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**PROFITABILITY AND CAPITAL PRODUCTIVITY  
IN CHINESE INDUSTRY**

by \_\_\_\_\_

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## ABSTRACT

This paper examines the behavior of profitability and capital productivity in Chinese industry in the post-reform period. Using firm-level data covering state owned and collective enterprises, issues such as convergence of factor returns and the relationship between profitability, capital productivity and profit tax are studied by ownership, affiliation, industry groups and market exposure in terms of exports and direct sale by the enterprise outside the plan. It is found that profitability and capital productivity are higher for firms that enjoy more autonomy and decentralized decision-making. Profit rates have declined in all enterprises irrespective of ownership, affiliation or market exposure. Profit rates also show convergence over time which is consistent with the view that reforms have resulted in growing competition by weakening the state monopoly and barriers to entry. Capital productivity has remained more or less stagnant in the state enterprises and in light industries such as food, textiles and clothing; but it has significantly increased in the township and village enterprises and in heavy industries such as building materials and transport equipment manufacturing. Profit retention rates indicate that taxation had little effect on capital productivity which is rather expected due to the absence of a hard budget constraint. While profitability is positively related to market exposure in terms of exports or direct sales outside the plan, it appears that profitability of exports relative to domestic sales declined in the late eighties.

## CONTENTS

Acknowledgment .....	<i>i</i>
Abstract .....	<i>ii</i>
1. Introduction .....	<i>1</i>
2. Profitability and Capital Productivity.....	<i>3</i>
Profitability and Productivity by Affiliation and Market Exposure.....	<i>5</i>
Profitability and Productivity in Various Industry Groups.....	<i>7</i>
3. Conclusion .....	<i>8</i>
References .....	<i>19</i>

## LIST OF TABLES AND FIGURES

TABLE 1: Profitability and Capital Productivity in Chinese Industry.....	<i>10</i>
TABLE 2: Profitability and Rate of Return of Capital by Ownership.....	<i>11</i>
TABLE 3: Relationship between Capital Productivity and Profit Retention Rate in Chinese Industry.....	<i>12</i>
TABLE 4: Profitability and Rate of Return of Capital by Affiliation.....	<i>13</i>
TABLE 5: Profitability and Rate of Return of Capital by Exports .....	<i>14</i>
TABLE 6: China: Profitability by Industry.....	<i>15</i>
TABLE 7: China: Capital Productivity by Industry .....	<i>16</i>
Figure 1: Profit Rates by Ownership in Chinese Industry, 1970-91.....	<i>17</i>
Figure 2: Capital Productivity by Ownership in Chinese Industry, 1970-91.....	<i>17</i>

## 1. INTRODUCTION

China's impressive growth performance of recent years is often attributed to a high rate of capital accumulation. Its investment rate of over 35 per cent, historically one of the highest in the world, has been realized through a comprehensive and complex system of controls on resources and economic activities. The controls, however, led to enormous production inefficiency in the economy.<sup>1</sup> This is what constituted the internal crisis of communism—even in China—and was an important reason why economic reforms were initiated.

The economic reforms introduced in the late 1980s changed the incentive structures at the micro level by allowing growth of township and village enterprises (TVEs) and urban collectives (COEs) in the non-state sector and also by providing greater autonomy to state-owned enterprises (SOEs). At the same time, the macro environment also became generally more favorable due to relaxation of wide-spread controls on prices and external trade. While collective enterprises have been protected under the Constitution for decades, the State Industrial Enterprises Provisional Rules of 1983 and the State Council Regulations of 1984 provided several areas of autonomy for the SOEs.<sup>2</sup> Under these rules, SOEs were allowed to determine their supplemental production, select and purchase goods, set prices for their products within twenty per cent of state prices, retain seventy per cent of depreciation funds, and take decisions on employee compensation and hiring issues. The State Industrial Enterprise Law of 1988 granted even more flexibility and autonomy to SOEs by allowing them to lease out fixed assets, use foreign exchange, invest in other enterprises and issue bonds. While most of the rights granted to SOEs are subject to regulations by the State Council, they have resulted in considerable autonomy in the management of state enterprises (see Lichtenstein 1993 a more detailed discussion of the legal aspects of Chinese enterprise reform).

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<sup>1</sup> That China was getting "less bang for the buck" is reflected to an extent in the incremental output-capital ratios: China had an average IOCR of .16, .25, .26 and .12 in the 1960s, 70s, 80s and 90s respectively which is worse than that of the East Asian countries (.44, .33, .27 and .24) and not better than India's (.23, .16, .26 and .25). See Gelb, Jefferson, and Singh (1993 Table 2).

<sup>2</sup> Private enterprises (usually with 7 or less employees) which were dismantled in the 1950s re-emerged during the reform period. The 1982 Constitution and the Civil Code recognized enterprises established by individuals as individual household and in 1988, the Private Enterprise Regulations and related tax provisions were enacted to provide a more comprehensive legal framework for these enterprises.

There is more or less a consensus now that China's impressive growth performance in recent years is to a great extent due to the competitive forces generated as a result of the economic reforms. Naughton (1992) argues that the relaxation of barriers to entry brought about by reforms resulted in many new firms entering the market with very high rates of initial returns, and as entry continued, monopoly rents maintained by state pricing policy were competed away and dispersed in rent-seeking. Thus, an evidence of the breakdown of state monopoly and growing competition is the decline as well as convergence of profit rates across sectors in both state and nonstate industry. Jefferson, Rawski, and Zheng (1992) and Jefferson and Xu (1991) also cite the convergence of factor returns as a sign of growing competition in Chinese industry. Ratha, Singh, and Xiao (1993) show that the growth of the nonstate sector not only resulted in above average rates of growth, but also improved the total factor productivity (TFP) of the state sector by providing greater competition. Groves et. al. (1993) and Ratha and Singh (1994) show that reforms brought about important changes in the wage incentive structure resulting in higher labor productivity.

The purpose of this paper is to examine the behavior of profitability and capital productivity in Chinese industry in the post-reform period. Since a direct result of reforms was the birth and growth of enterprises in the non-state sector (TVEs and COEs), we examine in particular the following questions:

- How did profitability behave over time and across various ownership categories?
- Did it show a tendency to decline and converge over time and across sectors as a result of growing competition?
- Are the township and village enterprises (TVEs) more efficient and profitable than the state owned enterprises (SOEs)?
- What is the relation between profitability and the ability of the firms to sell their output outside the plan?
- Are firms that export more profitable than those that do not?
- Did capital productivity improve due to reforms?
- Does profit-tax adversely affect productivity of capital? In other words, is capital productivity positively related to profit-retention rates, as one would normally expect?

Wherever possible, we use official data available from publications such as the China Statistical Yearbook. However, for analyzing issues such as convergence of factor returns or the relationship between profit tax, exports and capital productivity, relevant data at the desired level of disaggregation are not available from official sources. In such cases, we use new firm-level survey data that covers three ownership categories—SOEs, COEs and TVEs—in sixteen industrial groups for the period 1985-90. It may be noted that most existing studies have covered only SOEs and did not examine COEs or TVEs.

The plan of the paper is as follows: In the next section, we analyze the behavior of profit rates, average profitability of capital and profit retention rates by ownership types, industry groups, affiliation to various levels of government and by market exposure in terms of exports and direct sales by the enterprise outside the plan. We conclude in section 3 with a summary of our findings and a few brief remarks.

## 2. PROFITABILITY AND CAPITAL PRODUCTIVITY

We compute profit rate by expressing pre-tax profits as a percentage of the net value of fixed assets (NVFA) and capital productivity as gross value of industrial output divided by NVFA.<sup>3</sup> The average values of these variables are presented for the 1970-1991 period in Table 1 and Figures 1 and 2 for both SOEs and TVEs.

The figures reveal several interesting points: First, TVEs have very high rates of profits—their profitability is between 40 to 80 percent higher than that of SOEs. Secondly, profit rates have declined over time in both SOEs and TVEs, and it seems that the rate of decline is higher for the TVEs, implying a tendency of convergence in profit rates between the two ownership categories. Third, the productivity of capital is much higher in TVEs than in SOEs. Finally, while the level of capital productivity has remained more or less stagnant in state enterprises throughout the 1970-91 period, that of the TVEs has been rising since 1983. These results confirm that the new firms that entered the market (TVEs) after relaxation of barriers to entry were more efficient in general, and started with high rates of return which declined subsequently.

Note that these results are based on official data at the macro-level. Are they true also at the micro firm level? We examine this using the enterprise level survey data from the World Bank Sample.<sup>4</sup> This data set allows us to investigate several questions at highly disaggregated levels. Besides, certain issues such as the convergence of profit rates across enterprises necessitate enterprise level data. The subsequent analyses are based on this data set.

We present in Table 2 average profit rate, capital productivity and profit retention rate for SOEs, COEs and TVEs separately for the 1986-90 period estimated from the World Bank Sample Data. Again we see that TVEs are the most profitable enterprises followed by the COEs and the SOEs in that order. The profit rate has declined over time in all sectors and that the rate of decline seems to be the fastest for the SOEs followed by the TVEs and the COEs. The inter-enterprise variability in profit rates, as seen from the standard deviation, has declined consistently for the SOEs and remained somewhat stable for the COEs, whereas no clear pattern is evident for the TVEs.

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<sup>3</sup> Ideally, the value of fixed assets used in the calculation of capital productivity should be adjusted by revaluating assets of older vintage. We have used NVFA in original prices as published in official statistics. Our measure of capital productivity is therefore an approximation of the true measure.

<sup>4</sup> Sample survey conducted by Rural Development Research Center and the China Economic System Reform Research Institute under the World Bank research project *Industrial Reforms and Productivity in Chinese Enterprises* (RPO 657-38).

Table 2 also shows average profit retention rate (defined as retained profit as a percentage of profits plus tax) which has declined for both SOEs and COEs and to an extent also for the TVEs. This implies an increase in the tax rate paid by these enterprises to the government—in fact, the taxes as a percentage of GVIO increased from 12 percent to 17 percent for SOEs, from 17 percent to 24 percent for COEs and from 4 percent to 5 percent for the TVEs during the 1985-90 period.<sup>5</sup> This is rather unexpected because with reforms, enterprises in all ownership categories were allowed substantial concessions in their profit remittance to the government. As expected, however, profit retention rate is higher in the non-state sector, being the highest in the TVEs.

Capital productivity is the highest in the TVEs and the lowest in the SOEs, although, unlike what we observed from the macro data before, it seems to have stagnated in all sectors including the TVEs.<sup>6</sup> It may be noted here that Chinese industry has registered significant TFP growth during the 1980s (for example, Jefferson, Rawski and Zheng 1992 estimate that during 1980-88 TFP grew at an annual rate of 2.4 per cent in SOEs and 4.6 per cent in the non-state sector). If capital productivity remained stagnant, what brought about the significant TFP increase that occurred in Chinese industry during this period? The answer seems to be the substantial increase in labor productivity which registered an annual compound rate of growth of 6.3 per cent during the period 1980-91 (see Ratha and Singh 1994).

Is capital productivity positively related to profit retention rate? In other words, did taxation adversely affect productivity of capital in Chinese industry? This is an interesting question in the context where enterprises, particularly SOEs, operate without a binding hard budget constraint. To answer this, we present in Table 3 results obtained from regression of capital productivity on tax rate (=100 - profit retention rate) by ownership and industry categories. The coefficient of tax rate is found to be highly significant and negative for the COEs. For SOEs and TVEs, this coefficient is not significant for the sample as a whole, but when we examine the estimated equations for various industry categories, it is found to be significant and negative in most cases (we discuss this in more details later).

Declining and converging profit rates together with the apparent improvement in capital productivity support the view that competition eroded profitability and that reforms have resulted in better incentive structures for enterprises with sound results in terms of improvement in productivity. There is no evidence, however, of convergence in the profit retention rate (due perhaps to the ad hoc nature of tax administration) or in the average productivity of capital. Several authors, however, have noted convergence in marginal product of capital, which is not inconsistent with our finding.

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<sup>5</sup> Taxes here are defined as total profits minus retained profits. There is some doubt as to the definition of the tax which is netted out from total profit to obtain retained profit. It is likely that this tax includes levies on the income, profits and fixed assets of the firm, but not the turnover taxes levied on their products (see Rawski 1993 p. 23).

<sup>6</sup> The number of TVEs in our sample is small and covers only a few industry sectors. The results to that extent are not representative of the industrial sector as a whole. It may be noted here that Chow (1993) found the rate of return to capital, computed as the marginal product of capital using a Cobb-Douglas production function, declined from 0.781 in 1952 to .227 in 1980 and .215 in 1985.

### **Profitability and Productivity by Affiliation and Market Exposure**

All industrial enterprises in China are legally owned by the government so that the distinction between state-owned and non-state enterprises is essentially a distinction based on the level of the government to which the enterprises are affiliated. In practice such distinctions are more important than they might appear at first sight because of the implicit operational autonomy enjoyed by enterprises affiliated with lower levels of the government, for example the district or the county governments. As Groves et. al. (1993) argue using the agency theory, the closer the enterprise to the supervisory and decision-making body, the lower is the information cost and the better the performance. Moreover, since enterprises provide a major source of revenue for the local governments, it is in the interest of the latter to let the enterprises have operational autonomy and earn profits. Such coincidence of interests between enterprises and their supervisory bodies is likely to lead to a positive relationship between performance and the level of affiliation.

Our sample data covers SOEs affiliated to five different levels of affiliation, i.e., to central, provincial, municipal, district and village governments. We present in Table 4 estimates of profitability, capital productivity, sales outside the plan as a share of total sales, and share of exports in GVIO for four levels of affiliation (the fifth one is not presented due to insufficient observations). Again we find a picture of declining and converging profit rates together with an improvement in capital productivity. As expected enterprises affiliated to the central government have the lowest profit rates and capital productivity. Interestingly, however, it is the enterprises with the provincial government that have the highest profitability and productivity. The explanation seems to be in terms of their exposure to external markets reflected in the high export share, which at over 10 per cent is much higher than that of the central government (2%) and the municipal government (8%).

How do profitability and capital productivity depend on market exposure in terms of sales to foreign markets (exports) or direct sales by the enterprise outside of the plan? In other words, are enterprises that engage in exports more profitable than non-exporting enterprises? The rationale behind this question is threefold: first, exports are more profitable because of high exchange premia; secondly, to be able to export and compete in the international market, an enterprise has to be more efficient;<sup>7</sup> and finally, exposure to world markets is likely to help enterprise efficiency. As can be seen from Table 5, in the SOEs, profit rates of the enterprises that engage in exports are about one and half times as high as that of non-exporting enterprises. Here again it appears that the relative gap in profit rates between the two categories of enterprises has narrowed. In other words, *although exports are more profitable in general, the relative profitability of exports appears to be declining*. Similarly, capital productivity is higher for the exporting enterprises, although it has remained stagnant for both types of enterprises. Unfortunately our sample does not have sufficient observations for the TVEs, the most dynamic sector in terms of export performance.

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<sup>7</sup> Even if the government subsidizes exports, it would tend to subsidize the more efficient enterprises first simply because the fiscal burden would be less.

An important aspect of reform was the introduction of the dual pricing system whereby state enterprises were allowed to sell directly to the market after fulfilling their plan quotas. The share of collective enterprise output sold at market prices rose from about 35% in 1980 to about 85% in 1991; the same for SOEs rose from less than 15% in 1980 to about 70% in 1991 (Gelb, Jefferson, and Singh 1993 figure 2). Since market prices exceeded plan prices by a premium of more than 40 percent,<sup>8</sup> one would expect that the higher the share of SOE output sold outside the plan, the higher the profit rate of the enterprise. In fact, the same arguments mentioned above regarding the positive relation between profitability and exports can be used to expect a positive relation between enterprise profitability and market exposure. To check this, we regressed profit rate and capital productivity on the share of sales undertaken directly by the enterprise outside of the plan (self-sale) and the share of exports in total sales (x-share) to obtain the following equations:<sup>9</sup>

$$(1) \quad \text{profit rate} = 21.4 + 4.3 \text{ self-sale} + 0.13 \text{ x-share}$$

$$(\text{t-value}) \quad (6.99) \quad (1.98) \quad (4.9)$$

Adj. R-sq = .07, No. of Obs. = 3209

$$(2) \quad \text{capital productivity} = 3.91 + 0.53 \text{ self-sale} + 0.01 \text{ x-share}$$

$$(\text{t-value}) \quad (17.8) \quad (3.39) \quad (5.95)$$

Adj. R-sq = .05, No. of Obs. = 3209

Since TVEs are allowed to sell all their output directly outside the plan, this equation is only for SOEs and COEs. Although the adjusted  $R^2$  is low, the coefficients of self-sale and x-share are significant and positive. Thus, while the ability of the firm to sell outside the plan and its exports volume cannot explain fully the variation in profitability and capital productivity, they seem to affect the performance variables in a significant and positive way.

An interesting question in this context is: how are self-sale and x-share related? In other words, are exports a major part of the output sold directly to the market? We found that the correlation between self-sale and x-share is -0.16! The fact that this correlation coefficient is negative indicates that much of exports comes not from direct sale by enterprises, but perhaps from government trading agencies who obtain the output from the enterprises via procurement through the plan. The use of foreign trade corporations (FTCs) is mandatory for all but a handful of firms, and although enterprises now have a greater choice between which FTCs to use, it is not rare to encounter cases where they export at prices substantially below the international level (see World Bank 1993 pp 114-118).

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<sup>8</sup> As estimated by Zou (1992), quoted in Gelb, Jefferson, and Singh (1993).

<sup>9</sup> Both equations include dummies for year, ownership and affiliation, but these coefficients are suppressed to improve presentation.

### **Profitability and Productivity in Various Industry Groups**

The discussion above is based on highly aggregate analysis. To unmask the differential movements at the sectoral level, we use our sample data to estimate profitability and productivity by several industry groups. For convenience these industries can be broadly grouped under three headings: i) the loss-making energy sectors represented by coal mining and dressing; ii) "heavy" industries comprising chemicals, building materials, metal products, machine building, transport equipment manufacturing, electric machinery and electronics, instruments manufacturing; and iii) "light" industries comprising food, textiles, clothing, paper-making and manufactured goods, printing, rubber and plastic products, and medical products.

It is seen from Table 6 that except for the coal mining sector, the broad picture of declining profit rates emerges again from this sectoral analysis. In the coal mining industry which is known for chronic loss-making, it is seen that losses are confined to the state sector; the collective enterprises have made positive and substantial profits during the 1986-90 period. Moreover, the profit rate in the COEs does not show any sign of decline. While profitability in TVEs is clearly very high, it is higher in SOEs than in COEs for several heavy industries (for example, metal products, transport equipment manufacturing) and also for several light industry groups (such as food, clothing, paper-making, rubber and plastic products).

It is quite clear from Table 7, however, that capital productivity is higher in the collective enterprises than in the state enterprises (except the case of food industry where it is the opposite). Again a picture of stagnating productivity emerges, particularly in the state sector; in fact, in case of food and clothing industries, capital productivity has declined for the SOEs. The improvement in capital productivity seems to be confined to the collective enterprises—the noticeable increases are mostly in the heavy sectors such as building materials and transport equipment manufacturing. It is interesting that *in terms of capital productivity the heavy industries show improvement while it is the light industries that show signs of stagnation.*

Finally, let us examine the relationship between capital productivity and taxation presented in Table 2 for various industry groups. The coefficient of tax rate is not significantly different from zero for SOEs in most industry groups, which serves to underscore the point that in the absence of a hard budget constraint, taxation has no effect on capital productivity. It is significant and negative in coal mining, but significant and positive in case of transport equipment manufacturing. This is also expected in the light of the widespread government controls. This coefficient is significant and negative for the COEs in most industry groups. Interestingly, the magnitude of this coefficient is generally higher for the heavy industries (ranging from -.031 for building materials to -.089 for chemicals) than for the light industries (ranging from -.016 for food to -.032 for paper-making and manufactured goods). Thus, *taxation had little effect on capital productivity in the SOEs, whereas in the COEs, it affected the heavy industries more adversely than the light industries.*

### 3. CONCLUSION

Our analyses of profitability and capital productivity in Chinese industry, based on macro data from official sources and also confirmed by micro level enterprise survey data collected for the late 1980s, lead to several interesting results:

(i.) Profit rates in TVEs are between 40 to 80 per cent higher than the SOEs. Similarly capital productivity is higher in the TVEs than in the SOEs. In fact, both profitability and capital productivity are generally higher for the TVEs followed by the COEs and the SOEs, and also higher in firms that export their products than in firms that do not export. Within the state sector, enterprises affiliated to lower level of the government such as the municipal and the district governments are more profitable and productive than those affiliated to the central government. The enterprises under the provincial government seem to engage more in exports, and therefore, are more profitable than enterprises under lower levels of government. It is also seen that both profitability and productivity are positively related to the ability of the firm to sell outside the plan. Thus, it appears that profitability and productivity are higher in firms that enjoy more autonomy and decentralized decision-making.

(ii.) Profit rates have declined in all enterprises, irrespective of ownership, affiliation, or market exposure in the form of exports or direct sales outside the plan.

(iii.) We also find that the standard deviation of profit rates has decreased over time, particularly in the state enterprises, showing convergence. These findings are consistent with the view that economic reforms have resulted in growing competition by weakening the state monopoly and barriers to entry.

All the three results above support the hypothesis of Naughton (1992) that the entry of new firms in the initial reform period was characterized by very high profit rates, but as entry progressed, profitability declined rapidly.

(iv.) Capital productivity has remained more or less stagnant in the SOEs. Although it has improved significantly in the TVEs, the extent of improvement is far short of the total factor productivity growth noted for this ownership category. In fact, significant TFP growth has been noted even for the state sector during the 1980s. Thus, it appears that most of the TFP growth that occurred during the post-reform period is due to improvement in labor productivity, which in turn is due to substantive reforms in the wage and labor plans.

(v.) When we examine the data at the level of individual industries, it is seen that capital productivity has significantly increased in heavy industries such as building materials and transport equipment manufacturing, but it has remained stagnant in the light industries such as food, textiles and clothing. This is somewhat unexpected because light industries are often said to have benefitted from the economic reforms and are dynamic in terms of export performance. In fact, there is no evidence to suggest that the light industries are relatively more profitable than the heavy industries.

(vi.) When we examine profit retention rates, it is seen that taxation had little effect on capital productivity in the SOEs which is rather expected due to the absence of a hard budget constraint. In the COEs, taxation affected the heavy industries more adversely than the light industries.

(vii.) While profitability is positively related to market exposure in terms of exports or direct sales by the enterprise outside the plan, it appears that profitability of exports relative to domestic sales declined in the late eighties.

**TABLE 1**  
**Profitability and Capital Productivity in Chinese Industry**

	<i>Profit Rate (%)</i> <i>(Profits/NVFA)</i>			<i>Capital Productivity</i> <i>(GVIO/NVFA)</i>		
	<i>SOEs</i>	<i>TVEs*</i>	<i>TVEs/SOEs</i>	<i>SOEs</i>	<i>TVEs*</i>	<i>TVEs/SOEs</i>
1970	46	..	..	1.80	..	..
1971	45	..	..	1.79	..	..
1972	42	..	..	1.67	..	..
1973	39	..	..	1.61	..	..
1974	33	..	..	1.47	..	..
1975	34	..	..	1.52	..	..
1976	29	..	..	1.39	..	..
1977	32	..	..	1.43	..	..
1978	36	61	1.7	1.48	..	..
1979	36	56	1.5	1.54	2.42	1.6
1980	36	54	1.5	1.55	2.47	1.6
1981	34	48	1.4	1.49	2.45	1.6
1982	33	47	1.4	1.48	2.49	1.7
1983	33	47	1.4	1.50	2.73	1.8
1984	34	47	1.4	1.55	3.84	2.5
1985	34	47	1.4	1.58	4.63	2.9
1986	30	40	1.4	1.53	4.76	3.1
1987	29	37	1.3	1.57	4.96	3.2
1988	29	40	1.4	1.71	5.26	3.1
1989	25	34	1.4	1.75	5.00	2.8
1990	19	30	1.6	1.62	5.07	3.1
1991	17	32	1.8	1.57	5.93	3.8

\* For TVEs, data are for all sectors including industry, but since industry accounts for above 70%

Source: China Statistical Yearbook 1992 p 359 and 385.

**TABLE 2:**  
**Profitability and Rate of Return of Capital by Ownership\***

	1986	1987	1988	1989	1990
<b>SOEs</b>					
<i>Profits/NVFA (%)</i>	32.86	29.82	27.90	21.46	10.28
<i>Standard Deviation</i>	40.96	37.30	33.75	35.19	33.18
<i>Profit Retention Rate</i> <sup>(a)</sup>	32.13	31.84	31.60	31.14	24.56
<i>Capital Productivity</i> <sup>(b)</sup>	3.27	3.17	3.41	3.54	3.24
<b>COEs</b>					
<i>Profits/NVFA (%)</i>	32.75	29.12	36.07	30.89	19.69
<i>Standard Deviation</i>	56.13	49.12	61.56	56.74	51.15
<i>Profit Retention Rate</i> <sup>(a)</sup>	25.30	25.96	23.95	21.71	22.10
<i>Capital Productivity</i> <sup>(b)</sup>	4.71	4.66	4.81	5.04	5.08
<b>TVEs</b>					
<i>Profits/NVFA (%)</i>	53.61	54.51	58.34	44.67	--
<i>Standard Deviation</i>	62.48	77.06	79.55	49.70	--
<i>Profit Retention Rate</i> <sup>(a)</sup>	37.54	36.31	31.59	40.52	--
<i>Capital Productivity</i> <sup>(b)</sup>	5.61	5.33	5.11	5.38	--
<b>ALL</b>					
<i>Profits/NVFA (%)</i>	33.93	31.07	31.73	25.24	13.07
<i>Standard Deviation</i>	46.98	44.27	46.72	43.49	39.59
<i>Profit Retention Rate</i> <sup>(a)</sup>	30.59	30.55	29.51	28.92	23.85
<i>Capital Productivity</i> <sup>(b)</sup>	3.78	3.70	3.89	4.06	3.79

\* Based on approximately 740 SOEs, 300 COEs, and 50 TVEs from the World Bank sample.

(a) retained profits\*100/total profits

(b) gvio/nvfa

**TABLE 3:**  
**Relationship between Capital Productivity and Profit Retention Rate in Chinese Industry**  
 Estimated equation: Capital productivity = a + b\*tax rate

	<i>Ownership</i>	<i>Constant</i>	<i>Tax rate</i>	<i>No. of Obs.</i>
<i>All</i>	<i>SOEs</i>	3.52 (28.95)	-.003 (-1.58)	3690
	<i>COEs</i>	7.40 (18.34)	-.033 (-6.61)	1459
	<i>TVEs</i>	5.19 (6.01)	.002 (0.12)	278
<i>Coal mining and dressing</i>	<i>SOEs</i>	1.45 (11.66)	-.007 (-4.97)	185
	<i>COEs</i>	2.92 (2.97)	0.019 (1.54)	78
<i>Chemicals</i>	<i>SOEs</i>	3.75 (10.91)	0.002 (0.38)	369
	<i>COEs</i>	15.2 (5.05)	-.089 (-2.28)	88
<i>Building materials and other non-metal</i>	<i>SOEs</i>	2.34 (11.98)	-.008 (-3.10)	298
	<i>COEs</i>	3.47 (1.60)	-.002 (-0.09)	94
	<i>TVEs</i>	4.83 (5.53)	-.031 (-2.23)	50
<i>Metal products</i>	<i>SOEs</i>	4.39 (9.27)	-.009 (-1.27)	217
	<i>COEs</i>	9.17 (14.78)	-.064 (-7.83)	137
	<i>TVEs</i>	8.34 (1.50)	0.032 (0.43)	21
<i>Machine building</i>	<i>SOEs</i>	2.27 (7.84)	0.008 (1.99)	322
	<i>COEs</i>	-.77 (-.28)	.057 (1.78)	24
	<i>TVEs</i>	0.47 (0.25)	0.06 (2.33)	28
<i>Transport equipment manufacturing</i>	<i>SOEs</i>	2.06 (7.31)	0.012 (2.98)	208
	<i>COEs</i>	9.15 (7.98)	-.062 (-4.75)	43
<i>Electric machinery and electronics</i>	<i>SOEs</i>	4.47 (8.76)	0.001 (0.18)	398
	<i>COEs</i>	7.79 (6.50)	-.026 (-1.82)	196
	<i>TVEs</i>	18.04 (3.85)	-.158 (-2.20)	32
<i>Instruments manufacturing</i>	<i>SOEs</i>	1.61 (8.76)	0.005 (1.81)	179
	<i>COEs</i>	6.17 (6.62)	-.040 (-3.25)	79
<i>Food</i>	<i>SOEs</i>	4.84 (5.93)	-.006 (-0.57)	173
	<i>COEs</i>	3.13 (6.23)	-.016 (-2.27)	16
	<i>TVEs</i>	7.29 (4.99)	-.054 (-2.49)	18
<i>Textiles</i>	<i>SOEs</i>	3.91 (9.83)	-.003 (-0.53)	336
	<i>TVEs</i>	3.23 (2.47)	.024 (1.32)	52
<i>Clothing</i>	<i>SOEs</i>	5.47 (7.31)	-.008 (-0.73)	116
	<i>COEs</i>	8.74 (9.47)	-.029 (-2.46)	207
<i>Paper-making and manufactured goods</i>	<i>SOEs</i>	2.28 (8.42)	0.003 (1.03)	190
	<i>COEs</i>	5.63 (9.95)	-.032 (-4.81)	110
<i>Plastic products</i>	<i>SOEs</i>	3.05 (6.58)	-.001 (-0.14)	139
	<i>COEs</i>	4.47 (6.64)	-.015 (-1.90)	150
<i>Medical and pharmaceutical</i>	<i>SOEs</i>	4.81 (6.69)	-.001 (-.06)	219
	<i>COEs</i>	19.53 (4.06)	-.156 (-2.57)	54

Figures in parentheses show t-values of the coefficient.  
 Results are from World Bank Sample data.

**TABLE 4:**  
**Profitability and Rate of Return of Capital by Affiliation**

	1986	1987	1988	1989	1990
<b>CENTRAL GOVERNMENT</b>					
<i>Profits/NVFA (%)</i>	26.33	21.02	22.95	21.29	17.11
<i>Standard Deviation</i>	30.98	23.13	25.37	32.77	33.29
<i>Profit Retention Rate</i>	38.17	31.79	37.95	33.72	37.59
<i>Capital Productivity</i>	2.30	2.25	2.48	2.96	2.71
<i>Export Share (%)</i>	2.14	2.67	3.73	3.78	5.04
<b>PROVINCIAL GOVERNMENT</b>					
<i>Profits/NVFA (%)</i>	55.64	48.41	43.11	31.58	19.00
<i>Standard Deviation</i>	63.95	59.16	46.49	41.15	33.11
<i>Profit Retention Rate</i>	31.54	30.52	30.26	30.70	23.98
<i>Capital Productivity</i>	4.41	3.92	4.11	3.94	3.63
<i>Export Share (%)</i>	12.87	13.57	11.34	11.77	10.44
<b>MUNICIPAL GOVERNMENT</b>					
<i>Profits/NVFA (%)</i>	28.58	26.09	26.61	20.08	7.52
<i>Standard Deviation</i>	39.26	34.30	42.48	40.27	35.03
<i>Profit Retention Rate</i>	29.19	30.38	28.97	28.11	22.27
<i>Capital Productivity</i>	3.69	3.60	3.81	4.05	3.79
<i>Export Share (%)</i>	7.80	8.66	8.27	8.08	8.53
<b>DISTRICT GOVERNMENT</b>					
<i>Profits/NVFA (%)</i>	23.52	23.38	30.51	28.32	20.42
<i>Standard Deviation</i>	27.97	51.52	35.74	43.39	44.68
<i>Profit Retention Rate</i>	33.18	31.29	29.07	25.10	25.88
<i>Capital Productivity</i>	3.36	3.65	4.03	4.28	4.38
<i>Export Share (%)</i>	1.28	0.96	3.09	2.95	4.18

Source: World Bank sample.

**TABLE 5:**  
**Profitability and Rate of Return of Capital by Exports**

	1985	1986	1987	1988	1989	1990
<b><i>DX ENTERPRISES WITH NO EXPORTS*</i></b>						
<i>Profits/NVFA (%)</i>						
SOEs	--	24.98	21.79	19.75	15.77	8.18
COEs	--	32.92	29.46	37.56	33.30	21.48
TVEs	47.06	55.83	57.13	58.24	43.99	--
<i>Profit Retention Rate <sup>(a)</sup></i>						
SOEs	--	31.84	30.52	31.40	32.65	24.47
COEs	--	26.19	26.03	23.75	22.54	22.49
TVEs	38.65	38.49	36.81	31.68	41.27	--
<i>Capital Productivity <sup>(b)</sup></i>						
SOEs	--	2.83	2.67	2.84	2.93	2.68
COEs	--	4.65	4.54	4.76	4.98	5.03
TVEs	5.18	5.80	5.40	5.11	5.27	--
<b><i>DX ENTERPRISES WITH EXPORTS*</i></b>						
<i>Profits/NVFA (%)</i>						
SOEs	--	44.45	39.87	36.75	27.43	12.41
COEs	--	32.02	27.76	30.71	23.20	13.98
<i>Profit Retention Rate <sup>(a)</sup></i>						
SOEs	--	32.56	33.48	31.82	29.57	24.66
COEs	--	21.41	25.69	24.64	19.10	20.81
<i>Capital Productivity <sup>(b)</sup></i>						
SOEs	--	3.92	3.80	4.04	4.19	3.81
COEs	--	4.97	5.17	5.01	5.23	5.25

\* Based on approximately 400 SOEs, 240 COEs and 50 TVEs with no exports, and about 350 SOEs and 60 COEs with exports from the World Bank Sample. TVEs with exports not shown due to insufficient observations.

(a) retained profits\*100/total profits

(b) gvio/nvfa

**TABLE 6:**  
**China: Profitability by Industry**  
(profits/NVFA in percent)

	1985	1986	1987	1988	1989	1990
<i>Coal Mining and Dressing</i>						
SOEs	--	-3.69	-3.10	-4.10	-3.03	-8.00
COEs	--	59.86	32.54	52.17	115.09	69.95
<i>Chemicals</i>						
SOEs	--	25.01	26.33	33.10	28.45	22.88
COEs	--	54.37	43.60	55.41	52.47	49.56
<i>Building Materials and Other Non-Metal</i>						
SOEs	--	30.35	24.68	16.07	7.15	-2.30
COEs	--	16.87	27.01	26.70	23.87	16.87
TVEs	20.73	47.02	31.54	53.35	32.56	--
<i>Metal Products</i>						
SOEs	--	43.73	46.39	33.96	32.61	15.36
COEs	--	24.23	26.06	27.92	25.93	15.57
<i>Machine Building</i>						
SOEs	--	39.12	33.77	33.73	23.71	6.79
<i>Transport Equipment Manufacturing</i>						
SOEs	--	24.35	22.48	24.60	11.78	0.68
COEs	--	20.84	16.35	19.35	15.66	0.54
<i>Electric Machinery and Electronics</i>						
SOEs	--	44.02	41.61	40.41	27.63	17.51
COEs	--	39.80	32.89	51.07	29.18	21.69
<i>Instruments Manufacturing</i>						
SOEs	--	24.48	23.79	23.27	20.53	11.19
COEs	--	40.98	41.48	77.36	59.68	32.05
<i>Food</i>						
SOEs	--	37.13	17.59	11.48	14.38	6.34
COEs	--	2.29	7.79	13.39	9.97	16.45
<i>Textiles</i>						
SOEs	--	37.54	39.45	33.75	25.40	9.52
COEs	19.24	44.28	38.41	100.00	38.96	--
<i>Clothing</i>						
SOEs		40.31	29.82	36.52	35.09	22.34
COEs		29.50	22.87	24.28	20.96	8.78
<i>Paper-Making and Manufactured Goods</i>						
SOEs		14.88	20.76	19.48	13.05	1.50
COEs		16.78	13.82	16.53	11.72	7.21
<i>Printing</i>						
SOEs		22.71	19.52	18.82	12.67	11.68
COEs		26.61	23.52	29.39	20.91	18.72
<i>Rubber Products</i>						
SOEs		44.67	26.37	13.40	20.38	11.54
COEs		25.99	24.06	14.04	10.79	10.27
<i>Plastic Products</i>						
SOEs		27.90	20.70	25.10	20.78	8.91
COEs		19.45	20.14	27.49	18.65	7.99
<i>Medical and Pharmaceutical Products</i>						
SOEs		58.16	57.58	56.70	40.80	22.86
COEs		110.44	103.67	100.77	52.54	43.29

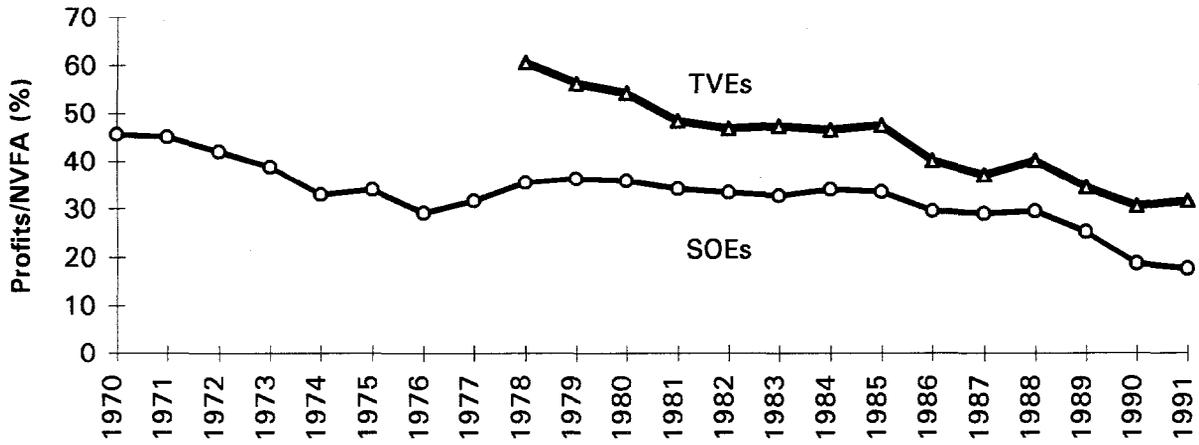
Source: The World Bank Sample. Categories with less than 10 observations are not shown.

**TABLE 7**  
**China: Capital Productivity by Industry**  
**(GVIO/NVFA)**

	1985	1986	1987	1988	1989	1990
<i>Coal Mining and Dressing</i>						
SOEs	--	0.77	0.77	0.86	1.02	0.86
COEs	--	3.71	3.57	4.34	5.39	4.08
<i>Chemicals</i>						
SOEs	--	3.58	3.66	3.91	4.13	4.05
COEs	--	9.27	9.91	7.48	6.99	9.50
<i>Building Materials and Other Non-Metal</i>						
SOEs	--	1.68	1.69	1.70	1.96	1.80
COEs	--	2.41	2.53	2.99	3.38	5.04
TVEs	2.92	2.74	2.37	3.62	3.47	--
<i>Metal Products</i>						
SOEs	--	3.46	3.57	3.79	4.49	3.67
COEs	--	4.35	4.16	4.52	5.03	5.02
<i>Machine Building</i>						
SOEs	--	2.68	2.65	2.95	3.10	2.64
COEs	--	3.36	4.43	3.45	4.28	3.43
<i>Transport Equipment Manufacturing</i>						
SOEs	--	2.55	2.70	3.20	3.03	2.38
COEs	--	3.83	4.08	4.00	5.19	4.92
<i>Electric Machinery and Electronics</i>						
SOEs	--	4.19	4.44	4.77	4.88	4.32
COEs	--	5.45	5.19	6.06	6.19	5.29
<i>Instruments Manufacturing</i>						
SOEs	--	1.69	1.77	2.15	2.08	1.89
COEs	--	3.26	3.24	2.91	3.41	3.43
<i>Food</i>						
SOEs	--	5.41	4.22	4.54	3.88	3.89
COEs	--	1.80	2.14	1.86	2.15	2.37
<i>Textiles</i>						
SOEs	--	3.99	3.56	3.70	3.73	3.56
COEs	4.73	4.28	4.60	6.25	4.72	--
<i>Clothing</i>						
SOEs	--	5.80	4.64	4.54	5.08	4.70
COEs	--	6.67	6.15	6.53	7.21	7.29
<i>Paper-Making and Manufactured Goods</i>						
SOEs	--	2.11	2.47	2.55	2.80	2.71
COEs	--	2.52	2.74	3.06	3.28	3.36
<i>Printing</i>						
SOEs	--	1.88	2.23	2.01	2.12	2.30
COEs	--	3.90	3.69	4.38	4.38	4.52
<i>Rubber Products</i>						
SOEs	--	4.88	4.37	4.94	5.49	4.98
COEs	--	4.11	4.38	3.75	4.26	4.67
<i>Plastic Products</i>						
SOEs	--	3.08	2.46	3.32	3.24	2.83
COEs	--	2.58	2.96	3.92	3.54	2.88
<i>Medical and Pharmaceutical Products</i>						
SOEs	--	4.77	4.63	4.92	4.86	4.66
COEs	--	11.30	9.30	7.99	4.66	5.56

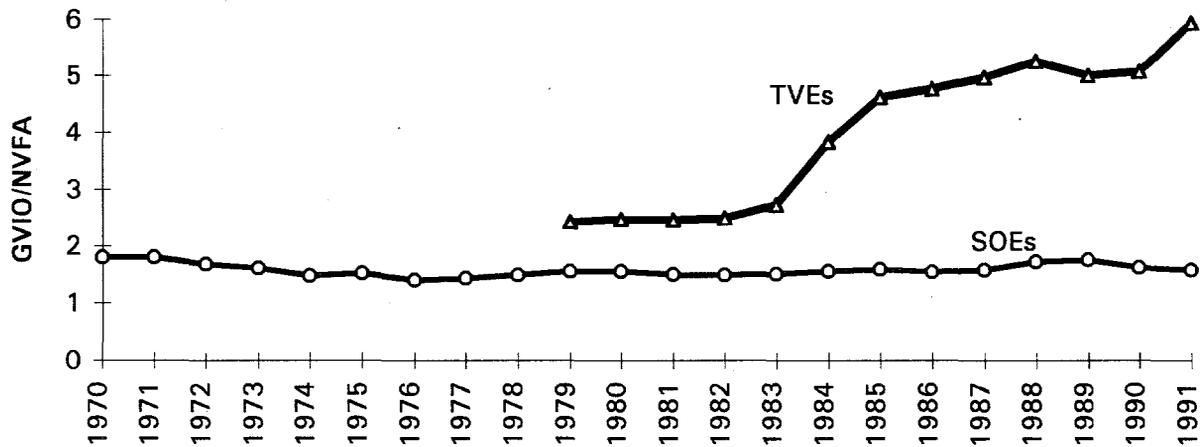
Source: The World Bank Sample. Categories with less than 10 observations are not shown.

**Figure 1**  
**Profit Rates by Ownership in Chinese Industry 1970-91**

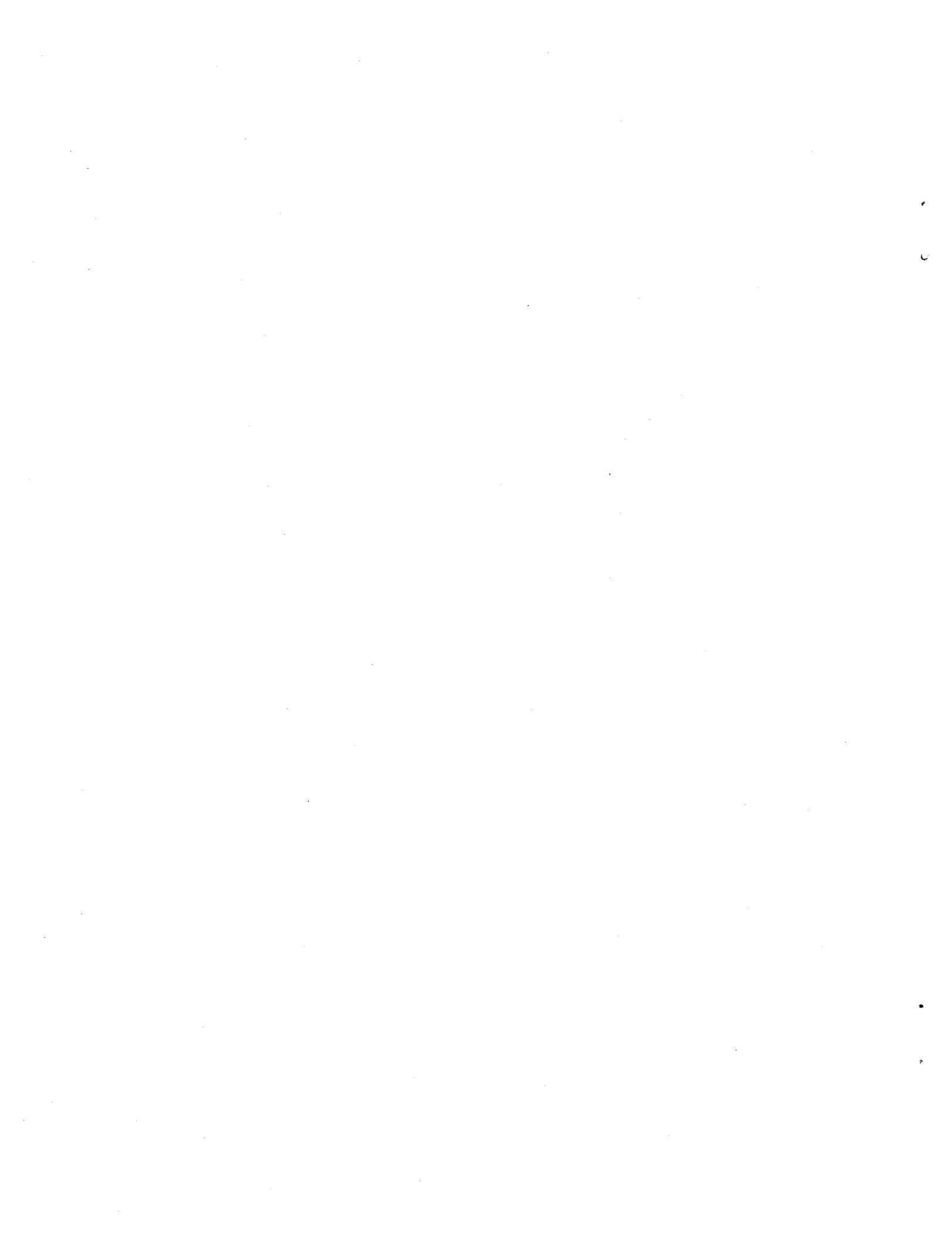


Source: Table 1

**Figure 2**  
**Capital Productivity by Ownership in Chinese Industry 1970-91**



Source: Table 1



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