

**CHINESE RURAL INDUSTRIALIZATION
IN THE CONTEXT OF THE EAST ASIAN MIRACLE**

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Chinese Rural Industrialization in the Context of the East Asian Miracle

One remarkable feature of China's economic development in the last twenty years is its rapid rural industrialization centered at the development of numerous small-scale rural enterprises (REs) established by townships, villages, and individuals.¹ Some other economies such as Taiwan also took the same road to rural industrialization, but the magnitude of China's scale is unprecedented. In 1978, only 9.5% of the rural labor force were engaged in industrial activities, and only 7.6% of rural income was contributed by the non-farm sectors; by 1996, 29.8% of the rural labor were working in local industry, and non-farm income accounted for 34.2% of rural total income. This remarkable growth, although remaining controversial regarding its role for enlarged regional income disparity, has brought more equal income distribution at the local level.

The magnitude and speed of China's rural industrialization have spurred wide attention in international academic community. Several competing theories have been developed in the literature trying to explain the success. Culture theory could be applied to signify the role of cooperative culture in the Chinese village in enhancing RE development. The new growth theory could be applied to emphasize the positive externality created by the accumulation of knowledge, and recently of social capital, in promoting sustainable growth. Fascinated by the perversion of public firms owned by local governments, a large body of the literature focuses on the positive functions of the vaguely defined property rights in promoting REs' rapid growth. This body of literature emphasizes the positive role of local governments, noticeably, those at the township and village levels, in helping REs meddling through China's half market-half plan economy to get accesses to precious financial and material resources as well as to walk through the maze-like bureaucratic hierarchy. Yet, another theory explaining the REs' success points to their alignment with the comparative advantage of rural China. This explanation, classical as it surely be, is often overlooked in economists' search for new and exotic theories, yet it may be able to explain China's successful rural industrialization as well as the wide regional disparity in its vast territory.

The aim of this paper is to synthesize the different explanations as well as to present an overview of the development and characteristics of the Chinese REs. An econometric analysis is conducted to test various competing theories explaining the success of the REs. The rural industrialization history of the Chinese provinces in the last thirty some years is analyzed. Among other results, the analysis has reached the following conclusions. First, provincial diversity in RE development is strongly linked with the capital stock in the rural area; in other words, a province with a comparative advantage in industry relative to agriculture has a larger RE sector. Second, a lighter SOE sector at the outset of the development helps a province develop a larger RE sector. This result suggests that a province that initially abided by China's comparative advantage in labor intensive industries laid a better stage for its future RE development. Thirdly, a larger share of public REs hinders the overall RE development in a province in the reform period. This last result contradicts the prediction provided by many theories advocating the vaguely defined property rights widely observed in Chinese REs.

We also place the Chinese experience in the context in East Asia and compare it to other East Asian countries, noticeably, Thailand. Surely enough, the Chinese experience has its unique features that are specific to its recent historical events and backgrounds. Nevertheless, there are also commonalties between the Chinese experience and some of the other East

¹ In Chinese literature and statistics, rural enterprises include all the enterprises at or below township level, regardless of their ownership types. These enterprises include not only those operating in industrial sectors, but also those in construction, transportation, commerce, and food services. We adopt this definition in this paper.

Asian countries'. In the light of the Asian financial crisis, the Chinese experience could provide a useful lesson to other developing countries. Although the crisis was triggered by capital fleeing, the economies hit most by the crisis might have some fundamental faults that could not stand serious financial shocks. Governments in Korea, Thailand, and other East and Southeast Asian countries adopted a policy that encouraged the development of large-scale industrial establishments in the hope of competing in the world markets. However, this development strategy largely deviated from these countries' comparative advantage as revealed in the world division of labor. This deviation, together with these countries' weak but heavily-intervened financial systems, constituted the fundamental cause of the crisis. As such, the proposition of the developmental state postulated by *The East Asian Miracle* seemed not to stand the test even in Korea that was regarded to have the right institutional and cultural context for the proposition to succeed. By presenting the Chinese experience and the experience of Taiwan and early Japan as a successful case of aligning with a country's comparative advantage, our paper will contribute to the understanding of the Asian financial crisis as well as of the mechanism of development in general.

The paper is organized as follows. In Section 1, we will present key statistics on the growth rates of the Chinese REs, their contribution to China's national economy, and their role in reducing local income disparity. In Section 2, we will provide a brief overview of the history of Chinese rural industrialization, trying to identify several key phases along its course. In Section 3, we will examine the key features of the Chinese REs in the last twenty years. In Section 4, we will discuss the theories applied to explaining the success of the REs, especially the role played by the local government in promoting the success. In Section 5, we will conduct an empirical analysis of the RE development by using a panel data set of the Chinese provinces in the period of 1970-1997. Special efforts will be paid to test the roles of the local government and factor endowments in defining the level of industrialization in a province. In Section 6, we will put the Chinese experience in the broad East Asian context, discussing two industrialization strategies that have led to different outcomes in the region.

1. Contribution of REs to China's National Economy

After more than twenty years of growth, REs have changed the economic landscape in China's rural areas. In the period of 1978 to 1996, the number of REs increased from 1.52 millions to 23.36 millions; and the number of workers hired increased from 28.27 millions to 135.08 millions, or in terms of percentage of total rural labor force, increased from 9.5% to 29.8%. The share of the REs in the total value of gross rural output increased more remarkably. In 1978, only 21.2% of the total gross rural output was created by the REs; by 1995, the percentage was raised to 77.2% (Table 1).

Equally remarkably, REs have become one of the major forces behind China's overall sustained growth. The output value of the REs in the industrial sectors accounted for only 9.1% of the national total in 1978. After twenty years, this figure became 57.9% in 1997 (Table 1). Rural industry is no longer merely a supplement to the agricultural production, but has become an indispensable source of growth nationwide. It is widely acknowledged that export has been one of the leading factors contributing to China's recent success. REs have done equally well in exporting, especially in the last ten years, a period when RE exports have been increasing much faster than the national average. In 1986, REs' share of exports in total exports was only 9.2%; by 1997, the figure reached 45.8% (Table 2).

When the comparison comes down to the provincial level, it is clear that there is a close correlation between RE development and per capita GDP. A quick review of the data presented in Table 3 and Table 14 will tell one that the provinces with higher levels of RE

development are also those with high per capita GDP. This leads to the question of whether the development of REs has contributed to the enlarged regional economic disparity in China that has been revealed by several studies (e.g., Lin, Cai and Li, 1997; Hsiung and Putterman, 1989; Rozelle, 1994). Ignoring the inter-provincial equality for a moment, let us first look at how RE development has done to the income disparity inside a province.

Table 3, adopted from Lin, Cai, and Li (1997), shows the shares of non-agricultural output in total rural social output of China's thirty provincial units and their Gini coefficients of per capita income for both urban and rural areas and rural areas alone in 1992.² The thirty provincial units are divided into two groups according to their non-agricultural shares whose median is used as the cutting point. Not surprisingly, the group with higher non-agricultural shares (averaged at 65%) consisted of all the coastal provinces and municipalities and several resource rich inland provinces, and the group with lower shares (averaged at 30%) were all inland provinces. Contrary to the casual belief, income distribution in the first group on average was more equitable than that in the second group. The average of the province-wide Gini coefficients was 0.25 for the first group whereas it was 0.28 for the second group. The gap between the averages of the rural Gini coefficients was also 0.03, with the average of the first group being 0.13 and that of the second group being 0.16. This seemingly small gap of 0.03 was actually quite significant as the Gini coefficient of per capita income for the whole country was only raised from 0.13 in 1978 to 0.18 in 1995 (Lin, Cai, and Li, 1997).

The remarkable role of the Chinese REs in bringing equitable income distribution inside a province is achieved by their small, indigenous, and labor-intensive nature. This is very much like Taiwan and contrasted to South Korea. In the latter case, industrialization has been accomplished by drawing rural migrants into cities where a few fairly large firms are concentrated. Although the country has been industrialized as rapidly as Taiwan has, its rural areas, until very recently, were much underdeveloped than Taiwan (Saith, 1987). China, by coincidence or logically, has followed Taiwan's road to industrialization by industrializing its rural areas directly by establishing labor-intensive and low-tech firms. The labor-intensive and indigenous nature enables the benefits created by REs to be shared by a wide range of the rural population so the income disparities both between urban and rural areas and inside the areas are reduced. In addition, as the demand for RE products increases, the return to labor, the factor more intensively used, is likely to be raised faster than the return to capital, the factor less intensively used. This added benefit to labor accelerates the equalization of income between urban and rural areas.

However, there is also a debate of whether the uneven development of REs among China's provinces have contributed significantly to the enlarged regional income disparity. Although there has not been a study providing direct empirical evidence, Lin, Cai, and Li (1997) shows that the most significant factor that contributes to China's income disparity is the income gap between rural and urban residents, whereas the gap between coastal and inland areas is not a significant factor. Therefore, the regional income disparity is likely related to the contrast of a large rural population in the inland provinces and a smaller rural population in the coastal provinces. By raising the income in the rural areas, therefore, the development of REs attacks the most important factor that creates China's income inequality.

2. Phases of China's Rural Industrialization

² The Gini coefficients are calculated based on county level income data rather than on household income data. For a description of the methodology and data issues, see Lin, Cai, and Li (1997).

China was a poor and agricultural country before 1949, and there were only a few handicraft workshops in the rural areas. In 1949, the output of these workshops and other household sideline production was about 1.16 billion yuan in 1957 prices.³ After the founding of the People's Republic of China, sideline production rose rapidly. By 1954, more than 10 million Chinese farmers were involved in handicraft industry, and the total output value reached 2.2 billion yuan. In the period of 1955-57, individual handicraftsmen were encouraged to form cooperatives. However, as a result of the excessive emphasis put on agriculture, the growth was slowed down. In 1957, the total value of sideline production only increased to 2.29 billion yuan, roughly 4.3% of the total agricultural output. In the communization and Great Leap Forward period of 1958-59, consistent with the heavy industry development strategy, large scale commune and brigade enterprises were established, and many of them were engaged in the production of steel with rudimentary technology. These enterprises employed 18 million people by the end of 1958, but their results were catastrophic and triggered the readjustment campaign started in 1960. In subsequent years, the output value of commune and brigade enterprises nosedived and reached 410 million yuan in 1963. The number of workers employed by these enterprises was also reduced drastically. During the following six years, the development of these enterprises was in eventual stagnation.

The emphasis on speeding up agricultural mechanization in the North China Agricultural Conference held in August to October 1970 provided a new chance for the development of commune and brigade enterprises. Acting to respond to the spirit of the conference, some rural areas began to set up factories manufacturing agricultural machinery and repairing tools. As the urban factories were paralyzed by fractional fights during the Cultural Revolution, a large market was open for the products of rural enterprises. As a result, their output value was increased from 9.25 billion yuan in 1970 to 27.2 billion yuan in 1976, with an average annual growth rate of 25.7%. After the fall of the Gang of Four in 1976, the development of the commune and brigade enterprises was accelerated. By 1978, their output value reached 49.3 billion yuan in 1970 constant prices, with an employment size of 28.3 million. In terms of shares, however, the output value of commune and brigade enterprises only accounted for 21.2% of the total value of rural social gross output, and their employment only 9.5% of total agricultural labor (Table 1).

The stagnation of rural industry in most of the pre-reform period was a consequence of the catch-up development strategy adopted by the Chinese government (Lin, Cai, and Li, 1995). Heavily influenced by the Soviet model of industrialization and the state of art of the development economics in the 50s, China adopted a strategy to industrialization by developing capital intensive heavy industries. This development strategy deviated from China's comparative advantage associated with its resource endowments, namely, abundant labor force and scarce capital. To mobilize resources for the heavy industry development strategy, prices of agricultural products were artificially suppressed in order to lower the living costs of the industrial labor force;⁴ interest rates were kept at a low level in order to make heavy industrial investment worthwhile. As a result, capital accumulation in rural areas was low. In addition, the commune system severely dampened farmers' work incentives and hampered the improvement of agricultural productivity (Lin, 1993; Wen, 1993), leaving

³ The numbers cited in this section, if not otherwise noted, are from Byrd and Lin (1990), pp. 9 and 10.

⁴ Some estimations (e.g., Yan, 1990) put the total amount of implicit transfer from agriculture to industry in the form of price scissors to be around 700 billion yuan for the period of 1950 to 1978. After adjusting the market prices of agricultural products, Wang (1992) estimates the total amount of transfer in the same period was between 115.2 billion yuan to 288.6 billion yuan. Feng and Li (1993) estimate that share of the transfer in total national savings ranged from 19% to 68% in that period.

agriculture with no significant surplus. To aggravate the situation, various restrictions were placed on rural enterprises to avoid the diversion of resources flowing to heavy industries, although often in the disguise of cutting “the capitalist tail”. The high growth rate of the 70s was only achieved when urban industries were in bankruptcy and the heavy industry development strategy was counterweighted by the government’s will to mechanize agriculture, an unwise policy itself by deviating from China’s comparative advantage. In fact, the fast development of the commune and brigade enterprises in the 70s was made possible by these enterprises’ alignment with China’s comparative advantage in labor intensive industries. This is shown by the geographic concentration of these enterprises in the Yangtze River and Pearl River deltas where highly abundant labor relative to land made farming less attractive and labor intensive industries more profitable.

The development of the commune and brigade enterprises in the 70s laid a solid foundation for the RE development in the 80s. In fact, the many publicly owned REs that have attracted wide academic interests were a continuum of these firms (Putterman, 1997). As we will see in the next section, this fact has been largely ignored by the theories that have rushed to rationalize the vaguely defined property rights possessed by the publicly owned REs.

The rural reform carried out at the turn of the 1970s/1980s has opened a new chapter for China's rural areas. In accordance, rural industrialization has embarked on a fast track to success. From 1978 onward, the Chinese rural industrialization can be divided into four periods.

The first period was from 1978 to 1984. In this period, the family farming system abandoned for 20 years was restored. Although rural industry was no longer regarded as the tail of the capitalism, the speed of rural industrialization was not impressive. Nevertheless, a robust growth of industrial employment was maintained (Table 1). In this period, China's rural areas were occupied by the institutional reform that restored the family farming system. As a result of the reform, the real value of agricultural output was increased by an annual rate of 6% in this period. By one estimation, the reform contributed to 60% of the agricultural growth in this period (Lin, 1992). Grain output reached historical record in 1984, and farmers for the first time in several decades experienced difficulty in selling their products. The fast growth of agricultural output, although occupying the major efforts of the rural areas, had accumulated crucial initial capital for REs' takeoff.

The second period was from 1984 to 1988. This period was the takeoff period of China's rural industrialization and witnessed the fastest growth of REs. Several factors contributed the fast growth in this period. First, the remarkable agricultural growth in the last period has accumulated considerable initial capital. Secondly, accompanying the official dismantling of the commune system in 1984, the official line toward private ownership was changed. The name for rural collective firms was changed from *shedui qiye* to *xiangzhen qiye*, or township and village enterprises, and private firms were encouraged. The relaxed policy environment was responded quickly by farmers. In 1984, 4.72 million new firms were set up, and the total number of firms reached 6.07 millions, a wholly 4.5 times of the number in 1983. In the next year, the number of firms was more than doubled again to reach 12.22 million (Table 1). Most of the newly established firms were privately owned or operated. In 1984, 69.3% out of the total of 6.07 million REs were private or cooperative enterprises, and after two years, the ratio increased to 88.6% in 1986 (Table 10, see also Chen, 1988). Lastly, the reforms carried out in the cities also facilitated the growth. A major reform in this period was the establishment of the dual track price system that allowed two prices for a single commodity: one for transactions carried out through the market, one for transactions carried out through

planning. This reform enabled farmers to get access, although by paying higher prices, to materials that were not obtainable before.

The third period of RE development was from 1989 to 1991. After the Tian'anmen Square event in 1989, the government economic policy became quite conservative. REs were accused of being inefficient, wasting resources, pirating products of state firms, and ultimately, hurting the development of the state sector (State Council, 1992). With this perception, several nationwide programs were carried out to restrict the development of the REs. As a result, the number, employment, and the share of output of the REs all declined in 1989 and 1990 (Table 1). The trend was not reversed until 1992 when the former leader Deng Xiaoping paid a visit to the south and made a speech there calling for continuing the reform and open-door policy.

Then, the RE development entered the fourth period that began in 1992 and stretches to the current date. This period was characterized by steady expansion of the REs although in recent two years the number of firms declined. The decline has raised concerns that, because of their technical incompetence, REs are falling behind in a much more mature market where consumer demand has become sophisticated and competition has been intensified (Wang and Yao, 1998). However, the decline may be only a correction to the over investment made after Deng's 1992 speech, and is a temporary phenomenon. Indeed, unlike the number of firms, the REs' employment and output share have kept an increasing trend throughout the whole period (Table 1). This may be an indicator that there has been a structural adjustment of the REs by which inefficient firms are eliminated or consolidated by efficient firms.

The worry that the Chinese REs are in trouble is partly induced by the high expectation based on the REs' marvelous growth reached in the last two decades. Probably, it is time to view REs as nothing different from urban industry in terms of growth and to be contended by a growth rate of the teens or a single digit. There has been a strong trend for REs, those in developed regions in particular, to converge with urban industry in terms of industrial and capital/labor structures. Many REs have departed, rightly, we should emphasize, from the labor intensive origin and entered capital intensive and high-tech industries. As consumer demand becomes more sophisticated, this trend will be rectified in the developed regions where REs have merged into the urban industry. In the meantime, REs in the inland areas will continue to catch up in terms of both development and capital/labor structure. Thanks to China's huge regional diversity, the regional catch-up process will likely to sustain China's economic growth in a long period of time.

3. Characteristics of RE Development in the Reform Era

Several salient features characterize the RE development in the reform era. First, much of the capital supporting RE development came initially from agricultural surplus and later from the accumulation of REs themselves, credits provided by the formal banking system are minimal. The rural reform carried out in late 1970s and early 1980s drastically increased rural income, and the shift-away from the heavy industry oriented development strategy reduced the deprivation of agricultural surplus, both contributing to enhancing rural savings. In the meantime, the heavy industry oriented development strategy in the planning era left China with a serious shortage of consumer goods amidst sheer poverty at the outset of the reform period, creating a huge market for low cost labor intensive products that are suitable for RE production. In the early stage of rural industrialization, this unfilled large market was critical in helping REs' fast capital accumulation. The lack of formal bank loans is surely a disadvantage of REs, but also puts a hard budget constraint on the REs, which in turn, rather ironically, improves REs' efficiency.

Second, REs have been overwhelmingly concentrated in labor and resource intensive industries although those in the coastal areas have recently begun to enter capital intensive and sophisticated consumer product industries. This pattern of industrial distribution is consistent with the comparative advantage of China in international labor division in general, and of rural China compared with urban China in particular. In accordance, REs are keen in adopting middle and suitable technologies.

Thirdly, Chinese REs are characterized by a variety of ownership that encompasses almost all the ownership types existing in the world. A major observation that has spurred heated debate in the literature is that many of the REs maintain vaguely defined property rights arrangements within which local governments play a significant role. Quite a few authors have attributed the success of the REs to their vaguely defined property rights by arguing that the involvement of local governments has helped REs in getting access to resources, information, and government supports. The vaguely defined property rights, therefore, are seen as a rational choice made by the entrepreneurs. Although this view might be applicable to the early stage of the RE development, the supporting evidence is weak. In addition, there has been a strong trend in recent years that the REs' vaguely property rights are being transformed into either some form of shareholding or purely private ownership.

Fourthly, REs are tied with urban industry in various ways. On the one hand, REs get technologies, equipment, personnel, and market channels from urban enterprises. On the other hand, the development of REs increases market competition and put pressures on urban industry. The consequences of the increased competition, however, have not been agreed on by economists in China. One spectrum of opinions views REs as a destructive force to the urban industry because REs compete with urban industry in materials and credits, yet use them inefficiently. The other spectrum of opinions, however, sees REs as a constructive force in improving the efficiency of the urban industry through market competition. The first spectrum of views emphasizes the technical inefficiency of the REs that have been supported by many empirical studies, but overlooks REs' superb allocative efficiency that may well outweigh their inferior technical efficiency. The second spectrum of views, while acknowledging REs' inferior technical efficiency, emphasizes REs' superior allocative efficiency and its externalities created through market competition. The reconciliation of these two views, therefore, calls for government policies to foster market competition as well as to encourage technical transfers from urban industry to rural industry.

Lastly, RE development is unevenly distributed across the country, and there is a call inside China crying for government interventions aiming at a more balanced regional development program. However, the regional diversity can be mostly explained by the different initial conditions, location, and factor endowments possessed by different regions. In addition, the regional ladder of economic development itself is part of the engine for China's sustainable long-run development because a stream of cheaper labor and technological flow can be maintained.

In the rest of this section, we will review the above five major characteristics in details. The objective of the review is to show the reader the complexities and dynamics of China's rural industrialization as well as to present raw materials for our review of the competing theories that try to explain the success of the Chinese REs.

(1) Capital Accumulation of the REs

In the initial stage of the reform period, two factors contributed to the initial capital accumulation of the REs in rural China. First, the heavy industry oriented development strategy was gradually weakened and the price scissors against agricultural products were

reduced in relative terms. By one estimation (Feng and Li, 1993), the value of the transfer due to price scissors was 25.4 billion yuan, or 23.3% of the total national savings in 1978. Although the value of the transfer in constant prices remained almost unchanged till 1990 (compared with 1978, it was increased by 4.3% in 1990), its share in total national savings was reduced to 14.8%. Second, the household responsibility system (HRS) reform carried out in the rural areas restored farmers' work incentives and drastically raised agricultural outputs and income in the first half of the 1980s (Lin, 1992). These two factors combined have resulted in large increases in rural savings. Table 4 shows the deposits received by the rural credit cooperatives between 1978 and 1993. Rural credit cooperatives are the only type of financial institute that is officially allowed to exist below the county level, so the amount of the deposits received by them is a good proxy for the total amount of savings in the rural areas. As the table shows, the total amount of deposits in 1993 was 25.9 times of that in 1978. The table also shows that the share of deposits made by households was expanded the fastest. In 1978, deposits made by households accounted for 34% of the total deposits, but the ratio was increased to 83% in 1993. In contrast, the share of the deposits made by the collectives was dropped from 57% to merely 6%. The collectives played a significant role in the initial stage of capital accumulation before the reform took place and in the initial stage of the reform. However, as the surplus held by individual farm households was increased in an unprecedented pace, especially after private and cooperative enterprises were formally sanctioned by the central government in 1984, the development of private and cooperative enterprises took momentum (see Section 2 for a description). This was only made possible by income growth at the household level that was brought about by the establishment of the HRS and subsequent accumulation through the operation of small firms.

The initial growth and capital accumulation of the REs was also facilitated by a large market for basic consumer goods left unfilled as a result of the catch-up development strategy pursued before 1978. The Chinese industrial structure was strongly heavy industry oriented at the outset of the reform. Table 5 shows the amounts of fixed capital investment allocated to light and heavy industries and their shares out of the industrial total in different periods from 1952 to 1978. As less than ten percent of the investment was directed to light industry in most of the periods, shortage of consumer goods was evident, symbolized by the various rationing coupons covering products ranging from basic foods to the three luxuries at that time, namely, watches, bicycles, and sewing machines. With the adoption of the reform and open-door policy in late 1970s and early 1980s, income in both urban and rural areas was raised. In the period of 1978 to 1992, rural and urban consumption expenditure kept an average annual growth rate of 6.5% and 5.8%, respectively, much higher than their counterparts in the period of 1952 to 1977 which were only 1.8% and 3.0%, respectively.⁵ The high growth rates of the demand for consumer goods after two decades of stagnation created a perfect opportunity for rural industry to take the lynch of labor intensive consumer goods left over by the heavy industry oriented state-run enterprises.

As for the channels of finance, REs rely heavily on household savings and borrowing from the informal financial market, credits in the form of formal bank loans are limited. Table 6 compares the amounts of formal bank loans REs and SOEs obtained in recent years. It is clear that the state banks (including the rural credit cooperatives) overwhelmingly favor the SOEs when they make loans as nearly 90% of their loans were issued to SOEs through 1993 to 1996.

The exclusion of the REs from formal bank borrowing forces them to engage in self-financing or to resort to informal financial markets to get necessary funds. Informal financial

⁵ Lin, Cai, Li (1994), pp. 155.

markets are risky and hard to be regulated. Under this situation, local governments created semi-formal credit unions and local stock markets that tremendously facilitated REs' finance. The semi-formal financial organizations have two merits. First, they are comprised of local people who know each other well, so the asymmetry of information that plagues formal financial institutes is overcome. Second, they are easier to regulate than informal credit markets as most of them are sanctioned and monitored by local governments. In terms of stock exchanges, China only has two of them in Shanghai and Shenzhen that are sanctioned by the central government but only provide accesses to large firms with national reputations. Under this circumstance, regional stock exchanges become important financial intermediaries for smaller firms to finance their expansions. However, the central government, triggered by the recent turmoil in the rural financial sectors, decided to close all the credit unions and local stock markets. This action will suppress the illegal activities temporarily, but will also drive legal transactions to underground, which in turn will increase the number of illegal activities.

The recent bank reform requires commercial banks to meet their own ends in credit lending. This measure makes banks prudent in making their loans. With an already disadvantageous position created by informal asymmetry, REs are hit more than urban enterprises. The central government is aware of the problem. Recently, banks are allowed to issue loans to small firms with interest rates that can be 20% higher or 10% lower than the official rates which currently are 6% to 7%.⁶ Small firms are less credible than large firms either because they really have higher default rates, or because banks are not familiar with them as a result of the credit rationing favoring large firms in the past. With some right to price actual or perceived risks, banks will have more incentives to provide loans to small firms, including REs. However, the new official interest rates for small firms are still much below the market rates on the informal market which are around 20% per year. Although the opening-up of the formal financial institutions could lower the market rates, it is hard to conceive that the risk shouldered by small firms is comparable with an interest rate in the range of 7% to 8%. As a result, it is unlikely that the current lending policy would turn out significant results. In addition, the new policy has only given some freedom to the lending side, but not to the savings side. With savings rates capped, it is hard for the state banking system to draw more savings, and rural savings will still flow into the informal financial markets whose interest rates are 2 to 3 times of the official rates.

It is noteworthy that FDI has been playing an increasingly important role in financing China's rural industrialization. In 1978, the amount of realized FDI was only 263 million US dollars. By 1997, it reached 64.4 billion US dollars. Although data on the amount of FDI received by rural firms are not available, it is believed that a large part of the FDI has gone to the firms in the rural areas in the coastal provinces. This assessment is especially pertinent to capital from the Great China regions, namely, Hong Kong, Taiwan, Macao, and Singapore. Studies show that FDI from this group of investors is more likely to enter labor-intensive sectors that are dominated by REs (Wang, 1997). In 1995, 28.1% of the output of firms at the township and village level was created by FDI firms.⁷

(2) Industrial Structure

REs' industrial structure reflects the comparative advantage of China's rural areas. At the international level, comparative advantage in international trade are still dominated by each country's factor endowment (Song, 1993). With abundant labor and limited land, natural

⁶ That is, the highest rates for small firms can be 7.2% to 8.4%.

⁷ FDI firms include firms solely owned by foreign investors and joint ventures.

resources and capital, China's comparative advantage clearly rest in labor intensive industries. Table 7 compares China with several developed and Asian developing countries in their non-residential capital stocks per worker in 1975 and 1990. In a dynamic framework, capital stock is an indicator of a country's current comparative advantage as well as the outcome of the choices made by it based on its past comparative advantage. As shown by the table, China was at the very lower end of per worker capital endowment in both years (only higher than India), making clear that its comparative advantage in international labor division have been resting in labor intensive industries.

Inside China, its rural areas are obviously endowed with far less capital and far more labor and resources than its cities. However, this comparative advantage was made available to the RE development only after the reforms took place. In the planning era, farmers were tied to the land because of the emphasis put on grain production; and the right to natural resources was monopolized by the central government. The establishment of the HRS not only raised farmers' production incentives, but also granted them with the right of labor allocation. The enhanced labor productivity released a huge amount of rural labor from agricultural production. In addition, the decentralization process allowed local people to get control of some of the local resources. All these changes induced REs to start in labor and resource intensive industries.

Table 8 shows the industrial structure of township and village owned enterprises from 1978 to 1996. At the early stage of development, these enterprises were heavily resource based. In 1978, 61.2% of their light industrial output and 93.1% of their heavy industrial output were generated by resource based enterprises. In 1996, these enterprises are still largely resource based, but for light industries, the trend of departing away from this pattern has also been clear over the years. In 1996, the share of resource based output was dropped to 52.9% of the light industrial total. This trend is consistent with the changed factor endowment proportions that we will soon discuss. In addition, Lu (1998) showed that China is losing comparative advantage in grain production. Therefore, it is unwise for the REs to stick to food and related industries whose relative input prices are rising.

Compared with SOEs in the cities, REs use much more labor and much less capital. Table 9 compares the capital intensities of REs and SOEs from 1978 to 1996. Two indicators are listed in the table. One is per worker net capital stock, the other is the number of workers hired per million yuan of output. The per worker net capital stock of the REs has never passed 20% of that of SOEs, and the number of workers hired by the REs per 10,000 yuan of output has been several times of the number hired by SOEs for most the years. Keeping lower capital intensity provides REs with two advantages. First, it allows them to lower their production costs significantly as labor is much cheaper than capital. Second, it permits the REs to enter industries with low technological thresholds, saving their costs of technical innovations. Technical innovations are linked with capital accumulation that REs are short of. Therefore, it is rational for them to choose the technology that requires less capital.

However, Table 9 also shows that the gaps between SOEs and REs in their capital intensities have been narrowed through the years. Per worker capital stock of the REs was raised from 9% of the SOEs' in 1978 to 18% in 1996, and the gap between the numbers of workers hired by 10,000 yuan of output of the two kinds of firms was narrowed from 6.2 times to only 1.3 times in the same period. The REs' catch-up in capital intensity can be explained by their adjustment to the changed factor endowments (and thus the comparative advantage) in the economy. One indicator of this change is that the gap between the average annual wage per worker of the REs and that of the SOEs has been narrowed. The RE wage as percentage of the SOE wage had been raised from 45% in 1978 to 56% in 1996, an eleven percent increase.

The labor-intensive nature of the Chinese REs has enhanced their position in China's exports. As Table 2 shows, the REs' share of China's export was only 9.2% in 1986; but after that year, it had kept an average annual growth rate of 20.6% in the next ten years and reached 47.9% in 1996. In the period of 1986 to 1995, the percentage of the REs' exports in their total output was raised from 3% to 8%, a 1.6 times increase. The enlarged shares of their exports in total exports, therefore, were realized by their shift from domestic to international markets as well as by their high growth rates of output that have outpaced the national average over the years.

(3) Ownership and Its Dynamics

Unlike its urban industry that is dominated by public ownership, China's rural industry is characterized by a plurality of ownership. Noticeably, there is a heavy presence of local government ownership among the REs. This, together with the extraordinary performance of the Chinese REs, has spurred wide academic interests as to the relationship between the local government ownership and the success of the REs. Several theories have emerged in the literature to explain why the local government ownership emerged and why it was successful. We reserve the discussion of these theories to the next section, and concentrate on presenting the evolution path of REs' ownership structure over the last twenty years.

Before 1978, non-private firms existed in China. In the early stage of the rural reform, although private firms were not encouraged by the government, their number still increased drastically. The official abolishment of the commune system and the beginning of the urban reform in 1984 further accelerated the development of private REs. Table 10 shows the development of private REs from 1984 to 1997. In 1984, 69.3% of the REs were privately owned. In 1997, that figure became 93.6%, that is, private firms have become the vast majority of the REs. In terms of employment and output, private firms accounted for 59.2% of the total RE employment and 51.2% of the total RE output in 1997. Therefore, although individual private firms are generally smaller than public owned firms, they have nevertheless become equally important as the public firms. Overly emphasizing the functions of publicly owned firms is misleading because the majority of the REs are actually privately owned and they account for more than half of the total RE employment and output.

After the fifteenth congress of the Chinese Communist Party held at the end of 1997, privatization programs have widely spread all over the country. Although there are problems similar to what have happened in East Europe and Russia where embezzlement of public equity has been widely observed, the demand for clarifying the property rights in the REs is high. This is especially urgent in the so-called "red cap" firms that are registered as public firms, but are operated exactly the same as private firms except paying the authority a certain amount of fee. These firms are established for various reasons. In addition to the potential benefits listed by Zhao (1997), an important reason is that the local political environment did not accommodate private firms when the firms were established. In a "red cap" firm, the private entrepreneur regards the firm as his own, but the local government regards the firm as public. If the official in charge in the government happens to be open-minded or a friend of the entrepreneur, things may not go wrong. However, if there is no such an official, or such an official is gone, things are very likely to go sour. Therefore, as markets become more sophisticated and government policy more transparent, the entrepreneurs of the "red cap" firms are eager to rectify their ownership of their firms.

(4) Relationship with Urban Industry

From the very beginning of its development, rural industrialization in China has been tied with urban industry. In the early days, the tie was only one way by which only technologies were transferred from urban industry to rural industry. In the collective era, the development of the commune and brigade enterprises relied heavily on urban technicians and youth that were sent to the countryside for the so-called "reeducation by peasants". After these people returned to the cities at the end of the Cultural Revolution, rural enterprises close to cities began to contract with urban technicians and hire retired urban workers to get necessary technologies. In this respect, firms in the Yangtze delta had a particular advantage. Many workers working in Shanghai factories were from the surrounding rural areas. After they retired, they brought back their expertise to their hometown. In addition, Shanghai's industrial structure also made technological transfers easier. In the collective era and quite a period of time after its ending, Shanghai was almost a synonym for consumer goods in China. The production of these consumer goods needs relatively less initial investment and is labor-intensive, so they can be easily transferred to the surrounding rural areas. Therefore, the lightness of the industrial structure of the urban industries in a particular region has some positive externalities to the development of the REs in that region. We will come back to this point in the next section when we examine the regional disparity of RE development.

After the late eighties, technical transfers from urban to rural industry began to take another route. Cooperation with urban firms began to emerge as the major channel for REs to get new technologies. Yan and Zhang (1995), in a survey study of a group of REs, showed that compared with firms with the same size, firms engaged in outside cooperation had more standardized products, higher labor productivity, more qualified labor force, and more investment in technical innovations (Table 11). In addition, these firms were keener to use middle technologies. For example, the percentage of equipment made in the eighties in these firms was 69%, 2 percentages lower than in firms without outside cooperation; but their percentage of equipment made in the seventies was 27%, 8 percents higher than the other group of firms. However, there was less very old equipment in these firms either. Their percentage of equipment made in the fifties was 4%, 6 percents lower than in the other group of firms.

As the size of the rural industry increased, urban industry began to feel the pressure in the late eighties. Before the urban reform was initiated in the middle of the eighties, urban industry was insulated by the plan that provided material supplies, credits, and product sales channels. Table 12, adopted from Jia et al. (1994), shows the access to planned resources of firms in Yichang, Hubei province by scale, ownership and affiliation at the end of the eighties. It is obvious that large firms, state firms, and firms with a higher administrative affiliations had more accesses to planned resources. The protection of the plan, however, turned out to be a curse as well as a blessing to the urban industry. It was a blessing because the state was always ready to bail out a failed state enterprise so its employees never needed to worry about losing their jobs; it was a curse because it fostered the state firms' inability to survive in the real market that soon would come to China. While most of the plans were abandoned in the nineties, the soft budget constraint faced by state firms still exists today. With loose financial constraints, the SOEs have performed much less efficient in terms of the use of financial resources. As Table 6 shows, the amount of loan per unit pre-tax profit of the SOEs has been seven to ten times of that of the REs.

In contrast, limited or no accesses to planned resources have proved to be a blessing as well as a constraint to REs. Under the harsh environment, REs learned how to survive in the real market. Meanwhile, the industrial and urban reforms started in 1984 gradually dismantled the plans and enlarged the scope for REs' activities. The result of the initial urban reform was a dual price system that maintained a planned price and a market price for every industrial

product. Although rent seeking was rampant under this dual system, it had released a large portion of resource allocation to the market and served as a bridge for smooth transition to a market economy. The rural industry benefited from this transition. Now, REs could buy production materials in the market and broke into the markets originally monopolized by the state enterprises such as textile and garment markets. Entering the nineties, almost all the industrial products have been priced in the market, and REs and SOEs alike have since been equal in terms of the access to materials and product markets.

The entrance of REs into traditionally state-dominated industries raised competition in factor markets as well as in product markets. Concerns were raised as to whether resources were wasted by their shift of use from more technically sophisticated state enterprises to less technically sophisticated REs. For example, when addressing the problem of REs, a report issued by the State Council in 1990 stated: “Compared with large and medium enterprises, their (small enterprises’) technology is backward, their consumption of materials and energy is high, and their product quality is low.” “They compete with large and medium enterprises for materials, energy, capital, and markets, making large and medium enterprises not able to fully utilize their production and technical potentials. From a social point of view, this trend of smallization and diversification will inevitably aggravate the inefficiency in industrial production.” (State Council, 1990). Other people blame REs for the sluggish growth of large enterprises and the technology intensive sectors, and call the flow of capital to REs “adverse allocation” of resources (Yin, 1997). With these concerns as one of the excuses, the conservatives have launched several attacks on the REs (see the previous section for details).

It is true that most of the REs are technically inferior to the SOEs, but this gap has been narrowed as time passed. Table 13, adopted from Wu (1992), shows the TFP indexes and their growth rates of the SOEs and the REs in the 1980s. On average, REs were 49% less technically efficient than the SOEs in the 1980s. However, the TFP growth rates of the REs were much higher than the SOEs'. As a result, the gap of the technical efficiency between the two groups of firms had been narrowed quickly. The REs were 61% less efficient than the SOEs in 1980, but the gap was narrowed to 41% in 1988. Although direct calculations for the nineties have not emerged, Wang and Yao (1998) showed that the gap between large firms, most of which are SOEs, and small firms, most of which are REs, was 35% in 1995.

The above quoted technical gaps between SOEs and REs may only reflect the gap between large and small firms, but not that between SOEs and REs *pe se*. Yao (1998) tried to disentangle the roles of firm size and ownership in determining the gap. He showed that small firms were indeed 49% less technical efficient than large firms, but collective firms, most which are REs, were 22% more technical efficient than state firms. In addition, collective firms had a spillover effect within a specific industry: a one percent increase of the number of collective firms in an industry would increase the technical efficiency of every firm in that industry by 0.2%. These results are illuminating and important for the making of sound government policies. Realizing that the technical backwardness of REs is not caused by their location and affiliation, but by their smallness, the harsh measures toward REs in early nineties were largely not warranted. To remedy the problem, more attention should be directed toward eliminating the disadvantages faced by small firms, such as their limited access to formal loans due to information asymmetry, lack of skilled personnel and information, and so on.

It is noteworthy that the TFP index does not reflect a firm's allocative efficiency which measures its ability to respond to price signals. Unfortunately, there has been no empirical study comparing the allocative efficiency of the SOEs and the REs. However, the reality that REs are flourishing with limited technical capacities and SOEs are shrinking with ample technical capacities may well imply that REs have higher allocative efficiency than SOEs. The

Chinese government is still very much occupied by the technocratic view of the economy that puts a skewed weight on the technological side of the economy. It is imperative for the policy makers to realize that allocative efficiency, if not more important, is at least as important as technical efficiency.

(5) Regional Diversity

As one expects, China's RE development is quite uneven across regions. As Table 3 shows, the share of the RE output in total rural social output varied from 86% in Shanghai to 4% in Tibet, and the average of the first group with higher shares was 35 percent more than that of the second group with lower shares. Several factors may have contributed to the huge regional diversity in China's RE development. Here we discuss three most important of them, initial conditions, location, and factor endowments.

Recent growth theory suggests that, other things equal, initial conditions are critical for a country's future development. This has much to do with the positive externalities possessed by some factors (such as human capital) that are unevenly distributed across countries at the initial stage. China's coastal provinces had two advantages over their counterparts in inland areas in the late 1970s. One is that commercialization in these provinces was much earlier than other provinces in recent history following their partial colonization by the world powers in the late nineteenth century. Before 1949, the economy of the coastal regions was centered at several large commercial cities such as Tianjin, Shanghai, and Guangzhou through which China was linked with the rest of the world. In the Yangtze River delta, the rural economy was closely tied with Shanghai, rural non-farm income, coming mostly from raising silkworms, and to a less extent, from other sideline activities and local silk factory jobs, surpassed farm income even in the 1930s (Cao, 1996). This long history of engagement in commercial activities nurtured entrepreneurship that is vital in the RE development in the late stage.

The other advantage that many of the coastal provinces had over other provinces was that they had a lighter industrial structure in the late 1970s. In the planning era, a large proportion of the national investment was placed in central and west regions (the so called second and third fronts) due to the consideration of balanced development and, more importantly, of preparation for war. Most of the factories thus established were in heavy industry. As a result, the industrial structure of the inland areas was heavy industry-biased compared with the coastal areas. A lighter industrial structure, however, was more consistent with China's comparative advantage and made the diffusion of technology to the REs much easier in the coastal areas. Take the example of Jiangsu and Liaoning. Liaoning is one of the industrial centers in China. With most of its large factories being in heavy industries, however, its RE development at the initial stage was behind that of Jiangsu. In 1980, there were 75,600 REs in Jiangsu, whereas there were only 33,200 in Liaoning.

A good location means better access to markets, information, and foreign capital. In this regard, the coastal provinces have an overwhelmingly advantage over the inland provinces. The most prominent example is Guangdong whose inch's distance with Hong Kong and Macao gives it a big lift to its RE development. The development of the REs in Guangdong generally experienced two stages (Zhe, 1997). In the first stage, local villages used their access to land to build standard factory buildings to provide Hong Kong and Macao businesses with a production base. The combination of outside markets and cheap local labor, local economy flourished quickly. With the rent collected on the buildings and income from employment in the factories and related services, local villages completed the initial capital accumulation. Then, in the second stage, they began to use the capital accumulated to

establish their own factories, some of which have been quite successful and are producing brand products with national and even international reputations.

Factor endowments may be the most significant element in explaining the regional diversity of RE development in China. The provinces that started earlier and have been taking the lead in RE development are those located in the coastal areas where labor is much more abundant relative to land and other natural resources than the inland areas. The last three columns of Table 14 show the amount of per capita arable land of all the provinces in 1987 and 1995 and their changes. Specifically, the provinces are divided into two groups, one consists of the coastal provinces and municipalities, the other consists of the rest. The average per capita arable land of the first group was only 54% of that of the second group in 1987. In 1995, the average per capita arable land of the latter group was increased by 6.2% due to new claim of waste land, and that of the former group was decreased by 4.6%, so the gap between the two averages was enlarged (with the former being 51% of latter). The division of labor based on regional comparative advantage thus requires that the inland areas specialize in agriculture and resource related industries, and the coastal areas specialize in labor intensive industries in which the REs have considerable comparative advantage. This largely explains why the provinces in the coastal areas had more successful REs. In addition, for the three inland provinces that are in the group of higher shares of non-agricultural output, Shanxi and Shannxi are rich in coal reservation and many of their REs are small miners; and Sichuan is China's most populous province whose per capita arable land is around 0.08 hectares, even less than many coastal provinces (Table 14).

The different factor endowment ratios of the coastal and inland provinces resulted in the different capital intensities of their REs. Table 15 lists data of two years to show the differences. The average per worker capital stock of the inland provinces was 65% of that of the coastal provinces in 1987. Between 1987 and 1995, capital stocks of the coastal provinces increased by 154% on average, but those of the inland provinces increased only by 108% on average. As a result, per worker capital stock of the inland provinces as percentage of that of the coastal provinces was reduced to 54%. This change was consistent with the dynamic changes of the comparative advantage in these two regions. As we have already discussed, per capita arable land decreased in the coastal regions, but increased in the inland regions in the period of 1987 to 1995. Also shown in Table 14, GDP per capita increased much faster in the coastal provinces than in the inland provinces and the gap between them increased from 1521 yuan, or 1.25 times of the per capita GDP of the inland provinces itself, to 2950 yuan, or 1.46 times of the inland GDP itself. In a dynamic framework, per capita GDP is a good proxy for the endowment ratio between labor and capital as the increase of per capita GDP means that either capital has increased more than proportional to the increase of labor force, or there have been technological changes that are brought about by the increase of capital stock. Therefore, the difference between the growth rates of the capital intensities in the coastal and inland provinces was consistent with the changes that happened to their factor endowments of labor and capital.

4. Public vs. Private Firms: Theories and Evidence

As we showed in the last section, public ownership has playing a diminishing role in RE development. This observation, though, does not excluded the possibility that public ownership played a significant role in the early stage of RE history. Large efforts have been devoted to theorizing the positive role of the local government in RE development, and a number of studies have tried to find empirical evidence supporting these theories. However, there are also dissident voices refusing the role of the local government, and a few empirical

studies have lent supports to them. Since the implications of this debate are well beyond China and especially pertinent to the current rethinking of the East Asian miracle, we devote this section to review the theories and empirical findings on both sides.

4.1. *Theories*

The theories that advocate a positive role of the local government can be roughly grouped into three categories.⁸ The first category sees local government's involvement as a solution to a planning problem considered by the central government. More realistically, the second category sees government ownership as a second best solution in the presence of market imperfections and policy distortions. The last category argues that the vaguely defined property rights in REs emerges from the cooperative culture in the Chinese village. We discuss these three categories of theories in turn.

Chang and Wang (1994) represents the first category of theories. They argued that the involvement of the local government in local industrial firms is an optimal solution of a mechanism design problem faced by the central government under the constraints of maintaining the current political structure and giving localities enough incentives. The first constraint explains why the government likes collective ownership more than pure private ownership; the second constraint explains why it prefers collective ownership to state ownership. As such, local government ownership becomes an optimal mechanism to improve social welfare. This explanation, however, gives the central government too much a positive role in the property rights evolution at the local level. The central government's role in rural initiatives has been by large passive, that is, to sanction what has been proved to be successful.⁹ Chang and Wang's explanation at best is an ex post rationalization of what has been successful.

The second category of theories tried to link the local government ownership with imperfect market and policy environments. For example, Li (1994) showed via a theoretical model that the vaguely defined ownership of the REs is an optimal institutional arrangement under gray markets, namely, markets in which government interventions and rationing prevail and some transactions are prohibited (Fan, 1988). From another point of view, Che and Qian (1998) provided a theoretical rationale for the existence of local government ownership of the REs, namely, local government ownership sets a firewall preventing the central government's financial expropriation of the REs. In addition, Li (1997) showed theoretically that the government ownership provides a self-enforcing mechanism for incomplete contracts via a hostage relation and competition. From the empirical side, Zhao (1997) summarized the potential benefits of the local government ownership in imperfect market and policy environments as follows: (i) preferential tax treatment; (ii) easy and low interest bank loans; (iii) access to land; (iv) access to materials; and (v) consumer trusts. To a large extent, these potential benefits provide a strong rationale for the REs to adopt the local government or vaguely defined ownership. What is missing in the theories is the history of the RE development that we outlined in the last section and will come back again later.

⁸ Theories beyond the three categories also exist. For example, Oi (1992) put the local state corporatism, a term she coined for the combination of the local government and enterprises, in the context of China's fiscal decentralization process that started in the middle of eighties and argued that it was this process that enhanced the local government's incentives to engage in local economy.

⁹ For example, the HRS reform was initiated by localities starting from 1978 and had not been sanctioned by the central government until it was proved economically successful and politically acceptable in 1982. See Liu, Carter, and Yao (1998) for a detailed description.

Weitzman and Xu (1994) represents the third category of theories. They argued that REs are labor cooperative firms with vaguely defined property rights that are based on a cooperative culture established through the play of a multiple stage game. They also contended that the success of the vaguely defined property rights possesses a challenge to the classical property rights theory. Putterman (1997) further suggested that labor management is the direction for future property rights reform for the REs. The culture view may have captured part of the reasons that lead to REs' success, but it is far too general to explain why government ownership was adopted. For one thing, cooperative culture in inland villages is certainly not weaker than in coastal villages, but a stark fact is that REs are far more successful in the coastal areas. In addition, as our discussion in the last section showed, REs are not evolving in the direction suggested by Putterman, rather, they are heading to partial or full privatization.

The second category of theories merits some further discussion as most theorizing efforts fall in this category. Admittedly, the rationalization of local government ownership as a response to market and policy imperfections is valid to the extent that it is a correct description of what is optimal under certain conditions. The danger, however, is that the rationalization might lead to the rationalization of the conditions themselves. The potential benefits provided by local government ownership, as listed by Zhao (1997), are tied to the ownership only because government policies are distorted. With these distortions removed, the benefits could hardly be counted as benefits anymore, and it is hard to justify the existence of the local government ownership from this perspective. Similarly, as market distortions are being remedied, the argument based on market failures could no longer stand for tests either.

All the three categories of theories overlooked the history of the RE development, yet the government ownership might be a natural consequence of that history. As Putterman (1997) pointed out and our review in the last section showed, REs started as *shedui qiye*, or commune and brigade enterprises, in the collective era. In the initial stage of the reform period, most of China's rural areas were taken by the energy newly released by the agricultural reform and occupied by agricultural production. The places that had the capacities to develop REs were those that had relatively successful commune and brigade enterprises in the past and understandably more powerful local governments. Jin and Qian (forthcoming)'s empirical study provided strong evidence supporting this assessment.¹⁰ The theoretical models at best describe why the government ownership, given its existence at the first place, survived in the subsequent years. In addition, all these models fail to explain why there exist huge regional diversities in RE development although all of them claimed that they found the reasons for successful RE development. In explaining the success and regional diversities of the Chinese REs, the old theory of comparative advantage seems to have more power.

Reviewing China's economic development since the 1950s, Lin, Cai and Li (1994) showed how derailing from China's comparative advantage led to the country's economic dismal in the planning era, and how aligning with its comparative advantage has lifted it to the track of fast economic development. As we showed in the previous section, China's

¹⁰ They also found evidence supporting the theory of Che and Qian (1998), that is, public ownership is more likely to emerge in provinces where central government interventions are heavier. However, the proxies they used for central government interventions are problematic. One of them is state supply of credits. As Che and Qian themselves have acknowledged, this variable is endogenous. The other proxy is the per capita state industrial real output. This variable, as we view it, does not measure the state intervention in the rural areas. As our review in the last section showed, the presence of more state industry in a province, if they have right structure in terms of capital intensity, are complementary to rural industry by supplying technologies and information.

comparative advantage rest clearly in labor intensive industries. Apparently, the heavy industry-oriented development strategy adopted in the planning era did not follow these comparative advantage. Although the strategy accumulated considerable physical capital and a relatively-well trained workforce, it entailed tremendous waste of resources and compared to other East Asian economies such as Taiwan and South Korea, resulted in much slowed and unbalanced economic development. The biggest change to China's sectoral and development policy in the reform era has been the abandonment of the heavy industry-oriented development strategy. REs benefited from this shift. By following the relative factor scarcities in the economy, they have registered remarkable success and endurable variability. This was shown in Lin and Yao (1999) studying the same data set used in this paper. They found that the provinces whose RE capital/labor ratios are closer to their respective per capita capital endowments have larger per capita RE output. In addition, as we showed in the last section, the regional diversity of RE development is a mapping to the different factor endowments in different regions.

4.2. *Empirical Evidence*

Empirically, an interesting and frequently studied issue is whether the local government ownership is more efficient than pure private ownership. Two sets of results have emerged in the literature. One set shows that there is no significant difference between government firms and private firms in terms of productive efficiency. Using a firm level panel dataset of 122 firms in the period of 1975 to 1986, Svejnar (1990) estimated a production function with labor and capital as inputs and several dummies as corrective variables, and found that ownership does not play a significant role in contributing to output. Working on a panel dataset of 200 firms in the period of 1984 to 1989, Pitt and Putterman (forthcoming) compared the efficiency of collective and private firms in their wage and employment determination. They compared firms' actual wages and employment levels with their corresponding figures under the assumption of profit maximization and found that the differences do not depend on the ownership type. Dong and Putterman (1997) studied a subset of the previous dataset in order to compare the technical efficiency gap between private and public firms. They estimated firms' technical efficiency based on the estimation of a stochastic frontier production function. Their results showed that there is no significant difference between private and public firms in terms of technical efficiency. Instead, they found village owned firms have a higher average technical efficiency than private firms. However, they found that ownership type is correlated with the regional dummies, that is, village ownership appears more in developed coastal areas. Therefore, after the regional dummies were introduced, the effect of ownership disappeared. Lastly, Jin and Qian (forthcoming) studied the contribution of public rural firms to government revenue, rural non-farm employment and rural income of China's provincial units. They found that more public-owned firms have a significant contribution to these measures, but do not raise rural income when non-farm employment and/or local public goods provision are held constant. They interpreted their second result by stating that the functions of the public firms rest in employment generation and public goods provision although certain form of inefficiency exists.

The second set of results, however, provides quite different results. Zhang (1997), based on a comprehensive survey of 630 rural firms in Sichuan and Zhejiang province in the period of 1987 to 1989, found that there is a major difference between collective and non-collective firms in terms of budget constraints. While non-collective firms generally face a hard budget constraint, collective firms have a soft budget constraint in the areas of bank loans, inter-firm

arrears, and tax payments. Specifically, a higher proportion of loss-making firms than profit making firms are supplied with increased amounts of bank loans; one third of the profit making and two thirds of the loss making firms have net arrears to other firms; and 40% of the profit making and 75% of the loss making firms have outstanding taxes unpaid to the government. These findings suggest that collective REs behave much like their state-owned counterparts in the cities albeit their problems are disguised by the local governments.

Yao (forthcoming) studied the relationship between rural industrialization and labor market integration in Ningxian county of Zhejiang province. Based on an income maximization model, he developed an econometric method to test market segmentation under the situation where employment choice is characterized by interior rather than corner solutions. His test showed that in the county, where collective firms dominate the economy, there is strong evidence showing that there exists rationing in industrial employment, and the extent of the rationing increases as the degree of local government interventions is raised. Pitt and Putterman (forthcoming) and Xu (1991) found that the actual wages of REs are higher than their marginal products of labor, providing yet another indication of job rationing. However, they did not find systematic differences between collective and private firms.

A recent study by Yao (1998) on a random sample of 14670 firms covered by the Third National Industrial Census conducted in 1995 compared the technical efficiency of firms of different ownership types, sizes, industries, and locations. He estimated firms' technical efficiency based an estimation of the stochastic frontier functions of 12 industries, and regressed the obtained technical efficiency on a set of determining variables among which ownership is one. His results showed that private firms are 57% and 35% more efficient than state and collective firms, respectively. As most of the private and collective firms are located in rural areas, Yao's result on the gap between those two kinds of firms can be taken as evidence showing the efficiency gap between collective and private REs.

5. Econometric Analysis of the RE Development

Empirical studies on China's REs are flourishing. Some of them are general description of the features of the RE development (e.g., Putterman, 1997; Ronnas, 1996; Zweig, 1997). More of them are concerned with the interaction of the RE sector, agriculture, and urban industry (Byrd and Lin, 1990; Wu, 1990; Wu, 1992a; Zhang, 1993; Lim, 1994), efficiency measurements (Wu, 1992; Wu, 1992b; Wu, 1993; Jefferson, Rawski, and Zheng, 1996), and wage and employment determination (Byrd and Lin, 1990; Yao, forthcoming). In the early 1990s, ownership issues became fascinating to intellectual probe and generated fruitful results (e.g., Byrd and Lin, 1990; Dong and Putterman, 1997). A few studies analyze the determinants of the fast development of the REs (Chen, Watson, and Findlay, 1990; Wu, 1992b; Zweig, 1997), but few of them alone constitutes a comprehensive study that either examines the huge regional diversities or tests the various theories emerging in the literature.¹¹ Lin and Yao (1999) studied how the degree of the alignment with their comparative advantage has led Chinese provinces to different performances in RE development. In this section, we will use the same data set used in Lin and Yao (1999) to test the various theories and assessments surveyed in the previous two sections. Every province in China is equivalent to a medium or large country in terms of both territory and population, and tremendous variations exist among them. This provides us with a good opportunity to conduct the tests.

¹¹ Jin and Qian (forthcoming) is close to such a study, but their panel is too short (from 1986 to 1994) to make their study comprehensive because many policy changes happened before 1986.

From the discussions carried out in the last two sections, several testable hypotheses can be formed. They are

- (i) **Initial conditions:** The provinces with favorable initial conditions in rural industry, state industry and its structure, or being close to markets, especially to foreign markets, and foreign capital would have a larger rural industrial sector.
- (ii) **Market conditions:** The provinces with higher income, more urban population, a larger population density, and more transportation facilities would have a larger rural industrial sector.
- (iii) **Human capital:** The provinces with a more educated labor force would have a larger rural industrial sector.
- (iv) **Interaction with SOEs:** The relationship between SOE and RE development is not clear, but a lighter SOE sector would help RE development.
- (v) **Economic reforms:** Economic reforms would accelerate rural industrialization nationwide.
- (vi) **Factor endowments:** The provinces with more arable land and less capital relative to labor would have a smaller rural industrial sector.
- (vii) **Public ownership:** It is not clear whether a province with more public owned firms would have a larger rural industrial sector.

In terms of the main theme of this paper, the last two hypotheses are the most important. In the next subsection, we will define the variables to be used in our tests.

5.1. Variables

We will conduct our tests based on two sets of data. In the Appendix, we present a detailed description of how the two data sets are constructed. The first data set is compiled on 28 provinces in the period of 1978 – 1997, and the second data set is compiled on 15 provinces in the period of 1970 – 1997. In both data sets, the year of 1996 is excluded because only value added RE output is recorded while in other years the gross output is recorded. The number of provinces drops to 15 for the period of 1970 – 1997 because the rest of the provinces do not have data on the output of the rural industry in the period of 1970 - 1977. Even for the remaining 15 provinces, we lack data on some key variables in the period of 1970 – 1977 and have to drop them. We will run our regressions separately on the two sets of data. While the data set of 1978 – 1997 captures a relative normal development path and is enough for the test of most of our hypotheses, the data set of 1970 – 1997 will provide more information on the factors that determine long-run economic development. In what follows, we discuss the variables that will be used in the regressions.

For the period of 1978 – 1997, the dependent variable is the RE output value per rural population (yuan/capita)¹² of each province. The year of 1978 is used as the starting point.

¹² All the monetary measurements are normalized to 1978 yuan. For a detailed discussion of the normalization, see the Appendix.

The initial conditions in that year include three variables and several regional dummies. The three variables are per capita RE output value (yuan/capita), per capita SOE output value in the whole province (yuan/capita), and per worker SOE capital (yuan/worker). The meaning of the first variable is obvious, i.e., accounts for the initial condition of the RE sector itself; the last two variables account for possible impacts of the size and capital structure of the SOE sector. A larger state sector may have more ready technologies to provide to the rural area, and a lighter state sector (less per worker capital) may have more technologies that are suitable for the labor-intensive rural firms. Both factors set a favorable stage for later RE development. To preserve the impacts of the three variables, we will not use province dummies. Instead, following Jin and Qian (forthcoming), we divide the 28 provinces into six regions: Large cities (Beijing, Shanghai, and Tianjin), coastal, south, southwest, northwest, and north. The three large cities are quite different from the rest of the countries because they have much less agricultural population. The coastal region has a longer history of industrial development and commerce. It is also close to foreign capital and markets. South and north are two interim regions, and southwest and northwest are the two most underdeveloped. In the regressions, south will be used as the reference region.

Variables accounting for market conditions are lagged provincial per capita GDP (yuan/capita), urbanization rate (ratio of urban population), population density (persons/km²), the density of roads (km/km²), of paved roads (km/km²), and of railroads (km/km²). The first three variables account for the purchasing power in a province, and the last three account for the convenience of transportation. Roads include paved and unpaved roads. As RE products are mainly sold in the same province, purchasing power in a province is an important factor determining the development of the REs in the province. GDP is lagged to avoid the problem of reversed causality as REs contribute to the current GDP.

We add two variables indicating the openness of a province, per capita export (yuan/capita) and FDI (yuan/capita). Export is lagged because RE export consists of a major part of the total export (see Section 1 for details). FDI is not only a measure of openness, but also a measure of the availability of capital in a province. We do not have data on the amount of FDI going to the rural area; otherwise, we would have added it to the amount of capital available in the rural area.

For human capital, we use the ratio of certified technicians in the RE sector. For the interaction with the state sector, as in the case of accounting for the initial conditions, we use per capita SOE value and per worker SOE capital in a province. Most economic reforms have been carried out uniformly across the country, so their effects are mixed with the time dummies that we will add into the regressions. One exception is the household responsibility system (HRS) that was implemented gradually and unevenly across the country in the period of 1978 to 1983. Therefore, we include a variable measuring the ratio of the villages adopting HRS in each year to account for the effect of this reform. Two other major reforms and policy changes happened in 1984 and 1992 (see Section 2 for details). Their effects can only be gorged by looking at the time dummies.

Two variables are used to measure a province's relative endowments. One is per capita arable land (mu/capita), the other is the lagged per capita capital (yuan/capita), both for the rural area only. We do not have good labor data, so rural population is used instead. Per capita capital is lagged to avoid the endogeneity of this variable. For public ownership, we use the share of the output produced the firms owned by townships and villages in a province's total RE output.

Finally, time dummies are included for the years, with 1979 being the reference year. While these time dummies carry a lot of information ranging from government policy changes to technological progresses, we will use them mainly to gauge the effects of major economic reforms, especially the two in 1984 and 1992.

For the period of 1970 – 1997, we can not construct a complete series for the three transportation variables, ratio of technicians, and per worker SOE capital. While we have to drop the first four variables, we use the lagged output share of light industry in the total industrial output to substitute for the last variable. Compared with the original variable, The new variable has two drawbacks. One is that the share of light industry is a measure for all industry in a province, not for just the SOE sector. The other is that light industry in Chinese statistics is based on products, not reflecting capital intensity in the production process.

The categorizations for RE output before and after 1978 are different. Before 1978, only industrial firms were recorded while after 1978, all kinds of firms (i.e., firms in manufacturing, construction, transportation, and services) are recorded. To get a unified measurement for RE output, we add the output of industrial firms and the output of sideline activities for the years before 1978, and add the output of all firms and the output of sideline activities for the years in and after 1978. Although the statistical scopes of the two periods still have not reached a perfect match, we believe the difference is small. In the next subsection, we will present and discuss our test results.

5.2. Regression Results

We run two models for each data set, one without the regional dummies and one with them. The results of the four models are presented in Table 16. We first discuss the results based on the 1978 - 1997 data set.

5.2.1. Results based on the 1978 – 1997 data set

Except for the RE output value in 1978, all the other variables have similar results in the two regressions without (Model 1) and with (Model 2) the regional dummies. In Model 1 where no regional dummies are present, the initial RE output is shown to have a significantly positive impact on future RE development. However, when the regional dummies are included, this positive impact vanishes, indicating that the initial variations of the size of the rural industrial sector had a strong regional pattern. As the five regional dummies show, while the rest of the three regions are not significantly different from the south, large cities fall much behind, and coastal provinces lead all the others. The leading position of the coastal provinces is not a surprising finding as they generally have better historical backgrounds as well as better accesses to foreign capital and markets. Nonetheless, its difference with the south is not large in economic sense (only 175 yuan/person), indicating that the contribution its unaccounted intrinsic characteristics is not large. The finding that the two west regions (southwest and northwest) are not different from the two central regions (south and north) shows that the backward of RE development in the west is not caused by its intrinsic “backward” characteristics such as the lack of entrepreneurship or the lack of a commercial tradition; rather, it is caused by its inferior market and transportation conditions and other factors explicitly accounted for in our regressions. The finding that the three large cities fall much behind the south (the difference is 1019 yuan/capita) is somewhat surprising. One explanation is that they have much more favorable conditions as accounted for by the

variables used in our regressions, yet these conditions have not been matched by a comparable success.

For the two variables accounting for a province's SOE sector in 1978, the size of the sector does not have a significant impact on future RE development, but the lightness of the sector significantly improves a province's prospect of RE development. The initial conditions of the SOE sector set a stage for technological transfers to the RE sector. The above results show that the initial size of the SOE sector does not matter in this respect, the important factor is how light the SOE sector is. This conclusion lends support to the comparative advantage argument that emphasizes rural China's position in low capital intensity industries.

Having Finished the discussion of the results on the initial conditions, we now turn to the results of the market and transportation conditions. Lagged per capita GDP is the most important powerful indicator for the market demand for RE products. One yuan increase in per capita GDP will induce about 1.70 yuan increase in per capita RE output in the following year. Transformed into elasticity, this means that a one percent increase in per capita GDP brings 1.89 percent increase in RE output (evaluated at the variable means). In contrast, urbanization and population density do not play a significant role. For transportation facilities, the densities of paved roads and railroads are shown to increase RE output significantly. However, RE output is negatively correlated with the density of all roads, a result that is hard to comprehend. When this variable is taken out of the regression, the positive effect of paved roads vanishes. This shows that the two variables are highly correlated (their correlation coefficient is 0.74). Although the effects of both kinds of roads are not large, we learn from the our regression that paved roads are more important than ordinary roads in providing better transportation facilities to the rural industrial sector.

For the two variables measuring a province's openness, lagged export is shown to have a negative effect while FDI is shown have a positive effect, both are significant. The negative effect of export seems to suggest that more foreign demand suppress the growth of the RE sector. Nevertheless, this puzzling result is reversed in the regressions based on the 1970 – 1997 data set. As export in the seventies was quite small, adding these years in the analysis enables us to capture the significant increase of export in the eighties. The positive effect of FDI verifies the importance of foreign capital in financing China's rural industrialization. The elasticity of this positive effect is 0.12 (Model 2), i.e., a one percent increase in the per capita FDI in a province will bring 0.12 percent increase in RE output per rural population.

The variable measuring the human capital stock in the RE sector, ratio of technicians in the labor force, is shown to have significant impact on the size of the sector. This result may arise from two reasons. First, we only have a measure for certified technicians whereas many technicians in the rural areas do not have formal certifications. That is, the variable we use in our regression underestimates the number of technicians in the rural industrial sector. Second, because rural firms are mainly engaged in labor-intensive industries that do not demand a sophisticated labor force, more technicians do not necessarily mean a higher output.

Now, we turn to the discussion of the link between the RE and SOE sectors. Now, not only the lightness of the SOE sector has a positive impact on the size of the RE sector, the size of the SOE sector also has a positive link with the RE sector. The elasticity is about 0.24 (model 2). Although it is not relevant whether a province starts with a large SOE sector, the RE sector benefits from a larger SOE sector in subsequent development.

The adoption of HRS is shown to be highly insignificant. It is noteworthy that the variable HRS has variations only for the period of 1978 to 1983 because after 1983, almost all the villages adopted HRS. As our review in Section 2 reveals, the period of the HRS reform was marked by relative stagnation of RE development. The reform raised agricultural productivity and facilitated the accumulation of the initial capital for the REs' takeoff; nonetheless, its

effect on immediate RE development was weak because the rural areas were occupied in increasing agricultural production.

For the two variables representing a province's factor endowments, per capita arable land is shown to have no significant impact although its sign is negative, and per capita rural capital is shown to have a significantly positive impact. Although in Section 3 we found difference in land endowments between the two groups of provinces that have different levels of RE development, this difference vanishes in multivariate analysis. Capital endowment, as we have emphasized in Section 3, makes a strong difference in the size of a province's RE sector.

Lastly, we come to the function of public firms. It is shown that the share of the output value generated by public firms has a significantly negative impact on the size of the RE sector. According to the estimate in Model 2, a one percent increase in the SOE share means a 0.61 percent decrease in the overall RE output.

5.2.2. Results based on the 1970 – 1997 data set

In the regressions based on the 1970 – 1997 data set, the estimates for per capita GDP, per capita FDI, HRS, per capita capital, and the initial size of the RE sector are qualitatively the same as in the regressions on the 1978 – 1997 data set. We will skip these results and concentrate on the variables that show different results. It is noteworthy to keep in mind that these different results are mainly brought about by adding the data before 1978 into our regression analysis.

China in the seventies was still characterized by a development strategy that was geared toward heavy industrialization. There were also many irrational decisions regarding firm locations. In the sixties and early seventies, in addition to the pressure from the capitalist camp, China was traumatized by a prospect of a war with the Soviet Union. Therefore, many factories were deliberately located in remote inland provinces, in many cases in mountains that was previously not accessible to any modern transportation means. Many of the results shown in our regressions based on the 1970 – 1997 data set reflect this irrationality.

The most significant results in this aspect are for urbanization, population density, and per capita arable land. The first two variables are shown to have significantly negative impacts on the size of the RE sector in a province, and the last variable is shown to have a strong positive impact. These results match perfectly with the firm locating strategy in the seventies that put firms in sparsely populated rural provinces. In addition, the positive link between the SOE and RE sectors disappear although the initial size of the SOE sector and its lightness in 1970 have a positive impact on future RE development. Despite the irrational firm locating strategy, however, the two inland regions plus the north are still shown to fall behind the south that is in turn behind the coastal provinces and large cities.

The new regressions also show several interesting results that deem more discussions. As opposed to the regressions based on the 1978 – 1997 data set, lagged export is shown to have a significantly positive effect on the RE output in the next year. As we pointed out earlier, this is mainly because the new data set captures the fast export growth in after 1978. In addition, the share of public firms becomes irrelevant to the size of the RE sector. This result could be a reflection of the fact that only public firms were allowed before 1978 and the differentiation only began after the reform was initiated.

Most importantly, the new regressions reveal the long-term trend in RE development. While the regressions based on the 1978 – 1997 data set show no clear time pattern, the new regressions show a clear time pattern by which the whole period of 1970 – 1997 can be divided into three sub-periods: 1970 – 1983, 1984 – 1991, and 1992 – 1997. The beginning

years of the last two periods, namely, 1984 and 1992, marked important reforms and policy changes. In 1984, the commune system was formally dismantled, private firms were officially sanctioned, and the urban reform was launched. In 1992, Deng Xiaoping paid a visit to the south and called for the continuation of the reform efforts, ending three year long repressive measurements toward REs. The impacts of these reforms and policy changes are reflected by the year dummies as estimated in model 4. While the year dummies before 1984 are highly insignificantly different from the starting year 1971, those in the period of 1984-1991 are weakly significant, and those in the period of 1992-1997 are all highly significant. With 1984 as the dividing point, the average of the year dummies before 1984 is 135.5, and the average after 1984 (1984 included) is 771.6. The F statistic for the test that the two averages are different is 4.01, larger than the critical value at the 5% significance level. With 1992 as the dividing point, the average of the year dummies before that year is 282.5, and the average after that year (1992 itself included) is 116.58. The F statistic for the test that the two averages are different is 16.72, larger than the critical value at the 1% significance level. While the year dummies carry a lot more than just the impacts of policy changes, the match of the estimated time pattern and the timing of the reforms and policy changes can not be explained as merely a coincidence.

With the discussions of the regression results concluded, we are at a position to assess the validity of the hypotheses we proposed at the outset of this section. We have verified most of the claims in hypothesis (i) except that the initial size of the RE sector is shown not to matter very much. Instead, we have found strong regional variations with the coastal provinces being unambiguously in a more advantageous position than the rest of the country. For hypothesis (ii), we have found that income is the most powerful demand factor that drives faster RE development. Transportation facilities are also shown to make a significant contribution. Related to this hypothesis, we have found that engaging in world trade and receiving foreign direct investment help a RE development in a province. We do not find supporting evidence for hypothesis (iii), partly because we do not have adequate data to measure human capital stock in the RE sector. For hypothesis (iv), we find strong evidence in the period of 1978 – 1997 that a larger and a lighter SOE sector helps a province to develop a larger RE sector. The positive effects of the economic reforms, as stated in hypothesis (v), are verified in the case of the reforms in 1984 and 1992. For the hypothesis concerning factor endowments, i.e., hypothesis (vi), strong evidence is found to support the claim concerning capital endowment, but only weak evidence is found for the claim on land endowment in the period of 1978 – 1997. For the last hypothesis on the role of public ownership, we have found strong evidence that more public element in a province has a negative impact on its RE sector for the period of 1978 – 1997. However, this negative role vanishes when we extend our data set to include the period of 1970 – 1977. This latter finding could be explained by the fact that only public firms were allowed before 1978.

6. Chinese Rural Industrialization from an East Asian Perspective

To what extent can the Chinese experience of rural industrialization fit into the broad picture of East Asia? China surely has its unique features that are rooted in its planning past as well as related to its current transition to a market economy; more importantly, however, it has broad commonality with the initial industrialization processes of two East Asian economies, Japan and Taiwan. Common to these three economies, rural industrialization took a road of the establishment of small, labor-intensive, and indigenous firms in the rural areas. In addition, rural industrialization started at the very beginning of the three economies' takeoff period. This is sharply contrasted with other East Asian economies such as Korea,

Thailand, Malaysia, and Indonesia that adopted government policies advocating the establishment of large urban firms. Starting in early eighties, some of the countries such as Korea and Thailand began to try to disperse the urban industry into the rural areas. Korea seems to have succeeded in this regard (Otsuka and Reardon, 1998),¹³ but the situation in Thailand remains largely unchanged (Poapongsakorn, 1995). For categorization purpose, we will dub the strategy adopted by China, Taiwan, and Japan the indigenous strategy, and the strategy adopted by the other countries the push strategy. There have been many studies addressing the East Asian experiences, comparing them with the rest of the developing world as well as among themselves (besides the World Bank's review *The East Asian Miracle*, see also White, 1988; Hughes, 1988; Amsden, 1989; Ranis, Hu, and Chu, 1998; Hayami, 1998; Hayami and Aoki, 1998; to name a few books). There are two schools emerging from the literature. The neoclassical school treats the East Asian success as the triumph of the free market and a limited government, the developmental states school emphasizes the role of government interventions (White and Wade, 1988). The first school ignores the heavy government interventions presented in the East Asian economies, the second school fails to explain why government interventions did not succeed in other developing countries, noticeably, those in Latin America. Lin (1996) tried to reconcile the two schools by arguing that the East Asian success has been brought about by the alignment of the comparative advantage in each economy. In this section, we will further Lin (1996)'s argument by examining the two development strategies adopted by the East Asian countries. It is not our intention to provide yet another complete comparison, though. Instead, we will only present a selective comparison that is pertinent to the topic of rural industrialization, taking Taiwan and China as the representatives for the indigenous strategy and Korea and Thailand as the representatives for the push strategy.

The contrast between Taiwan and Korea has received especially strong attention (e.g., Ho, 1979; Saith, 1987; Kutznets, 1988; and Otsuka and Reardon, 1998), partly because they are among the first four East Asian economies that attained the status of newly industrialized economies (NIEs) in a short period of time. While the neoclassical school emphasizes the function of the free market and a limited government in the two countries' rapid growth, the developmental states school emphasizes their commonalities in successful government interventions. However, besides export-orientation, the two economies differ more than they share.

Although both economies experienced a period of import substitution in the fifties when both of them adopted very similar policies, i.e., low interest rate, overvalued currency, taxation on agriculture, etc., government interventions in the subsequent years diverged widely in the two economies. In Korea, the government maintained a very active industrial policy. The government never hesitated to direct private investment to certain industries that it thought were vital for the whole economy (Luedde-Neurath, 1988). While acknowledging Korea's gradual move from labor-intensive industries to capital-intensive industries, Amsden (1989) emphasized the government's role in bringing about the leap between two consecutive stages of development, in many cases by deliberately setting the relative prices "wrong". Large conglomerates were encouraged in steel, shipbuilding, heavy chemicals, and auto industries. To ensure that these large firms got enough capital, the government tightly controlled the financial system (Luedde-Neurath, 1988). As a result, the Korean industrialization was overwhelmingly concentrated in and around two cities, Seoul and Pusan, and the development of the rural areas was retarded.

¹³ Nugent (1996) showed that the reversal was made possible by the changes of Korean government's financial policies toward a friendly environment for smaller firms.

Contrasting to Korea, Taiwan took a much decentralized strategy. Although it also used selective policies to promote certain industries (such as heavy chemicals in the sixties), government interventions were much less than and the form was much different from those adopted by the Korean government. Instead of economy-wide control of private investment, the Taiwanese government adopted government ownership in key industries such as heavy chemicals and steel. The private sector was largely left intact. This created ample room for rural indigenous industrialization. One indicator for the two different development strategies is the different firm sizes in the two countries. In 1981, the average urban firm in Korea hired 67.8 workers, and the average rural firm hired 51.5 workers. In the same year, the average Taiwanese urban firm only hired 31.8 workers, and the average rural firm only hired 18.1 workers (Otsuka and Reardon, 1998).

Why the two economies adopted different strategies to industrialization? Saith (1987) provided an answer by tracing to the initial conditions faced by the two economies. Both were colonies of Japan before the Second World War, but Taiwan enjoyed a much higher level of rural infrastructure development than Korea. This had much to do with Japan's strategy to develop Taiwan as an agricultural colony complementary to its own industrial development. In addition, Taiwan also enjoyed a favorable agro-climate that allowed it to have a much diversified and profitable agriculture whose surplus provide vital initial capital for rural industrialization. Korea had not such a luck. It maintained a mono-agriculture centered at expensive rice production. Lastly, although both had a land reform, Taiwan gave much more initiatives to the locals than Korea did. However, while these factors definitely played a role in setting the two countries' initial development paths, our discussion above shows that subsequent government policies in Korea have aggravated the problem and created new problems. In what follows, we will provide a comparison of China and Thailand to put forward some new insights on the government's role as well as to further Saith's arguments.

Both China and Thailand are still under the way of rural industrialization, yet their approaches are quite different. While China largely takes the indigenous strategy, Thailand takes the push strategy. The word "takes", though, is somewhat misleading as it seems to suggest that the two governments consciously select the different strategies. This was at least not the case for China because the fast development of the rural industry in the eighties came as a total surprise to its leadership.¹⁴ In Thailand, the government was more conscious in adopting deliberate policies encouraging the development of large firms and geographical concentration. In what follows, we will show that while this difference is consistent with the different initial conditions and factor endowments the two countries have, government policies have reinforced the trend of large establishments and geographical concentration in Thailand.

Both China and Thailand were predominantly agricultural at the outset of their rural industrialization in the sixties and seventies. Rural population accounted for 80% of China's total population for a long period of time before the eighties. In 1960, rural employment accounted for 90% of the national total (Krongkaew, 1995). However, two significant factors differentiated the two countries.

¹⁴ The Chinese former leader Deng Xiaoping once told a reporter: "Generally speaking, our rural reforms have proceeded very fast, and farmers have been enthusiastic. What took us by surprise completely was the development of township and village industries. The diversity of production, commodity economy, and all sorts of small enterprises boomed in the countryside, as if a strange army appeared suddenly from nowhere. This is not the achievement of our central government. Every year township and village industries achieved 20 percent growth...This was not something I thought about. Nor had the other comrades. This surprised us." (*People's Daily*, June 13, 1987)

One is that China had more favorable initial conditions in terms of infrastructure and initial accumulation. This had much to do with more than twenty years of collective economy in rural China. The collective economy, despite its well-documented inefficiency, had accumulated a considerable size of public goods in roads, electricity, and basic health care. In addition, the commune and brigade enterprises that thrived in the seventies laid a firm foundation in parts of rural China. Lastly, the existence of a large state sector, especially in provinces with a lighter industrial structure, has provided the rural industrial sector with needed technologies and human capital. In contrast, Thai rural industrialization started almost from scratch. Even the import-substitution strategy pursued in the sixties did not improve the situation in the rural area. This contrast of initial conditions is parallel to that between Taiwan and Korea as suggested by Saith (1987).

The other factor is that China and Thailand had and still have different land endowments. While China is well known for its tight land endowment, land is relatively abundant in Thailand. Until the mid-eighties, the average area cultivated per farm household in Thailand was increasing because of land abundance (Poapongsakorn, 1995). Most of the new land came from claims of forest land which nominally belongs to the king, but was *de facto* open land until very recently. The abundance of land sets Thailand's comparative advantage in agricultural production, especially in its traditional product, rice. This largely explains why Thailand remains a major rice exporter in the world market. Land abundance holds up labor force. In addition, because private claim of the margin land was illegal, the squatters had to stay on their newly claimed land by building a household. This further retarded the development of the rural industry as well as permanent migration to the cities.

The different development strategies adopted in China and Thailand are largely consistent with their different initial conditions and land endowments that we have just discussed. In China, land is scarce relatively to labor in almost every province, setting an incentive for them to develop nonagricultural activities, albeit to various extents depending on their relative land scarcities compared to other provinces. In addition, relatively favorable initial conditions in the rural areas facilitated the establishment of indigenous industrial firms. Together, these two factors made the decentralized rural industrialization possible in China. This was by no mean a conscious choice of the Chinese government. Although it was reverting the heavy-industrialization strategy at the beginning of the eighties, it never expected the rural industrial sector to become a major contributor to the national economy. Rather, as in the case of many rural reforms, rural industrialization was initialized by the localities in a spontaneous way.

In Thailand, the lack of a solid foundation in the rural area and land abundance were conducive to industrial concentration, at least at the early stage of industrialization when higher labor costs around Bangkok were more than offset by the scale externalities it provided. However, the differences in initial conditions and land endowment are not the end of the story. While China has also maintained financial and other policies that discriminate against small rural firms (see Section 3 for details), these policies have not halted the growth of the rural industrial sector. This should be attributed to the local public accumulation in the planning era and private accumulation benefited from the agricultural reform. The situation in Thailand is quite different. Without solid capital accumulation in the rural area, biased government policies aggravated the concentration of large firms.

Before 1960, the Thai government pursued a development strategy that was characterized by state capitalism. Accepting the World Bank's then state-of-the-art advice of import substitution centered at private investment, the Thai government gave up the state capitalism approach and enacted the investment law that encouraged private and foreign investment (Falkus, 1995). Under the law, large firms engaged in import substitution enjoyed

tariff exemption on imported capital goods and raw materials, permission to export manufactured products, repatriate profits and so on. In addition, there was a minimum wage law that discouraged employment. As a result, large and capital intensive firms emerged and dominated their respective industries (Tinakorn, 1995). In addition, large firms needed better infrastructure, so industrial concentration in and around Bangkok was reinforced. Apparently, this trend deviated from Thailand's comparative advantage at that time. As a natural result, the import substitution strategy encountered problems at the end of the sixties because of continuous trade deficit and insufficient domestic market. Government policy shifted to promote exports. The size limit for preferential treatments was lowered and a spatial industrial policy was adopted to disperse industries away from Bangkok. However, several factors still hinder the development of small firms in the rural area. First, the Thai fiscal system is still very centralized, depriving local provinces of the capacities to improve their investment environments. Second, there is still a size limit and a substantial application fee for the eligibility of the privileges. Thirdly, firms located in industrial estates are easier to get the privileges. Because the land price of the industrial estates is usually two to three times price elsewhere, the policy clearly discriminates against small firms. Lastly, the minimum wage law raises labor costs, discouraging new firms to be established in rural areas. Consequently, industrial dispersion has not come about as 35% of the enterprises were still located in Bangkok by 1995 (Poapongsakorn, 1995).

Although the development records of both the indigenous and push strategies are remarkable, there are considerable gaps between them in specific areas. The most prominent is income distribution. While China's Gini coefficient of 0.20 could be attributed to its long history of egalitarian distribution in the planning era, the information presented in Table 17 on eight East Asian NIEs is illuminating. The table, adopted from Riedel (1988), shows the ranks of the eight economies in a comparison of 34 developing economies in terms of growth and income distribution in 1985. The ranks are based on Border count, a rule that aggregates multiple criteria into a single rank ordering. As it is clear in the table, the ranks of income growth alone and income growth and distribution together are much more compact than the rank of income distribution alone. While Taiwan occupies the first place for all the three ranks, Korea is fourth for income growth, but eighth for income distribution. Other countries following Korea's strategy are even worse. For example, in terms of income growth alone, Thailand and Indonesia stand 10th and 8th, but in terms of income distribution, they are 15th and 16th, respectively. Some authors (e.g., Wade, 1988) argued that the more equitable income distribution in Taiwan was a result of the conscience of the Chinese culture that regards income inequality a more serious problem than poverty. If that had been true, we would have seen more re-distributive measures being adopted by Taiwan than other economies such as Korea, yet no such evidence has been found. We contend that the more equal income distribution in Taiwan, like we have argued for the case of China, was a result of its indigenous nature of industrialization.

In addition to income distribution, the two different strategies to industrialization also have long-lasting effects on the adopters' economic performances. It is not a coincidence that Taiwan stood out as the single economy in East Asia that has a convertible currency, yet was not affected by the East Asian financial crisis.¹⁵ While the crisis was triggered and in most countries confined in the financial sector, the development strategy of encouraging the establishment of large firms and conglomerates should take the blame of resulting in an

¹⁵ Certainly, Taiwan is more prudent in opening its financial markets. For example, it still maintains quite restrictive regulations toward short-term foreign loans and foreign banks' operations in its territory. Recently, its currency was also devaluated, but not as a direct result of the financial crisis; rather, it was caused by the sluggish demand in the other East Asian countries.

unbalanced industrial structure and a weak financial system. First of all, many of the large firms, especially those in Korea, have been established to explore the so-called dynamic comparative advantage, that is, the comparative advantage that a country would possess in the future. However, any planning concerning the future has to bear a risk of making the wrong prediction about the future. As a result, the comparative advantage thought to come may never come. The contrast between Taiwan and Korea's approaches to the auto industry is illuminating. Taiwan specializes in making auto parts and firms enjoy a large margin of profits. Korea produces whole car, but firms' profit marginal is minimal. Yet, until after the financial crisis, the government, with its control of the banking system, kept pumping credits into those large firms. The government's supports also sent a wrong signal to foreign lenders that these large firms could not fall easily. This in turn encouraged irresponsible borrowing. As a result, the average debt-equity ratio of the 30 largest conglomerates reached 350%, and some of them even reached 1200%. Similar situation happened in Thailand. Although the Thai government does not have a strong control of the country's financial system, its biased policies encouraged large and capital-intensive firms to dominate the economy. The high debt-equity ratio can only be sustained if new credits keep coming. However, foreign capital sniffed the problem and began to draw out. Thus the ball of the crisis began to roll.

China also has huge problems in its state sector and the financial system. It is fortunate that China has aligned with Japan and Taiwan to follow the indigenous rural industrialization strategy in the last twenty years. The indigenous strategy has created a non-state sector that is largely out of the sphere of the state financial system. In addition, the new non-state sector has become a major source to generate new employment, accommodating both the new labor force and those laid off by the state sector. Consequently, the task of solving the problems in the state and financial sectors is made less daunting. The new amendment to the constitution to be approved this spring emphasizes that the private sector is an important part of the overall Chinese economy, raising its status to the par of the state sector. This new move sets a brighter stage for the private sector's future development.

Appendix

In this appendix, we present a detailed description of our data. As we mentioned in the text, we have constructed two data sets, one for 28 provinces in the period of 1978-1997, the other for 15 provinces in the period of 1970-1997. In the first data set, Hainan and Tibet are excluded, and Chongqing is added into Sichuan. The second data set includes Beijing, Tianjin, Hebei, Shanxi, Shanghai, Jiangsu, Zhejiang, Anhui, Jiangxi, Hubei, Hunan, Guangxi, Sichuan, Shannxi, and Ningxia. All of the data on REs are taken from *Rural Statistical Yearbook of China* (from 1987 to 1997) and the Ministry of Agriculture. Other data, such as population, the share of light industry, cultivated land, export, FDI, and so on, are taken from *Chinese Domestic Production: 1952-95*, *Quanguo Ge Sheng Zizhiqu Zhixiashi Lishi Tongji Ziliao Huibian: 1949-1989* (*Historical Records of Chinese Provinces, Autonomous Regions and Municipals: 1949-1989*), *China Agricultural Yearbook* from 1978 to 1990, *China Rural Statistical Yearbook* from 1986 to 1997, and *The Statistical Yearbook of China* from 1983 to 1998. All the financial measures are measured by 1978 prices. Two kinds of price deflators are used for various variables. One is the price index for specific items such as the rural retail price index for industrial products and the price index for fixed capital. The other is constructed by us. For example, we construct a GDP deflator for each province by comparing the province's real GDP and nominal GDP. This deflator is used to deflate per capita exports and other variables. In what follows, we describe how some of the variables used in our regressions are constructed (for the variables not discussed, the description in the text is enough).

Per capita RE output value. For the period of 1985-1997, it is the gross output value of all REs. For the period of 1977-1984, data on private firms are not available, so we only account for the output of the collective enterprises. For the period of 1970-1976, the figure is the sum of the output value of rural industrial enterprises and the value of sidelines. As we explained in the text, when we work on the data set of 1970-1997, we add the value of sidelines to the output value of REs for the years after 1976 to obtain a more consistent measure. The deflator we use for this variable is the rural retail price index of industrial products in each province.

Paved roads. Starting in 1996, the official statistical publications no longer publish data on paved roads. We use the sum of class one and two roads and highways for 1996 and 1997.

Share of technicians. Data for 1987, 1990 and 1991 are not available. The 1987 data are fit in by the average of 1986 and 1988. To recover the data for the other two years, we assume the number of technicians grew with a constant annual rate from 1989 to 1992.

Share of light industry. For the period of 1978-1997, the share is based on the gross output value of industrial enterprises at the township and above. For the period of 1970-1977, it is based on the gross output value of all the industrial enterprises in a province.

Export and FDI. They are converted into Chinese RMB. From 1970 to 1986, the official exchange rates are used; from 1995 to 1997, the weighted averages of the official and swap exchange rates are used. Export is deflated by the GDP deflator of each province, FDI is deflated by the price index of fixed assets.

SOE output value. It is deflated by the industrial GDP deflator of each province.

Per capita capital in the rural area. From 1985 to 1997, it is the sum of productive fixed assets owned by REs and rural households. From 1977 to 1980, it is the fixed assets of the communes. Data before 1977 are not available. To get a complete series of data, we use the smoothing method used by Fan and Pardey (1997) to fill the missing data. For the years before 1977, we assume that the growth rate of the productive fixed assets in each province is constant from 1970 to 1980. So the average growth rate from 1977 to 1980 is used to backward recover the data of each province before 1977 using 1977 as the year of the

starting point. For the years between 1980 and 1985, we assume that the growth rate is constant from 1980 to 1985. So the missing data are filled by referring to the data in these two years. The price index of fixed assets of each province is used to convert the data into 1978 prices.

Share of public firms. For the years before 1985, the share is assumed to be 1. For 1995 and 1996, the share is based on the value-added instead of gross value.

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Table 1. The Development of the REs in China from 1978 to 1996 (current prices)

Year	Num. of firms (mil.)	Labor force		Gross output ¹		Industrial Output		Rural income	
		Amount (mil. persons)	% of total rural labor	Value (100 mil. yuan)	% of total rural output ²	Value (100 mil. yuan)	% of national output	Per capita Income ²	Contribution of REs(%)
1978	1.52	28.27	9.2	495.1	24.2	385.3	9.1	122.9	7.6
1979	1.48	29.09	9.4	552.3	n.a.	425.3	9.1	n.a.	n.a.
1980	1.42	30.00	9.4	656.9	23.5	515.1	10.0	166.4	10.1
1981	1.34	29.70	9.1	736.7	n.a.	567.9	10.5	194.5	n.a.
1982	1.36	31.13	9.2	846.3	30.4	636.0	12.0	n.a.	n.a.
1983	1.35	32.35	9.3	1007.9	24.4	744.3	11.5	272.91	n.a.
1984	6.07	52.08	14.5	1697.8	33.7	1240.0	16.3	315.06	n.a.
1985	12.22	69.79	18.8	2755.0	43.5	1845.9	19.0	350.1	24.6
1986	15.15	79.37	20.9	3583.3	47.7	2443.5	21.8	374.68	n.a.
1987	17.50	88.05	22.6	4947.7	52.4	3412.4	24.7	418.4	28.1
1988	18.88	95.45	23.8	7017.8	56.0	4992.9	27.4	494	30
1989	18.69	93.67	22.9	8401.8	58.0	6144.7	27.9	540.3	31.2
1990	18.50	92.65	22.1	9581.1	57.7	7097.1	29.7	623.1	26.8
1991	19.08	96.09	22.3	11611.7	61.1	8708.6	32.7	638.9	27.9
1992	20.92	106.25	24.2	17695.7	69.7	13193.4	38.1	746	27.1
1993	24.53	123.45	27.9	31776.9	74.3	23558.6	48.7	873	32.5
1994	24.95	120.18	26.9	45378.5	74.2	34688.0	49.4	1144.8	31.8
1995	22.03	128.61	28.6	68915.2	77.2	51259.2	55.8	1479.5	32.6
1996	23.36	135.08	29.8	77903.5	76.9	55901.1	56.1	1813.3	34.2
1997	20.15	130.5	28.4	89900.6	78.5	65851.5	57.9	1987.27	n.a.

1. Gross output is the total of all kinds of REs as defined in footnote 1.

2. The values of total rural gross output after 1991 only include agricultural and RE outputs whereas the values for other years include outputs (such as Household sideline products) that are not covered by the two categories. Rural income is the net income net of transfer and remittance income.

Sources: *China Statistical Yearbook, 1997, 1998, The Yearbook of Chinese Township and Village Enterprises, 1995, 1997 1998, China Economic Yearbook, 1997, 1998.*

Table 2. Export Performance of the REs (100 mil. US dollars, current prices)

year	Total exports	RE exports	RE exports/ total exports	RE exports/ total output
1986	309.42	28.45	9.19	0.03
1987	394.37	43.45	11.02	0.03
1988	475.40	72.31	15.21	0.04
1989	525.38	99.77	18.99	0.04
1990	620.91	96.07	15.47	0.05
1991	719.10	148.27	20.62	0.07
1992	849.40	216.66	25.51	0.07
1993	917.44	380.70	41.50	0.07
1994	1210.38	394.64	32.60	0.07
1995	1487.70	644.58	43.33	0.08
1996	1510.66	723.86	47.92	0.08
1997	1827.00	836.93	45.81	0.08

Sources: *China Statistical Yearbook, 1995, 1997, 1998, The Yearbook of Chinese Township and Village Enterprises, 1995, 1997, 1998.*

Table 3. Share of Non-agricultural Output and Income Disparity of China's Provinces in 1992

Region	Non-agr. output /total output	Gini coefficient	
		Whole region	Rural area
Whole country	0.60	0.35	0.20
Shanghai	0.86	0.12	0.09
Tianjin	0.85	0.14	0.03
Beijing	0.78	0.04	0.13
Jiangsu	0.76	0.30	0.16
Zhejiang	0.76	0.30	0.23
Shandong	0.67	0.31	0.13
Shanxi	0.66	0.32	0.15
Hebei	0.63	0.30	0.17
Liaonin	0.63	0.24	0.15
Guangdong	0.61	0.40	0.12
Henan	0.59	0.25	0.13
Fujian	0.54	0.24	0.10
Sichuan	0.49	0.30	0.18
Anhui	0.48	0.26	0.13
Shannxi	0.47	0.30	0.13
Submean	0.65	0.25	0.14
Hubei	0.46	0.31	0.16
Jiangxi	0.44	0.22	0.16
Hunan	0.43	0.23	0.12
Jilin	0.43	0.20	0.05
Gansu	0.42	0.38	0.24
Heilongjiang	0.38	0.21	0.12
Ninxia	0.35	0.43	0.30
Guangxi	0.30	0.25	0.17
Guizhou	0.27	0.34	0.18
Inner Mongolia	0.27	0.23	0.13
Yunnan	0.27	0.39	0.25
Qinhai	0.21	0.31	0.15
Xingjiang	0.15	0.31	0.15
Hainan	0.14	0.29	0.08
Tibet	0.04	0.16	0.16
Submean	0.30	0.28	0.16

Sources: Figures of the shares of non-agricultural income are from *Rural Statistical Yearbook of China*, Gini coefficients are from Lin, Cai, and Li (1997), Table 11.

Table 4. Deposits Received by Rural Credit Cooperatives (100 mil. yuan, current prices)

Year	Total	By collective		By REs		By households		Other
		Amount	Share	Amount	Share	Amount	Share	
1978	166.0	93.8	0.57	n.a.		55.7	0.34	16.5
1979	215.9	98.3	0.46	21.9	0.10	78.4	0.36	17.3
1980	272.3	105.5	0.39	29.5	0.11	117.0	0.43	20.3
1981	319.6	113.2	0.35	29.7	0.09	169.6	0.53	7.1
1982	389.9	121.1	0.31	33.7	0.09	228.1	0.59	7.0
1983	487.4	91.8	0.19	62.3	0.13	319.9	0.66	13.4
1984	624.9	89.9	0.14	81.1	0.13	438.1	0.70	15.8
1985	724.9	71.9	0.10	72.1	0.10	564.8	0.78	16.1
1986	962.3	83.9	0.09	91.7	0.10	766.1	0.80	20.6
1987	1225.2	89.9	0.07	104.7	0.09	1005.7	0.82	24.9
1988	1399.8	98.4	0.07	128.3	0.09	1142.3	0.82	30.8
1989	1669.5	92.3	0.06	126.2	0.08	1412.1	0.85	38.9
1990	2144.5	106.5	0.05	149.9	0.07	1841.6	0.86	47.0
1991	2709.5	135.9	0.05	191.7	0.07	2316.7	0.86	65.2
1992	3477.7	215.2	0.06	301.8	0.09	2867.3	0.82	93.4
1993	4297.3	245.8	0.06	362.1	0.08	3576.2	0.83	113.2

Source: *The Chinese Financial Yearbook: 1994*.

Table 5. Industrial Fixed Capital Investment from 1952 to 1978 (bil. yuan in current prices)

Period	Light Industry		Heavy Industry	
	Amount	Share (%)	Amount	Share (%)
First Five-Year Plan (1952-1957)	3.75	15.0	21.28	85.0
Second Five-year Plan (1957-1962)	7.66	10.1	65.17	89.9
Adjustment Period (1963-1965)	1.65	7.8	19.37	92.2
Third Five-Year Plan (1966-1970)	4.26	7.9	49.89	92.1
Fourth Five-Year Plan (1971-1975)	10.30	10.5	87.49	89.5
1976-1978	7.48	10.6	62.45	89.4

Source: Lin, Cai, and Li (1994), pp. 62.

Table 6. Comparison of the REs and SOEs in Their Access to Formal Bank Loans (bil. yuan, current prices)*

year	REs			SOEs		
	Loan (bil. yuan)	Share (%)	loan/profit (yuan)	Loan (bil. yuan)	Share (%)	loan/profit (yuan)
1993	2198	9.08	1.24	22014	90.02	8.97
1994	3686	12.37	1.61	26104	87.63	9.08
1995	4823	13.41	1.48	31149	86.59	10.84
1996	5191	13.14	1.34	34324	86.86	12.54

* Loan is the total liability at the end of each year. Profit is measured in pre-tax terms.

Sources: *China Statistical Year Book: 1995, 1997*; *The Yearbook of Chinese Township and Village Enterprises: 1995, 1997*.

Table 7. International Comparison of Non-Residential Capital Stocks Per Worker (US dollars in 1985 international prices)

Country	U.S.A.	U.K.	France	Japan	Korea	Taiwan	Thailand	Philippine s	India	China
1975	26,109	14,618	24,242	16,400	6,533	8,451	2,385	3,314	1,259	1,869
1990	34,705	21,179	35,600	36,480	17,995	25,722	4,912	3,698	1,946	3,260

Sources: International data are from Penn World Tables, Mark 5.6. Chinese data are calculated based on figures published in *The Statistical Yearbook of Chinese Industries: 1991*. Producer price index is used to convert the values into 1985 constant prices. The official exchange rate in 1985, 2.94 yuan to one dollar, is used to convert Chinese yuan into dollars.

Table 8. Output Distribution of Township and Village Owned Enterprises (bil. yuan, current prices; %)

Year	Light Industries			Heavy Industries		
	Total value	Perc. of agri. based	Perc. of non-agr. based	Total value	Perc. of raw materials	Perc. of manufacturing
1987	134.93	61.21	38.79	126.09	93.10	6.90
1988	182.69	58.39	41.61	161.09	92.88	7.12
1989	237.98	59.93	40.07	223.47	93.19	6.81
1990	282.17	59.93	40.07	241.85	93.31	6.69
1991	354.49	59.47	40.53	297.34	93.36	6.64
1992	523.17	57.34	42.66	462.11	93.20	6.80
1993	864.00	56.05	43.95	832.23	93.16	6.84
1994	1292.40	57.41	42.59	1260.08	93.22	6.78
1995	1846.11	55.95	44.05	1628.26	93.33	6.67
1996	1851.75	52.91	47.09	1702.12	93.47	6.53

Sources: *China Statistical Yearbook, 1995, 1997, The Yearbook of Chinese Township and Village Enterprises, 1995, 1997.*

Table 9. Comparisons of SOEs and REs in Their Capital Intensities and Wages*

Year	Capital/worker (yuan)			Workers/10,000 yuan output			Annual wage (yuan)		
	SOEs	REs	REs/SOEs	SOEs	REs	REs/SOEs	SOEs	REs	REs/SOEs
1978	7090	643	0.09	0.92	5.71	6.21	681	307	0.45
1979	n.a.	777	n.a.	0.86	5.27	6.11	755	357	0.47
1980	7582	887	0.12	0.85	4.57	5.38	852	398	0.47
1981	n.a.	1024	n.a.	0.86	4.03	4.69	851	440	0.52
1982	n.a.	1100	n.a.	0.83	3.68	4.46	863	493	0.57
1983	n.a.	1153	n.a.	0.76	3.21	4.20	877	544	0.62
1984	9255	856	0.09	0.71	3.07	4.32	1070	601	0.56
1985	10435	n.a.	n.a.	0.65	2.53	3.88	1239	676	0.55
1986	11489	n.a.	n.a.	0.64	2.22	3.47	1448	738	0.51
1987	12830	n.a.	n.a.	0.50	1.78	3.59	1601	836	0.52
1988	14283	n.a.	n.a.	0.41	1.36	3.33	1931	1009	0.52
1989	16460	n.a.	n.a.	0.35	1.11	3.22	2177	1126	0.52
1990	18534	2254	0.12	0.33	0.97	2.89	2409	1219	0.51
1991	21259	2484	0.12	0.30	0.83	2.77	2627	1358	0.52
1992	24293	2964	0.12	0.25	0.60	2.37	3161	1445	0.46
1993	29578	4164	0.14	0.20	0.39	1.96	3912	1898	0.49
1994	31282	5539	0.18	0.17	0.26	1.59	5165	2499	0.48
1995	39741	7933	0.20	0.14	0.19	1.33	6343	3406	0.54
1996	51767	9254	0.18	0.15	n.a.	n.a.	7069	3957	0.56

* Capital is the average net fixed capital stock in each year. Figures are measured in current prices. Figures of REs before 1984 do not account for private firms.

Sources: *China Statistical Yearbook, 1995, 1997, The Yearbook of Chinese Township and Village Enterprises, 1995, 1997.*

Table 10. The Development of Private REs*

Year	Number of Firms		Labor force		Gross output	
	Amount (mil.)	% of all REs	Amount (mil.)	% of total REs labor	Value (100 mil. yuan)	% of total REs output*
1984	4.20	69.28	12.26	23.54	244.01	14.37
1985	10.37	84.87	26.52	38.00	681.41	24.73
1986	13.43	88.60	33.96	42.78	1026.98	28.66
1987	15.92	90.95	40.87	46.42	1587.95	32.11
1988	17.29	91.58	46.52	48.73	2282.94	32.53
1989	17.15	91.78	46.47	49.61	2819.55	33.56
1990	17.05	92.14	46.72	50.43	3327.34	34.73
1991	17.64	92.44	48.42	50.39	3901.87	33.57
1992	19.39	92.70	54.49	51.28	5883.15	33.31
1993	22.84	93.13	65.78	53.28	11355.42	35.73
1994	23.29	93.38	61.19	50.91	14712.41	32.42
1995	20.41	92.65	68.01	52.88	5236.00	35.88
1996	21.81	93.37	75.55	55.93	7401.00	41.91
1997	18.86	93.59	77.24	59.19	46056.46	51.23

* Private firms include solely individual owned and shareholding firms.

Sources: *China Statistical Yearbook, 1997, The Yearbook of Chinese Township and Village Enterprises, 1995, 1998, China Economic YearYearbook:1998.*

Table 11. Comparison between Firms with and Without Outside Cooperation: 1990

	Cooperated Firms (A)	Non-cooperated Firms (B)	A/B
Number of Workers	228	211	1.08
--With high school or above education (%)	25.9	24.5	1.06
--Technicians (%)	4.6	3.1	1.48
Trained workers	8.0	4.5	1.77
Contracted outside technical and management personnel	4.9	2.2	2.25
Innovation spending (thou. Yuan)	127.5	16.2	7.87
Standardized products (%) ¹	50.5	31.3	1.61
Equipment made in 1980s (%)	69.0	71.0	0.97
Pre-tax profit per worker (thou. Yuan)	2.83	2.6	1.06

Sources: Yan and Zhang (1995).

Table 12. Access to Planned Resources by Type of Firm in the Eighties

	By Scale			By Ownership		By Affiliation			
	Large	Medium	Small	State	Collective	Central	Municipal	County	Township
Planned production	26.3	21.9	17.2	24.2	10.6	14.8	21.6	0	0
Planned material supply	58.5	19.6	21.4	21.0	24.5	54.0	21.0	17.9	0
Investment:									
--Allocated by plan	22.2	5.6	3.7	6.9	2.1	31.5	3.1	6.7	7.5
--Bank loans	46.2	48.3	50.6	51.5	47.9	24.6	53.0	27.7	45.0
--By firm itself	31.5	46.2	42.2	41.6	43.6	43.9	41.6	65.7	47.5
Sales through the plan	18.6	3.6	12.8	9.0	11.2	8.3	10.5	0	0

Sources: Jia et al. (1994), pp. 37-39.

Table 13. TFP Indexes and Their Growth Rates of the SOEs and REs in the 1980s

Year	TFP Indexes			TFP Growth Rates (%)	
	SOEs	REs	REs/SOEs	SOEs	REs
1980	1.102	0.431	0.39	-2.4	5.3
1981	1.029	0.451	0.44	-6.9	4.4
1982	1.036	0.466	0.45	0.7	3.7
1983	1.073	0.509	0.47	3.7	9.6
1984	1.156	0.591	0.51	7.9	19.8
Sub-mean				0.6	8.6
1985	1.174	0.638	0.54	1.5	8.7
1986	1.160	0.659	0.57	-1.2	3.6
1987	1.175	0.663	0.56	1.3	0.5
1988	1.137	0.668	0.59	-3.5	0.8
1989	n.a.	0.663		n.a.	-1.0
Sub-mean				-0.5	2.5
Total-mean	1.116	0.574	0.51	0.1	5.5

Source: Wu, Y. (1992), Table 4.

Table 14. Per Capita GDP and Arable Land of China's Provinces in 1987 and 1995

Region	GDP/capita (1990 yuan)			Arable land/capita (hectares)		
	1987	1995	Change(%)	1987	1995	Change(%)
Whole country	1741	3010	72.9	0.154	0.161	4.3
Liaoning	2511	3959	57.7	0.179	0.183	1.9
Tianjin	3795	5665	49.3	0.119	0.125	4.5
Beijing	4730	6467	36.7	0.077	0.062	-19.1
Hebei	1307	2568	96.4	0.147	0.135	-8.6
Shandong	1491	3333	123.6	0.103	0.093	-10.3
Jiangsu	2011	4232	110.4	0.096	0.087	-9.0
Shanghai	6243	10094	61.7	0.077	0.069	-10.3
Zhejiang	1990	4733	137.9	0.060	0.061	1.1
Fujian	1322	3871	192.8	0.065	0.057	-12.4
Guangdong	1980	4842	144.5	0.070	0.077	10.5
Submean	2738	4976	81.8	0.099	0.095	-4.6
Heilongjiang	1838	3157	71.8	0.447	0.539	20.6
Jilin	1729	2527	46.2	0.320	0.372	16.3
Inner Mongolia	1228	2115	72.2	0.439	0.487	11.1
Shanxi	1296	2059	58.9	0.199	0.208	4.7
Henan	1094	1914	75.0	0.109	0.103	-5.5
Anhui	1122	1933	72.2	0.106	0.097	-8.2
Hubei	1464	2403	64.2	0.099	0.103	3.4
Jiangxi	1052	1777	69.0	0.091	0.132	45.6
Hunan	1161	1992	71.6	0.079	0.083	5.9
Guangxi	860	2051	138.4	0.079	0.080	1.7
Hainan		2917			0.087	
Shannxi	1080	1642	52.0	0.199	0.187	-6.0
Gansu	1085	1316	21.4	0.217	0.214	-1.5
Ninxia	1249	1919	53.7	0.221	0.274	23.8
Qinhai	1449	1993	37.5	0.182	0.166	-8.8
Xingjiang	1493	2881	93.0	0.265	0.305	14.8
Sichuan	1007	1810	79.8	0.076	0.083	9.6
Guizhou	776	1010	30.2	0.081	0.079	-3.3
Yunnan	858	1754	104.4	0.099	0.117	18.9
Tibet	1274	1353	6.2	0.157	0.158	0.4
Submean	1217	2026	66.6	0.182	0.194	6.2

Sources: *China Statistical Yearbook: 1988, 1996*

Table 15. Per Worker Capital Stocks of REs in 1987 and 1995(original value at 1990 prices)

Region	1987	1995	Change(%)
Whole country	2604	5790	122.3
Liaoning	3445	5942	72.5
Tianjin	4119	11071	168.8
Beijing	5299	11033	108.2
Hebei	1972	5704	189.3
Shandong	3007	6464	115.0
Jiangsu	3086	9341	202.7
Shanghai	5463	14523	165.9
Zhejiang	3175	9112	187.0
Fujian	2396	6644	177.3
Guangdong	3129	7814	149.7
Submean	3509	8765	153.6
Heilongjiang	3222	4786	48.5
Jilin	2926	3644	24.6
Inner Mongolia	2577	3430	33.1
Shanxi	3256	4562	40.1
Henan	1801	5117	184.1
Anhui	1590	4977	213.0
Hubei	2563	4142	61.6
Jiangxi	1828	2881	57.6
Hunan	2154	3237	50.2
Guangxi	1546	6399	313.8
Hainan		9417	
Shannxi	2067	3121	51.0
Gansu	1894	2673	41.1
Ninxia	2682	7269	171.0
Qinhai	2221	5842	163.1
Xingjiang	3115	7014	125.2
Sichuan	1980	3041	53.6
Guizhou	1330	4571	243.6
Yunnan	2517	4260	69.2
Submean	2293	4757	108.0

Source: *China Statistical Yearbook: 1988, 1996.*

Table 16. Regression Results

Variables	1978 - 1997		1970 - 1997	
	(1)	(2)	(3)	(4)
Constant	1468.90** (294.29)	1330.4** (378.27)	-914.45* (496.00)	112.23 (543.53)
Lagged GDP	1.69** (0.14)	1.70** (0.14)	0.48** (0.15)	0.74** (0.16)
Urbanization	659.80 (588.93)	-383.97 (679.89)	-537.65 (606.89)	-6176.3** (1576.9)
Population Density	0.04 (0.27)	-0.24 (0.35)	-0.12 (0.30)	-1.4** (0.45)
Road	-1723.9** (581.52)	-1285.2* (716.19)		
Paved Road	1528.6** (516.19)	1371.2** (516.87)		
Railroad	1631.3** (668.08)	4404.1** (1092.6)		
Lagged Export/capita	-0.93** (0.16)	-1.08** (0.17)	1.34** (0.28)	1.08** (0.28)
FDI/capita	3.43** (0.50)	3.49** (0.50)	2.37** (0.52)	2.44** (0.51)
Ratio of technicians	-2458.2 (2687.4)	-117.62 (2724.6)		
SOE Value/capita	0.25** 0.09	0.24** (0.09)	-0.16* (0.87)	-0.07 (0.08)
SOE Capital/worker (Share of Light Industry)	-0.02** (0.006)	-0.02** (0.006)	14.94 (122.48)	-229.81 (150.89)
HRS	-14.31 (241.91)	-23.56 (236.19)	105.46 (300.28)	67.33 (292.72)
Land/capita	-46.23 (33.70)	-15.94 (45.56)	6.64 (38.96)	143.97** (59.027)
Lagged Capital/capita	0.70** (0.20)	0.86** (0.20)	1.01** (0.16)	0.92** (0.16)
Share of Public Firm Output	-723.81** (240.60)	-855.06** (242.12)	407.73 (304.58)	287.02 (307.50)
Initial RE Value/capita	7.23** (1.50)	3.83 (2.07)	3.74 (6.25)	3.70 (6.15)
Initial SOE Value/capita	0.64 (0.42)	0.43 (0.47)	-0.03 (0.26)	1.10** (0.36)
Initial SOE Capital/worker (Initial Share of Light Industry)	-4.52** (0.78)	-2.64** (0.97)	303.27** (100.66)	236.97* (123.86)
Large Cities		-1019.3** (406.56)		1129.2** (519.94)
Coastal Provinces		175.03* (97.45)		412.74** (132.17)
Southwest		-85.10 (111.51)		-282.47** (94.69)
Northwest		-164.96 (125.08)		-587.79** (161.00)
North		-192.87 (133.38)		-415.52** (131.67)

1. Standard errors are reported in the parentheses.

* Significant at the 10% significance level; ** Significant at the 5% significance level.

Table 17. Eight East Asian NIEs' Ranking among 34 Countries in Growth and Equity

Economies	Income Distribution	Income and GDP Growth	Income Distribution and Per Capita Income Growth
Taiwan	1	1	1
Singapore	5	2	2
Korea	8	4	3
Hong Kong	11	5	4
Indonesia	15	8	8
Thailand	16	10	9
Malaysia	26	16	14
Philippines	22	17	17

Source: Riedel (1988), pp. 20.