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NON-STATE ENTERPRISES AS AN ENGINE OF GROWTH: AN ANALYSIS OF PROVINCIAL INDUSTRIAL GROWTH IN POST-REFORM CHINA

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ABSTRACT

It is widely reported that most of the industrial dynamism in China since the start of reforms in 1978 has come via the rapid growth of the non-state sector, particularly in the coastal provinces. The strong growth performance of the coastal region is often attributed to the strategy of export-led development. This paper examines provincial data for China for the period 1978-90 to investigate in detail the relative importance of the Hong Kong and Taiwan factor, the so-called coastal strategy, and the change in industrial "ownership" structure, in determining the differences in provincial industrial performance. The main findings are:

- The main source of growth in China has been the industrial sector which accounted for 76 percent of total growth during 1984-1990. In the industrial sector, in turn, most (about 64%) of the growth has come from the non-state sector.

- The average growth rate of the coastal provinces was about 3.7% per annum higher than that of the inland provinces between 1982-1990. However, when we take out the effect of Hong Kong and Taiwan by excluding Guangdong and Fujian from the Eastern (Coastal) provinces, the remaining provinces yield a much lower rate of growth; in fact lower rate than the inland provinces. Once the effects of the nonstate industry share is accounted for, the growth gap between the East (excluding Guangdong and Fujian) and Inland provinces disappears. *The implication is clearly that it is the size of the nonstate sector that explains the differences in growth rather than the so-called coastal strategy.*

- Our results confirm the extreme importance of externalities provided by Hong Kong and Taiwan as "kindred models" through large amounts of capital flows, access to managerial skills and technology transfers as well as assured market outlets through exports, which are enjoyed by the proximate provinces.

- There is a widely held perception that the non-state collective and private sector has been dominant in the development of light industry while the state-owned sector has dominated the growth in heavy industry. While this is found to be true in general, *industrial orientation was not significant in explaining overall industrial growth rate once the share of the nonstate sector was included as an explanatory variable*

- There is a strong positive relation between the TFP of state sector enterprises and non-state share in industry. There is also a significant negative relation between the growth of non-state sector and profitability of the state sector. *The implication is clearly that the non-state enterprises were not only more efficient; they also improved the efficiency of the state sector by providing greater competition.* This seems to resolve an apparent paradox: that China's state sector experienced significant TFP growth while at the same time its profitability was declining.

To conclude, although locational factors have been important to some degree, it is the growth of non-state sector that appears to be the most important factor explaining the differences in the rates of provincial industrial growth in China. The unhampered development and entry into the non-state quasi-private sector has been crucial to enhancing the productivity, efficiency and competition in Chinese industry.

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1. INTRODUCTION

While Chinese industrial development since the start of reforms in 1978 has been characterized by high rates of growth, this growth has been highly differentiated in terms of types of ownership as well as geographic location. Economic reforms since 1978 adopted a differentiated policy towards regional development. The coastal provinces were given greater autonomy in planning, pricing, and policy making earlier than the inland and western provinces. The Special Economic Zones and the coastal open cities and the various export incentives provided there are the results of such policy biases. The share of planned state investment to the coastal provinces increased from 48.74% during 1981-85 (Sixth-Five Year Plan) to 51.86% during 1986-90 (Seventh Plan) (World Bank 1992). There is a temptation to attribute the strong growth performance of the coastal provinces to the strategy of export-led development. The recent increase in Chinese export from 4.67% of GNP in 1978 to 12.39% in 1989 reinforces this view.

It is widely reported that most of the industrial dynamism has come via the rapid growth of the non-state sector or that industrial development in coastal provinces has been more rapid than in more inland and in western provinces; in particular the provinces closest to Hong Kong and Taiwan (Fujian and Guangdong) seem to have done exceptionally well. Chen, Jefferson and Singh (1992), for example, emphasize that two key lessons from Chinese reforms are the importance of a leading sector (the township and village enterprises), and the importance of proximate, kindred economies as reform models (the Hong Kong-Taiwan factor).

The importance of a leading sector—whether it is the township and village enterprises or the non-state enterprises in general, is rather easily understandable. Economic reforms initiated through various policy measures invariably lead to an increase in the relative size of non-state sector. While the multitude of policy measures are hard to quantify, the share of non-state sector is observable and in a sense, not only captures the ownership pattern, but also is a good proxy for the degree of competition in the economy. An increase in non-state share would lead to an increase in productivity and growth, because (a) non-state enterprises are more efficient due to competitive conditions (better incentive, freedom of operation and harder budget constraint), and as a result, grow faster than the average rate; and (b) they impart competitive pressures on the state sector as well, and thus, may lead to increased efficiency in the rest of the economy ("locomotive effect").

The importance of the Hong Kong-Taiwan factor, in turn, is due to the externalities that the proximate provinces of Guangdong and Fujian enjoy mainly due to their strategic location. These externalities include, among other things, large amounts of investment and working capital flows, access to managerial skills and factory level know how, financial management and accounting practices, marketing skills, and technology transfers as well as assured market outlets through exports. This proximity also provides a model demonstrating efficacy of the market, which serves to challenge the institutions and attitudes of central planning (see also Sung 1991). Indeed in these coastal provinces, production for exports has been carried out mainly in non-state enterprises (according to Yusuf (1992) about half of China's total exports originate in the nonstate sector; this figure is much higher for the exports originating in the coastal provinces). These non-state collectives, private and joint ventures appear to have been the key to both China's industrial growth on the coast as well as China's success in export markets.

How fast have coastal provinces grown compared to more inland and Western provinces and what role has proximity to Hong Kong and Taiwan played in determining industrial growth? What role has the change in industrial "ownership" structure—as measured by the share of the non-state sector in the gross value of industrial output (GVIO)—played in determining the differences in provincial industrial performance? If one accounts for the rising share of the non-state sector, does geographic location matter?

This paper attempts to address these questions using provincial data for China for the period 1978-90. In the next section we discuss the role of industrial sector in China's economy and analyse the changing pattern of industrial growth by ownership and geographic location. Section 3 contains a simple econometric analysis testing the role of ownership and location in the determination of industrial growth. We conclude in Section 4 with a summary of our findings. The Appendix contains issues relating to data, particularly a sensitivity analysis to determine the nature of bias arising out of use of GVIO instead of national income data in our analysis.

2. CHANGING PATTERN OF INDUSTRIAL GROWTH IN CHINA

Three separate statistics are used to measure output in China: Total Product of Society (TPS), Gross National Product (GNP), and National Income (NI). National Income includes mainly wages, salaries and profits. Gross National Product adds depreciations (and major repairs) to National Income and is similar to gross value added in the western tradition. Total Product of Society adds materials to Gross National Product and is the gross value of output.

Output measures are available for five sectors: agriculture, industry, construction, transportation, and commerce. During the period 1978-1990, there was significant growth in all the sectors. In nominal terms, there was little difference in the level of average growth (of about 15 to 16 percent per annum) among the five sectors. In real terms, however, gross output of industry grew at an average annual rate of 12.2%, almost twice as fast as that of agriculture. Other sectors (construction, transportation, and commerce) maintained average growth of about 10%. The difference in real growth resulted largely from price changes as brought about by the differences in price reforms carried out in various sectors; most agricultural prices were freed earlier than industrial prices. In particular, agricultural prices, on average, increased 8.3% a year during 1978-1990. Industry had the lowest rate of inflation during this period (an average of 3%). The industrial sector has been the main source of real output growth throughout, and it has become more so in the recent years contributing over three-quarter of overall growth.

Within the industrial sector how have enterprises under different forms of ownership—state-owned, urban and township and village collectives—contributed to the growth of the industrial sector as a whole?

All enterprises are characterized as state-owned or non-state enterprises in the Chinese reporting system. The main difference between them is not between "public" and "private" ownership per se as commonly understood (although some purely private ownership of small scale businesses is allowed). Rather the difference is between "public" ownerships at different administrative levels of government and the degree of autonomy associated with different types of "collective" ownerships. Most state-owned enterprises (SOEs) are considered to be owned by the "people as a whole" and are usually supervised by central or provincial bureaus and are subject to considerable regulation and supervision, limiting the degree of autonomy with which they can operate. Most non-state enterprises by contrast are "collectively owned" by local (urban, township or village)

authorities, are free from supervision from higher levels of administration and exercise an enormous degree of autonomy in their operations. They are also free of the many rules and regulations (on labor hiring/firing, on providing social security and other benefits like housing and health services to the work force, on production decisions and product choice, on pricing, on the allocation of investment and other funds from their surplus and on financing) which constrain the operations of state-owned enterprises. A key difference between the state-owned and the non-state sector is that the SOEs can get subsidies, preferential loans and guarantee of permanent employment for their employees which the non-state sector cannot. Non-state enterprises, on the other hand, face a harder budget constraint, but their profits are largely kept by their managers, workers and local communities (Gelb and Byrd 1990, Byrd and Lin 1990). Thus, the non-state sector, though not "private" in the sense of having legally defined private property rights, operates with considerable autonomy and freedom from rules and regulations to mimic conditions of private ownership.

The non-state sector consists of "collectives" (including urban, township and village enterprises (TVEs)) and "other" enterprises (some private, mainly small enterprises and joint ventures with foreign investments). While the share of the state sector declined from 78% of gross value of indstrial output (GVIO) in 1978 to 55% in 1990, the share of the non-state sector—collectives (urban and TVEs)—grew from 22% to 36% during the same period (See Table 2.1). Most of this is due to the growth of TVEs; the share of urban collectives actually declined during this period. Private enterprises were not counted as such in official statistics until mid-1980s. Since 1984, they have been the fastest growing sector in Chinese industry—the share of private enterprise grew to over 5% of GVIO by 1990. A similar pattern is observed for joint ventures which accounted for a little over 4% of GVIO by 1990.

Table 2.2 gives the relevant data used in estimating the contribution of the state and non-state sectors to total industrial growth in current and comparable prices for two distinct phases of recent reforms—1979-84 and 1984-90. While total industrial growth nearly doubled in nominal terms due to industrial reforms in the latter period; the rates of growth accelerated in real terms from 9.2% to 13.5%. When measured in comparable prices the non-state sector accounted for less than 50% of industrial growth between 1979-1984; but once industrial reforms accelerated, *the non-state sector accounted for over two-thirds of industrial growth with TVEs and other private and joint venture firms providing most of the sources of growth.*

The growth of non-state sector has not been even across all the provinces. Table 2.3 shows the share of GVIO in 1990 for state-owned, collective and other enterprises in different Western, Inland and Eastern (or coastal) provinces and for two coastal provinces—Fujian and Guangdong—that are in close physical proximity to Hong Kong and Taiwan (HKTW). If we combine the share of the collectives, private and joint venture enterprises to get at the share of the non-state sector, one observes very marked differences across regional categories. As evident from Figure 2.1, going from West to the coast, the share of the non-state sector increases very dramatically from 24% of GVIO in the Western provinces, to 34% in the inland provinces, to 47% in the coastal provinces and finally to 57% in the two coastal provinces closest to Hong Kong and Taiwan.[1]

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[1] Although in terms of physical proximity, Fujian and Guangdong automatically fall into the HKTW group, one might also like to include two other provinces, Jiangsu and Zhejiang, because of their strong economic interaction with Hong Kong and Taiwan. The average shares of SOEs, collectives and others would then be respectively 59, 32, and 9 percent for the Eastern provinces and 38, 46, and 16 percent for the HKTW.

3. IMPACT OF OWNERSHIP AND LOCATION ON INDUSTRIAL GROWTH

The previous section brings out two important points: 1) non-state sector led by TVEs contributed the most to the rapid industrial growth; and 2) most of the growth in non-state sector was in the coastal provinces, particularly those closest to Hong Kong and Taiwan. In this section, we subject these findings to a simple econometric analysis. We examine three hypotheses:

(i.) The development of non-state sector characterized by decentralized ownership and autonomy was an important factor contributing to industrial growth in China.

(ii.) The non-state sector was indeed the engine of industrial growth in the sense that it not only grew at a faster rate, it also generated the locomotive effect, i.e., it helped improve the efficiency of the state sector as well by exerting competitive pressures.

(iii.) Provincial differences in Chinese industrial growth can be explained by locational factors of which the proximity to Hong Kong and Taiwan is the most central.

In testing these hypotheses econometrically using available data at the provincial level, we encountered two measurement problems. First, data limitations forced us to use gross value of industrial output, while ideally national income data should be used to account for differences in material costs between ownership category. We report a simple sensitivity analysis in the Appendix to examine the posssible bias that this may cause in our results. Secondly (as pointed out by Thomas Rawski), real growth rates for the non-state sector computed from official industrial statistics may suffer an upward bias because the non-state enterprises sometimes tend to report current price output as constant price output. Consequently, provinces with a high share for non-state industry may have higher upward bias and higher apparent growth than other provinces. Since it is impossible to estimate the extent of the bias, there is no simple solution to this problem. One obvious way in which we could account for the effect of such bias on our inferences would be do all our regressions using real as well as nominal growth rates and see if the results differ. Unfortunately, the nominal industrial output data broken down into ownership categories at provincial level are not published until 1988. We will therefore base our main analysis on real growth rates for the period 1982-90, while at the same time, report some regression results that use nominal growth rates for the period 1989-90.

Using provincial data on GVIO at current prices and applying implicit price deflators for each province, we have derived real growth rates for periods 1982-85, 1985-86, 1986-87, 1987-88, 1988-89, and 1989-90 and separately for state industry, collective industry, light industry and the total industrial sector.[2] To analyze the

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[2] Each aggregate output variable has two original time-series in the China Statistical Yearbook: 1) output value at current price in 100 million yuan and 2) index of output value at constant or comparable price. The second series is computed by Chinese statisticians at the State Statistics Bureau from output at constant prices. The constant price is not a sales price, it is a fixed price designed solely for the purpose of book-keeping. Enterprises have to calculate and report the constant price value of their output according to published price books. The constant price lists for all products were published only in 1952, 1957, 1970 and 1980. When two output series of constant price in diffferent years (say 1970 and 1980) are joined into one constant (1980) price series, the new series is said to be at comparable prices. Whenever control on some prices is relaxed, the price increase would be more significant in the state sector than in the collective sector since the latter is able to set higher prices for its products than the state sector in the beginning. Using higher deflator for the state sector may therefore reflect more accurately the relative movement in real output.

impact of ownership, industrial orientation, and geographical location on industrial growth, we pool the samples of estimated real growth rates for 28 provinces over the six time periods. The dependent variable is provincial growth rate of GVIO measured in constant prices.[3] The explanatory variables include the share of non-state sector in provincial GVIO, the share of light industry in provincial GVIO, and regional and time dummies. While the share of non-state sector in provincial GVIO indicates the extent of non-state sector activities in each provincial economy, the light industry share of GVIO characterizes the industrial orientation of the local economies—that is the degree to which they are dependent on light or heavy industry.[4] These two variables together capture important institutional and structural differences in the industrial sector in each provincial economy. The regional dummies are West for Western provinces, HKTW for Guangdong and Fujian, the two provinces closest to Hong Kong and Taiwan,[5] and East for Eastern or coastal provinces excluding HKTW. The time dummies are 1986, 1987, 1988, 1989 and 1990. Thus, Inland provinces are the base region and 1982-85 the base year against which the coefficients of the region and time dummies can be compared.

In all of the four regressions presented in Table 3.1, the coefficient for non-state sector share is highly significant and positive. The coefficient is 0.22 implying an elasticity at the mean of about 0.65 (assuming a mean nonstate industry share of 40% and mean growth rate of GVIO of 14%). That is, industrial growth rate would be higher by 3.25% if non-state industry share increased by 5%. This could be both because of "above average growth rate" of non-state sector as well as the "locomotive effect" mentioned before. We will come back to this point later.

It is seen from the second regression that the coefficient of light industry share is not significantly different from zero, whereas that of non-state share is significant. This is not unexpected, given the overlap between ownership and industrial orientation (the correlation between non-state sector share and light industry share is 0.55 for the period 1982-90). Although we do not report it here, we ran several regressions similar to these four regressions using share of light industries as an additional independent variable. Its coefficient was not significant whenever non-state share was included (but significant and positive whenever the latter was not included).

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3 Ideally national income data should be used, but since such data are not available at the disaggregated level, we have used GVIO data instead. This involves a substantial risk of double counting resulting from inter-enterprise transactions. A recent paper (from issue #5 (1993) of the Chinese journal "Studies in Chinese Industrial Economics"), for example, indicates that in Jiangsu province, TVE output growth during 1989-90 was 26% in terms of gross value of output, whereas it was less than 14% in valuee added terms. However, there are some reasons to justify the use of gross output data. Profits and payments to workers are often under-reported in China - particularly in the non-state sector - to avoid taxes. Hence the gross output data may be more accurate than the "quasi-national income" (profits plus wages) which was used in the Jiangsu paper. Aware of these problems, we report in the Appendix a simple sensitivity analysis to examine the possible bias that the use of gross output instead of value added may cause in our results.

4 It is often said that most of the recent growth in China's industry has come from the light industries. It is also said that state sector is more concentrated in heavy industries and non-state sector in light industries. It is interesting, therefore, to examine whether industrial orientation mattered after accounting for ownership.

5 The results are qualitatively unchanged when Jiangsu and Zhejiang are grouped with the HKTW instead of the Eastern provinces.

By including the year and the regional dummies, we can compare the difference in growth rates relative to a base year and a base region *after accounting for the effect of the nonstate share*. Note that 1982-85 is the base period and inland provinces are the base region in the third and the fourth regressions. The year dummies have negative and significant coefficients (except 1988) indicating that growth rates were lower in 1986-90 period (except 1988) than the boom years for industrial growth during 1982-85 (See also Table 3.2 which lists the average industrial growth rates by region for separate periods).

When the regional dummies are added to the explanatory variables, both West and HKTW have significant positive coefficients, indicating that these provinces had more rapid growth than the inland provinces. On average Western provinces experienced a 3.4 percentage point higher rate and Fujian and Guangdong 5.5 percentage points higher rate of growth than Inland provinces. However, the coefficient for East (excluding HKTW) is not significant. This suggests that after accounting for the impact of the non-state sector, only those Eastern (or coastal) provinces with close proximity to Hong Kong and Taiwan have achieved higher growth than the inland provinces; whereas the remaining Eastern provinces experienced similar or lower rates of growth on average than the inland provinces during the period 1982-90. There are two implications of this finding. First, the higher growth in the coastal provinces was due to the larger share of the non-state industry. Secondly, this confirms the enormous importance of the externalities (the inflow of technology, capital, skills and market access for exports) provided by proximity to Hong Kong and Taiwan. Thus, it is not the "coastal" strategy based on labor intensive exports that has been a success per se, but rather that it is mainly in the proximity of Hong Kong and Taiwan that this strategy has succeeded.

In Table 3.3, we report regression results for individual years during the period 1982-90, to examine if there are any temporal patterns in the industrial growth process of China. The results broadly reconfirm our earlier findings about the positive role of non-state sector and the proximity to Hong Kong and Taiwan. One interesting point to note is the result that for the year 1989, none of the coefficients are significant! This appears to be due to the austerity program of late 1988, mounted by the Chinese government to contain high rates of inflation, which in turn was due to the extensive credit creation during the period of initial industrial reforms.

As mentioned earlier, the price deflators for the collective sector may be biased downward so as to overestimate the real growth of non-state sector. To check if our results are affected by this bias, we run regressions a) for the state and the collective sector separately, and b) for both sectors using nominal growth rates. It is seen from Table 3.4 that the growth of output in the state industry is positively related to the non-state sector share indicating the presence of the "locomotive effect" which we discuss in more details later.

Table 3.5 contains regression results for the collective sector—the results are obvious. Results from regressions using nominal growth rates are also consistent with our earlier results.[6]

4. NON-STATE INDUSTRY AND EFFICIENCY OF STATE SECTOR

As non-state sector expands, the share of the state sector declines. On the other hand, increasing presence of nonstate sector also means greater competitive pressures on the state sector, so the state enterprises that do survive have to operate more efficiently. Insofar as the growth rate of the state sector is a result of both these effects, its relationship with nonstate sector share is not clear a priori. However, as mentioned in the previous section, this relationship is found to be positive.

To examine the "locomotive effect" of nonstate sector and its impact in creating a more competitive environment for state enterprises, therefore, we use a measure of provincial total factor productivity (TFP) of state industrial enterprises estimated by Hsueh, Rawski and Tsui (1992). This study uses a panel data covering 26 provinces for the period 1978-90 and estimates efficiency change in state industry using "fixed effects" and "random effects" specifications (the inputs are capital, labor and intermediate inputs). For our purpose, we have taken their estimate of TFP obtained from the "fixed effects" model for the period 1982-90, and pooled it to conform with the periods used in the present study. The regression of state sector TFP on a constant and the nonstate sector share of industrial output yields the results presented in Table 3.6.

It is interesting to find that the coefficient of nonstate industry share is significant and positive, confirming the presence of the "locomotive effect" and the increased competition provided for the state sector by the growth of non-state industries. We present the result for 1990 in Figure 3.1 where we plot the state sector TFP against

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6 For example, for the pooled data for the period 1989-90 (data for earlier periods not available) we obtain the following equation:

G_NOM = 22.03 + 0.11 SNST - 0.15 SLIGHT + 5.22 DWEST + 1.63 DEAST1 + 6.93 DHKTW

(5.59) (1.45) (-1.58) (2.86) (0.86) (2.05)

Adj. R^2 = 0.71 No. of Obs. = 56

where G_NOM is nominal growth rate of GVIO, SNST is share of non-state sector, SLIGHT is share of light industries, and DWEST, DEAST1 and DHKTW are respectively regional dummies for western provinces, eastern provinces and provinces closest to Hong Kong and Taiwan.

nonstate industry share.[7] While the scatter plot shows that Beijing, Shanghai and Tianjin are outliers (note also the low adjusted R^2 in the first regression), it is quite clear that the fitted line is upward sloping, showing the positive relation between state sector efficiency and nonstate sector share. Once the outliers are taken care of by adding three dummies, the fit improves considerably—as seen from the adjusted R^2 of 0.71 in the second regression.[8]

An alternative way of testing the "locomotive effect" is to use the fact that rapid rates of penetration by the nonstate sector creates competition and erodes profits (creates losses) for state owned enterprises. The following two regressions confirm this view point.[9] The dependent variable, PK, is profit over original value of fixed assets for the state sector. The explanatory variables are SNST, the share of non-state industry, SHEAVY, the GVIO share of heavy industry, GNST, the growth rate of non-state sector, and the regional dummies for Eastern and HKTW provinces.

(1) PK = 47.54 - 0.17 SNST - 0.49 SHEAVY + 3.40 DEAST1 - 0.22 DHKTW

(6.30) (-2.11) (-4.62) (1.59) (-0.06)

Adjusted R^2 = .40 No. of Obs. = 56

(2) PK = 0.00 - 0.29 GNST - 0.58 SHEAVY

(7.42) (-2.51) (-5.4)

Adjusted R^2 = .49 No. of Obs. = 30

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7 The fitted line in Figure 4.1 is from the following regression for the year 1990:

State Ind. TFP = 1.49 + 0.005 (Nonstate industry share)

(15.87) (1.97)

Adjusted R^2 = 0.10 No. of Obs. = 26

The coefficient of non-state share which ranges between .004 and .006 may appear small suggesting a tiny impact on productivity, but assuming a mean non-state share of 40% and mean state sector TFP of 1.6, the elasticity of TFP with respect to non-state share is between .11 to .17. This implies that a 5% increase in non-state share would lead to an increase of between 1/2 and 1 % in state sector productivity.

8 It is important to add these dummies for Beijing, Shanghai and Tianjin because the estimates of TFP by Hsueh et al. (1992) were obtained after adding these dummies. The other two outliers are Yunnan and Shanxi. Yunnan produces highly profitable tobacco products, whereas Shanxi is known for its poverty and backwardness.

9 The first regression is for 28 provinces for two years 1989 and 1990. The second regression covers 30 provinces for 1989. In this regression, GNST is the growth rate of non-state industry during the period 1984-89. (We are indebted to Gary Jefferson for the second regression.)

Note that the coefficients of SNST and GNST are negative and significant, implying the higher the size and the growth rate of the nonstate sector, the lower is the profitability in the state sector.

The strong positive relation between nonstate industry share and industrial growth is similar to the finding of Xiao (1991) that nonstate industry share is positively related to industrial efficiency as measured by TFP levels. All our results point to the fact that competitive forces are becoming increasingly important in the Chinese industrial scene and that this competition is being generated by the rapid growth of the non-state sector. This is in line with the findings of Chen et al (1992), Jefferson et al (1992) and Naughton (1992) who report that there is an increasing convergence in factor returns in Chinese industry.

5. CONCLUSIONS

Our analysis of provincial rates of industrial growth sheds considerable light on a number of issues that have been the focus of debate on China. Here we summarize the main findings.

Regional Differences in Industrial Growth

Economic reforms since 1978 adopted a differentiated policy towards regional development. Hence, there is a strong presumption that the coastal provinces would grow much faster than the inland and western provinces during recent reforms. Moreover, there is strong temptation to attribute the strong growth in the coastal region to the strategy of export-led development. *Our calculations show that after controlling for other factors, specifically, the share of non-state industry, the average growth rate of the coastal provinces was about 3.7% higher than that of the inland provinces between 1982-1990.*

However, when we take out the effect of Hong Kong and Taiwan by excluding Fujian and Guangdong from the Eastern region, the remaining provinces yield a much lower rate of growth; in fact, sometimes lower rate than the inland provinces (see Tables 3.1 and 3.2). As can be seen from Table 3.2, it is the state industry in these provinces that has lagged behind its counterpart in the Inland provinces, the collective industry has done generally better than the latter. Once the effect of nonstate industry share is accounted for, as regression (4) in Table 3.1 shows, the growth gap between the East (minus HKTW) and Inland provinces disappears. *The implication is clearly that it is the nonstate sector that has brought about the growth differential rather than the so-called coastal strategy.*

The Hong Kong Taiwan Factor

The enormous impact of the Hong Kong and Taiwan connection on industrial growth in China's southern coastal provinces, such as Guangdong and Fujian has been widely recognized. Our results confirm this by showing that it is *not to the Eastern coastal provinces that we should look to while explaining regional differences in industrial growth; rather it is to those coastal provinces with the HKTW connection.* Remarkably, the growth gap between HKTW and Inland provinces (for that matter, also Western provinces) persists even after controlling for the nonstate sector share.

The Role of Light and Heavy Industry

There is a widely held perception that the non-state collective and private sector has been dominant in the development of light industry while the state-owned sector has dominated the growth in heavy industry. If true, this would mean that as industrial orientation (proxied by the share in GVIO) turns more toward light industry, overall growth should be higher. While this is found to be true in general (the correlation between shares of state and heavy industries is 0.55), because of the same reason, *industrial orientation has not significantly affected overall industrial growth rate once the nonstate share is included as an explanatory variable. This again points to the fact that it is the presence of quasi-private ownership rights in the non-state sector that plays a more important role than industry orientation.*

The Critical Importance of the Non-State Sector

All our results lead to the central conclusion that industrial growth in China can be largely attributed to the rapid development and growth of the non-state sector and that its development has even contributed to better performance in the state sector. The industrial sector has always been the main source of growth for China's economy. This has been even more so since the beginning of reforms, and particularly so since industrial reforms accelerated in the period 1984-1990. In turn the non-state sector has been the main source for the industrial sector as a whole, and most of the very high rates of growth experienced in 1984-1990 can be attributed to the development of the non-state sector. Interestingly, it is found that there is a strong positive relation between the TFP of state sector enterprises and non-state share in industry. Also there is significant negative relation between growth of non-state sector and profitability of state sector. The implication is clearly that expansion of non-state sector improved the efficiency of state sector by providing greater competition. This seems to resolve an apparent paradox that China's state sector registered significant TFP growth while at the same time its profitability was eroding. To sum up, although locational factors have been important to some degree, it is the growth of non-state sector that appears to be the most important factor explaining the differences in the provincial industrial growth of China.

APPENDIX

Sensitivity Analysis

In this section, we examine the extent and nature of bias that might result from the use of GVIO instead of the industry component of the national income in our analysis. The basic relation between gross value (Y), value added (V) and materials (M) can be written as $Y = V + M = V + sM$, where $s=M/Y$. This relation can be transformed into growth format as $\%Y - \%V = ds/(1-s)$, where %Y and %V are percentage growth rates for gross value and value added respectively, and ds is the change of s over last period. The expression $ds/(1-s)$ is the bias that will arise in our analysis. While the absolute level of materials may not be reliable because of double-counting, the share of materials over gross output and its change over time is likely to be less biased. Note that in this paper we are not so much interested in growth rates per se as we are in comparing growth rates across sectors, regions or ownership. If the change in materials share of gross output is the same or random across sector, region and ownership, the use of gross output value may not lead to biased comparison. We computed the bias for all the provinces for three years 1986, 1987 and 1989, and regressed it on the same independent variables we used in our regressions. Except for the constant term, none of the coefficient is found to be significant. Hence it is not likely that the biases have generated the pattern we derived from the growth of GVIO.

TABLE 2.1

China: Composition of GVIO by Ownership

Year	*Total*	*State*	*Col total**	*TVE col.*	*Urban col.*	*Private*	*Other*
1978	*100.00*	*77.63*	*22.37*	-	-	-	-
1979	*100.00*	*78.47*	*21.53*	*9.05*	*12.48*	-	-
1980	*100.00*	*75.97*	*23.54*	*9.88*	*13.66*	*0.02*	*0.47*
1981	*100.00*	*74.76*	*24.62*	*10.73*	*13.89*	*0.04*	*0.58*
1982	*100.00*	*74.44*	*24.82*	*11.12*	*13.70*	*0.06*	*0.68*
1983	*100.00*	*73.36*	*25.74*	*11.72*	*14.02*	*0.12*	*0.78*
1984	*100.00*	*69.09*	*29.71*	*16.35*	*13.36*	*0.19*	*1.01*
1985	*100.00*	*64.86*	*32.09*	*18.81*	*13.28*	*1.85*	*1.20*
1986	*100.00*	*62.27*	*33.51*	*21.56*	*11.95*	*2.76*	*1.46*
1987	*100.00*	*59.73*	*34.61*	*23.48*	*11.13*	*3.64*	*2.02*
1988	*100.00*	*56.80*	*36.14*	*24.85*	*11.29*	*4.34*	*2.72*
1989	*100.00*	*56.06*	*35.69*	*23.82*	*11.87*	*4.80*	*3.45*
1990	*100.00*	*54.60*	*35.62*	*25.29*	*10.33*	*5.39*	*4.39*

* *Collective total = TVE col + Urban col*

TABLE 2.2
China: Composition of GVIO by Ownership

Gross Value of Industrial Output

	Current price, RMB 100 Million						Index, 1980 = 100				
Year	Total	State	Urban Col.	TVE col	Other	Year	Total	State	Urban Col.	TVE Col.	Other
1979	4681.3	3673.6	584.2	423.5	0.0	1979	91.52	94.69	83.86	83.86	-
1984	7617.3	5262.7	1017.7	1245.4	91.5	1984	145.38	130.77	144.20	243.84	-
1990	23924.4	13063.8	2472.5	6050.3	2337.9	1990	327.68	210.19	277.01	936.71	-

Contribution to Growth

	At Current Prices						At Comparable Prices*				
Year	Total	State	Urban Col.	TVE Col.	Other	Year	Total	State	Urban Col.	TVE Col.	Other
1979-84	9.74%	5.30%	1.43%	2.74%	0.26%	79-84	9.26%	4.76%	1.40%	2.79%	0.31%
	(100)	(54.48)	(14.73)	(28.13)	(2.66)		(100)	(51.47)	(15.13)	(29.28)	(4.12)
1984-90	19.07%	9.37%	1.75%	5.48%	2.47%	84-90	13.54%	4.89%	1.29%	4.67%	2.69%
	(100)	(49.13)	(9.19)	(28.75)	(12.92)		(100)	(36.11)	(9.52)	(34.48)	(19.89)

Growth Rates by Ownership

	At Current Prices					At Comparable Prices*			
Year	State	Urban Col.	TVE Col	Other	Year	State	Urban Col.	TVE Col.	Other
1979-84	7.19%	11.10%	21.57%	-	79-84	5.38%	9.03%	17.79%	-
1984-90	18.18%	17.75%	31.61%	64.81%	84-90	7.91%	10.88%	22.43%	-

Note : The indices for TVE and Urban collectives are not available from the Statistical Yearbook of China, so these are computed from their current price GVIO using the deflator for Collectives total. Growth rates here are exponential rates computed as $\ln(x_t/x_0)/t$.

**Contribution to growth at comparable prices are obtained using growth rates implied by index of GVIO and nominal share of each ownership category in total output as weight. Other = Total-State-TVE col-Urban col .*

TABLE 2.3
China: Composition of GVIO by Ownership in Different Provinces
(1990 at current price)

Province	State-owned	Collective	Other
A. Western			
Sichuan	*63.67*	*28.32*	*8.01*
Guizhou	*77.26*	*14.00*	*8.74*
Yunnan	*76.71*	*20.00*	*3.29*
Shaanxi (Xi'an)	*68.73*	*23.24*	*8.03*
Gansu	*78.07*	*17.96*	*3.96*
Qinghai	*84.09*	*13.43*	*2.48*
Ningxia	*78.59*	*16.99*	*4.45*
Xinjiang	*80.26*	*16.70*	*3.04*
Avg Western	*75.92*	*18.82*	*5.25*
B. Inland			
Shanxi (Taiyuan)	*59.71*	*32.83*	*7.46*
Inner Mongolia	*77.30*	*18.44*	*9.26*
Jilin	*70.36*	*22.53*	*7.11*
Heilongjiang	*80.52*	*16.55*	*2.93*
Anhui	*58.24*	*31.95*	*9.81*
Jiangxi	*65.27*	*27.16*	*7.59*
Henan	*55.18*	*34.57*	*10.25*
Hubei	*62.27*	*32.64*	*5.10*
Hunan	*63.96*	*28.72*	*7.31*
Avg Inland	*65.86*	*27.26*	*6.80*
C. Eastern			
Beijing	*63.24*	*28.92*	*7.83*
Tianjin	*57.46*	*39.63*	*5.92*
Hebei	*49.41*	*39.53*	*11.09*
Liaoning	*61.23*	*28.24*	*10.53*
Shanghai	*68.25*	*19.92*	*11.84*
Shangdong	*41.42*	*50.73*	*7.85*
Guanxi	*72.17*	*20.48*	*7.37*
Jiangsu	*34.32*	*58.02*	*7.66*
Zhejiang	*31.25*	*60.07*	*8.68*
Avg Eastern	*53.42*	*37.84*	*8.75*
D. Provinces Near Hong Kong & Taiwan (HKTW)			
Fujian	*45.64*	*31.76*	*22.60*
Guangdong	*40.24*	*34.68*	*25.09*
Avg HKTW	*42.94*	*33.22*	*23.84*
Total Average	*54.60*	*35.62*	*9.77*

TABLE 3.1
China: Regressions Comparing Growth of Provincial GVIO by Ownership, Industry, Region, and Time Period

Dependent variable: Pooled growth rates of Provincial GVIO	*(1)*	*(2)*	*(3)*	*(4)*
Constant	*4.07*	*1.88*	*9.03*	*6.78*
	(2.85)	*(0.82)*	*(7.25)*	*(4.83)*
Non-state sector share of GVIO	*0.22*	*0.19*	*0.24*	*0.27*
	(5.83)	*(4.21)*	*(8.46)*	*(7.68)*
Year 1990			*-11.09*	*-11.26*
			(-8.72)	*(-9.57)*
Year 1989			*-9.81*	*-9.94*
			(-7.73)	*(-8.49)*
Year 1988			*-0.12*	*-0.31*
			(-0.10)	*(-0.26)*
Year 1987			*-3.24*	*-3.38*
			(-2.55)	*(-2.89)*
Year 1986			*-8.59*	*-8.67*
			(-6.79)	*(-7.45)*
West				*3.42*
				(3.69)
East excluding HKTW				*-0.24*
				(-0.27)
HKTW				*5.46*
				(3.59)
Light industry share of GVIO		*0.07*		
		(1.23)		
*Rbar**2*	*0.17*	*0.17*	*0.56*	*0.63*

Note: Figures in parentheses indicate t-values.
The regressions use pooled sample (168 observations) of growth rates of GVIO for 28 provinces for 6 time periods 1982-85, 1986, 1987, 1988, 1989 and 1990. See Table 2.3 for classification of western, inland, eastern and HKTW provinces. Hainan and Tibet are not included in the sample.

TABLE 3.2
Pattern of China's Regional Growth of GVIO 1982-90

Average growth rate by region	*1982-85*	*1986*	*1987*	*1988*	*1989*	*1990*
Industry Total						
National total	*16.24*	*8.85*	*14.80*	*21.00*	*7.09*	*7.62*
Western provinces	*16.67*	*6.79*	*12.77*	*14.11*	*8.70*	*6.75*
Inland provinces	*15.15*	*8.96*	*13.61*	*12.82*	*6.52*	*4.08*
Eastern provinces excluding HKTW	*16.22*	*8.62*	*13.88*	*22.44*	*6.73*	*6.85*
Eastern provinces near HK ,Taiwan (HKTW)	*21.67*	*12.57*	*25.37*	*33.86*	*12.89*	*16.64*
State Industry						
National total	*11.52*	*6.18*	*11.30*		*3.59*	*3.15*
Western provinces	*14.79*	*5.17*	*12.63*		*7.37*	*5.36*
Inland provinces	*12.56*	*7.17*	*12.69*		*4.53*	*1.83*
Eastern provinces excluding HKTW	*10.47*	*6.62*	*10.49*		*2.73*	*2.89*
Eastern provinces near HK ,Taiwan (HKTW)	*15.19*	*8.30*	*16.75*		*6.79*	*7.15*
Collective Industry						
National total	*30.96*	*14.66*	*19.90*		*9.37*	*9.64*
Western provinces	*29.74*	*18.09*	*12.68*		*13.37*	*8.10*
Inland provinces	*24.96*	*15.22*	*15.57*		*12.10*	*6.33*
Eastern provinces excluding HKTW	*30.23*	*10.40*	*17.91*		*10.41*	*8.45*
Eastern provinces near HK ,Taiwan (HKTW)	*25.87*	*17.63*	*23.80*		*8.10*	*11.48*

Note: Data not available for 1988 for state and collective industry.
See Table 2.3 for classification of western, inland, eastern and HKTW provinces.
Hainan and Tibet are not included in the sample.

TABLE 3.3
Regressions Explaining Chinese Provincial Growth of GVIO 1982-90

Dependent variable: Provincial growth rate of GVIO for Industry total	*1982-85*	*1986*	*1987*	*1988*	*1989*	*1990*
Constant	*4.13*	*2.85*	*3.92*	*-4.71*	*3.15*	*-1.22*
	(2.22)	*(1.17)*	*(1.82)*	*(-1.09)*	*(0.80)*	*(-0.65)*
Non-state sector share of GVIO	*0.37*	*0.18*	*0.27*	*0.49*	*0.10*	*0.16*
	(6.72)	*(2.79)*	*(4.98)*	*(4.49)*	*(0.96)*	*(3.14)*
West	*4.90*	*-0.65*	*2.00*	*6.93*	*3.20*	*4.23*
	(3.56)	*(-0.39)*	*(1.38)*	*(2.30)*	*(1.15)*	*(3.16)*
East excluding HKTW	*-2.11*	*-1.32*	*-1.48*	*4.16*	*-1.04*	*0.08*
	(-1.59)	*(-0.85)*	*(-1.10)*	*(1.43)*	*(-0.37)*	*(0.62)*
HKTW	*1.02*	*1.18*	*7.43*	*10.37*	*4.32*	*9.01*
	(0.46)	*(0.45)*	*(3.21)*	*(2.07)*	*(0.93)*	*(3.91)*
*Rbar**2*	*0.66*	*0.26*	*0.68*	*0.64*	*-0.01*	*0.63*

Note: Figures in parentheses indicate t-values.
The regressions use pooled sample (168 observations) of growth rates of GVIO for 28 provinces for 6 time periods 1982-85, 1986, 1987, 1988, 1989 and 1990.
See Table 2.3 for classification of western, inland, eastern and HKTW provinces.
Hainan and Tibet are not included in the sample.

TABLE 3.4
Regressions Explaining Chinese Provincial Growth of GVIO 1982-90

The State Industry					
Dependent variable: Provincial growth rate of GVIO for State Industry	*1982-85*	*1986*	*1987*	*1989*	*1990*
Constant	*9.53*	*5.04*	*6.82*	*5.85*	*-0.44*
	(6.28)	*(2.20)*	*(2.65)*	*(2.41)*	*(-0.19)*
Non-State sector share of GVIO	*0.10*	*0.06*	*0.16*	*0.04*	*0.07*
	(2.26)	*(1.03)*	*(2.51)*	*(0.61)*	*(1.08)*
West	*3.16*	*-1.47*	*1.65*	*2.44*	*4.19*
	(2.81)	*(-0.94)*	*(0.95)*	*(1.42)*	*(2.52)*
East excluding HKTW	*-2.96*	*-0.88*	*-3.26*	*-1.30*	*0.23*
	(-2.72)	*(-0.60)*	*(-2.03)*	*(-0.75)*	*(0.14)*
HKTW	*1.13*	*0.29*	*1.44*	*3.07*	*3.79*
	(0.62)	*(0.12)*	*(0.52)*	*(1.06)*	*(1.32)*
*Rbar**2*	*0.44*	*-0.00*	*0.25*	*0.17*	*0.16*
Average growth rate by region					
National total	*11.52*	*6.18*	*11.30*	*3.59*	*3.15*
Western provinces	*14.79*	*5.17*	*12.63*	*7.37*	*5.36*
Inland provinces	*12.56*	*7.17*	*12.69*	*4.53*	*1.83*
Eastern provinces excluding HKTW	*10.47*	*6.62*	*10.49*	*2.73*	*2.89*
Eastern provinces near HK ,Taiwan (HKTW)	*15.19*	*8.30*	*16.75*	*6.79*	*7.15*

Note: Figures in parentheses indicate t-values. Data not available for 1988. The regressions use pooled sample (168 observations) of growth rates of GVIO for 28 provinces for 6 time periods 1982-85, 1986, 1987, 1988, 1989 and 1990. Western provinces include Sichuan, Guizhou, Yuanna, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang. Eastern provinces include Beijing, Tianjin, Hebei, Laianing, Shanghai, Jiangsu, Zhejiang, Shangdong and Guanxi. Inland provinces include Shanxi, Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi Henan, Hubei and Hunan. HKTW indicates the two provinces near Hong Kong and Taiwan, namely Fujian and Guangdong. Hainan and Tibet are not included in the sample.

TABLE 3.5
Regressions Explaining Chinese Provincial Growth of GVIO 1982-90

The Collective Industry					
Dependent variable: Provincial growth rate of GVIO for Collective Industry	*1982-85*	*1986*	*1987*	*1989*	*1990*
Constant	*7.15*	*5.23*	*5.30*	*2.78*	*-1.14*
	(1.23)	*(1.13)*	*(1.34)*	*(0.21)*	*(-0.37)*
Non-State sector share of GVIO	*0.59*	*0.29*	*0.29*	*0.28*	*0.22*
	(3.48)	*(2.39)*	*(2.87)*	*(0.79)*	*(2.76)*
West	*10.23*	*5.36*	*0.12*	*4.07*	*3.97*
	(2.38)	*(1.70)*	*(0.04)*	*(0.43)*	*(1.84)*
East excluding HKTW	*0.14*	*-6.42*	*0.49*	*-5.16*	*-0.60*
	(0.03)	*(-2.17)*	*(0.20)*	*(-0.54)*	*(-0.28)*
HKTW	*-7.97*	*-1.54*	*3.64*	*-8.80*	*0.14*
	(-1.15)	*(-0.30)*	*(0.86)*	*(-0.56)*	*(0.04)*
*Rbar**2*	*0.28*	*0.25*	*0.40*	*-0.13*	*0.20*
Average growth rate by region					
National total	*30.96*	*14.66*	*19.90*	*9.37*	*9.64*
Western provinces	*29.74*	*18.09*	*12.68*	*13.37*	*8.10*
Inland provinces	*24.96*	*15.22*	*15.57*	*12.10*	*6.33*
Western provinces	*29.74*	*18.09*	*12.68*	*13.37*	*8.10*
Eastern provinces excluding HKTW	*30.23*	*10.40*	*17.91*	*10.41*	*8.45*
Eastern provinces near HK ,Taiwan (HKTW)	*25.87*	*17.63*	*23.80*	*8.10*	*11.48*

Note: Figures in parentheses indicate t-values. Data not available for 1988.
The regressions use pooled sample (168 observations) of growth rates of GVIO for 28 provinces for 6 time periods 1982-85, 1986, 1987, 1988, 1989 and 1990. Western provinces include Sichuan, Guizhou, Yuanna, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang. Eastern provinces include Beijing, Tianjin, Hebei, Laianing, Shanghai, Jiangsu, Zhejiang, Shangdong and Guanxi. Inland provinces include Shanxi, Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei and Hunan. HKTW indicates the two provinces near Hong Kong and Taiwan, namely Fujian and Guangdong. Hainan and Tibet are not included in the sample.

TABLE 3.6
China: Efficiency of State Industries and Non-State Industry Share (1982-90)

Dependent variable: Pooled TFP of state sector	*(1)*	*(2)*	*(3)*
Constant	*1.49*	*1.39*	*1.37*
	(35.36)	*(57.37)*	*(62.52)*
Non-state sector share of GVIO	*0.004*	*0.005*	*0.006*
	(3.24)	*(7.78)*	*(9.54)*
Dummy for Beijing		*0.53*	*0.53*
		(12.06)	*(13.67)*
Dummy for Shanghai		*0.57*	*0.57*
		(12.94)	*(14.72)*
Dummy for Tianjin		*0.33*	*0.33*
		(7.45)	*(8.46)*
Dummy for Yunnan			*0.19*
			(4.94)
Dummy for Shanxi			*-0.16*
			(-4.22)
*Rbar**2*	*0.06*	*0.71*	*0.78*

Note: Figures in parentheses indicate t-values.
The regressions use pooled sample (156 observations) of growth rates of GVIO for 26 provinces for 6 time periods 1982-85, 1986, 1987, 1988, 1989 and 1990. Hebei, Shandong, Hainan and Tibet are not included in the sample.

Source of TFP data: Hsueh et al. (1992).

Figure 2.1
China: Composition of GVIO by Ownership in Different Regions
(At 1990 current prices)

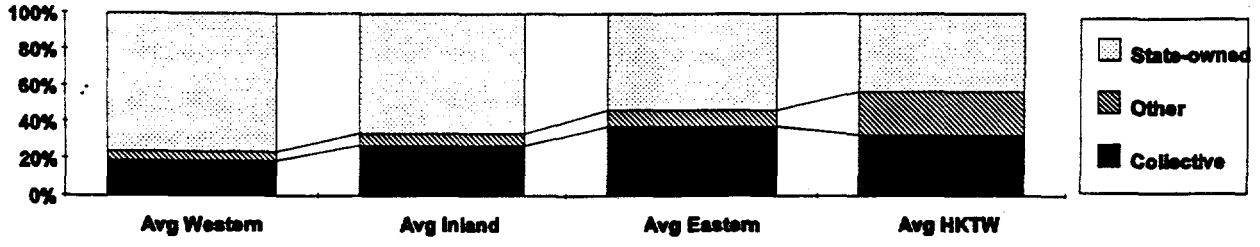
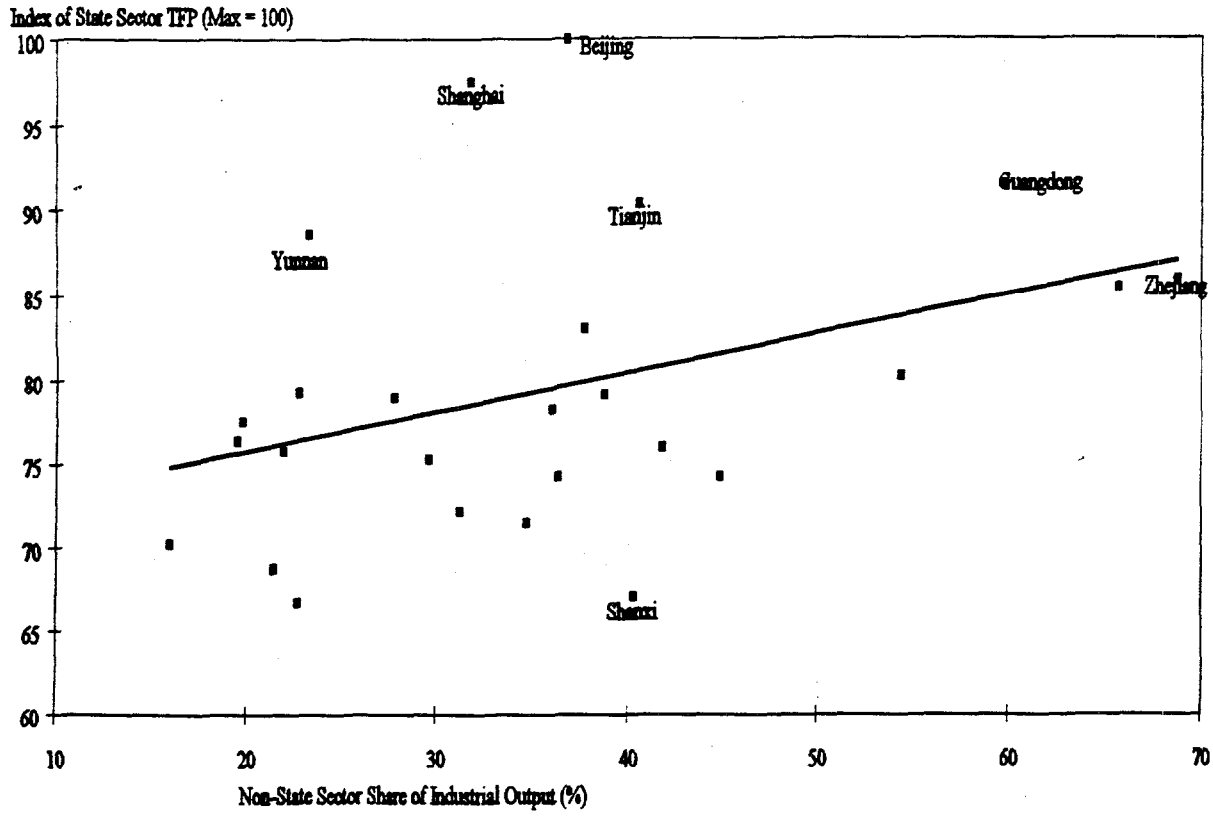


Figure 3.1
China: Non-State Industry and Efficiency of the State Sector in 1990



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