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Sources of Economic Growth in China: a Regional Analysis

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Sources of Economic Growth in China: a Regional Analysis

by

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Abstract

By most standards China's post-1978 economic reforms have been a colossal success. And by most accounts China's rural enterprises, the so-called Township and Village Enterprises (or TVEs), ought to be credited as the engine for much of that success. This paper uses a panel data analysis to measure the contribution TVEs have made to China's growth. Like earlier cross-section studies of economic growth rates, the model explains differences in per capita income between provinces by using initial endowments, demographic variables, and measures of investment in human and physical capital as explanatory variables. Important contributions in this study are its focus on the role of TVEs and its use of time series data from the provinces, which significantly expands the number of observations available. Because of the panel nature of the data we can also take account of heterogeneity bias by allowing the intercepts to vary across provinces. This captures the role of unobservable differences between provinces in institutional, geographic, and historical factors.

1. Introduction

This study examines China's economic growth in the context of transition from a centrally planned economy (CPE) to a market economy. China's economic reform was launched in 1978 when the Third Plenary Session of the 11th CPC Central Committee adopted policies aimed at reforming the domestic economy and opening it to the outside world.¹

Though the Chinese continue to advocate a "socialist market economy," or "socialism with Chinese characteristics," implying, among other things, limited private ownership of the means of production² measures like the "household contract responsibility system" and the "open door policy" have irrevocably changed its economy and society. The state sector now accounts for only 29% of industrial output down from 78% in 1978. The so-called township and village enterprises³ (TVEs), arguably the most distinctive feature of the Chinese transition, proliferated and became a major economic force. In 1978, 1.5 million TVEs employed 28.2 million workers, whereas by 1996, 23.4 million TVEs employed 135.1 million workers. Private enterprises are also increasing fast and poised to, perhaps, become the new engine of growth. The coastal areas, targeted for development, have attracted billions of dollars in foreign investment.

The results have been staggering. Between 1978 and 1996 real per capita GDP increased at an annual average rate of almost 20% (Table 1). The accumulated rate of growth varies from 682% (Fujian province) to 75% (Tibet autonomous region) for the same period. A casual reading of table 1 suggests that "convergence" may be at work: generally speaking regions with lower than average real per capita GDP in 1978 are growing at faster rates than regions with higher than average real per capita GDP. The three municipalities (Beijing, Shanghai and Tianjin) which started out with a relatively high per capita income exhibit much lower rates of growth. In addition, the share of China's GDP per capita for each region provides a picture of the relative regional importance. A comparison is made between the shares for 1978 and 1996, and the variation computed as a measure of regional disparities. Again the three municipalities seem to be losing whereas the largest gains go to the coastal provinces of Zhejiang, Fujian, Guangdong, and Shandong.

This study attempts to identify China's sources of economic growth, namely the contribution of the township and village enterprises (TVEs), by analyzing data for all 30 regions (municipalities, provinces, and autonomous regions) for the period 1978 to 1996.

Table 1: China's regional economic growth, 1978-1996

Region	Population 1996 (10000 persons)	Real per capita GDP (RMB per person)		Rate of growth 1978-96	Share of China GDP per capita (at constant prices)		
		1978	1996		1978	1996	Change
Zhejiang	4343	353.2	2731.7	673%	0.9	1.6	0.7
Fujian	3261	292.6	2287.5	682%	0.7	1.3	0.6
Guangdong	6961	400.8	2679.9	569%	1.0	1.6	0.5
Shandong	8738	346.0	1951.9	464%	0.9	1.1	0.3
Hainan	734	301.6	1518.6	403%	0.8	0.9	0.1
Guangxi	4589	241.4	1165.8	383%	0.6	0.7	0.1
Xinjiang	1689	337.9	1545.4	357%	0.9	0.9	0.0
Henan	9172	249.3	1149.2	361%	0.6	0.7	0.0
Jiangsu	7110	545.3	2416.5	343%	1.4	1.4	0.0
Yunnan	4042	241.5	1056.0	337%	0.6	0.6	0.0
Anhui	6070	259.0	1102.8	326%	0.7	0.6	0.0
Sichuan	11430	256.5	1055.2	311%	0.7	0.6	0.0
Hubei	5825	356.9	1459.1	309%	0.9	0.8	-0.1
Hunan	6428	307.6	1178.4	283%	0.8	0.7	-0.1
Hebei	6484	391.4	1523.9	289%	1.0	0.9	-0.1
Inner Mongolia	2307	332.4	1221.5	267%	0.8	0.7	-0.1
Jiangxi	4105	295.5	1057.6	258%	0.8	0.6	-0.1
Guizhou	3555	187.7	579.4	209%	0.5	0.3	-0.1
Jilin	2610	412.4	1466.0	255%	1.1	0.9	-0.2
Shaanxi	3543	316.3	949.3	200%	0.8	0.6	-0.3
Shanxi	3109	392.5	1201.6	206%	1.0	0.7	-0.3
Ningxia	521	377.2	1063.4	182%	1.0	0.6	-0.3
Heilongjiang	3728	598.5	1844.1	208%	1.5	1.1	-0.5
Gansu	2467	374.2	828.4	121%	1.0	0.5	-0.5
Liaoning	4116	711.0	2195.3	209%	1.8	1.3	-0.5
Qinghai	488	460.3	1076.4	134%	1.2	0.6	-0.5
Tibet	244	433.0	759.5	75%	1.1	0.4	-0.7
Tianjin	948	1234.3	3327.5	170%	3.1	1.9	-1.2
Beijing	1259	1384.4	3672.3	165%	3.5	2.1	-1.4
Shanghai	1419	2685.7	5852.4	118%	6.8	3.4	-3.4
National	122389	392.7	1717.2	337%			

Sources: *China Statistical Yearbooks*, various issues

The paper is organized as follows: part 2 provides an overview of some aspects of China's economic reform, including a discussion on the origins and role of township and village enterprises, and part 3 presents the model and examines the empirical findings. Some concluding remarks are made in part 4.

2. China's Economic Reform: An Overview

China's economic reform first succeeded in the countryside,⁴ with the “household (contract) responsibility system.” Under this system, farmers were given the right to use the land for a period of 15 years and considerable management autonomy. Once they met the production targets set by the state, and sold to the state at fixed prices, they could sell the surplus in the open market (dual-price system). As a result the productivity increased dramatically, particularly during the period 1979-84. The contract system quickly spread to township and village enterprises (mostly small industrial units) and in 1984 was adopted in a variety of forms by state-run enterprises. Essentially, this system does reward economic efficiency with wage bonuses or the retaining of “excess profits.” Under this system there is a separation between ownership and right of use, control and management. There is still state ownership but the enterprises have considerable autonomy in terms of management (price, wages, investment decisions) in exchange for fulfilling output and/or profit obligations on a “contract” basis.

From 1979 to 1991 an open coastal belt, covering 289 cities and counties, an area of .32 million square kilometers, and a population of .2 billion was developed. In the spring of 1979 leaders of the CPC decided to create special economic zones (SEZ) in the provinces of Guangdong (Shenzhen, Zhuhai, Shantou) and Fujian (Xiamen), to take advantage of the proximity to Hong Kong, Macao, and Taiwan. In April 1988, Hainan island became the fifth and largest SEZ with a population of 6 million and an area of 33,920 km². The SEZs are zones in which “special” economic policies and “special” economic management systems are carried out, designed to attract foreign investment, mainly market regulated and with a relatively high level of autonomy. In May 1984, Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang, and Beihai, became Coastal Open Cities. These cities were selected because of their rich natural and human resources, sound industrial foundations and location advantages in terms of transportation and communications. They were established to speed up the reform and to extend the fruits of development to China's interior.

Following the success of the COCs in 1985, the CPC and the State Council decided to establish 3 CEDAs: Changjiang (Yangtze River) Delta, Zhujiang (Pearl) Delta, and the delta area

that covers Xiamen, Zhangzhou, and Quanzhou in Southern Fujian. In 1988, two new CEDAs were created: Liaoning Peninsula and Shandong Peninsula. These 5 CEDAs consist of about 204 counties and towns over the following provinces: Jiangsu, Zhejiang, Fujian, Guangdong, Hebei, Liaoning, Shandong; the Guangxi Zhuang Autonomous Region, and the cities of Shanghai and Tianjin. Like SEZs and COCs, CEDAs are designed to benefit from foreign trade and foreign direct investment. They are supposed to absorb foreign capital and technology, promote scientific and technological development, gain managerial experience, produce higher quality products, adjust agricultural structure, and serve as tests for economic reform.

These reforms are dramatically changing the economic landscape, namely in terms of ownership (table 2). The most striking change is the shrinking share of the state sector, which now accounts for less than one third of industry's "gross output value."⁵ Collective ownership almost doubled from 1978 to 1996, whereas individual ownership and other (such as joint ventures and foreign enterprises) went from zero to 15.5 and 16.6% respectively. They are both increasing very fast.

Table 2: Ownership Structure of Industrial Production (%)

Ownership	1978	1985	1990	1992	1994	1996
State	77.6	64.8	54.6	51.5	37.3	28.5
Collectives	22.4	32.1	35.6	35.1	37.7	39.4
Individual	0	1.8	5.4	5.8	10.1	15.5
Other	0	1.2	4.4	7.8	12.9	16.6

Source: China Statistical Yearbook, 1997.

Though some economists recognize that SOEs played a positive role in the transition process, they believe time has come for China to privatize the SOE sector (Naughton, 1994). Under China's "share holding" approach, the capital of state-owned enterprises (either the original or the additional capital) is to be converted into shares to be sold to the employees or the public. In May 1990, the government decided to continue this practice on a trial basis and subject to serious restrictions. Public ownership must be dominant and share ownership is limited to joint-ventures, township and village enterprises, and to special economic zones and open coastal cities, of which Shenzhen and Shanghai (sites of the two Chinese stock exchanges) have been the most

successful. As a result, only a few SOEs have been privatized. A bankruptcy law was passed but only smaller firms have been closed. In November 1993, the Chinese government announced sweeping reforms including a restructuring of the state-owned sector, in fact renouncing one of the “four cardinal principles” - state ownership (*The Economist*, October 22, 1994). The official attitude toward privatization of the SOEs seems to have shifted from a very ebullient position in 1993 to a more conservative approach that reflects a desire to hold on to a large state sector.⁶

Collectively owned enterprises include urban as well as rural enterprises.⁷ The latter ones are usually termed township and village enterprises. These are not collectives in the ordinary sense but rather community enterprises, encouraged by the existence of surplus labor in the rural communities and the lack of mobility among those communities. Many of these enterprises have strong linkages to agriculture, both backward and forward, such as farm machinery, fertilizers, and feed/grain processing. Though they first appeared in 1956, it was with the rural economic reform that they exploded. In 1980 they adopted the contract responsibility system and shared ownership, with employees as shareholders. They typically have more independence and flexibility than SOEs, and face “harder” budget constraints. Key to their success seems to be the high degree of competition, flexibility, and autonomy, which have occurred without significant privatization.

It was only after 1984 that private enterprises with more than seven employees were allowed. Privately owned enterprises can consist of one (self-employed) owner, who may hire up to seven other workers (individual units) or it may take the form of an enterprise that hires more than eight people (private enterprises).⁸ From 1978 to 1988, private enterprises grew quite rapidly, but in 1989 they suffered a sharp decline. In 1993, 25% suffered losses, partly due to an austerity program designed to fight inflation. Since then, private enterprises have been growing rapidly. And just this year China’s constitution was amended to recognize and protect private enterprises.

Township and Village Enterprises

These rural enterprises first appeared in the 1950s, but it was only in the Deng era that they multiplied. After reform, commune and brigade owned enterprises were reclassified as township and village enterprises (TVEs), but the development and dramatic growth of the TVEs can only be understood in the context of China’s transition strategy. TVEs are viewed as a natural

response to a strategy of transition that first liberalized the product markets, which went without liberalization of factor markets (Naughton, 1994). TVEs gave rural communities - townships and villages the ability to transform control over assets into income in the “absence of asset markets.” This could be done without resorting to privatization. And the profits of those enterprises could then be used for the benefit of the entire community. These local government units also helped the channeling of funds (mostly from households) in the absence of a well-functioning banking system.

Though the proliferation of the TVEs was to a large extent the response to China's own version of transition strategy, it was only made possible because of the pre-reform existing conditions. These “preconditions” were created by both the decentralized Chinese model of development and the relative inadequacy of central planning. In contrast to the Soviet-type model that favored centralization and specialization at the country level, the Maoist view of local self-sufficiency resulted in substantial decentralization, and specialization at the province and local level. Only six percent of Chinese industrial enterprises could be classified as large or medium scale prior to the market reforms, while seventy eight percent of Chinese enterprises were small scale, labor-intensive collectives controlled by local governments (Nee, 1992). Also, the decision-making process concerning distribution of resources and products were made on a multi-tiered level, with the central government delegating authority to regional and local governments. Moreover, the difficulty in the implementation of central planning in China fostered relationships between township enterprises and SOEs early on, and helped explain the rapid development of township enterprises (Hua, Zhang and Luo, 1993), and the subsequent expansion of subcontracting ties between SOEs and TVEs.

Economic reforms further favored TVEs. State monopoly of several economic sectors (such as manufacturing) was relaxed and barriers to entry removed, enabling TVEs to engage in activities previously denied to them (Naughton, 1994). Local governments were given greater powers and more incentives to develop local marketized economies based on private or collective ownership. Collectives became the main source of local revenues forging a mutual dependence between local enterprises and local governments. This “partnership” effectively energized and enabled the local firms and collectives to compete against large SOEs for resources and markets. Also, of special significance was the reform of foreign trade and its subsequent decentralization to

provincial and local level. This measure led to the “internationalization of the countryside” (Zweig, 1990) and resulted in dramatic increases of TVEs exports (Lardy, 1992).

In many TVEs ownership can be characterized as “fuzzy.” According to Weitzman and Xu (1994) a TVE is “best described as a vaguely defined cooperative, meaning an essentially communal organization quite far removed from having a well-defined ownership structure,” with “a deep involvement of the community government.” Nevertheless, it should be noted that in most TVEs the township and village officials possess all the key components of property rights namely control of residual income, the right to dispose of assets, and the right to appoint and dismiss managers and assume direct control if necessary. Though property rights for TVEs may be not precisely defined in a legal framework, in practice they are fairly clearly specified (Naughton, 1994).

The Statistical Yearbook of TVEs divides TVEs into four groups: towns, villages, cooperatives and individual. “Generally speaking, TVEs are privately- or collectively-owned enterprises involved in non-agricultural work” (Chian et al. 1996).⁹ Because of flexibility and adaptability to the environment, TVEs structures and development patterns, vary from locale to locale throughout China. Though generalizations are difficult Dong (1988) described three dominant models of (rural) economic development: the Wenzhou Model, the Jiangsu Model, and the Mixed Model.

Most studies have concluded that the TVE sector is more efficient than the SOE sector (Woo et al., 1994; Chen et. al, 1992). Using data for the 1979-91 period, Weitzman and Xu (1984) found that TVEs total factor productivity grew three times as fast as the corresponding SOEs. The following, in addition to higher flexibility and autonomy, have been identified as advantages of the TVEs: shorter information channels between principals and agents, greater focus on financial objectives (lower costs), harder budget constraints, and special ties with the state sector (Jefferson and Rawski, 1994).

Some attribute the economic success of the TVEs to advantages that stem from their peculiar “internal institutional form” which are seen to facilitate cooperation through *implicit contracts* among community members locked into an ongoing relationship (Weitzman and Xu, 1994; Nee, 1992). It has been suggested that it is the interaction of these enterprises with the whole community through a “set of interlocking financial, administrative, personnel, and other

ties” (Byrd, 1990), the existence of a strong “cooperative culture” (Weitzman and Xu, 1994) that is behind their success. Undoubtedly, local government-sponsorship brings certain advantages such as privileged access to capital, and coordination with urban firms. On the other hand, these special ties between government, community, and TVEs usually result in a “redistribution of income.”¹⁰

Others (Naughton, 1994) instead emphasize the external conditions to which TVEs are an effective adaptation. Zhang et al. (1994) attribute the “rural enterprise boom,”¹¹ of which TVEs are a major part, to the existence of barriers to factor mobility, price distortions and the abundant labor in the rural areas. Their study shows how exports contributed to rural enterprises growth. The rural share of national exports increased from 5% to 16%. In addition, the composition of rural enterprise exports reflects the difference in comparative advantage between urban and rural areas. Only 60-65% of all national exports are labor intensive as opposed to about 80% of the exports by rural enterprises. The dramatic rise of rural industrial exports, the result of an export-led growth strategy, was a major contributor to the growth of the TVE sector (Zweig, 1990).

3. Empirical Evidence

Assume that a province’s real GDP is given by the Cobb-Douglas production function¹²

$$Y = AH\beta^1 K\beta^2 L\beta^3 Z\beta^4 \quad (1)$$

where A denotes the level of production technology in the province; H, K and L denote the quantities of human capital, physical capital and labor employed in the province; and Z represents other factors (such as natural resource endowments or the presence of collectives) that might affect the level of output. Denoting rates of change of variables by lower-case symbols, this function implies that $y = a + \beta_1 h + \beta_2 k + \beta_3 l + \beta_4 z$, so we would predict that the growth rate of output in a province is an increasing function of its growth rates of technology, the three input quantities, and “other factors.”

We estimate this model using a longitudinal panel¹³ including province-specific data from the years 1978 through 1992. All data are taken from issues of the *China Statistical Yearbook*, the *China Statistical Abstract* and other official sources.

Our primary interest is in improvements in living standards, so we focus on growth in real output per capita in each province, which could be denoted $y - n$, where n is the growth rate of

population. To control for the effects of broader macroeconomic fluctuations we use as our dependent variable the difference between each province's real growth rate and the national growth rate for that year.

Changes in the production technology are assumed to be accessible throughout China, so the rate of change in technology ("a" in the equation above) is subsumed in the common intercept term in the regression model. We use data on university graduates in each province (measured as a percentage of the province's population) to represent growth rates of human capital, which are expected to have a positive effect on the growth rate of output.¹⁴ It has been suggested that this measure can also serve as a proxy for R&D activities in the region.¹⁵

We do not have reliable data series for net investment and total fixed assets by province throughout the period in question, so we cannot calculate the growth rate of the capital stock directly. Instead we include as an explanatory variable the ratio of total investment in fixed assets to GDP (*invshare*) in each province,¹⁶ which also is expected to have a positive coefficient.

To explore the possible role of foreign investment in China's growth, we include an explanatory variable (*forinv*) that is equal to the share of net investment that is funded from foreign sources. If foreign investment is accompanied by significant technology spillovers, we would expect this variable to have a positive impact on growth.

We are missing labor force data for some years, so it is not included explicitly in the analysis. But the growth rate of the population is included, and it captures the effects of both population growth and labor force growth. If the ratio of the labor force to total population (L/N) does not change, then the labor force grows at the same rate as the population, and the model can be rewritten as

$$y - n = a + \beta_1 h + \beta_2 k + (\beta_3 - 1)n + \beta_4 z \quad (2)$$

with the coefficient $(\beta_3 - 1)$ expected to be between zero and -1 .

In the Cobb-Douglas formulation and other interesting specifications the impacts of changes in investment or other variables vary along the production function. In this analysis this is incorporated by including each province's level of per capita real GDP in 1978 as an explanatory variable. We expect to find that the initial level of per capita real GDP has a negative coefficient, indicating that provinces that are poorer initially tend to grow faster and converge

over time relative to the richer provinces. The possibility of “convergence” has been an important focus of many earlier studies of the sources of economic growth.¹⁷

One aspect of national economic policy is incorporated into the analysis by including a dummy variable (*SEZ*) to capture the preferential treatment due to the creation of Special Economic Zones in Guangdong and Fujian in 1979 and in Hainan in 1988. We would expect these to grow faster in subsequent years, so the coefficient on *SEZ* is expected to be positive.

Changes in economic policy and market structure are also reflected in the *COLLSHARE* variable, which measures the output of collectives (as a proxy for township and village enterprises) as a share of total industrial output in each province. We expect the coefficient on this variable also to be positive, for the reasons discussed in part 3.

Natural resource endowments are measured by each province's coal reserves and its use of hydroelectric power. The data do not exhibit notable changes in these variables over time, so they are included in the analysis in terms of levels rather than growth rates. To the extent that these endowments significantly spur a province's growth, we would expect the coefficients on these variables to be positive.

Our model extends the structural equation (2) to incorporate a time component in the error term. We also include lags on investment spending and foreign investment. Random effects generalized least squares estimation results are presented in Table 3.¹⁸ We find strong evidence of convergence (since the coefficient on 1978 per capita income is negative and significant) and a positive role for lagged investment and foreign investment spending (contemporaneous and lagged) in determining growth rates. While the growth model posits a supply-side relationship between investment and growth, there could also be a same-year demand-side relationship (since investment is an important component in GDP). The empirical results might also reflect a more complicated dynamic relationship between investment and growth.

As expected, the *SEZ* coefficient is positive and significant, and the coefficient on the population growth term is negative and significant. Changes in educational attainment, measured by the share of university graduates in the population, are also of the expected sign and significant. More important, it is clear that the share of TVEs in the economy (as reflected in the *COLLSHARE* variable) has a positive and nearly significant impact on growth rates.¹⁹ We estimate that the elasticity of the real per capita growth rate with respect to the TVE share is

equal to about 0.05. We can conclude that TVEs have indeed stimulated real economic growth and promoted significant improvements in living standards. The credibility of our conclusions concerning the role of TVEs is further enhanced by the fact that our results are obtained in the context of standard, cross-country growth models for which we obtain results concerning the roles of other variables (such as investment and initial levels of per capita real GDP) that are generally consistent with earlier studies.

Table 3: Determinants of Real Growth Rates by Province

Dependent variable: province's per capita real GDP growth rate minus national per capita real GDP growth rate

	Coefficient	Z Statistic
Intercept	0.03745 **	2.26
per capita income in 1978	-0.00047 ***	3.91
Collective output as share of total industrial output (lagged one period)	0.04515	1.48
Invshare	-0.03130	0.61
Invshare lagged 3 periods	0.12223 ***	3.45
Foreign Investment	0.00166 ***	4.06
Foreign Investment lagged 3 periods	0.00116 ***	3.06
SEZ	0.02187 *	1.74
Population growth rate	-0.37310 *	1.83
University graduates (% of population)	16.0664 *	1.91
Coal reserves in 1978	-0.000005	0.79
Hydropower resources in 1978	6.91E-08	0.07
R ² – overall	0.17	
R ² – within	0.09	
R ² – between	0.68	
N	323	

Estimates marked ***, **, and * are significant at the 1%, 5%, and 10% levels.

4. Concluding Remarks

This paper uses a model usually associated with cross-country growth studies to identify and estimate various sources of economic growth in post-economic reform China. Regional differences in growth rates of per capita income are explained by differences in investment rates

for physical capital and human capital, population growth, and reform-specific factors such as the presence of township and village enterprises, special economic zones, and the level of foreign direct investment.

We found a positive role for lagged investment and foreign investment spending (contemporaneous and lagged) in determining growth rates. The estimate of the impact of foreign direct investment is strongly significant. This is consistent with cross-country studies that often find the returns to foreign direct investment to be extremely high. This may be because foreign direct investment is typically attracted to those areas that are already doing relatively better,²⁰ or because of possible technology transfer and important technological spillovers.

Human capital investment appears to be significant as well. The proxy used in this study, the number of new university graduates as a share of regional population, captures not only the impact of a better educated population on growth, but may also be regarded as a proxy for research and development activities. Estimates of the impact of natural resource endowments are not significant, perhaps suggesting that these resources can be transported between provinces relatively easily.

The estimate for population growth is negative and significant, which is consistent with cross-country growth studies as well. Most studies have found a weak relationship between growth of per capita income and growth of population and consider this variable of limited interest. Explanations given for a negative coefficient typically involve decreases in average human capital and the capital-labor ratio. Fertility rates are also found to have a negative link to growth. And finally, population growth may generate important negative externalities that, in turn, may affect growth adversely, particularly in overcrowded regions.

As for China-specific influences on growth, we looked at Special Economic Zones and the presence of Township and Village Enterprises. Recent growth studies have focused on the impact of social and political factors on growth, namely the relationship between “social arrangements,” incentives and growth. This study extends this literature by suggesting that Township and Village Enterprises have contributed significantly to China’s economic growth.

The “contract responsibility system,” by effectively separating ownership and control, is an innovative alternative to individual privatization. It has been described as “a halfway house to privatization” (Fischer, 1991).²¹ And the TVEs were China's (rather effective) alternative to early

privatization. They arose because of China's own strategy and because the Chinese development model prior to the reform created conditions favorable to their establishment. They prospered, to the point of being described as the major engine of China's success, because of considerable autonomy, flexibility, competition (at all levels) and special ties to the government and community. And maybe more importantly, since they do not operate under a "soft constraint" like SOEs, they must strive for efficiency in order to survive. However, as transition progresses, and China's economy and society change, they too are changing. Most TVEs are non-state enterprises owned collectively by townships or villages. Since collective ownership does not have a precise legal definition it may lead to some uncertainty about ultimate property rights (Naughton, 1994). Some believe the importance of well-defined property rights depends on the "cooperating capabilities among people," thus varying from society to society (Weitzman and Xu, 1994). Others, (Chen et al., 1992) point out that private ownership and a code of property rights are absolutely necessary to limit the ad hoc intervention of the Chinese bureaucracy. Two forms of privatization seem to be currently at work. On one hand, there are indications that significant "privatization" of community-owned enterprises is already occurring in China in a variety of ways, such as "leasing" or "contracting," sale or transfer of enterprises to individuals, or establishment of joint-ventures (Byrd, 1990). Thousands of collectives (and some SOEs) have been transformed into locally-held joint-stock companies²² (Jefferson and Rawski, 1994). On the other hand, new private firms (urban and rural) are being established at a very fast rate. Rural enterprises formerly identified with TVEs, are not so anymore, as its private component is increasing rapidly.²³

Lastly, we found strong evidence of convergence, which is consistent with cross-country growth studies. One interesting research line of inquiry would be what is driving this convergence.²⁴

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¹See (Perkins, 1988) for a detailed analysis of this process.

²The concepts of capitalism and socialism are used here in their most common way, i.e. they are defined in terms of private versus nonprivate ownership of the means of production (Hillman et al., 1992)

³TVEs generally refer to enterprises owned by village and township governments (including those leased to individuals). Because of data restrictions those privately owned are often included.

⁴Though reform succeeded first in the countryside, it was attempted first in the industrial sector but with no success (Naughton, 1994).

⁵ However, in 1994, state units still accounted for three-quarters of investment and 70 percent of bank credit. (*World Development Report*, 1996, p. 46)

⁶ SOEs are still a major drag in the economy, though their losses as a percentage of GDP have been decreasing. Forty percent of the state-owned firms reported losses in 1994 (*World Development Report* 1996).

⁷Since 1984, collectively as well as privately owned enterprises, located in rural areas, are classified as "rural enterprises" (*Chinese Statistical Yearbook* 1989, p. xxxvi).

⁸ The difference between the two is ideologically and politically important, while the former are viewed as small proprietors, the later are viewed as capitalists. The number 8 is (wrongly) attributed to Marx (Xie, p. 458).

⁹ All the TVEs are registered with the Agricultural, Industrial and Commercial Corporation (AICC), which regulates them. Private enterprises *per se* are not registered with the AICC (Chian et al. 1996)

¹⁰About 35%-40% of TVEs' profits after taxes are remitted to local governments.

¹¹Rural enterprises include not only TVEs but also private enterprises.

¹² Our approach is modeled on the authoritative cross-country growth studies by Barro (1991, 1996) and Mankiw, et al. (1992).

¹³ Barro (1996) also used panel data, while Barro (1991) and Mankiw, et al., focused on cross-sectional evidence on long-run average growth rates.

¹⁴ Barro (1991) uses school enrollment data to measure human capital investment. Barro (1996) instead includes educational attainment rates, while Mankiw, et al., use the share of the population that is of school age.

¹⁵ YiMin Chen (1996) p. 418.

¹⁶ Our focus on the investment rate is standard in cross-country growth studies. For example, see Barro (1996), pp. 22-23.

¹⁷ For example, see Barro (1991), Barro (1996), pp. 14-15, and Mankiw, et al., pp. 421ff.

¹⁸ A Hausman test supports the use of random effects for time. Results available from authors.

¹⁹ In a one-tailed test the *COLLSHARE* coefficient is significant at the 10% level.

²⁰ Endogeneity may be a serious problem. See Temple (1999), pp. 137-38.

²¹ in agriculture there is a *de facto* privatization in the sense that leases are now for up to 15 years and they can be transferred or sold. There is no sale of property rights but there is sale of user rights.

²²Weitzman and Xu (1994) argue that this does not represent a clear movement to privatization, because "the bulk of shares is held collectively" (pg. 135)

²³ A study by Smith (1995) of eight TVEs in Zhejiang Province revealed that five of them were shareholding

cooperatives, one regarded itself as a private enterprise and the other two were more traditional township and village enterprises. The latter two combined the public ownership with some formal employee ownership and one of them even had outside shareholders.

²⁴ Within cross-country studies it has been suggested that convergence may be due to technology transfers (Temple, 1999).