

The Ongoing Transition in China's Labor Demand

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Abstract

This study aims to indicate an aspect of the present Chinese economy through the analysis of the labor demand structure of state-owned enterprises (SOE) and private and other enterprises (POE). The results indicate that the labor demands for these two types of enterprises react differently in terms of the degree of privatization and wage rate. The low responsiveness of the labor demand of SOE is identical to the cases in the transition economies in East Europe. The positive correlation of wage rate and the degree of privatization for POE can be explained as the result of POE-led economic expansion.

Key words: economic reform, state-owned enterprises, privatization, transition economics, restructure

JEL classification: J23, P11, P31

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1. Introduction

Since the start of its economic reform in 1978, China has attained amazingly high economic growth. Since manufacturing has been the engine of this growth, China is sometimes called as the “factory of the world.” However, in terms of the number of employed persons, its growth is less than that of earnings and value added. The manufacturing sector is even witnessing a decline in the number of workers despite its importance as the engine of China’s economic growth.

Table 1 lists some of the economic indicators in recent years by sectors. In terms of the total and average value added (measured in terms of GDP), all the sectors have been growing steadily. However, in terms of the number of employed people, the growth is rather moderate. Further, in the industry sector manufacturing, mining, and energy supply, which ought to be the center of the rapid economic growth the number is even decreasing. The decline of the number is more prominent in terms of staff and workers, which we are going to define in the next section.

One of the main reasons for this decline in the number of workers is China’s poorly prepared statistics system. It is well known that due to the rigid communist and bureaucratic conditions prevailing in China, the Chinese statistics system does not reflect the true condition of its economy and society. Rawski (2001, 2002) has conducted several studies related to this problem in China’s statistics system, pointing out that the local governments and departments in the central government tend to exaggerate the data in order to portray substantial economic success¹.

Another and more acceptable reason is the reform within the state-owned enterprises (hereafter SOE), which compelled them to lay off their excess workers. In

¹ However, in this study, we employ the official figures, with the belief that even the incorrect figures reflect the true condition of workers to some extent.

fact, the recent rapid growth has been achieved mainly by enterprises that belong to different ownership types, for example, foreign subsidiaries and self-employed persons (henceforth, these are referred to as POE, an abbreviation for private and other enterprises; the category does not include self-employed persons). On the other hand, most of the state- and collectively-owned enterprises suffer from severe competition and ineffective management. This leads to the mass dismissal of workers, in excess of the increased employment in the prosperous POE.²

Table 2 shows transition in the number of employed persons since the start of China's economic reform by the ownership type of the enterprise. While a detailed explanation is provided in the next section, here we want to focus on the third and fourth columns, which list the number of employees in SOE and urban collectively owned enterprises (UCOE). These numbers keep increasing until around 1993, when the government decided to introduce the capitalistic system of management. Since then, they have been decreasing, while those for POE have been increasing.

As explained above, China's labor structure is now facing various situations that appear to be inconsistent with each other. There are prosperity and expansion on the one hand and decline and restructuring on the other hand. Chinese employees and employers have been thrust into confusing and peculiar situations under the ongoing transition, similar to other aspects of society and the economy. The behavior of employers, or labor demand, must be different from that in other countries and indicate different characteristics based on the sector, region, and ownership type of the each enterprise. How does labor demand reacts with the change of environment such as

² The meaning of "layoff" in China (*xiagang* in Chinese) is not same as that in the Western countries. In the West, "layoff" means a temporary termination. However, in China, it is just a paraphrase of complete dismissal.

wage increase and the progress of privatization? Is there any difference by the types of enterprise? This study aims to find solution to these questions by estimating labor demand equations and to indicate an aspect of the present Chinese economy in terms of the labor demand structure.

There have been a large number of studies on the characteristics of the Chinese labor structure³. Most of these studies deal with the gap between urban and rural workers, the nature of the rural labor market, and the wage gap among various enterprises and sectors. Due to the reasons described in the following section, this study focuses on the situation of the urban labor demand, in which field Meng (2000) has conducted an outstanding survey (which has been well-described in Chapter 7). However, his study deals with the situation in the early 1990s, when the drastic change in employment was about to begin, and not with that during the period of change. By limiting the time span to the late 1990s and using ascribed data for the entire country, this study attempts to provide a comprehensive understanding of the labor demand during the drastic transition situation of that time.

In order to answer the abovementioned questions of this study, some analyses were performed to estimate the labor demand function for each sector, region, and ownership type. It was found that the labor demand functions for SOE and POE have contrastive characteristics in terms of the wage rate and degree of privatization in each sector and region. The more privatized each sector or region becomes, the greater is the growth in POE in terms of the number of employee. The inverse is true in the case of SOE. The nature of the labor demand of SOE is similar to the general cases in labor economics, but its responsiveness is low, identical to the case of the transition economies

³ For a recent and comprehensive review, refer to Knight and Song (2005) and Cooke (2005).

in East Europe. In the POE, labor demand and wage rate are positively correlated, which is strangely contrary to the common knowledge of labor economics. However, this can be explained by the POE-led expansion of the Chinese economy. Altogether, these contrary tendencies of labor demand indicate one of the most representative aspects of Chinese economy under the economic reform: POE in the middle of the rapid growth and SOE facing the difficulties under transition.

The structure of this study is as follows. Section 2 explains the system and the recent history of China's labor demand. The regression equation is deduced in Section 3. Section 4 indicates the source and characteristics of the data. Section 5 provides the result of the basic regression, and Section 6 presents a detailed analysis of POE with a focus on the wage rate and the nationwide economic expansion. Section 7 presents the conclusion of this study.

2. Description of present China's present and past labor structure

Before we begin the analysis, we have to comprehend the general condition of China's labor demand because its system and figures are too complicated to be sassily understood.

Classification of workers in China

First, we want to see the manner in which Chinese government classifies its workers. The Chinese registration system distinguishes its people by the area in which they live, that is, rural and urban areas, and officially restricts the migration of rural dwellers to urban areas (there are many loopholes in this restriction, but the regulation itself is still effective and is enforced strictly). In the urban areas, the

employees are classified according to the ownership type of the enterprise to which they belong. Employees of SOE comprise the largest category of workers. The second-largest category comprises those employed in UCOE, such as those established by municipal or rural governments. The rest of the employees belong to various types of enterprises, such as shareholding corporations; subsidiaries of multinational enterprises; firms founded by utilizing funds from Hong Kong, Macau, and Taiwan; and so on. In this study, we classify these also as POE, as mentioned in the previous section. Another type of enterprise is that owned by self-employed persons, which is also growing steadily due to the reform. The growth of small personal businesses resembles the growth of informal sector in most of developing countries.

Refer again to Table 2 for the growth of each ownership type in terms of the number of employed persons. Over half of the workers live in rural areas, and most of them are believed to be peasant farmers. The township and village enterprises (TVE), which are widely credited with being the engine of China's early economic growth, employ a large number of persons in rural areas; however, this number has remained almost unchanged in recent years. As mentioned in the previous section, the number of persons employed in SOE and UCOE showed constant growth until the early 1990s, but began to decrease thereafter. On the other hand, the number of persons employed in POE and self-employed individuals are showing constant growth, and such enterprises have become the new center of growth in terms of the number of workers. A similar situation is also observed in rural areas.

The workforce can also be classified by employment status. Most of the workers, especially in urban areas, are classified as "staff and workers," which is almost equivalent to the term "paid workers." The rest of the workforce is believed to

comprise farmers in rural areas and self-employed people in urban areas.

Due to the degree of organization of the statistics and, perhaps, the priority set by the Chinese government due to the historical influence that we mention later, the data on the numbers of employees and their earnings are well prepared in the case of the staff and workers in urban areas. Therefore, this study adopts these workers as the samples for investigating China's labor structure. Unfortunately, we have to abandon the analysis of the TVE in rural areas and self-employed firms in urban areas, which exhibit the unique characteristics of the Chinese economy. However, we focus on the staff and workers in urban areas and investigate their transition in terms of the region, sector, and ownership types of the firms in which they are employed.

Brief history of the present Chinese labor system⁴

Precisely the same as other aspects of the Chinese economy and society, the labor demand structure in China has dual characteristics: underdeveloped and developing, socialistic and capitalistic. At the outset of its economic reform in 1978, China suffered from the underemployment in rural areas and low productivity in urban enterprises due to inefficiency. SOE were recognized as the key to socialist construction and their workers and managements were protected by lifetime employment and soft budget constraints. On the other hand, these privileges placed a heavy burden on the productivity of SOE and gradually suppressed their operations. Compared with the reform in rural villages, such as establishment of TVE and the dissolution of people's commune, reform in urban areas was relatively slow, especially in the field of labor. Several reforms were enforced to raise liquidity of the labor force, such as the

⁴ This subsection is written in accordance with Cooke (2005) and Knight and Song (2005).

introduction of bonuses and temporary workers. However, these reforms were moderate and their results were limited.

In the 1990s, in its intensification of economic reform, the Chinese government allowed the acceptance of foreign investments (including those from Hong Kong and Taiwan) and gave its approval of limited-liability companies. The rise of private units increased the competition within the Chinese market and exerted immense pressure on the incumbent SOE. At the same time, reforms were introduced in the operations and personnel system of SOE. For example, in 1992 they were allowed more discretion in recruitment and labor management, while the budget constraint was tightened in order to reduce their deficit compensation and improve their managerial efficiency. These impacts of external and internal factors altered the behavior of SOE management (however, the impact of external factors appeared to be relatively stronger than that of the internal factors). Due to this large-scale dismissal, the number of the workers employed in SOE reduced drastically in the late 1990s as shown in Table 1. The number of workers in POE and that of self-employed persons are also growing steadily, but their growth is not sufficient to offset the mass reduction of workers in SOE. The official unemployment rate declared by government is approximately 5% in urban areas; it is stated that the real unemployment rate is approximately 10% in urban areas and 10%–40% in rural areas. The Chinese government has managed to improve the operations of enterprises and establish a strong foundation for economic growth, but it still has to cope with the difficulty arising from its contradictory situation with regard to the labor structure, which has the potentiality to threaten the existing political and social system.

3. Description of analytical method

Now we want to define labor demand function for the empirical analysis. The function itself is a typical one shown in textbooks of labor economics. Here we deduce it by the method taken by Basu, Estrin, and Svejnar (2005), which was theoretically based upon that adopted by Lucas and Rapping (1970)⁵.

At first, let us assume the production function for each industry in time t as below, in a manner of constant elasticity of substitution function;

$$Y_t = X_t \left[a(L_t)^{-\rho} + b(K_t)^{-\rho} \right]^{-\frac{1}{\rho}}, 0 < a, b < 1, \rho > -1$$

where Y denotes production; L , the labor input; K , the capital input; and X , other factors such as technological improvement. The exponent ρ denotes the substitution rate.

For profit maximization we differentiate this function by L_t and obtain the following:

$$w_t = a \left(\frac{Y_t}{L_t} \right)^{1+\rho} \cdot X_t^{\frac{1}{1+\rho}}$$

where w_t denotes the wage rate.

Then, by taking the logarithmic deviation and arranging the result, we obtain the following:

$$\ln L_t = \frac{1}{1+\rho} (\ln a - \ln w_t) + \ln Y_t + \frac{1}{(1+\rho)^2} \ln X_t$$

Further, following Nickel (1986), we include the time lag effect and obtain the basic regression equation to be used in this study.

$$(1) \quad \begin{aligned} \log L_t = & \alpha_0 + \alpha_1 \log(W/P)_t + \alpha_2 \log(W/P)_{t-1} + \alpha_3 \log Y_t + \alpha_4 \log Y_{t-1} \\ & + \alpha_5 \log X_t + \alpha_6 \log X_{t-1} + \alpha_7 \log L_{t-1} + \varepsilon_t \end{aligned}$$

The second and third variables on the right-hand side of equation (1) represent the real

⁵ For the detailed form of the labor demand function and the empirical results in other countries, refer to Hamermesh (1986, 1993).

wage rate for the present time and the previous term, and the eighth variable represents the labor demand in the previous term. The coefficient α_1 represents the short-term effect of the real wage rate on the labor demand, and $\frac{\alpha_1 + \alpha_2}{1 - \alpha_7}$ represents the long-term effect (this is the same for other variables and coefficients).

By applying equation (1), we can perform the regression in a simple form without using capital stock data. While neglecting capital is not an appropriate way to analyze the characteristics of the labor demand that each employer represents, we can still gauge the approximate tendency of labor demand. Moreover, this method has been applied by Basu et al. (2005) and others to analyze the labor demand in the transition economies in East Europe. With this simple equation, they revealed the characteristics of the labor demand in those countries and the differences in their labor demand based on their respective degree of reform. Their methodology as well as the results provides a useful insight to this study on China, which is also undergoing economic transition (the comparison of China and East Europe is dealt with in a subsequent section).

4. Data on Chinese labor and its trend

All the data utilized in this study have been taken from the *China Statistic Yearbook* and the *China Labor Statistics Yearbook* (hereafter *Yearbooks*) issued by the National Statistics Bureau each year. As explained in Section 1, the statistics issued by Chinese government are somewhat incorrectness but we still employ these figures under the assumption that they reflect the truth to some degree (refer also to Footnote 1). The statistics are sector-based, not firm-based, so they lack certain data such as those pertaining to the number of establishments and the profits and losses; however,

they still provide useful and comprehensive data to understand the outline of China's labor structure.

Data on the number of and the total wage payment to all types of staffs and workers were directly taken from the *Yearbooks*, which was also the source of data on the employees of SOE and UCOE. The data on POE were obtained by the subtracting the data of the other two employment types from the entire data. The wage rate was then calculated by dividing the total wage payment by the number of workers in each sector, region, and ownership type and then adjusted by the price index with 1996 as the base year.

In the subtraction process we found a number of invalid or missing figures for POE, especially in the western area. Therefore, the sample size for POE is smaller than that for SOE.

In equation(1) and most of the earlier literatures, the variables $\ln Y_t$ denotes the value of production or the total sales, but as the *Yearbooks* do not provide such data, we employ the value added (GDP) as the representative indicators which is easily obtained for each sector and region from the *Yearbooks*. However, there arises another problem: the data available is not organized by ownership type; only the gross data can be obtained. To overcome this problem, we prepared an estimation by multiplying the amount of value added for all ownership types with the rate of nationalization/privatization explained in the next paragraph.

To obtain the variable $\ln X_t$, we employed the inverse degree of privatization, STA_t , in order to analyze the impact of economic reform on labor demand. This variable was calculated as the share of workers belonging to SOE in each sector and each region. Subtracting this value from 1 in turn provided the rate of privatization. Data on the

number of enterprises classified by ownership type is not revealed, so using the share of workers as the index is the second-best alternative.

Using this variable, the estimated value added figure for SOE and POE, mentioned above, is calculated as follows. Y_{stat_t} , or the value added of SOE, is estimated as $Y_{stat_t} = Y_t \times STA_t$. Y_{priv_t} , or the value added of POE, is calculated as $Y_{priv_t} = Y_t \times (1 - STA_t)$ ABC.

The definitions of the terms “sector” and “region” as used in this paper are provided in Table 3. The investigated sectors are categorized into the five broader groups: industry⁶, construction, transportation, commerce, and service. The sectors that belong to the primary industry, such as farming, are excluded because most of the workers employed in these sectors are believed to be the peasant workers in rural areas and are therefore unsuitable for the purpose of this study.

Data have been collected for all regions (provinces and autonomous regions) except Tibet, for which we could not obtain data on the unemployment rate and on most of the POE. The regions are classified into four groups: coast, central, west, and northwest. The first three groups are based on the regional classification conducted by the concerned authority: the coastal area, which is the center of the country’s rapid growth; the less prosperous central area; and the western area, which is very backward. However, the last group northwest which includes Liaoning, Jilin, and Heilongjiang, is defined by the author himself in order to clarify the tendency of this former industrial core that now suffers from old-fashioned production facilities.

The instrumental variables (IV) used in this regression are as follows: dummy

⁶ The Chinese statistics system defines “industry” as a combination of manufacturing, mining, and energy supply. Usually, this word is used to imply “commercial industry,” but in this study, we follow the definition and terminology of the Chinese statistics system.

variables for regions and sectors; unemployment rate, labor demand and value added within a region; shares of labor input and value added in a region; and value added for all of China (for an enterprise's own sector, the entire private sector, or the entire economy). The unemployment rate is calculated by adding the official number of unemployed workers in urban areas to the "laid-off" workers and then dividing this number by the employed population in that area. By including the laid-off workers, we attempt to reveal the effect of hidden unemployment and labor hoarding, which are prominent in SOE and other socialist concerns. Region- or sector-specific effects are reflected by including the labor demand and the value added within a region as well as the specific dummies. The shares of workers or value added reflects the centripetal or centrifugal force for each region-sector that promotes or restrains regional development. The data for the entire nation are used to include nationwide effects, which are considered in Section 6.

The summary statistics of the dataset used in this study are listed in Table 4. This dataset covers various sectors and regions, so the standard deviation tends to be large as compared with the average for most of the variables. What is noticeable is the difference in the average values for the present time and the previous term. The number of staff and workers is shrinking for SOE as well as all enterprises, while it is growing in the case of POE, similar to the observation from Table 2. There is a wide gap in the wage rates for SOE and POE, but both values are increasing in the sample period. The amount of value added estimated for each ownership type by the method mentioned above is also increasing regardless of the ownership type.

To observe the tendency of STA_t by sector and by region, refer to Table 5. The upper part of this table presents the (inverse) degree of privatization of each sector

during 1996–2001. This value is lower for the industry, construction and commerce sectors, which are easy for outsiders to enter, as compared with the service sector (education, finance, and so on) strongly controlled and dominated by government where this value is very high. The lower part of the table is the results for each region. Even in 1996, the first year of the analysis, the value of STA_t was already comparatively low in coastal regions such as Zhejiang and very high in the western and central areas such as Xinjiang and Shanxi. The decline in the value progresses regardless of sector and region, but the relative difference among the sectors and regions is constant throughout the period. The three columns on the right present the growth rate of workers in each ownership type during the sample period. This simple regression between labor growth rate and change in STA_t indicates that these two variables are positively correlated in the case of SOE; however, no clear relationship was found in the case of POE.

5. The results of the analysis

The results for the general cases and SOE

Table 6 presents the results of the basic regression analysis for all sectors and regions, classified by ownership type. The first, third, and fifth columns present the results of regressions by the ordinary least squares (OLS) method, and the second, fourth, and sixth columns present the results of those by IV. According to equation (1), all regressions in this table take $\ln L_t$ the logarithm of the number of workers at the present time as the dependent variable (the same has been done for the subsequent regressions and tables).

The first and second columns present the results for all enterprises. The

coefficients for $\ln W_t$ (logarithm of the wage rate at the present time) are negative and insignificant. The coefficients for $\ln Y_t$ (the logarithm of the value added) are positive and sufficiently significant. The negative correlation with the wage rate and the positive correlation with the value added imply that in general, the labor structure in China does not violate the common knowledge of labor economics: labor demand decreases with the wage rate and increases with the value added. However, the small absolute value and low significance of these coefficients (especially in the case of the wage rate) suggest that the structure is not so similar to those in the general cases in developed countries. The coefficients for $\ln L_{t-1}$ (the number of workers in the previous term) are strongly positive, which is also commonly seen in labor economics. The coefficients for STA_t (the inverse degree of privatization) are negative and significant. This means that the labor demand for each region-sector tends to grow as the degree of privatization increases.

The third and fourth columns present the results for SOE. The tendency of labor demand in the case of SOE is similar to the general analysis for all enterprises, which has been mentioned above, although the absolute value and significance increase for the wage rate and decreased for the (estimated) value added. The only exception is the coefficients for STA_t , which turned out to be the opposite of those for all enterprises. This indicates that for SOE, the promotion of privatization has a negative effect in terms of their number of workers. As the extent of privatization increases, the level of pressure on state enterprises also increases.

The most notable aspect in these regressions is the value of the coefficients of (the logarithm of) wage rate and value added. The signs themselves are similar to those in the general cases in labor economics, but the absolute values are still lower than those

in the cases of developed or more capitalized countries. A similar trend was presented in the studies of Basu et al. (1997, 2005). According to them, the labor demand in East Europe was irresponsive to the market condition at the beginning of the transition in 1989. In Poland and Hungary, which had already initiated economic reform before the political transition, the responsiveness was already high at that time, but in the Czech Republic and Slovakia, which began the reform after the transition, the labor demand was very irresponsive at that time (however, it became sufficiently responsive within a few years). Moreover, these countries have experienced a large scale dismissal of workers in ex-state firms soon after the beginning of transition, just same as SOE of China in recent years. China has not experienced the drastic transition of the East European countries, but similar to these countries, its state enterprises have already been strongly affected by economic reform like them and have a similar tendency in terms of labor demand.

Results for POE

The fifth and sixth columns present the results for POE. Here, we can see that the tendency is rather different from those in the other cases. First, the coefficients for $\ln W_t$ are significantly positive, which is contrary to the common knowledge of labor economics explained in the previous subsection. The coefficients for value added are positive, but not very significant. The coefficients for STA_t are significantly positive, in contrast to those in the case of SOE and similar to the general cases.

With the exception of the wage coefficient, the results are not difficult to interpret. Despite its low value and significance, the positive sign of the $\ln Y_t$ coefficients indicates that the labor demand in the case of POE is positively correlated with value added,

similar to the general cases in labor economics. The result for STA_t indicates the opposite situation to that for SOE: the progress of privatization, expressed by the number of workers in POE, stimulates the growth of private enterprises in terms of the number of employees.

However, the interpretation of the coefficients of $\ln W_t$ is very difficult. As long as the decreasing return to the labor input prevails (this is the most persuasive situation), labor demand and wage rate cannot be correlated positively. We conduct a more detailed consideration to this phenomenon in the next section.

Results according to sector and region

Table 7 presents the results of the analyses for each sector, separated by ownership type. Most of the sector-wide coefficients do not vary greatly from those presented in Table 6, which lists the results of the analysis for all sectors. The only exception is that for value added in the industry sector of SOE (the most top-left case in the Table 7). However, there are no clear reasons for this exception.

Table 8 presents the results of the analysis each region, also separated by ownership type. Similar to the case discussed in the previous paragraph, the results do not vary from those of the general regression presented in Table 6. In the case of SOE, the central area exhibits an exceptional result for wage rate, but its very low significance suggests that it can be attributed only to the strong irresponsiveness. In the case of POE, the northeast area is an exception: the coefficients for wage rate and value added are significantly negative, contrary to the other areas. In the case of wage rate, this implies that only those living in the northeast area show the “common tendency of labor economics;” whereas those living in the other areas do not have.

Therefore, the enterprises in this area do not receive the effect of “POE-led economic expansion” inferred in the next section. However, in the case of value added, the available material is insufficient to make a persuasive surmise.

6. Interpretation of the results

In the previous section, we had gained contrary results for SOE and POE in China with regard to the correlation between their labor demand and two of the dependent variables, degree of privatization and wage rate. In this section, we wish to consider the reason why such contrary results were gained.

It is easy to consider the background of the relationship between labor demand and degree of privatization. The result that the labor demand of POE is larger in the sectors and regions where the degree of privatization is high matches the contemporary economic condition of China. There is a huge inflow of foreign investment into these sectors and regions, making them the core of the economic growth. Thus, there ought to be an expansion of labor demand in these sectors and regions. On the other hand, SOE in such sectors or regions are exposed to severe competitive pressure, which make them keen to restructure their operations. The facts presented in Section 4 and Table 5 also support these considerations.

The relationship between labor demand and wage rate, particularly in the case of POE, appears difficult to interpret because of the positive correlation between them. As is commonly acknowledged in labor economics, the increase in wage rate leads to the decrease in labor demand; therefore, the results on POE in China are contradictory with this.

However, it is possible to interpret this apparently strange phenomenon by

applying a simple hypothesis, which is explained here. As mentioned previously, POE (foreign subsidiaries and private corporations) is the core of the recent economic growth in China. Their active investment and production lead to both the expansion of the entire economy and the increase of their own labor demand. This tightens the labor market and the wage rate increase in every unit.

Some readers might argue that the expansion of the entire economy also leads to an increase in the labor demand of SOE. However, this possibility is excluded due to the inefficient structure within SOE; soft budget constraint and excess employment make it difficult for them to operate effectively and enjoy the benefit of economic expansion. Rather, the abovementioned wage raise and increased competition against POE place a burden on their management and drives them toward rationalization and the reduction in the number of employees.

Figure 1 presents these phenomena on a simple chart. For simplicity, we assume that there exist only two units—SOE and POE—and that they share a single labor market containing O_sO_p amount of labor input. The labor demand for SOE is measured moving toward the right from the origin O_s and that for POE is measured moving toward the left from O_p . The two vertical axes indicate the wage rates. The initial labor demand curve for SOE is L_{Ds} and that for POE is L_{Dp} ; the former is measured moving toward the right, and the latter toward the left. The initial equilibrium point is E; SOE employ their workers up to the point O_sL^* , and POE up to O_pL^* . Further, the initial wage rate is W^* .

Then, suppose that the labor demand of POE increases with economic expansion while that of SOE does not. The labor demand curve of POE shifts outward to L_{Ds}' , and the equilibrium point moves to E'. Then, $L^*L'^*$ number of workers moves from SOE to

POE, and the wage rate for both units increases to W^* . This is the explanation for the increase in the labor demand of POE and the reduction in that for SOE together with the increase in the wage rate for both units.

Undoubtedly, this explanation is so simple that it does not reflect the actual labor market situation in China. As indicated in the summary statistics in Table 4, the wage rates of both units are not equal and differ considerably. The hypothesis assumes the smooth transfer of employees between units; however, in reality, moving from SOE and finding a new job is not an easy task. Further, there exists a high level of unemployment, both visible and invisible, in the labor market (however, the wage gap and unemployment can be explained by a temporary non-equilibrium that is generated by structural inadequacy). Moreover, this framework does not include labor supply from rural areas, which is one of the most crucial sources of labor in China⁷.

Nevertheless, this framework is useful for understanding an aspect of the structural change of labor demand as long as we limit our focus to the urban labor market, as is the case with our empirical analysis. Using a simple framework, we can rationalize the situation of labor demand in China in recent years: mass reduction of workers in SOE, POE-led expansion, increase in the wage rate across the entire economy, and frictions concerning the restructuring of SOE.

7. Conclusion and discussion

The regression analyses discussed in the previous section have revealed some aspects of China's labor demand structure in the midst of rapid growth and economic reform. The results for SOE and POE showed very contrastive characteristics in terms

⁷ For the detailed analysis including labor inflow from rural areas and structural inefficiency in SOE, please refer to Meng (2000), Ch. 9 and 11.

of the degree of privatization and wage rate. As the deeper the privatization progresses, POE becomes larger in terms of workers. The reverse is true in the case of SOE. We also found a peculiar characteristic of POE with regard to the positive correlation between labor demand and wage rate. This apparently strange phenomenon can be explained simply, though, by the increase of the labor demand within POE generated by POE-led economic expansion.

As mentioned in Section 5, in terms of irresponsiveness, the signs and values of the coefficients for SOE resembles those in case of the labor demand structure of the East European countries at the beginning of the transition in their economies. The circumstances of the Chinese economy are rather different from those of the East European countries, but the characteristics of SOE are similar in both areas as both face strong pressure due to capitalization.

With regard to the labor structure of POE, we expect to find aspects that are similar to those of other Asian countries such as Korea and Taiwan that also experienced rapid economic growth and industrialization. However, few studies have carried out an intensive analysis on these countries, so this idea still remains an intuition.

For a deeper understanding, we must investigate the situation in the period before 1996 when SOE were still growing in terms of the number of workers. Approximate data can be obtained even for the 1970s, but detailed data can be obtained only from 1990 onward, when the statistics bureau publishing the labor statistics.

Nonetheless, this study presented some aspects of the China's labor structure under the rapid growth and reform. Moreover, through the investigation of labor demand structure we could depict the nature of the ongoing economic transition of

China in recent years; POE-led economic expansion and restructure in SOE.

References

- Basu, S., Estrin, S. and Svejnar, J. (1997). 'Employment and wage behavior of industrial enterprises in transition economies: The cases of Poland and Czechoslovakia', *Economics of Transition*, 5 (2), pp. 271 287.
- Basu, S., Estrin, S. and Svejnar, J. (2005). 'Employment determination in enterprises under communism and in transition: Evidence from Central Europe', *Industrial and Labor Relations Review*, 58(3), pp. 353 369
- Cooke, F.L. (2005). *HRM, Work, and Employment in China*, New York: Routledge.
- Hamermesh, D.S. (1986). 'The demand for labor in the long run', in Ashenfelter, O. and Card, D. (ed.), *Handbook of Labor Economics*, Vol. 1, Amsterdam: North Holland, pp. 429 471.
- Hamermesh, D.S. (1993). *Labor Demand*, Princeton: Princeton Univ. Press.
- Knight, J. and Song, L. (2005). *Toward a Labor Market in China*, Oxford Univ. Press.
- Lucas, R.E. and Rapping, L. (1970). 'Real wages, employment and inflation', in Phelps, E. (ed.), *Microeconomic foundation of employment and inflation theory*, New York: W. W. Norton & Co, pp. 257 305.
- Meng, X. (2000). *Labor Market Reform in China*, Cambridge: Cambridge Univ. Press.
- Nickell, S. J. (1986). 'Dynamic models of labour demand', in Ashenfelter, O. and Card, D. (ed.), *Handbook of Labor Economics*, Vol. 1, Amsterdam: North Holland, pp. 473 522.
- Rawski, T. G. (2001). 'What is happening to China's GDP statistics?' *China Economic Review*, 12, pp. 347 354.

- Rawski, T. G. (2002). 'Recent Development in China's Labor Economy', Report prepared for international policy group, International Labor Organization, Geneva, <http://www.pitt.edu/~tgrawski>.
- Svejnar, J. (1999). 'Labor markets in the transitional central and east European economics', in Ashenfelter, O. and Card, D. (ed.), *Handbook of Labor Economics*, Vol. 3B, Amsterdam: North Holland, pp. 2810 - 2857.

Figure 1

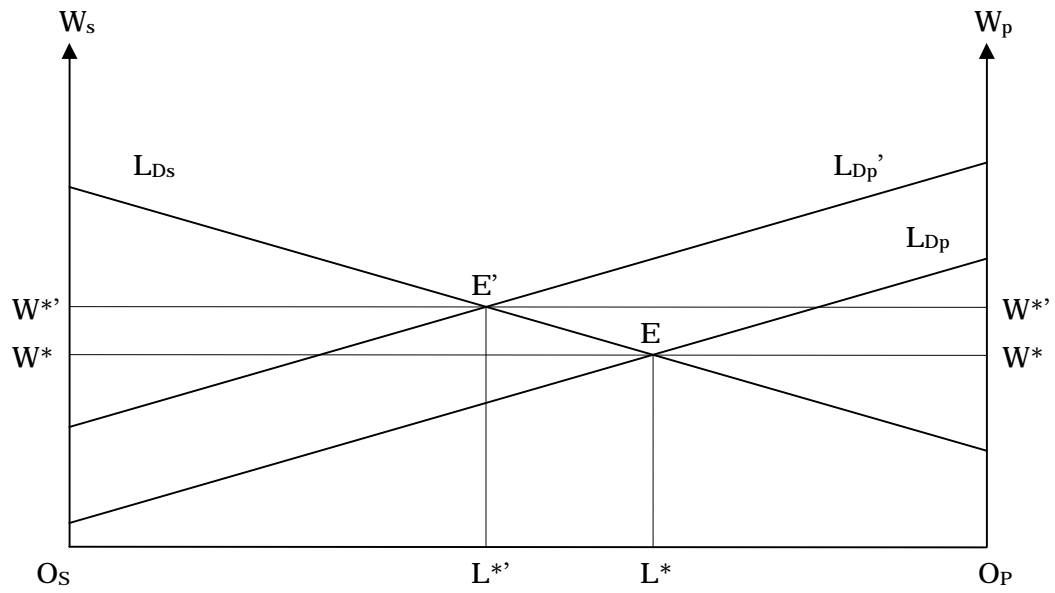


Table 1 Recent Trend of Chinese Economy for GDP and Labor

GDP	(Unit: 100million yuan)					
	1996	1997	1998	1999	2000	2001
Total	68584	80521	75461	87192	96299	105034
PRIMARY	13940	14463	14335	14542	14705	15289
SECONDARY	31921	37535	35365	40535	45355	49047
industry	27909	32448	30945	34888	39113	42142
construction	4013	5088	4420	5647	6242	6903
TERTIARY	22724	28523	25760	32116	36238	40700
transportation	4210	5537	4932	6358	7294	8293
sales	6622	7996	7367	8744	9659	10658
services	11893	16865	13462	39791	27389	21716
GDP per capita	(Unit: yuan)					
	1996	1997	1998	1999	2000	2001
Total	9947	11533	10683	12213	13359	14383
PRIMARY	4236	4370	4314	4342	4409	4637
SECONDARY	22251	26411	27957	32498	36354	39288
industry	25516	30148	33193	38503	43829	47180
construction	11775	14751	13284	16550	17573	19433
TERTIARY	14580	17434	15630	19435	21133	23288
transportation	20912	26854	24659	31444	35947	40714
sales	14679	16675	15859	18404	20613	22500
services	13123	17747	13686	40803	26255	20290
Employed persons	(Unit: 10000 persons)					
	1996	1997	1998	1999	2000	2001
Total	68950	69820	70637	71394	72085	73025
PRIMARY	32910	33095	33232	33493	33355	32974
SECONDARY	14346	14212	12650	12473	12476	12484
industry	10938	10763	9323	9061	8924	8932
construction	3408	3449	3327	3412	3552	3552
TERTIARY	15586	16360	16481	16525	17147	17477
transportation	2013	2062	2000	2022	2029	2037
sales	4511	4795	4645	4751	4686	4737
services	9062	9503	9836	9752	10432	10703

Table 2 General Trend of Employees by area and ownership, 1980-2001

Unit: 10,000 persons

Year	Total	Urban	Rural				TVE	
			SOE	UCOE	POE	self		
1980	42361	10525	8019	2425	0	81	31836	3000
1985	49873	12808	8990	3324	44	450	37065	6979
1990	94749	17041	10346	3549	2532	614	47708	9265
1995	68065	19040	11261	3147	3072	1560	49025	12862
1996	68950	19922	11244	3016	3953	1709	49028	13508
1997	69820	20781	11044	2883	4935	1919	49039	13050
1998	70637	21616	9058	1963	8336	2259	49021	12537
1999	71394	22412	8572	1712	9714	2414	48982	12704
2000	72085	23151	8102	1499	11414	2136	48934	12820
2001	73025	23940	7640	1291	12878	2131	49085	13086

Table 3 Definition of Regions and Sectors

REGIONS

Coast	Beijing, Tianjin, Hebei, Liaoning(*1), Shanghai, Jiangsu, Zhejiang, Fujian, Shangdong, Guangdong, Guanxi, Hainan
Central	Shanxi, Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei,
West(*2)	Sichuang(*3), Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang
Northeast	Liaoning(*1), Jilin, Heilongjiang

(*1) Liaoning is categorized both to Coast and Northeast

(*2) Tibet excluded

(*3) Chongqing included

SECTORS

Industry manufacturing, mining, energy supply

Construction

Transportation

Commerce retail, wholesale

Service finance, real estate, civil service, etc.

Table 4 Summary Statistics

		All		SOE		POE	
		Average	Sta. Dev.	Average	Sta. Dev.	Average	Sta. Dev.
L_t	*1	89.3	207.6	56.0	62.9	22.4	194.4
L_{t-1}	*1	94.7	209.7	60.7	66.3	20.6	194.2
W_t	*2	8602.0	3788.4	8884.5	3415.0	13125.4	11296.6
W_{t-1}	*2	7667.8	2873.2	7977.7	2844.5	11615.5	12560.7
Y_t	*3	556.6	1145.7				
Y_{t-1}	*3	508.3	1114.6				
$Ystat_t$	*3			359.0	909.4		
$Ystat_{t-1}$	*3			338.5	902.8		
$Ypriv_t$	*3					210.0	405.1
$Ypriv_{t-1}$	*3					180.5	350.1
STA_t		0.687	0.191				
STA_{t-1}		0.703	0.186				

*1 Unit: 10000 persons

*2 Unit: yuan

*3: Unit: 100 million yuan

Table 5 General trend of STA, the inverse degree of privatization

	Value of STA						Growth of workers, 1996-2001		
	1996	1997	1998	1999	2000	2001	total	SOE	POE
TOTAL	0.738	0.734	0.714	0.708	0.700	0.687	-0.273	-0.323	1.274
industry	0.663	0.650	0.573	0.545	0.511	0.476	-0.405	-0.573	1.081
construction	0.575	0.575	0.525	0.513	0.500	0.458	-0.292	-0.435	4.500
transportation	0.824	0.826	0.833	0.833	0.833	0.824	-0.242	-0.243	4.333
sales	0.584	0.585	0.553	0.548	0.544	0.532	-0.535	-0.576	1.082
services	0.912	0.906	0.907	0.905	0.900	0.895	0.046	0.026	1.761
all China	0.738	0.734	0.714	0.708	0.700	0.687	-0.273	-0.323	1.274
Beijing	0.758	0.749	0.713	0.687	0.643	0.589	-0.131	-0.324	1.652
Tianjin	0.684	0.681	0.640	0.566	0.544	0.561	-0.352	-0.468	1.083
Hebei	0.773	0.785	0.776	0.778	0.778	0.776	-0.254	-0.252	1.065
Shanxi	0.801	0.799	0.735	0.748	0.747	0.736	-0.219	-0.283	7.772
Inner Mongolia	0.796	0.636	0.764	0.751	0.748	0.742	-0.339	-0.383	3.120
Liaoning	0.670	0.672	0.695	0.693	0.697	0.684	-0.453	-0.442	0.787
Jilin	0.752	0.750	0.766	0.754	0.749	0.735	-0.390	-0.403	1.292
Heilongjiang	0.759	0.763	0.759	0.758	0.734	0.722	-0.373	-0.403	1.497
Shanghai	0.684	0.673	0.638	0.618	0.590	0.564	-0.365	-0.476	0.555
Jiangsu	0.636	0.646	0.626	0.621	0.611	0.603	-0.309	-0.344	1.163
Zhejiang	0.586	0.591	0.567	0.550	0.527	0.503	-0.287	-0.388	1.830
Anhui	0.730	0.703	0.693	0.682	0.685	0.680	-0.260	-0.311	2.942
Fujian	0.621	0.603	0.561	0.546	0.525	0.504	-0.103	-0.273	0.679
Jiangxi	0.816	0.816	0.790	0.794	0.795	0.796	-0.322	-0.339	3.056
Shandong	0.710	0.710	0.711	0.700	0.686	0.674	-0.172	-0.214	1.243
Henan	0.760	0.717	0.648	0.646	0.634	0.636	-0.164	-0.300	1.968
Hubei	0.767	0.762	0.762	0.762	0.767	0.757	-0.320	-0.330	0.806
Hunan	0.790	0.789	0.803	0.814	0.818	0.795	-0.333	-0.329	2.926
Guangdong	0.610	0.607	0.573	0.565	0.559	0.541	-0.199	-0.290	0.513
Guanxi	0.826	0.826	0.788	0.796	0.795	0.797	-0.204	-0.231	1.200
Hainan	0.853	0.843	0.849	0.843	0.841	0.830	-0.273	-0.293	0.254
Sichuang	0.744	0.739	0.719	0.719	0.716	0.705	-0.303	-0.339	1.311
Guizhou	0.849	0.842	0.807	0.793	0.792	0.787	-0.183	-0.243	4.467
Yunnan	0.847	0.845	0.831	0.813	0.807	0.792	-0.171	-0.224	3.831
Shaanxi	0.844	0.846	0.804	0.809	0.808	0.796	-0.186	-0.233	4.117
Gansu	0.834	0.844	0.811	0.808	0.822	0.820	-0.231	-0.243	3.839
Qinghai	0.872	0.871	0.868	0.874	0.870	0.832	-0.337	-0.367	8.000
Ningxia	0.847	0.835	0.795	0.797	0.796	0.793	-0.169	-0.222	2.583
Xinjian	0.895	0.896	0.878	0.880	0.858	0.800	-0.212	-0.297	7.043

Note: Chongqin is included to Sichuang. Tibet is excluded from the sample.

Table 6 Results of Regression for General Case

Dependent Variable: $\ln L_t$

	ALL		SOE		POE	
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)
Constant	-0.3038 (-1.53)	-0.3641 (-1.10)	-0.7508 *** (-5.88)	-0.8137 *** (-3.84)	-1.5343 *** (-5.84)	-1.1472 ** (-2.36)
$\ln W_t$	-0.0766 (-0.91)	-0.0793 (-0.93)	-0.3351 *** (-6.45)	-0.3162 *** (-6.34)	0.1022 *** (3.92)	0.0765 ** (2.03)
$\ln W_{t-1}$	0.0611 (0.68)	0.0785 (0.71)	0.3851 *** (7.01)	0.3723 *** (6.40)	-0.0178 (-1.06)	-0.0266 (-1.38)
$\ln Y_t$	0.1355 *** (4.70)	0.1346 *** (4.62)				
$\ln Y_{t-1}$	-0.0769 *** (-2.65)	-0.7758 *** (-2.66)				
$\ln Y_{sta_t}$			0.0249 (1.44)	0.2977 * (1.85)		
$\ln Y_{sta_{t-1}}$			-0.0129 (-0.75)	-0.0246 (-1.55)		
$\ln Y_{priv_t}$					0.0690 (1.29)	0.0443 (0.75)
$\ln Y_{priv_{t-1}}$					0.1325 ** (2.45)	0.1468 *** (2.61)
STA_t	-2.0262 *** (-22.52)	-2.0288 *** (-22.37)	0.5818 *** (7.53)	0.5327 *** (7.97)	-6.1701 *** (-27.90)	-6.2577 *** (-26.31)
STA_{t-1}	2.3453 *** (26.10)	2.3464 *** (26.07)	-0.2950 *** (-3.71)	-0.2195 *** (-3.24)	6.6151 *** (28.79)	6.6620 *** (28.31)
$\ln L_{t-1}$	0.9428 *** (60.59)	0.9447 *** (53.74)	0.9923 *** (99.88)	0.9995 *** (92.21)	0.7615 *** (48.46)	0.7664 *** (46.28)
R^2	0.972	0.972	0.990	0.991	0.951	0.951 ***
samples	725	725	725	725	679	679

Figures in parenthesis stand for t-value

*** Significance at 1%

** Significance at 5%

* Significance at 10%

STA: Degree of Nationalization

$\ln Y_{sta} = \ln(Y * STA)$

$\ln Y_{priv} = \ln(Y * (1 - STA))$

Table 7 Results by Sectors

Dependent variable: $\ln L_t$

<i>State</i>	industry	construction	transportation	commerce	service
Constant	-0.1883 (-0.35)	-0.6531 ** (-2.18)	-0.2978 (-1.46)	-0.8678 ** (-2.50)	0.2330 ** (1.99)
$\ln W_t$	-0.2929 ** (-2.11)	0.0296 (0.46)	-0.1647 ** (-2.61)	-0.6035 *** (-6.45)	-0.0499 (-1.35)
$\ln W_{t-1}$	0.2978 * (1.97)	0.0131 (0.19)	0.1705 ** (2.48)	0.6726 *** (7.17)	0.0219 (0.52)
$\ln Y_{sta_t}$	-0.3273 *** (-3.64)	0.2270 *** (5.55)	0.2803 *** (11.90)	0.5347 *** (7.41)	0.0049 (1.02)
$\ln Y_{sta_{t-1}}$	0.3653 *** (4.12)	-0.1896 *** (-4.67)	-0.2507 *** (-10.38)	-0.5326 *** (-7.10)	-0.0089 ** (-1.99)
STA_t	2.2693 *** (6.14)	1.5118 *** (7.28)	1.1378 *** (14.74)	0.7981 ** (2.31)	-0.0075 (-0.31)
STA_{t-1}	-2.1011 *** (-5.73)	-1.4062 *** (-7.22)	-0.9710 *** (-12.47)	-0.5958 (-1.63)	0.0237 (1.23)
$\ln L_{t-1}$	0.9435 *** (28.08)	0.9778 *** (59.57)	0.9615 *** (72.71)	0.9994 *** (51.79)	1.0075 *** (132.43)
R^2	0.983	0.988	0.996	0.989	0.999
samples	145	145	145	145	145

<i>Private</i>	industry	construction	transportation	commerce	service
Constant	0.2215 (0.40)	-1.6263 * (-1.74)	-1.2273 (-1.43)	-0.3770 (-0.75)	0.5519 (0.68)
$\ln W_t$	-0.0242 (-0.39)	0.0616 (0.74)	0.1313 ** (2.02)	0.0373 (0.86)	0.0200 (0.34)
$\ln W_{t-1}$	-0.0562 * (-1.92)	0.0547 (1.22)	0.0370 (0.81)	-0.0484 ** (-2.20)	0.0194 (0.50)
$\ln Y_{priv_t}$	0.1226 (0.76)	-0.7036 ** (-2.07)	-0.1925 (-1.07)	-0.2423 (-1.30)	0.1362 ** (2.00)
$\ln Y_{priv_{t-1}}$	0.0107 (0.07)	0.9435 *** (2.81)	0.4277 ** (2.44)	0.3912 ** (2.04)	0.0321 (0.45)
STA_t	-5.8861 *** (-16.00)	-8.1110 *** (-7.06)	-7.2397 *** (-8.67)	-5.6262 *** (-6.59)	-6.6237 *** (-17.80)
STA_{t-1}	6.3185 *** (16.45)	8.0907 *** (7.02)	6.2488 *** (7.41)	5.8589 *** (6.26)	5.4127 *** (10.27)
$\ln L_{t-1}$	0.8238 *** (23.60)	0.6626 *** (13.46)	0.5462 *** (12.84)	0.8121 *** (22.89)	0.7199 *** (12.99)
R^2	0.981	0.838	0.895	0.962	0.926
samples	143	138	121	139	138

Figures in parenthesis stand for t-value

*** Significance at 1%

** Significance at 5%

* Significance at 10%

STA: Degree of Nationalization

$\ln Y_{sta} = \ln(Y * STA)$ $\ln Y_{priv} = \ln(Y * (1 - STA))$

Table 8 Result by Regions

Dependent variable: $\ln L_t$

<i>State</i>	coast		central		west		northeast
Constant	-0.7700 *** (-4.03)		-0.8813 *** (-2.72)		-0.1996 (-0.76)		-1.5470 *** (-3.42)
$\ln W_t$	-0.5156 *** (-5.80)		0.0461 (0.51)		-0.1326 (-1.64)		-0.6892 *** (-5.11)
$\ln W_{t-1}$	0.5708 *** (5.96)		0.0201 (0.21)		0.1036 (1.16)		0.8283 *** (6.16)
$\ln Y_{sta_t}$	0.0405 * (1.82)		0.0002 (0.01)		0.2141 *** (6.07)		0.3048 *** (4.00)
$\ln Y_{sta_{t-1}}$	-0.0435 * (-1.96)		0.0048 (0.16)		-0.1882 *** (-5.13)		-0.3021 *** (-3.78)
STA_t	0.1457 (1.51)		1.2951 *** (9.47)		0.7091 *** (6.76)		0.9249 (1.40)
STA_{t-1}	0.1366 (1.39)		-1.0425 *** (-7.07)		-0.3138 *** (-3.21)		-0.6646 (-0.96)
$\ln L_{t-1}$	1.0118 *** (77.28)		1.0021 *** (47.29)		0.9842 *** (47.35)		1.0093 *** (33.03)
R^2	0.992		0.988		0.995		0.991
samples	247		204		200		75

<i>Private</i>	coast		central		west		northeast
Constant	-1.6877 *** (-4.93)		-1.3740 ** (-2.53)		-2.9956 *** (-3.80)		-0.8081 (-0.99)
$\ln W_t$	0.1751 *** (4.60)		0.1013 * (2.13)		0.1585 * (1.94)		-0.1414 * (-1.75)
$\ln W_{t-1}$	-0.0456 * (-1.95)		-0.0327 (-1.05)		0.0140 (0.32)		0.0487 (1.55)
$\ln Y_{priv_t}$	0.0645 (1.27)		0.0601 (0.60)		0.3497 (1.55)		-0.5337 ** (-2.37)
$\ln Y_{priv_{t-1}}$	0.0638 (1.25)		0.1697 (1.65)		-0.0385 (-0.16)		0.9179 *** (4.12)
STA_t	-6.3186 *** (-32.14)		-6.6901 *** (-15.04)		-3.6983 *** (-2.99)		-7.8322 *** (-4.50)
STA_{t-1}	6.5865 *** (31.08)		7.0245 *** (15.99)		4.5978 *** (3.45)		8.8242 *** (4.93)
$\ln L_{t-1}$	0.8374 *** (46.33)		0.7284 *** (24.09)		0.7067 *** (14.17)		0.6441 *** (12.24)
R^2	0.977		0.939		0.904		0.974
samples	247		197		163		73

Figures in parenthesis stand for t-value

*** Significance at 1%

** Significance at 5%

* Significance at 10%

STA: Degree of Nationalization

$\ln Y_{sta} = \ln(Y * STA)$ $\ln Y_{priv} = \ln(Y * (1 - STA))$