at 5 percent, ** significant at 1 percent (one-sided test).

Table 6. Composition of Sales Revenue, the Casting Industry, 1995 and 1998 (%)

	Original products	Subcontract	Total
1995			
Shanghai	15.0	85.0	100
Southeast Jiangsu	33.0	67.0	100
Southwest Jinagsu	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 Jinagsu	59.5	40.5	100
Anhui	60.0	40.0	100
Total	48.4	51.6	100

Table 7. Ownership Share by Transaction Mode,
the Casting Industry, 1995 and 1998 (%)

	Enterprises with the proportion of original products > 50 % in 1995 (i)	Enterprises with the proportion of original products ≤ 50 % in 1995 (ii)	Total (iii)
Number of observations	29	29	58
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

Table 8. Estimates of Growth Functions, the Casting Industry, 1995-98

	$G(K/L)$ 3SLS (i)	$G(V/L)$ 3SLS (ii)	$G(V/L)$ OLS (iii)
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)
Proprotion of original product in 1995	−0.069	0.014	−0.002
	(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-squared	0.397	0.302	0.254

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

* Significant at 5 percent, ** significant at 1 percent (one-sided test).