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China's Productivity Performance and Its Impact on Poverty in the Transition Period

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CHINA'S PRODUCTIVITY PERFORMANCE AND ITS IMPACT ON POVERTY IN THE TRANSITION PERIOD

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ABSTRACT

The objective of this report is to document China's productivity performance since 1978 and determine its impact on poverty. The report finds that China has made substantial progress in economic development since economic reform started in 1978. Strong economic growth has been fuelled by rapid productivity growth, and has been accompanied by impressive declines in the incidence of poverty. Productivity performance has not been uniform across the agricultural and industrial sectors, but both have contributed to aggregate growth and poverty reduction. Unfortunately economic reform has also brought increasing income inequality, mostly between rural and urban areas but also within both rural and urban areas and across regions as well. Labour productivity is found to have had a strong negative effect on poverty in China, with productivity increases in the industrial sector more important for poverty reduction than those in the agricultural sector. The econometric results do not show that trends in inequality have a significant effect on poverty. However, the process of economic growth, besides bringing the benefits of productivity increases, also brings structural adjustments that exacerbate income inequality through displacing workers. The government of China has an important role to play in further developing a social security system that will ensure the gains from productivity are more equally shared, thus maintaining a healthy and equitable society in which further productivity gains can be realized.

CHINA'S PRODUCTIVITY PERFORMANCE AND ITS IMPACT ON POVERTY IN THE TRANSITION PERIOD

EXECUTIVE SUMMARY

The objective of this report is to document China's productivity performance since 1978 and determine its impact on poverty. The report finds that China has made substantial progress in economic development since economic reform started in 1978. During the past two decades, China's real GDP has increased at an average annual rate of more than 9 per cent and average per capita income has quadrupled. Accompanying the rapid growth of the national economy in China has been an astounding achievement in the reduction of poverty, especially rural poverty. Based on the government's definition of poverty, between 1978 and 2000, the number of poverty-stricken people in rural areas without enough food to eat and clothes to wear decreased from 250 million to 30 million; and the proportion of poverty-stricken people in the total rural population dropped from 30.7 per cent to about 3.4 per cent.

This great achievement in economic growth and poverty reduction is shown here to be due in large part to productivity improvements. The paper is divided into three parts: the first looks at how productivity growth in different sectors contributes to rapid economic growth in China in the ongoing transition period; the second seeks to understand Chinese poverty and how it was affected by productivity growth; and the third considers the outlook for sustainable productivity growth and the role government could play to support a healthy economy.

Over the 1978-2001 period labour productivity in China advanced at a rate of 6.6 per cent per year, contributing 70 per cent of output growth (9.4 per cent per year) and 81 per cent of growth in per capita income (8.1 per cent per year). The economic reforms begun in 1978, including measures to give more decision-making authority to managers and allow redundant workers to be laid off, fuelled these productivity gains. However, productivity performance over this period was not uniform across industries.

The agricultural sector experienced productivity growth of only 4.7 per cent per year between 1978 and 2000, and in 2001 had a productivity level of only 30.4 per cent relative to the total economy average. The industrial sector's labour productivity level in 2001, on the other hand, was 229.1 per cent of the national average.

Both state-owned and collective-owned enterprises in the industrial sector have shown strong productivity gains since 1978, especially in the latter 1990s when the laying off of redundant workers was allowed. However, other ownership structures such as foreign funded and

private enterprises have become increasingly more important in the industrial sector. Although no disaggregated data are available on the productivity performance of private and foreign companies, they are believed to have had a large positive effect on industrial and aggregate labour productivity increases, and will likely continue this positive influence through efficient production practices and high levels of investment.

Accompanying this stellar productivity performance has been an equally impressive decline in the incidence of poverty in China. Poverty has typically been regarded as strictly a rural problem in China, but according to official statistics the rural poverty rate fell from 30.7 per cent to about 3.4 per cent between 1978 and 2001. These official estimates have been criticized as underestimating the extent of rural poverty, but in any case several other data sources indicate the same large declines in rural poverty incidence.

Estimates of urban poverty rates do not exist for long time periods, and there is much debate surrounding recent attempts at quantifying urban poverty due to disagreement over who should be counted as poor. Nonetheless, there appears to have been a reduction in urban poverty as well throughout the 1990s, according to the data that are available.

Economic reform and the consequent strong output and productivity gains have unfortunately brought income inequality as well. There are large income gaps in China, between rural and urban areas, within both rural and urban areas, and across provinces as well. The national Gini coefficient actually fell from 0.33 in 1980 to 0.28 in 1991, but has steadily increased since then. The Gini coefficient exceeded the “warning line” of 0.4 in 1996, as stressed by the Government of China. Since 1996, the coefficient has still shown no signs of declining. Meanwhile, we observe that if rural and urban are treated as separate categories, neither of them manifests inequality as severe as the nation as a whole. In this sense, China’s income inequality is mainly one of rural-urban inequality.

However, there have been strong upward trends in inequality within both rural and urban areas, and if current trends continue, the Gini coefficients related to urban and rural areas could hit the warning line in 2010. China is famous for its huge labour endowment. Thus although higher productivity resulted in income increases of those who stayed employed, the increases were at the expense of those who lost the opportunity to work.

Neither have the benefits from rapid economic growth been spread equally across the regions, due for example to the adoption of preferential regional policies. For example, for a long time an open-door policy was only applied to coastal cities all of which are located in eastern areas. Those open-door regions accumulated capital resources more easily and quickly compared to other regions. In addition, the open regions used their resources more efficiently, further adding to regional inequality.

Using official labour productivity data and poverty and inequality data from the World Bank, estimates of the effect of productivity and inequality on poverty are developed. Productivity is found to have a strong negative effect on poverty in China, although when controlling for different productivity levels across sectors it is found that industrial labour productivity is the key driver of reductions in poverty. The weak positive relationship observed between agricultural labour productivity and poverty in the 1990s might reflect a terms of trade effect: agricultural prices when compared with urban industrial prices are unreasonably low so that rural people cannot obtain a corresponding benefit from productivity increases. Trends in income inequality appear to have no substantial effect on poverty in China. Despite some statistical weaknesses, we still have confidence in the main conclusion that productivity increases have played a key role in reducing poverty in China.

In order to continue its strong productivity performance and further improve its record on poverty reduction, China needs to continue with its economic reforms and more fully utilize its labour resources through improved skills acquisition in the population. More importantly, to ensure that the gains from economic growth are shared more equally across society, the government needs to take a stronger role in developing the recently implemented basic social security system. The economic growth process brings a huge potential for increasing incomes through productivity growth, but by its nature also brings structural adjustment that creates inequality through displacing workers, which in turn can create instabilities in society. A well-developed social security system is the key to sharing the gains from growth more equally and maintaining a healthy society. An appendix documents the success China has had thus far in implementing such a system. Reforms aimed at making the taxation system more equitable are also required for addressing the inequality issue.

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CHINA'S PRODUCTIVITY PERFORMANCE AND ITS IMPACT ON POVERTY IN THE TRANSITION PERIOD[1]

INTRODUCTION

It is widely recognized that China has made substantial progress in economic development since economic reform started in 1978. During the past two decades, China's real GDP has increased at an average annual rate of more than 9 per cent and average per capita income has quadrupled.

Accompanying the rapid growth of the national economy in China has been an astounding achievement in the reduction of poverty, especially rural poverty. Based on the government's definition of poverty, between 1978 and 2000, the number of poverty-stricken people in rural areas without enough food to eat and clothes to wear decreased from 250 million to 30 million; and the proportion of poverty-stricken people in the total rural population dropped from 30.7 per cent to about 3.4 per cent (Government of China, 2001).

This great achievement in economic growth was due in large part to productivity improvements. The objective of this paper is to examine China's productivity performance since 1978 and its impact on poverty. In considering China's complicated reform experience, this paper separates the whole Chinese economy into several sectors and investigates how productivity changed in these different sectors throughout the reform period. There are ample statistics showing that for most of the sectors, productivity increased rapidly.

Higher productivity resulted in higher incomes leading to a reduction in China's poverty. Empirical findings from 1990s data strongly support this relationship and also provide evidence that only industrial productivity improvements had a significant effect on poverty reduction while

[1] This paper was written by Wei Chang with the supervision of Andrew Sharpe.

agricultural productivity improvements did not.

This paper also examines growing income inequality in China and whether or not it affects poverty. The phenomenon of income inequality and its potential to cause social problems is one that many are reluctant to acknowledge.

The paper is divided into three parts: the first looks at how productivity growth in different sectors contributes to rapid economic growth in China in the ongoing transition period; the second seeks to understand Chinese poverty and how it was affected by productivity growth; and the third considers the outlook for sustainable productivity growth and the role government could play to support a healthy economy.

PART ONE: EFFECT OF ECONOMIC REFORM ON PRODUCTIVITY

1.1 Productivity Performance at the Aggregate Level

Chinese economic reform has been going on for 24 years. This period witnessed continuous growth of the Chinese economy. In Table 1-1, we see that nominal GDP increased from 362.4 billion yuan in 1978 to 9593.3 billion yuan in 2001. Real GDP increased at a 9.4 per cent average annual rate.[2] But total population growth during this period was much slower at 1.2 per cent per year, while employment grew at only 2.6 per cent.

Based on aggregate data, we see that Chinese economic growth benefited from rapid labour productivity growth that reform helped to achieve. Indeed, output per worker advanced at a 6.6 per cent average annual rate over the 1978-2001 period and accounts for 70 per cent of output growth. And as a developing country, productivity improvement is by far the most important way for China to sustain strong economic growth.

Using the 1978 purchasing power parity (PPP) estimate from the Penn World Tables, we converted China's real GDP, real GDP per capita and real GDP per worker into 1978 U.S. dollar values,[3] as shown in Table 1-2. According to these estimates, China in 1999 had a GDP per capita of $U.S.1113 expressed in 1978 constant prices. Maddison (2001) estimates much larger GDP per capita levels (see Appendix 2).

It is well known that Chinese economic reform is a very complicated process and the nature of reform has changed through time. Box 1 provides a simplified chronology of the economic reform in China since 1978, and for a discussion of these reforms from the perspective of the development of the social security system in China see Appendix 3. Although China demonstrated rapid productivity growth for the total economy, performance varies across industries. In order to better our understanding of the entire progress of productivity changes since reform, we need to investigate industry level performance.

The Chinese economy is classified into three sectors: (1) primary industry, (2) secondary industry and (3) tertiary industry. Primary industry involves almost all agricultural production (including crop cultivation and animal husbandry), forestry and fishery production. Given the predominance of agricultural production, it is often called the agricultural sector. Secondary industry includes manufacturing, mining and quarrying, power production and supply and

[2] Maddison (2001: Table C3-B) has estimated real GDP growth rates at only 7.3 per cent per year over the 1978-99 period, 2.1 percentage points below the official estimates. Maddison (2001: Table C3-A) estimates population growth at 1.3 per cent per year for the same period, very similar to the official 1.2 per cent. Because employment data are only available for limited time periods from Maddison (2001: Table E-2) it is not possible to compare productivity or employment growth directly with official estimates. See Appendix 2 for both growth and level comparisons of Maddison's GDP and per capita GDP estimates with official statistics.

[3] The reason that we the use 1978 PPP is that we have deflated nominal GDP at 1978 constant prices.

construction. The term industrial sector is used for secondary industry excluding construction. Tertiary industry, also called the service sector, covers all remaining industries with economic units in this sector mainly providing producer services and social services.

Table 1-1: Basic Statistics on the Chinese Economy, 1978-2001

Year	Nominal GDP (billions) (1)	Real GDP (billions) (2)	Employment (millions) (3)	Population (millions) (4)	Real GDP per capita (unit) (5)=(2)/(4)	Real GDP per worker (unit) (6)=(2)/(3)
1978	362.4	362.4	401.5	962.6	376.5	902.6
1980	451.8	420.4	423.6	987.1	425.9	992.4
1985	896.4	699.1	498.7	1058.5	660.4	1401.7
1986	1020.2	761.1	512.8	1075.1	707.9	1484.1
1987	1196.3	849.1	527.8	1093.0	776.9	1608.7
1988	1492.8	944.8	543.3	1110.3	851.0	1738.9
1989	1690.9	983.2	553.3	1127.0	872.4	1777.0
1990	1854.8	1020.9	647.5	1143.3	892.9	1576.7
1991	2161.8	1114.8	654.9	1158.2	962.5	1702.2
1992	2663.8	1273.5	661.5	1171.7	1086.9	1925.1
1993	3463.4	1445.3	668.1	1185.2	1219.5	2163.4
1994	4675.9	1628.3	674.6	1198.5	1358.6	2413.9
1995	5847.8	1799.4	680.7	1211.2	1485.6	2643.6
1996	6788.5	1971.9	689.5	1223.9	1611.2	2859.9
1997	7446.3	2146.2	698.2	1236.3	1736.0	3073.9
1998	7834.5	2314.0	706.4	1248.1	1854.0	3275.9
1999	8206.8	2479.2	713.9	1259.1	1969.1	3472.6
2000	8944.2	2676.4	720.9	1265.8	2114.3	3712.8
2001	9593.3	2871.7	730.3	1276.3	2250.1	3932.5
1978-2001 Average Annual Growth Rate (%)	15.3	9.4	2.6	1.2	8.1	6.6
1978-97 Average Annual Growth Rate (%)	17.2	9.8	3.0	1.3	8.4	6.7
1997-2001 Average Annual Growth Rate (%)	6.5	7.6	1.1	0.8	6.7	6.4

Source: Columns (1), (3), (4) are from the Statistical Yearbook of China, 2002 Table 3-1. Other columns are calculated by the author.

Note: 1. All output values are expressed in Chinese currency (yuan) and all real terms are in 1978 constant prices.
2. Since there is no official GDP deflator, we calculate real GDP values by multiplying the real GDP index listed in the Statistical Yearbook of China by the 1978 base year value.

Table 1-3 provides a clear picture of the relative importance in terms of output and employment of each sector, and changes in their importance over the 1978-2001 period. The industrial sector has the largest output at almost the half of total economy GDP, and this share has been relatively stable over time. Agriculture's output share has been decreasing as the service

sector's share has been increasing over most of this period.

Table 1-2: PPPs, and Real GDP, Real GDP per capita and Real GDP per worker at 1978 PPP

Year	PPP (yuan/$U.S.) (1)	Market Exchange Rate (yuan/$U.S.) (2)	Real GDP ($U.S.) (billions) (3)	Real GDP per capita ($U.S.) (unit) (4)	Real GDP per worker ($U.S.) (unit) (5)
1978	1.9	1.7	190.7	198.2	475.1
1980	1.8	1.5	221.3	224.2	522.3
1985	3.6	2.9	367.9	347.6	737.8
1986	4.1	3.5	400.6	372.6	781.1
1987	4.2	3.7	446.9	408.9	846.7
1988	3.6	3.7	497.3	447.9	915.2
1989	3.3	3.8	517.5	459.2	935.3
1990	4.3	4.8	537.3	470.0	829.9
1991	4.7	5.3	586.7	506.6	895.9
1992	4.6	5.5	670.3	572.0	1013.2
1993	4.2	5.8	760.7	641.8	1138.6
1994	5.2	8.6	857.0	715.1	1270.5
1995	4.4	8.4	947.0	781.9	1391.4
1996	4.1	8.3	1037.8	848.0	1505.2
1997	4.1	8.3	1129.6	913.7	1617.8
1998	4.2	8.3	1217.9	975.8	1724.2
1999	4.3	8.3	1304.9	1036.4	1827.7
2000	4.3	8.3	1408.6	1112.8	1954.1

Source: Columns (1) and (2) come from the Penn World Tables version 6.1, which can be downloaded from *http://pwt.econ.upenn.edu.*

Examining changes in the employment structure, we find that employment in agricultural production declined sharply from 70.5 per cent in 1978 to 50.0 per cent in 2001, while the employment shares of the industrial sector and service sector both increased. This is especially true for the service sector, which employed more than one quarter of total labour in 2001, even more than the secondary sector.

The ratio of a sector's output share to employment share is an indicator of its relative productivity. A sector that accounted for 25 per cent of output and 25 per cent of employment would have average productivity. As sector whose output share exceeds its employment share has above average productivity while a sector whose output share is less than its employment share has below average productivity.

Table 1-3A shows that in 2001, the level of output per worker in agriculture was only 30.4 per cent of the national average, down from 39.9 per cent in 1978, implying that agricultural labour productivity growth was less than total economy labour productivity growth. In contrast, the level of output per worker in secondary industry was 229.1 per cent of the total economy average in 2001, down from 278.6 per cent in 1978. In service, the level of output per worker was 121.3 per cent of the total economy average in 2001, down from 194.3 per cent in 1978.

Box 1

Simplified Chronology of Economic Reform in China since 1978

Stage One (1978-1984) – Revitalization Period

The 3rd plenum of the 11th Communist Party of China (CPC) congress central committee in December 1978 adopted an economic reform program that during the 1978-1984 period of time:

- Leased land to farmers under the household responsibility system;
- Lifted procurement prices for key crops;
- Introduced a dual price system for agricultural products;
- Encouraged diversification and specialization of crops;
- Introduced a profit retention system into state-owned enterprises on an experimental basis; and
- Applied an open-door policy by setting up special economic zones firstly in Shenzhen, Zhuhai, Shantou and Xiamen (later expanded to 14 cities).

Stage Two (1984-1988) – Reform Broadening Period

The 3rd plenum of the 12th CPC congress central committee decided to expand economic reform to include urban enterprises in October 1984.

- The "contract responsibility system" was introduced to strengthen the responsibility and decision-making authority of managers.
- The enterprise tax system replaced the profit retention system.
- A new labour contract system pushed out the life-long labour system.
- The private sector was given formal permission to exist and develop within the regulated range.
- Severe inflation took place during 1987-1988.

Stage Three (1989-1991) – Retrenchment period

- Aimed at combating inflation

Stage Four (1992-1997) – Reform deepening period

The 14th CPC congress central committee made clear that the basic objective of Chinese economic reform was the establishment of a social market economy.

- Experimental share-holding system was carried out in state enterprises.
- Introduction of a modern enterprise system.
- "8-7 plan" was launched (1994) as a poverty reduction plan that aimed to eliminate the 80 million rural poor within seven years in 592 poverty-stricken counties and raise per capita income to 500 yuan per year (in 1990 constant prices).
- The Asian crisis happened in 1997
- The 15th CPC congress central committee encouraged expansion of all kinds of non-state-owned enterprises in September 1997.

Stage Five (1998- present) – Reform Acceleration period

- Firms were encouraged to lay off redundant workers so as to improve efficiency. It was especially applied to state-owned enterprises.
- Became a member of WTO in 2001.
- A basic social security system was set up, consisting mainly of social insurance (old age pension, medical care insurance, unemployment insurance, working injury insurance and childbirth insurance), social relief (minimum living allowance), social welfare and special social care for disabled people.

Note: see Appendix 3 for a detailed discussion of these economic reforms in the context of the development of a social security system in China.

Table 1-3: Distribution of GDP and Employment by Sector in China, 1978-2001

Year	Total (1)=(2)+(3)+(4) or (5)+(6)+(7)	Nominal GDP Share (%)			Employment Structure (%)		
		Primary industry	Secondary industry	Tertiary industry	Primary industry	Secondary industry	Tertiary industry
		(2)	(3)	(4)	(5)	(6)	(7)
1978	100	28.1	48.2	23.7	70.5	17.3	12.2
1979	100	31.2	47.4	21.4	69.8	17.6	12.6
1980	100	30.1	48.5	21.4	68.7	18.2	13.1
1981	100	31.8	46.4	21.8	68.1	18.3	13.6
1982	100	33.3	45.0	21.7	68.1	18.4	13.4
1983	100	33.0	44.6	22.4	67.1	18.7	14.2
1984	100	32.0	43.3	24.7	64.0	19.9	16.1
1985	100	28.4	43.1	28.5	62.4	20.8	16.8
1986	100	27.1	44.0	28.9	60.9	21.9	17.2
1987	100	26.8	43.9	29.3	60.0	22.2	17.8
1988	100	25.7	44.1	30.2	59.4	22.4	18.3
1989	100	25.0	43.0	32.0	60.0	21.6	18.3
1990	100	27.1	41.6	31.3	60.1	21.4	18.5
1991	100	24.5	42.1	33.4	59.7	21.4	18.9
1992	100	21.8	43.9	34.3	58.5	21.7	19.8
1993	100	19.9	47.4	32.7	56.4	22.4	21.2
1994	100	20.2	47.9	31.9	54.3	22.7	23.0
1995	100	20.5	48.8	30.7	52.2	23.0	24.8
1996	100	20.4	49.5	30.1	50.5	23.5	26.0
1997	100	19.1	50.0	30.9	49.9	23.7	26.4
1998	100	18.6	49.3	32.1	49.8	23.5	26.7
1999	100	17.6	49.4	33.0	50.1	23.0	26.9
2000	100	16.4	50.2	33.4	50.0	22.5	27.5
2001	100	15.2	51.1	33.6	50.0	22.3	27.7

Souce: Statistical Yearbook of China, 2002, Table 3-2, Table 5-2

The decline in the relative productivity of all three sectors is explained by the reallocation of labour from low productivity agriculture to the two other much higher productivity level sectors. This inter-sectoral employment shift contributed significantly to aggregate productivity growth and raised the aggregate labour productivity level of the total economy.

1.2 Reform in the Agricultural Sector

Chinese economic reform began in the agricultural sector in 1978. This sector had been heavily repressed under central planning and reform in this sector was very successful. The major reforms were to introduce the household responsibility system[4] (HRS) and increase procurement prices for

[4] The household responsibility system (HRS), implemented over 1979-1984, was intended to solve problems of poor motivation and

key crops.[5] The new farming system greatly increased the farmers' incentives to produce, which led them to use their labour more effectively. The higher prices for agricultural

Table 1-3 A: Relative Labour Productivity by Sector, 1978-2001

year	Relative Labour Productivity (%)		
	Primary (1)	Secondary (2)	Tertiary (3)
1978	39.9	278.6	194.3
1979	44.7	269.3	169.8
1980	43.8	266.5	163.4
1981	46.7	253.6	160.3
1982	48.9	244.6	161.9
1983	49.2	238.5	157.7
1984	50.0	217.6	153.4
1985	45.5	207.2	169.6
1986	44.5	200.9	168.0
1987	44.7	197.7	164.6
1988	43.3	196.9	165.0
1989	41.7	199.1	174.9
1990	45.1	194.4	169.2
1991	41.0	196.7	176.7
1992	37.3	202.3	173.2
1993	35.3	211.6	154.2
1994	37.2	211.0	138.7
1995	39.3	212.2	123.8
1996	40.4	210.6	115.8
1997	38.3	211.0	117.0
1998	37.3	209.8	120.2
1999	35.1	214.8	122.7
2000	32.8	223.1	121.5
2001	30.4	229.1	121.3

Source: Columns (1), (2) and (3) are all calculated from Table 1-3.

products helped to maintain higher productivity. Meanwhile, agricultural reform encouraged diversification and specialization of crops, together with stimulation of rural markets.

- Justin Lin (1992) estimated a production function and a supply response function to show the shift from the production-team system to HRS had a positive and significant effect on

bad management in agriculture by giving decision-making power and rights to income from work to the peasant household. The basic idea was that producer and manager should be the same and that the peasant producer had a strong claim to the fruit of his/her labour and the results of his/her decisions about production and investment.

[5] Grain and cotton were not included as they were still subject to mandatory targets.

agricultural growth, which came primarily from the more productive use of inputs. According to Lin, real agricultural output increased by 42.2 per cent between 1978 and 1984, and nearly half of the total growth was contributed by productivity change.

- McMillan et al. (1987) found that for the 28 per cent increase in total factor productivity of the agriculture sector between 1978 and 1984, about one-fourth was due to higher prices paid for farm production and three-fourths to changes in property rights and incentives.

The evolution of agricultural productivity in China has not been continuous over the 1978-2000 period. Labour productivity in the agricultural sector began to stagnate in the mid-1980s (Chart 1-1). This stagnation can be explained partly by the fact that the HRS had only a short-term level impact on productivity without inducing productivity-enhancing, long-term investments. In addition, there was no major technological change in Chinese agriculture production in the late 1980s.

Another reason for the stagnation was the uncertainty of land usage rights. In China, all land belongs to the government. Even under HRS, farmers were only given the right to use the land for a limited number of years. Although in 1985 the government permitted the extension of leasing to 15 years, the policy was not applied effectively (Prosterman et al., 1996). In many counties and villages, land was recollected every 3-6 years and re-allocated according to changes in household size. The result was that the farmers rejected long-term renovation.

Starting in the 1990s, agricultural productivity recovered from stagnation, as shown in Chart 1-1. The recovery was not surprising because during the previous decade, the government had made greater efforts to improve agricultural product markets and to strengthen the use of advanced technology to accelerate the development of high quality and pollution-free agricultural products in rural areas. In terms of total agricultural productivity growth in the past decade, technological progress contributed about 45 per cent (Zhang, 2000).

At the same time, structural adjustment of the agricultural sector reallocated rural labour to higher-demand animal husbandry and fishery production. Farmers no longer concentrated on just crop cultivation. This adjustment in the product mix meant that the labour and capital inputs yielded higher returns.

1.3 Reform in the Industrial Sector

Industrial sector reform is at the heart of Chinese economic reform. In 2000, industrial output reached 1.26 trillion yuan. However, although little doubt was cast on this impressive achievement, some people believed that the rapid industrial development in China was mainly due to more intensive use of inputs not productivity improvement. To assess this situation here we need to look at the impact of reform on different types of industrial enterprises.

Chinese industrial production is carried out in several ways:

- State-owned enterprises (SOEs) where the means of production or income are owned by the state.

• Collective-owned enterprises (COEs) where the means of production are owned collectively. These include urban and rural enterprises invested in by collectives and enterprises which

Table 1-4: Agricultural Labour Productivity, 1978-2000

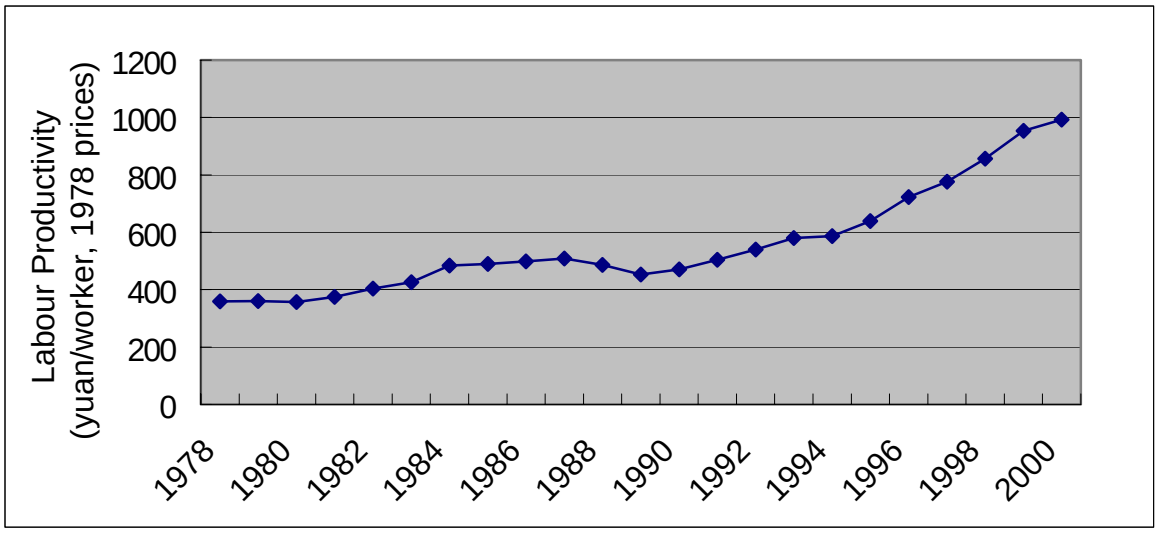
Year	Nominal Gross Output (billions)	Deflator (1978=100)	Real Output (billions)	Employment (millions)	Labour productivity (yuan/ worker)
	(1)	(2)	(3)	(4)	(5)
1978	101.8	100.0	101.8	283.2	359.6
1979	125.9	122.1	103.1	286.3	360.1
1980	135.9	130.8	103.9	291.2	356.9
1981	154.6	138.5	111.6	297.8	374.7
1982	176.2	141.5	124.5	308.6	403.4
1983	196.1	147.7	132.8	311.5	426.2
1984	229.6	153.6	149.5	308.7	484.1
1985	254.2	166.8	152.4	311.3	489.5
1986	276.4	177.5	155.7	312.5	498.3
1987	320.4	198.8	161.2	316.6	509.1
1988	383.1	244.5	156.7	322.5	485.9
1989	422.8	281.2	150.4	332.3	452.5
1990	501.7	273.9	183.2	389.1	470.8
1991	528.9	268.4	197.0	391.0	503.9
1992	580.0	277.5	209.0	387.0	540.1
1993	688.2	314.7	218.7	376.8	580.4
1994	945.7	440.3	214.8	366.3	586.4
1995	1199.3	527.9	227.2	355.3	639.4
1996	1384.4	550.1	251.7	348.2	722.8
1997	1421.1	525.3	270.5	348.4	776.5
1998	1455.2	483.3	301.1	351.8	855.9
1999	1447.2	424.3	341.1	357.7	953.4
2000	1462.8	409.0	357.7	360.4	992.4
1978-2000 Average Annual Growth rate (%)	12.9	6.7	5.9	1.1	4.7
1978-1990 Average Annual Growth rate (%)	14.2	8.8	5.0	2.7	2.3
1990-2000 Average Annual Growth rate (%)	11.3	4.1	6.9	-0.8	7.7

Source: 1. Columns (1), (2) and (4) come from the Statistical Yearbook of China 2002, Table 3-1, Table 5-5 and Statistical Yearbook 2000, Table 9-11.
2. Columns (3) and (5) are calculated by the author.
Note: Gross agricultural output is deflated using the agricultural goods procurement price index.

were formerly owned privately but have been registered in an industrial and commercial administration agency as collective units through raising funds from the public.

- Other types of enterprises include those economic units that are owned or controlled by the private sector and that use domestic funds, namely private limited liability corporations, private share-holding corporations, private partnership enterprises and private sole investment enterprises, and foreign funded enterprises, including joint venture enterprises, cooperative enterprises, sole investment enterprises and limited liability corporations. Enterprises that receive funds from Hong Kong, Macao and Taiwan are also included in this part.

Chart 1-1: Agricultural Labour Productivity, 1978-2000



Source: Table 1-4

1.3.1 Productivity performance of SOEs

1.3.1.1 Labour and capital productivity

Before economic reform began in 1978, SOEs accounted for the lion's share of entire industrial production. After 1978, however, the production share of non-state-owned enterprise increased and surpassed that of the state sector. Table 1-5 clearly shows that in 1993, the industrial output share of SOEs was for the first time below 50.0 per cent, and in the following years, the ratio became smaller and smaller. By 1999, only 26.1 per cent of total output was accounted for by SOEs. However, a falling output share does not mean that the labour productivity of SOEs was declining.

The real output of SOEs has been increasing for most of the past two decades (Table 1-6). Total real gross output reached 126.4 billion yuan (1980 prices) in 2001 as compared to 39.2 billion yuan in 1980, with an average annual growth rate of 5.7 per cent. After declining in 1997 and 1998,

output returned to rapid growth over the 1998-2001 period, advancing 10.4 per cent in 1999 and 16.8 per cent in 2000.

Over the same period, i.e. 1998-2000, the employment level actually fell. Indeed 1993 was a watershed when labour employed in SOEs began declining. By 1997, employment was below the 1987 level. Employment decreased even more sharply after 1997 as a result of the large-scale implementation of laid-off policy in China. This refers to the laying off of redundant employees in the interests of efficiency. Employment fell by 32.7 per cent in 1998, followed by 11.4 per cent in 1999, 12.9 per cent in 2000 and 13.3 per cent in 2001.

Table 1-5: Gross Output by Ownership Structure for the Industrial Sector, 1978-1999 (% of nominal gross output)

Year	State-owned Enterprises	Collective-owned Enterprises	*of which*: TVE[6]	Others[7]
1978	77.6	22.4		
1980	76.0	23.5		0.5
1983	77.0	22.5	6.7	0.5
1984	74.0	25.0	7.7	1.0
1985	64.9	32.1	14.6	3.0
1986	62.3	33.5		4.2
1987	59.7	34.6		5.7
1988	56.8	36.1	16.3	7.1
1989	56.1	35.7	16.4	8.2
1990	54.6	35.6		9.8
1991	56.2	33.0	17.8	10.8
1992	51.5	35.1	20.7	14.4
1993	47.0	34.0	21.8	19.0
1994	37.3	37.7	25.3	24.9
1995	34.0	36.6	25.9	29.5
1996	33.7	36.5	27.7	29.8
1997	29.8	35.9		34.3
1998	26.5	36.0		37.5
1999	26.1	32.8		41.1

Source: 1. Statistical Yearbook of China, 2000, Table 13-3, 13-4,
2. Statistic Yearbook of China 1998 Table 13-1
3. Statistical Yearbook of China 1996, Table 12-1

The divergent trends of output and employment provide us with strong evidence that the labour productivity of SOEs was increasing through reform especially after 1997, as shown in Chart 1-2. Labour productivity surged up 39.2 per cent in 1998, 24.5 per cent in 1999, 34.4 per cent in 2000 and 16.9 per cent in 2001. Over the 1997-2001 period, employment fell 55.0 per cent,

[6] TVEs refer to Township and Village enterprises. They are owned by local citizens and controlled by township or village governments. Their behavior is regulated by local governments to varying degrees, but much less so than SOEs are.
[7] This includes all the other types of enterprises that are not state-owned or collective-owned.

output rose 22.8 per cent and output per worker increased an amazing 172.3 per cent.

There is no doubt that reform has pushed China's state-owned industrial enterprises into a growth path that is based on higher labour productivity but using more capital. We can find in Table 1-7 that over the 1980-2001 period, real capital stock grew at an average annual rate of 7.9 per cent. Especially in 1998, the capital stock increased by 25.2 per cent from 1997, followed by 11.4 per cent in 1999, 6.7 per cent in 2000 and 7.4 per cent in 2001.

Table 1-6: Output, Employment and Labour Productivity in Chinese State-owned Enterprises (SOEs), 1980-2001

Year	Nominal Gross output (billion) (1)	Deflator (1980=100) (2)	Real Gross Output (billion) (3)=(1)/(2)	Employment (million) (4)	Labour productivity (yuan/worker) (5)=(3)/(4)
1980	39.2	100.0	39.2	33.3	1174.6
1985	63.0	101.8	61.9	38.2	1622.7
1986	69.7	110.7	63.0	39.6	1592.2
1987	82.5	114.9	71.8	40.9	1757.3
1988	103.5	123.9	83.5	42.3	1975.5
1989	123.4	142.5	86.6	42.7	2027.1
1990	130.6	169.0	77.3	44.7	1771.4
1991	149.6	176.0	85.0	43.6	1900.1
1992	178.2	186.9	95.43	45.2	2109.4
1993	227.3	199.6	113.9	45.0	2531.2
1994	262.0	247.5	105.9	43.7	2423.0
1995	312.2	295.8	105.5	44.0	2400.4
1996	361.7	339.8	106.5	42.8	2488.4
1997	359.7	349.7	102.9	40.4	2545.9
1998	336.2	348.6	96.4	27.2	3544.5
1999	355.7	334.3	106.4	24.1	4411.5
2000	405.5	326.3	124.3	21.0	5929.6
2001	424.1	335.4	126.4	18.2	6932.0
1980-2001 Average Annual Growth rate (%)	12.0	5.9	5.7	-2.8	8.8
1980-1997 Average Annual Growth rate (%)	13.9	7.6	5.8	1.1	4.7
1997-2001 Average Annual Growth rate (%)	4.2	1.0	5.2	-18.0	28.5

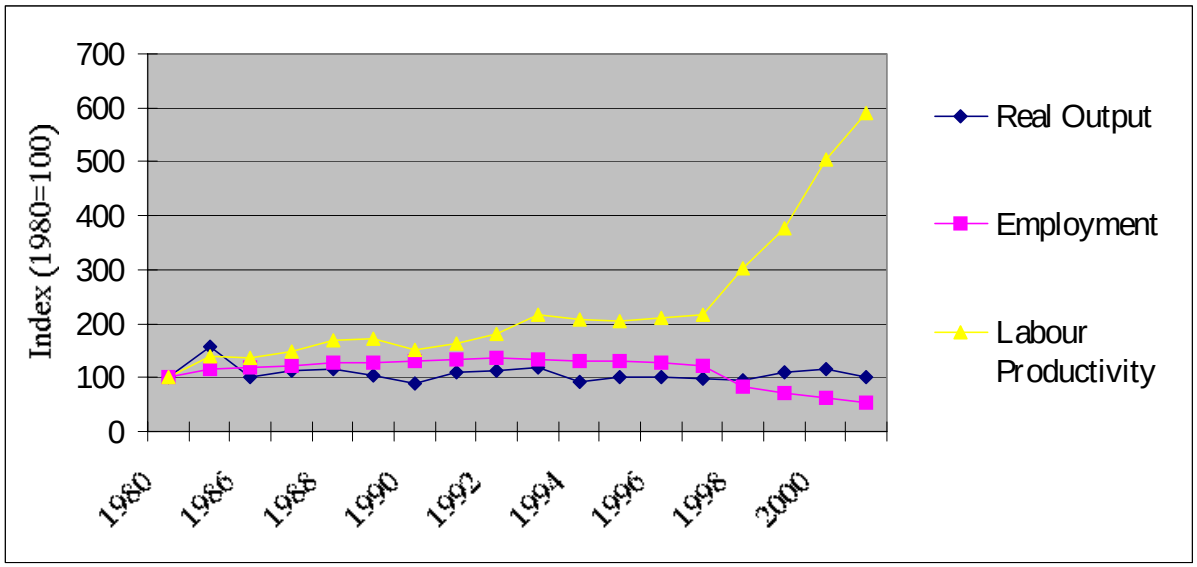
Source: 1. Columns (1), (2) and (4) are from the Statistical Yearbook of China, 2000, Table 13-2, Table 13-3 and the Statistical Yearbook of China, 2002, Table 9-9, Table 13-1, Table 13-2.
2. Columns (3) and (5) are calculated by the author.

Note: The deflator used here is the general price index of industrial output.

However, in contrast to labour productivity, capital productivity of state-owned industrial enterprises in China has declined during most of the 1980-2001 period, over which an average annual growth rate of -1.7 was exhibited. Especially, the rapid capital stock growth over the 1997-2001 period resulted in a continuous fall of capital productivity and the rate of decrease was more than 23.0 per cent.

In addition, the capital/labour ratio of Chinese state-owned industrial enterprises shows an increasing trend. The growth is astounding between 1997 and 2001, when capital investment kept on rising while employment fell rapidly.

Chart 1-2: Trends in Output, Employment and Output per Worker in SOEs, 1980-2001



Source: Table 1-6

1.3.1.2 Trends in total factor productivity (TFP)

Another widely adopted method to evaluate the reform impact on productivity performance is to examine how total factor productivity (TFP) changes as a result of reform. Several representative works, either using aggregate data or specific industrial level data, have tried to give reliable results. But it still remains contentious as to whether TFP increased or decreased because of estimation difficulties as the following works indicate.

- Chen et al. (1988) estimated TFP for the state industrial sector. They used time-series data of net output as dependent variables and estimated a Cobb-Douglas production function. Applying those estimates of production elasticity of factor inputs from the production functions, they found that TFP growth was about 4.8-5.9 per cent per year between 1978 and 1985. Furthermore, they found that TFP growth acceleration was significant after economic reform

was launched.

- Gary H. Jefferson and Thomas G. Rawski (1994) estimated a Cobb-Douglas function using aggregate data of the state sectors. According to their estimation results, average annual rates of growth of TFP were within the range of 2-4 per cent from 1980 to 1988. They also indicated that rising TFP was consistent with micro-level evidence of increases in both static and dynamic efficiency. Theodore Groves et al. (1994) estimated a joint production function for five representative industries in their sample set, and found a two-way causation between workers' incentive and total factor productivity.

- Woo et al. (1994) did not find support for the view that TFP of the state industrial sector significantly increased. They applied various deflators to nominal output and inputs and obtained nearly zero TFP growth among large and medium SOEs between 1984 and 1988.

- Evidence from Y. Huang and X. Meng (1997) suggests that at least for the period 1986-1990, reform policies for the state industrial sector failed to stimulate productivity growth. TFP in fact decreased by 2 per cent per year. A real growth rate of 5.6 per cent was supported by more rapid expansion of factor inputs and such growth cannot be sustained. They concluded that more substantial reform measures are required to maintain a positive productivity growth in the state sector.

There are many other related studies in the literature, but almost all use data from before 1995. The previous conclusions, even if they were fairly consistent, cannot make us believe that the most recent reform would necessarily have the same effects on TFP in the state sector. We have calculated a TFP index with our own data from Table 1-6 and Table 1-7 (see Appendix 1).

Table 1-7: Fixed Assets of Chinese State-owned Industrial Enterprises, 1980-2001

Year	Nominal Fixed Assets (billions)	Fixed Asset Deflator (1980=100)	Real Fixed Assets (billions)	Capital Productivity (yuan/1000 real yuan offixed assets)	Capital/Labour Ratio (yuan per worker)
	(1)	(2)	(3)	(4)	(5)
1980	37.3	100.0	37.3	1049.8	1118.8
1985	59.6	120.6	49.4	1253.7	1294.3
1986	67.4	128.3	52.6	1198.3	1328.7
1987	76.8	135.1	56.8	1263.3	1391.0
1988	88.0	153.4	57.4	1456.7	1356.1
1989	101.6	166.4	61.1	1418.3	1429.3
1990	116.1	175.5	66.2	1168.5	1516.0
1991	135.6	190.4	71.2	1193.4	1592.1
1992	156.7	215.2	72.8	1309.4	1610.9
1993	190.7	269.0	70.9	1606.5	1575.6
1994	231.0	295.9	77.8	1360.7	1780.7
1995	309.4	314.7	98.3	1073.6	2235.7
1996	347.6	327.3	106.6	1002.2	2483.1
1997	383.5	332.8	115.2	892.6	2852.1
1998	479.1	332.2	144.2	668.6	5301.0
1999	531.5	330.8	160.6	662.4	6659.9
2000	573.0	334.5	171.3	725.6	8172.4
2001	617.8	335.8	184.0	687.3	10086.2
1980-2001 Average Annual Growth Rate (%)	14.3	5.9	7.9	-1.7	11.0
1980-1997 Average Annual Growth Rate (%)	14.7	7.3	6.9	-0.9	5.7
1997-2001 Average Annual Growth Rate (%)	12.7	0.2	12.4	-6.3	37.1

Source: Columns (6) and (7) are from the Statistical Yearbook of China 1996, Table 12-17, the Statistical Yearbook of China, 2000, Table 13-10, Table 9-14 and the Statistical Yearbook of China 2002, Table 13-11, Table 13-2, Table 9-11

Note: All real terms in this table are in 1980 constant prices.

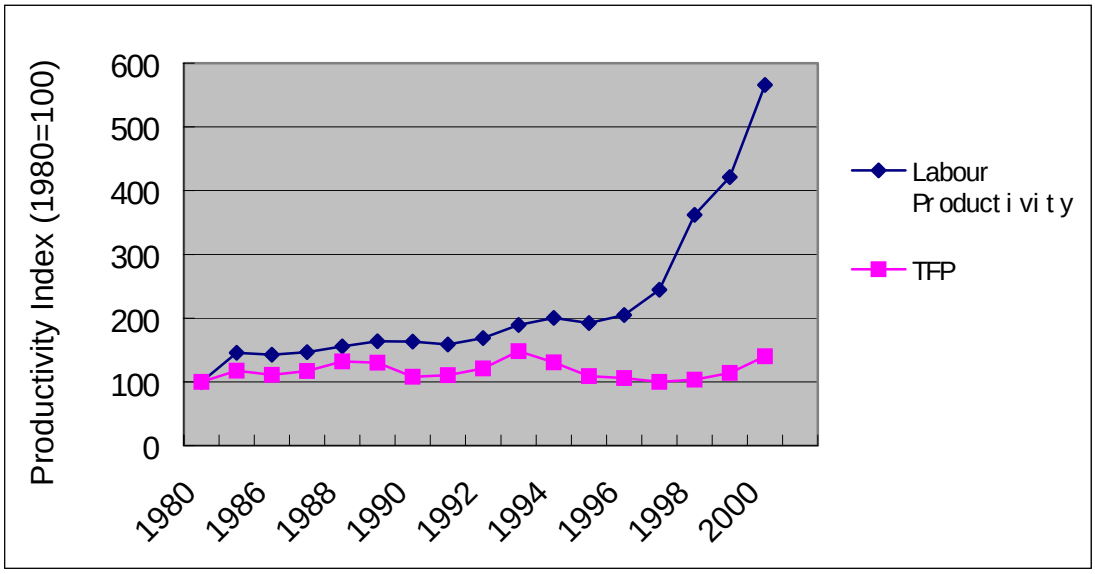
Based on our own elasticities, i.e. 0.74 for the capital input and 0.67 for the labour input (see Appendix 1 for a derivation), the TFP index for SOEs during the period of 1980-2000 is given below:

Table 1-8: TFP index of Chinese SOEs, 1980-2000

Year	TFP (%) $TFP_i = \exp[\ln Y_i - \alpha \ln K_i - \beta \ln L_i]$
1980	3.84
1985	4.51
1986	4.27
1987	4.50
1988	5.08
1989	4.99
1990	4.14
1991	4.24
1992	4.65
1993	5.68
1994	5.02
1995	4.19
1996	4.06
1997	3.84
1998	3.97
1999	4.38
2000	5.37
1980-2000 Average Annual Growth Rate (%)	1.66
1980-1997 Average Annual Growth Rate (%)	0.00
1997-2000 Average Annual Growth Rate (%)	11.83

We compare TFP growth with labour productivity growth in Chart 1-3. Both seem to follow the same pattern prior to 1997 but after that labour productivity grew much more rapidly than TFP. This is reasonable because after 1997, capital investment in SOEs did not decrease as employment did, but rather increased dramatically. The capital/labour ratio therefore surged (Table 1-7). As a result, TFP growth between 1997 and 2000 was much less than labour productivity growth , but still strongly advanced at 11.8 per cent per year compared to no increase over the 1980-1997 period.

Chart 1-3: Comparison of SOE Labour Productivity and TFP



Source: Table 1-6 and Table 1-9

1.3.2 Productivity performance of COEs

Collective-owned enterprises (COEs) in China played a leading role in the reform of the non-state-owned sector. COEs refer to both urban collective-owned enterprises and to township and village enterprises (TVEs) in rural areas which actually accounted for much of the impressive output growth in this sector. As noted in Table 1-5, TVEs produced only 6.7 per cent of industrial output in 1983, but by 1996 were responsible for 27.7 per cent (more recent data are not available).

It should be noted here that TVEs include enterprises that operate in industry, construction, transportation, commerce, trade and agriculture, that is, almost the entire rural economy except for the SOEs and urban controlled COEs operating in rural areas. Most TVEs concentrate on non-agricultural production, especially industrial production. By 1996, industrial production accounted for more than four fifths of TVEs' total output. Table 1-9 shows the concentration within TVEs in the industrial sector relative to other sectors.

Due to data constraints, a complete time-series of TVEs' total output cannot be obtained. After 1996, value added rather than gross output began to be reported so that the new measurements made consistent comparisons impossible. There is no doubt that TVEs have been on a rapid growth path.

Table 1-9: Industrial Structure of Non-agricultural TVEs in 1996

	Total Gross Output (million)	Share (%)
Industry	11.28	80.71
Construction	0.88	6.30
Transportation and communications	0.24	1.74
Wholesale and retail trade	1.13	8.07
Social services etc.	0.44	3.18
Total:	13.97	100.00

Source: Statistical communiqué (1996), National Bureau of Statistics

Referring to the whole collective sector, the data in Table 1-10 shows that real gross output increased from less than 12.1 billon yuan in the beginning of reform to 133.5 billion yuan in 1999, at an average annual growth rate of 13.5 per cent. This spectacular growth cannot be explained without considering the remarkable contribution of increasing labour productivity in the collective sector.

1.3.2.1 A literature review on the productivity growth of COEs

A number of studies have found that COEs achieved impressive success in terms of productivity growth. For example:

- Jefferson and Rawski (1994) found that average annual TFP growth in the collective sector was 3.4 per cent, 5.9 per cent, and 4.9 per cent for urban collective enterprises in the periods 1980-1984, 1984-1988 and 1988-1992 respectively. For TVEs, the rates were 7.3 per cent, 6.6 per cent and 6.9 per cent. Both urban COEs and TVEs had higher TFP growth rates when compared with those of SOEs.

- Woo et al. (1994) calculated TFP growth rates for a sample of 200 TVEs between 1985 and 1988. They found that TVEs showed an annual average growth of 8-10 per cent under different estimation methods. Based on their sample data, SOEs had very low TFP growth.

Table 1-10: Output, Employment and Labour Productivity in Collective-owned Industrial Enterprises, 1980-1999

Year	Nominal Gross Output (billions)	Deflator (1980=100)	Employment (millions)	Real Gross Output (billions)	Labour Productivity (yuan per worker)
	(1)	(2)	(3)	(4)	(5)
1980	12.1	100.0	14.3	12.1	849.4
1985	31.2	101.8	17.1	30.6	1795.8
1986	37.5	110.7	17.8	33.9	1903.1
1987	47.8	114.9	18.3	41.6	2276.7
1988	65.9	123.9	18.5	53.2	2873.7
1989	78.6	142.5	18.5	55.1	2988.8
1990	85.2	169.0	18.8	50.4	2688.3
1991	87.8	176.0	19.0	49.9	2629.3
1992	121.4	186.9	18.6	64.9	3487.0
1993	164.6	199.6	16.9	82.5	4875.0
1994	264.7	247.5	16.1	107.0	6664.0
1995	336.2	295.8	15.0	113.7	7562.7
1996	392.3	339.8	14.3	115.5	8079.5
1997	433.5	349.7	13.3	124.0	9341.0
1998	457.3	348.6	8.0	131.2	16356.8
1999	446.1	334.3	6.7	133.4	19826.8
1980-1999 Average Annual Growth rate (%)	20.9	6.6	-3.9	13.5	18.0
1980-1997 Average Annual Growth rate (%)	23.4	7.6	-0.4	14.7	15.1
1997-1999 Average Annual Growth rate (%)	1.4	-2.2	-28.8	3.8	45.7

Source: 1. Columns (1) and (3) are from the Statistical Yearbook of China 1996, Table 4-11, Table 12-3, Table 13-2; Statistical Yearbook 1998, Table 13-3; Statistical Yearbook 2000, Table 13-2, Table 13-3
2. Columns (4) and (5) are calculated by the author.
Note: The deflator used in this table is the same as that in Table 1-6.

1.3.2.2 Factors behind TVE productivity growth

The prosperity of TVEs contributed much to China's industrial development. This kind of enterprise has no counterpart in any other developing country. The success of reform on TVEs can be attributed to many distinctly Chinese factors. First, Chinese TVEs are small, flexible and market driven. They have to rely on markets for sourcing supplies and selling products. TVEs are usually located in rural areas where there is a shortage of goods or where output is needed as a supplement to the production of SOEs. Market forces not only influence the production decisions made by TVEs but also stimulate them to produce effectively.

Second, TVEs have access to cheap labour because of their location in rural areas, but they usually face expensive capital due to a strong tendency on the part of banks to grant loans to SOEs. This, in some degree, forced TVEs to choose appropriate production technologies. In this sense, labour and capital inputs of TVEs should be more productive compared to those of SOEs.

In addition, many TVEs put special emphasis on human capital investment and innovations. With their autonomous and flexible system, TVEs recruit highly competent engineers and technicians by paying attractive wages and providing a better research environment. TVEs also sign contracts directly with research institutions for advice on technological improvements. According to a survey in 1999, nearly 50 per cent of TVE total investment was for technological development.[8]

1.3.3 Productivity performance of foreign funded enterprises

1.3.3.1 The uncertain productivity performance of domestic private owned industrial enterprises

"Private" has been a sensitive term in the Chinese economic system for a long time. Controlled under socialist ideology, people regarded everything that was private as being against socialism. Thus at the beginning of the reform period, private enterprises were not allowed to enter most industries, including infrastructure and large-scale manufacturing. But later on, when the market-based economic system gradually came into being, private-owned enterprises began to be accepted as one of the important components in the whole economy and they performed an increasingly important role.

However, because of lack of statistics on private enterprises, it is not easy to statistically ascertain whether the rapid development of private industrial firms is a result of productivity growth or employment growth. On one side, domestic private enterprises have almost total management autonomy. They can employ as few workers as possible to pursue the highest profits and resource allocation can thus be more efficient compared to SOEs or COEs. But few research studies have successfully shown how their strong autonomy has led to higher productivity.

There is some supportive evidence from examining the productivity growth of collective firms. Because of ideological pressures, many private firms did not indicate that they were privately owned. Instead, they sought local authorities as a co-owner although they still made management decisions. By doing so, these firms could obtain certain advantages such as bank loans and credits from the authorities. Statistics from the Development Research Centre of the State Council[9] show

[8] Although TVEs mainly produce industrial goods, statistics on TVEs are gathered by the TVE Bureau of the Ministry of Agriculture. These data are from http://www.cte.gov.cn/index/asp/xqxw.asp?idd=328.

[9] These statistics can be found at http://www.drcnet.com.cn/NEW_fulltextindex/s1.asp.

that 87 per cent of the collective firms before 1995 were in fact private owned, and these firms accounted nearly 27 per cent of COE output. This is not a good phenomenon since it would suggest an upward bias of productivity growth in the collective sector. But this can reflect that higher productivity in private industrial enterprises is very possible.

On the other side, unlike state enterprises and collective firms, domestic private enterprises are usually small, engaging mostly in manufacturing production that needs little skills. Management of many private firms is decided by family owners. Consequently, employees have to abide by the family rules instead of formal regulation. In addition, private firms have a strong tendency to make full use of the talents of their staff and provide few training and retraining opportunities. Despite their uncertain productivity performance, private industrial enterprises have always been praised for facilitating reform by absorbing extra labour.

1.3.3.2 Foreign funded enterprises

Foreign capital was more welcomed than domestic private capital at the beginning of the reform period. Foreign capital flows mainly to the industrial sector, especially manufacturing. Thus foreign funded enterprises injected great energy into the Chinese economy. In 1990, they accounted for only 1.9 per cent of the total industrial output, but by 1999, their share had increased to 14.4 per cent.[10]

There are different ways for foreign capital to be invested in China, including joint-ventures,[11] cooperation[12] and sole investment. Between 1979 and 1985, cooperation was the most popular form. But after 1985, joint-venture firms began to increase and the number of cooperation firms shrank. At the same time, sole investment firms found more and more development opportunities as restrictions on sole investment were relaxed step by step.

Foreign funded firms brought capital, advanced technology and advanced management skills to China, which are all believed to have direct or indirect positive effects on productivity. Liu et al. (2001), using 41 sub-sector levels of data for the Chinese electronics industry for 1996 and 1997, found that the industry significantly benefited in terms of labour productivity from the

[10] Again, these statistics can be found at http://www.drcnet.com.cn/NEW_fulltextindex/s1.asp.

[11] Joint Venture Enterprises are ones in which overseas companies, enterprises and financial entities or individuals join hands with their Chinese counterparts to invest, administrate, benefit and shoulder risks of their joint holdings with limited responsibilities. All investing parties must put in their share of money in accordance with a certain percentage of the total registered capital and hence benefit from revenue and dividends or shoulder risks and losses.

[12] Cooperative enterprises are ones in which overseas enterprises, financial entities or individuals join hands with their Chinese counterparts to cooperate under contracts in enterprises inside China. Contract conditions and terms will be the gauge via which to function, distribute dividends, shoulder risks and losses, pay debts, reclaim investments and redistribute leftover properties while terminating cooperation by each cooperative party. Even though it does convert its investment or cooperation condition into shares and rights, the conversion will not be considered at all or only considered to limited extent when distributing dividends, shouldering losses, paying debts and redistributing leftover properties while terminating cooperation. Administration and reclamation of investment can be conducted in a different way from that of joint venture enterprises. This offers the cooperative enterprises more flexibility.

demonstration and competitive effects exerted by foreign firms.

Between 1987 and 2000, about 60 per cent of foreign firms' investment in China was for machinery imports. In terms of transferred technology, nearly 34 per cent was advanced and 66 per cent was fairly mature. An increasing number of multinational companies set up new R&D centers in recent years.

China's WTO entry in 2001 encouraged more foreigners to make investments outside of manufacturing industries. The Chinese government has approved new regulations in order to cooperate with foreign investors in industries such as agricultural technology, transportation and energy. Other service industries such as banking, telecommunications, insurance and tourism will also gradually become open to foreign investment. In 2002, the Chinese government also permitted foreigners to take part in key SOEs, that is, foreign investors now can be shareholders of SOEs. All in all, the foreign presence and involvement in recent years has exerted a positive impact on China's economic growth. In the future, a combination of a favourable investment environment and policies will provide more opportunities for foreign enterprises. In turn, China will also benefit from an investment boom from the foreign capital investment.

1.3.4 A brief comparison of labour productivity . . .

1.3.4.1 . . . between the agricultural sector and the industrial sector

Agricultural labour productivity is much lower than industrial labour productivity (Table 1-11) with the latter 5 to 6 times the former during the reform years. This indicates the dual economic structure that dominated the Chinese economy until recently.

1.3.4.2 . . . and across different types of industrial enterprises

Table 1-12 provides us with a clear trend of labour productivity changes in different types of industrial enterprises. Labour productivity in SOEs was lowest in 1980, but up to 1998, labour productivity in the other-type enterprises group outperformed both SOEs and COEs. SOEs' labour productivity surged after 1998 due to the implementation of laid-off policy mentioned earlier. This policy also had an effect on COEs, where employment fell from 13.3 million to 8.0 million in 1998 (Table 1-10), and resulted in the highest increase of labour productivity.

Table 1-11: Labour Productivity Comparison Between Primary and Secondary Industry. 1980-2000

Year	Agriculture (1)	Industry (2)
1980	466.8	2652.5
1981	490.2	2830.0
1982	527.7	2798.7
1983	557.4	2841.1
1984	633.3	3036.8
1985	640.2	3181.1
1986	651.7	3364.9
1987	665.8	3487.2
1988	635.5	3613.5
1989	591.9	3803.1
1990	615.7	3595.0
1991	659.2	3165.0
1992	706.4	3475.2
1993	759.1	4083.4
1994	767.0	4435.6
1995	836.4	4940.1
1996	945.4	5364.3
1997	1015.7	5932.4
1998	1119.6	6452.3
1999	1247.2	6958.6
2000	1298.0	7569.2
2001		8259.1
1980-2000 Average Annual Growth Rate (%)	5.2	5.4
1980-1997 Average Annual Growth Rate (%)	4.7	4.8
1997-2000 Average Annual Growth Rate (%)	8.5	8.5

Source: 1. Column (1) is from Table 1-4
2. Column (2) is calculated from the Statistical Yearbook of China 2002, Table 3-1, Table 5-2

Note: Agricultural labour productivity has been adjusted to 1980 price for comparison.

Table 1-12: Labour Productivity Comparison for Industrial Enterprises by Ownership

Year	SOE Labour productivity (1)	COE Labour productivity (2)	Other-type Enterprises Labour productivity (3)
1980	1174.6	849.4	N/A
1985	1622.7	1795.8	7885.1
1986	1592.2	1903.1	9475.1
1987	1757.3	2276.7	11924.9
1988	1975.5	2873.7	13128.2
1989	2027.1	2988.8	11585.3
1990	1771.4	2688.3	10020.6
1991	1900.1	2629. 3	9062.7
1992	2109.4	3487.0	10431.1
1993	2531.2	4875.0	10586.5
1994	2423.0	6664.0	11669.8
1995	2400.4	7562.7	12880.8
1996	2488.4	8079.5	12658.5
1997	2545.9	9341.0	13930.2
1998	3544.5	16356.8	11111.1
1999	4411.5	19826.8	12448.6
2000	5929.6		
2001	6932.0		

Source: 1. Columns (1) and (2) are from Table 1-6 and Table 1-10
2.Column (3) is calculated from the Statistical Yearbook of China 1996 & 2000 Table 13-2, Table 13-3 and the Statistical Yearbook of China 2000, Table 1-17

Note: 1. All values are in 1980 constant prices.
2. As to the growth rates of each type of enterprise, please see the relevant sections.

PART TWO: UNDERSTANDING CHINESE POVERTY

2.1 Poverty and its Distribution in China

2.1.1 National poverty

Since the adoption of economic reform, the Chinese Government has made notable achievements in poverty relief. Sala-i-Martin (2002) applied the World Bank poverty lines, i.e. $1/day and $2/day, to trace Chinese poverty from the 1970s to the late 1990s, and found that poverty in China decreased dramatically through time (Table 2-1).

Table 2-1: Chinese Poverty Statistics

	Poverty rate (%)				Number of poor (million)			
Year	1970	1980	1990	1998	1970	1980	1990	1998
$1/day	27	20	10	3	218.3	194.8	109.5	32.4
$2/day	74	56	36	19	608.7	554.1	405.0	231.8

Source: Sala-i-Martin, NBER Working paper 8933, May 2002

2.1.2 Rural poverty

Poverty in China has always been regarded as a rural problem. In China, the rural population accounts for a very large part of the total population. In 1978, the rural population share was 82.1 per cent. By 2001 it declined to 62.3 per cent (Table 2-2).[13] It is interesting to note that all the population growth in China since 1978 has been accounted for by the urban population. The size of the rural population was virtually the same in 2001 as in 1978 (790 –796 million), while the urban population nearly tripled from 172 million to 481 million.

China is widely recognized for its achievement in reducing rural poverty since the adoption of a broad program of rural economic reforms beginning in 1978. The sustained dramatic reduction of rural poverty over the last two decades of reform is exemplary by any standard.

[13] In fact, three definitions of the rural and urban division have been used in China. The first one is by an administrative system whereby urban population refers to the total population under the jurisdiction of cities and the population of towns under the jurisdiction of counties; while rural population refers to the total population of townships under the jurisdiction of counties. The second definition is based on permanent residence whereby urban refers to the total population of districts under the jurisdiction of a city without district establishment, the population of resident-committees of towns under the jurisdiction of a city without district establishment, and the resident-committees of towns under the jurisdiction of a county; while rural refers to the total population excluding the urban population. The most recent definition classifies urban and rural according to the Regulation of Statistics Classification on Urban and Rural Population, formulated by the National Bureau of Statistics in 1999. Before 1982, population statistics were based on the first definition. From 1982 to 1999, the second definition was widely used. Since 2000, the population census began using the Regulation of Statistics Classification on Urban and Rural Population, formulated by the National Bureau of Statistics in 1999.

Table 2-2: Basic Statistics on the Urban/Rural Split in the Chinese Population, 1978-2001
(in millions of persons)

Year	Total Pop. (1)	Urban Pop. (2)	urban/total (%) (3)	Rural Pop. (4)	rural/total (%) (5)
1978	962.59	172.45	17.92	790.14	82.08
1980	987.05	191.40	19.39	795.65	80.61
1985	1058.51	250.94	23.71	807.57	76.29
1986	1075.07	263.66	24.52	811.41	75.48
1987	1093.00	276.74	25.32	816.26	74.68
1988	1110.26	286.61	25.81	823.65	74.19
1989	1127.04	295.40	26.21	831.64	73.79
1990	1143.33	301.95	26.41	841.38	73.59
1991	1158.23	312.03	26.94	846.20	73.06
1992	1171.71	321.75	27.46	849.96	72.54
1993	1185.17	331.73	27.99	853.44	72.01
1994	1198.50	341.69	28.51	856.81	71.49
1995	1211.21	351.74	29.04	859.47	70.96
1996	1223.89	373.04	30.48	850.85	69.52
1997	1236.26	394.49	31.91	841.77	68.09
1998	1247.61	416.08	33.35	831.53	66.65
1999	1257.86	437.48	34.78	820.38	65.22
2000	1267.43	459.06	36.22	808.73	63.81
2001	1276.27	480.64	37.66	795.63	62.34
1978-2001 Average annual Growth Rate (%)	1.2	4.6	3.3	0.7	-1.2

Source: Statistical Yearbook of China, 1999 and 2002, Table 4-1
Note: Data after 1990 were adjusted according to the national population census. So once there is inconsistence data from previous years, we follow the latest one.

Based on the official rural poverty lines[14] 30.7 per cent of the rural population was poor in 1978. But by 2001, only 3.2 per cent of rural residents were living under the official poverty line (Table 2-3).

[14] The poverty line is set as an expenditure level that is necessary to meet both the minimum nutritional requirement of 2100 calories/day and the minimum non-food expenditure requirement. After 1995, the Chinese National Bureau of Statistics (NBS) began using a food expenditure regression model to calculate the weight of non-food expenditure, instead of applying a fixed weight of 0.4 for non-food expenditure. In reality, the NBS also takes into consideration other factors, such as regional expenditure differences and household expenditure differences, in determining the weight given to non-food expenditure.

Table 2-3: Official Rural Poverty Statistics

Year	Individual Annual Poverty line (yuan in current prices)	Poverty incidence (%)	Number (millions)
1978	100	30.7	250.0
1984	200	15.1	128.0
1985	206	14.8	125.0
1986	213	15.5	131.0
1987	227	14.3	122.0
1988	236	11.1	96.0
1989	259	11.6	102.0
1990	300	9.6	85.0
1992	317	8.8	80.0
1994	440	7.7	70.0
1995	530	7.1	65.4
1997	640	5.4	49.6
1998	635	4.6	42.1
1999	625	3.7	34.1
2000	625	3.4	32.1
2001	635	3.2	29.0

Source: Chinese rural poverty between 1978-2001, NBS

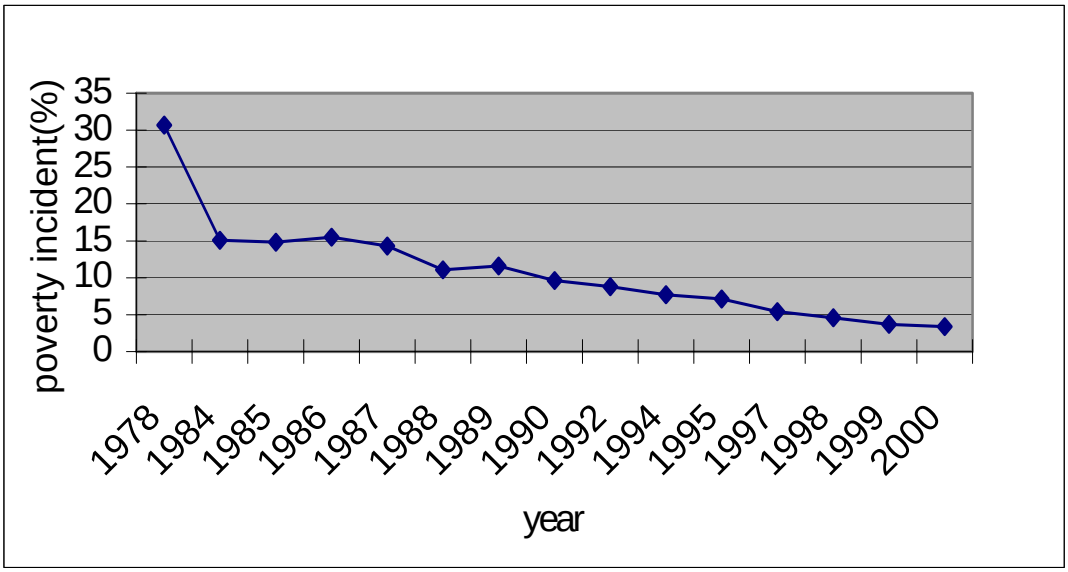
China's rural poverty did not experience a steady decline over time. The most impressive decline happened in the first half of the 1980s (Chart 2-1) – from 1978 to 1984, the rural poverty rate dropped more than 15 points, declining at a slower rate after that.

The official poverty lines are criticized for being too low. For example, in 1998 the poverty line set by the Chinese government was 635 yuan per year or 1.74 yuan per day. If we take the official exchange rate as a proxy for PPP, that is PPP=8,[15] this makes the official poverty line only about 0.22$U.S. per day. Even using the Penn World Table PPP estimate of 4, 1.74 yuan per day is equivalent to a poverty line of 0.44$U.S. per day, still far below the lower international standard poverty line set for developing countries of 1$U.S. per day.[16] In this sense, the poverty incidence in rural China should be much larger than those official statistics. As shown in Table 2-4, the World Bank has estimated the incidence of rural poverty at 11.5 per cent in 1998, more than double the official estimate of 4.6 per cent. Note, however, that no matter which estimates we take, there is strong evidence of a downward trend in rural poverty.

[15] In 1998, the average exchange rate was 1$U.S.=8.2791YUAN, but PPP could not be that high. It is usually thought to be around 4 yuan per dollar.

[16] The higher international standard for developing countries is 2$U.S. per day.

Chart2-1: Trend in Rural Poverty, 1978-2001



Source: Table 2-3

Table 2-4: World Bank Estimates of Chinese Rural Poverty

Year	World Bank (1992) (%)	World Bank (2001a – income-based) (%)	World Bank (2001b – expenditure-based) (%)
1978	33.0		
1984	11.0		
1985	11.9		
1986	11.9		
1987	11.1		
1988	10.4		
1989	12.3		
1990	11.5	31.3	42.8
1991		31.7	40.8
1992		30.1	40.9
1993		29.1	40.8
1994		25.9	34.9
1995		21.8	31.0
1996		15.0	24.3
1997		13.5	24.2
1998		11.5	

Source: Quoted in Park and Wang (2001)

2.1.3 Emergence of urban poverty

Unlike rural poverty, urban poverty did not attract much attention in the 1980s. At that time, only a very small number of urban residents were considered to be living under the poverty line. They were broken down into three groups of “have-nots”, i.e. those having no income resources, those having no ability to work and those having no legal guardian. The ratio of the urban poor to the rural poor population in 1980 was less than 1 to 50. After the mid-1980s and especially entering the 1990s, the urban poor group began to include more people who were employable and wanted to work but could not find jobs.

Because the Government of China has never published official estimates of the urban poor population, some scholars and government agencies have used their own methods to estimate the scale of urban poverty.[17] These estimates vary, roughly between 15 million urban poor and 31 million urban poor, with some suggesting that another 5 to 6 million should be added to include people working in nearly bankrupt firms or working part-time.

In recent years, the National Bureau of Statistics has begun to follow a new method based on the work of Martin Ravallion[18] to calculate urban poverty, although the simple base-year adjustment model[19] is still used most often. The available estimates by using both methods are listed in Table 2-5:

Table 2-5: NBS Estimations of Urban Poverty

Year	Poverty line (yuan)	Ravallion method		Base-year Adjustment Method	
		Scale (million)	Incidence (%)	Scale (million)	Incidence (%)
1995		19.1	5.4	12.4	3.5
1998	1480	14.8	3.5		
1999	1860	13.8	3.1		
2000	1875	11.7	2.5	10.5	2.3

Source: National Bureau of Statistics

All of the above statistics have convinced us that urban poverty increased significantly in recent years since the beginning of economic reform. The Chinese government realized that urban poverty was a severe problem that could impact on further reform or even cause political instability, and instituted measures to reduce urban poverty.[20] Between 1995 and 2000 the urban poor population decreased.

[17] See http://www.macrochina.com.cn/gov/hgyx/20010426002903.shtml for details.
[18] See http://www.stats.gov.cn/tjfx/fxbg/index.htm for details.
[19] The base-year adjustment method considers 3-5 years as a cycle and treats the first year as the base. Once a poverty line is set for the base year, other poverty lines in the following years within this cycle will be adjusted by the price index. This method is very simple in application, but its automatic assumption of a uniform price index across cities is obviously unrealistic.
[20] See Appendix 3 for a discussion of the social security system in China, which has contributed through unemployment insurance

2.2 Productivity growth and income inequality

Two decades of economic reform has lead to higher productivity in all of the economic sectors that we have data for and as a result people have gradually earned higher incomes. But the higher incomes are not equally distributed. In addition to inequality between rural and urban areas, in recent years, gaps have developed within the same urban city and across regions. Additionally, a more general concept of inequality would include inequality of access to opportunities for education, medical care, social insurance, etc. The inequality phenomenon in China needs to be explored beyond the context of economic growth.

2.2.1 Higher incomes but lower equality

2.2.1.1 Income growth in rural and urban China

Higher incomes in both rural and urban areas have lifted many poor people out of poverty and most Chinese people now live a much better life than ever before. For rural Chinese, the average annual net income was just 133.6 yuan in 1978 (Table 2-6). By 1989, it exceeded 600 yuan for the first time. Rural residents' net income increased to 2090.1 yuan by 1997 and to 2366.4 yuan by 2001. Based on 1978 constant prices, the average annual rate of increase in real incomes between 1978 and 2001 was 7.3 per cent, with a rate of increase of 15.2 per cent per year between 1978 and 1985.

For urban residents, real income increased at an average annual rate of 6.4 per cent per year, a little lower than growth in rural incomes. But urban average annual disposable incomes were at much higher levels (Table 2-7).

2.2.1.2 Evidence of income inequality

(A) Rural-urban income inequality

Despite the continuous income growth in both rural and urban China, there is a big income gap between urban residents and rural residents (see Chart 2-2). And although the gap tended to shrink in the early 1980s, it later on turned to expansion with the rural population becoming relatively poorer but the urban population relatively richer.

Moreover, income of peasants in rural areas does not only include money income, but also includes income in form of goods. Only about 60 per cent of rural income is in fact money income. When the necessary expenditures for seeds, fertilizers, oil and other materials for production in the following year are taken into account, rural disposable income is even lower. In addition, urban residents can receive non-pecuniary benefits such as housing, education and health care which are

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and a minimum living standard allowance to reducing the urban poor.

not included in income. Both these two effects suggest that the gap between rural and urban incomes is underestimated.

Table 2-6: Average Annual Net Income per capita[21] of Rural Chinese, 1978-2001

Year	Nominal Income (current prices) (1)	Real Income Index (1978=100) (2)	Real Income (1978 constant prices) (3)
1978	133.6	100.0	133.6
1980	191.3	139.0	185.7
1985	397.6	268.9	359.3
1986	423.8	277.6	370.9
1987	462.6	292.0	390.1
1988	544.9	310.7	415.1
1989	601.5	305.7	408.4
1990	686.3	311.2	415.8
1991	708.6	317.4	424.0
1992	784.0	336.2	449.2
1993	921.6	346.9	463.5
1994	1221.0	364.4	486.8
1995	1577.7	383.7	512.6
1996	1926.1	418.2	558.7
1997	2090.1	437.4	584.4
1998	2162.0	456.2	609.5
1999	2210.3	473.5	632.6
2000	2253.4	483.5	646.0
2001	2366.4	503.8	673.1
1978-2001 Average annual Growth Rate (%)	13.3	7.3	7.3
1978-1997 Average annual Growth Rate (%)	15.6	8.1	8. 1
1997-2001 Average annual Growth Rate (%)	3.2	3.6	3.6

Source: 1. Columns (1) and (2) are from the Statistical Yearbook of China 2002, Table 10-3
2. Column (3) is calculated by multiplying the real income index by the base year income value.

[21] Rural net income refers to the total income of permanent residents of rural households during a year, after deducting of expenses for productive and non-productive business operation, payment of taxes and payment for collective units for their contracted tasks. Income can then be used for investments in productive and non-productive construction, for consumption in daily life and for savings deposits. It is an indicator that shows the actual level of the income of the rural household. The rural net income also includes the income from non-business operation, such as the money remitted or brought back by the members of the household who are in other places, government relief payments and various subsidies.

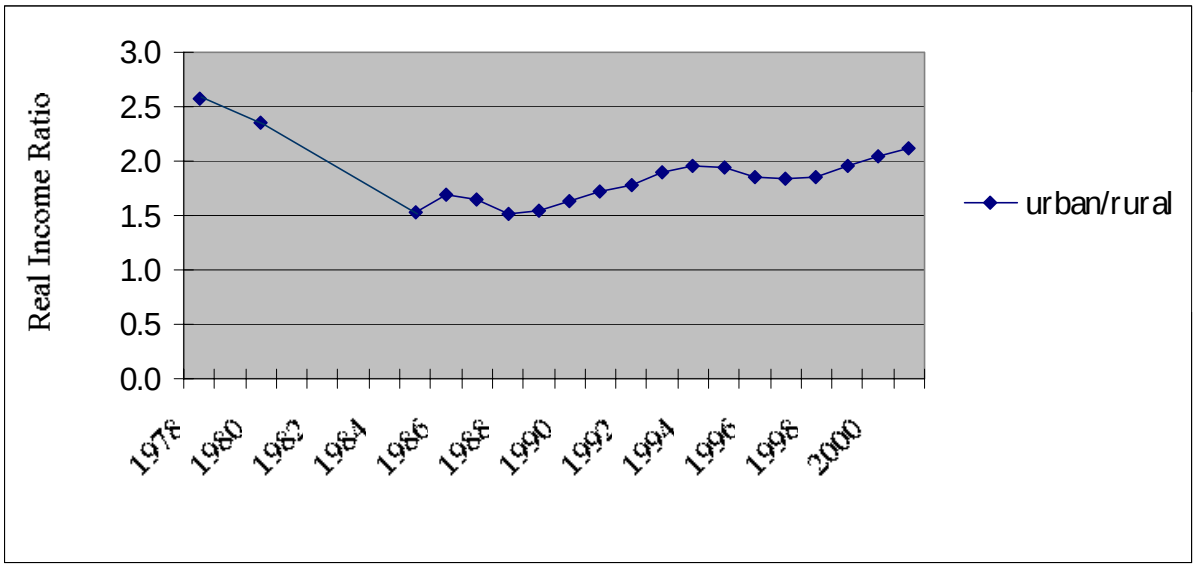
Table 2-7: Average Annual Disposable Income per capita[22] of Urban Chinese, 1978-2001

Year	Nominal Income (current prices) (1)	Real Income Index (1978=100) (2)	Real income (1978 constant price) (3)
1978	343.4	100.0	343.4
1980	477.6	127.0	436.1
1985	739.1	160.4	550.8
1986	899.6	182.5	626.7
1987	1002.2	186.9	641.8
1988	1181.4	182.5	626.7
1989	1375.7	182.8	627.7
1990	1510.2	198.1	680.3
1991	1700.6	212.4	729.4
1992	2026.6	232.9	799.8
1993	2577.4	255.1	876.0
1994	3496.2	276.8	950.5
1995	4283.0	290.3	996.9
1996	4838.9	301.6	1035.7
1997	5160.3	311.9	1071.1
1998	5425.1	329.9	1132.9
1999	5854.0	360.6	1238.3
2000	6280.0	383.7	1317.6
2001	6859.6	416.3	1429.6
1978-2001 Average annual Growth Rate (%)	13.9	6.4	6.4
1978-1997 Average annual Growth Rate (%)	15.3	6.2	6.2
1997-2001 Average annual Growth Rate (%)	7.4	7.5	7.5

Source: 1. Columns (1) and (2) are from the Statistical Yearbook of China 2002, Table 10-3
2. Column (3) is calculated by multiplying the real income index by the base year income value.

[22] Urban disposable income refers to the actual income of the urban households which can be used for daily expenses, i.e. total income minus personal income tax, household subsidies and expenditure on household sideline production.

Chart 2-2: Urban/rural Real Income Ratio Index



Source: Table 2-6, Table 2-7

Note: Because of lack of data for 1980-1985, we use a linear trend for the intervening years.

The Gini coefficient is an indicator of income inequality. In China, the national Gini coefficient actually fell from 0.33 in 1980 to 0.28 in 1991, but has steadily increased since then. The Gini coefficient exceeded the "warning line" of 0.4 in 1996, as stressed by the Government of China. Since 1996, the coefficient has still shown no signs of declining (Table 2-8).

Meanwhile, we observe that if rural and urban are treated as separate categories, neither of them manifests inequality as severe as the nation as a whole. In this sense, China's income inequality is mainly one of rural-urban inequality.

(B) Inequality within rural and urban areas

Even though rural and urban Gini coefficients were still below the official warning line of 0.4 by 2000, there is an increasing trend toward inequality within rural and urban areas. These trends are worth investigating because of the potential of the current situation developing into a critical problem over time. Looking at the rural situation, we see that the Gini coefficient in 1978 was fairly low, at 0.212, but it has increased continuously over time and by 2000, it had jumped up to 0.354. In urban areas, there has also been a significant upward shift from a very low level of 0.16 in 1978 to 0.32 in 2000. If current trends continue, the Gini coefficients related to urban and rural areas could hit the warning line in 2010.

Table 2-8 : Gini coefficients in China, 1978-2000

Year	National	Rural	Urban
1978		0.212	0.16
1980	0.33	0.241	0.16
1981		0.241	0.15
1982		0.232	0.15
1983		0.246	0.15
1984		0.244	0.16
1985		0.227	0.19
1986		0.304	0.19
1987		0.305	0.20
1991	0.282	0.303	0.24
1992		0.313	0.25
1993		0.329	0.27
1994		0.321	0.30
1995	0.388	0.342	0.28
1996	0.424	0.323	0.28
1997		0.329	0.29
1998	0.456	0.337	0.30
1999	0.457	0.336	0.295
2000	0.458	0.354	0.32

Source: National Bureau of Statistics

(C) Regional inequality

Regional inequality in China has become pronounced along with rural/urban inequality, especially after 1992 when Chinese economic reform accelerated. China has 23 provinces, five autonomous regions and four centrally controlled municipalities. A useful way to investigate the regional inequality is to divide these regions into several compound parts. Instead of following the standard coastal-central-western division, we follow the official geographical division:

- the South-west region, including Sichuan, Chongqing, Guizhou and Yunan;
- the North-west region, including Shanxi, Gansu, Qinghai, Ningxia and Xinjiang;
- the Middle region, including Henan, Hubei, Hunan, Guangxi and Guangdong;
- the South-east region, including Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi and Shandong;
- the North-east region, including Liaoning, Jilin and Heilongjiang; and
- the North region, including Beijing,Tianjin, Hebei and inner Mongolia.

It can be seen in Table 2-9 that GDP per capita in each region has increased since 1978. For example, in 1978, GDP per capita in the South-east region was 403.9 billion yuan and it reached

3303.8 billion yuan in 2001; while for the South-west region, GDP per capita increased from 223.4 billion yuan in 1978 to 1409.1 billion yuan in 2001. But levels of GDP per capita across regions actually differ a lot. Western regions are much poorer than eastern regions.

Taking the national GDP per capita as the base, the regional GDP per capita can be transferred into indexes that are relative to the base value, as shown in Table 2-10. Clearly GDP per capita in Central and Western regions has never reached the national level while that in the other three regions, i.e. North, Northeast and Southeast, has been above the national level.

GDP per capita growth rates seem to be very close across region, but have been slightly lower in western regions. With their much lower levels of GDP per capita, a slight difference in growth results in a growing gap between regions.

2.2.2 Economic growth and the evolution of inequality

Income equality in China not only exists between rural and urban areas but also within rural areas, within urban areas and across regions. The growth in income inequality is an outcome of economic growth during reform.

China is a country with an apparent dual economic structure, i.e. the modern industrial sector and the traditional agricultural sector, which co-exist and co-develop. The Chinese industrial sector is usually capital intensive, large-scale and with most industrial enterprises located in urban areas, while the agricultural sector is more labour intensive and by nature mainly rural. Thus the income levels of rural and urban residents were different before reform.

When reform started, successful implementation of HRS together with higher procurement prices greatly increased farmers' productivity in the agricultural sector. Farmers benefited from higher output that was a crucial basis for income increases. But for the first few years, there was actually no commensurate reform in other sectors. Therefore increasing rural income simply demonstrated a catch-up trend.

In the late 1980s as reform efforts expanded, not only did rural-urban income inequality gradually expand, but also income differences between rural families appeared. For some, income increases from agricultural production slowed down since HRS only improved productivity by raising farmers' incentives for a short period of time. For others, development of rural industry (TVEs), did help rural non-agricultural workers achieve higher incomes. From 1984 on, the emphasis of Chinese economic reform began shifting from rural areas to urban areas. The natural advantages of the existence of a large industrial sector together with the government's strong support greatly encouraged urban economic growth. And in terms of income increases, urban workers benefited much more than rural workers during that period.

Table 2-9: Regional GDP per capita, 1978-2001

Year	National	South-west	North-west	Central	North-east	North	South-east
1978	360.3	223.4	323.2	285.9	560.3	477.6	403.9
1979	391.8	255.5	342.3	320.1	574.5	512.9	439.3
1980	415.7	267.5	350.9	346.0	627.8	531.3	464.7
1981	437.2	275.3	353.9	372.8	634.7	533.8	504.9
1982	480.2	316.0	381.4	409.0	683.6	591.6	551.4
1983	527.2	339.4	430.1	447.2	777.0	651.7	599.9
1984	592.7	382.9	473.1	496.4	866.0	735.4	683.3
1985	643.6	411.0	516.9	545.3	901.1	780.9	757.6
1986	680.4	420.8	558.8	581.7	981.6	806.7	800.3
1987	758.3	470.4	604.1	659.5	1101.9	870.8	894.6
1988	839.2	524.8	670.4	737.2	1189.7	952.2	994.9
1989	859.7	529.2	686.0	771.7	1212.8	977.5	1009.2
1990	888.4	576.7	725.3	809.2	1227.5	987.8	1027.0
1991	941.9	600.2	774.4	862.5	1286.3	1041.2	1097.0
1992	1057.6	641.2	828.9	980.7	1426.2	1142.2	1265.3
1993	1221.4	746.6	875.8	1135.3	1621.5	1327.8	1480.9
1994	1341.0	805.1	910.3	1243.8	1724.7	1401.3	1688.0
1995	1488.0	878.0	970.3	1399.1	1776.1	1573.1	1911.7
1996	1643.7	972.4	1060.4	1544.2	1933.2	1757.7	2117.1
1997	1819.9	1068.5	1160.0	1704.9	2138.7	1956.9	2354.0
1998	1994.0	1166.7	1266.0	1859.0	2334.4	2160.4	2590.2
1999	2135.6	1231.3	1367.3	1979.9	2485.6	2301.8	2797.7
2000	2330.7	1320.2	1497.7	2161.8	2729.8	2531.2	3050.8
2001	2525.8	1409.1	1628.1	2343.6	2974.0	2760.7	3303.8
1978-2001 Average annual Growth Rate (%)	8.9	8.3	7.3	9.6	7.5	7.9	9.6
1978-1997 Average annual Growth Rate (%)	8.9	7.6	7.0	9.9	7.3	7.7	9.7
1997-2001 Average annual Growth Rate (%)	8.5	7.2	8.8	8.3	8.6	9.0	8. 8

Sources: 1. Liu (2000)
2. The Statistical Yearbook of China 2002, Table 3-8, Table 4-3

Note: 1. We did not include the GDP of Hainan in the South-east region, nor the GDP of Tibet into the South-west region, so the national GDP per capita is slightly different than that in Table 1-1.
2. All values are in billions yuan at 1978 constant prices.

Table 2-10: GDP per capita Indexes across Regions

Year	North	Northeast	Southeast	Central	Southwest	Northwest
1978	1.33	1.56	1.12	0.79	0.62	0.90
1979	1.31	1.47	1.12	0.82	0.65	0.87
1980	1.28	1.51	1.12	0.83	0.64	0.84
1981	1.22	1.45	1.15	0.85	0.63	0.81
1982	1.23	1.42	1.15	0.85	0.66	0.79
1983	1.24	1.47	1.14	0.85	0.64	0.82
1984	1.24	1.46	1.15	0.84	0.65	0.80
1985	1.21	1.40	1.18	0.85	0.64	0.80
1986	1.19	1.44	1.18	0.85	0.62	0.82
1987	1.15	1.45	1.18	0.87	0.62	0.80
1988	1.13	1.42	1.19	0.88	0.63	0.80
1989	1.14	1.41	1.17	0.90	0.62	0.80
1990	1.11	1.38	1.16	0.91	0.65	0.82
1991	1.11	1.37	1.16	0.92	0.64	0.82
1992	1.08	1.35	1.20	0.93	0.61	0.78
1993	1.09	1.33	1.21	0.93	0.61	0.72
1994	1.04	1.29	1.26	0.93	0.60	0.68
1995	1.06	1.19	1.28	0.94	0.59	0.65
1996	1.07	1.18	1.29	0.94	0.59	0.65
1997	1.08	1.18	1.29	0.94	0.59	0.64
1998	1.08	1.17	1.30	0.93	0.59	0.63
1999	1.08	1.16	1.31	0.93	0.58	0.64
2001	1.09	1.18	1.31	0.93	0.56	0.64

Source: Table 2-9

By the 1990s, growing income inequality was exhibited in a number of dimensions, that is, rural-urban inequality, within rural inequality and within urban inequality. Throughout the whole decade, firms employed less labour as pursuing growth depended on increasing productivity rather than increasing labour input. And both the urban industrial sector and TVEs demonstrated strong trends to substitute capital for labour. China is famous for its huge labour endowment. Thus although higher productivity resulted in income increases of those who stayed employed, the increases were at the expense of those who lost the opportunity to work.

Benefits from rapid economic growth have not been spread across the regions because preferential regional policies have been adopted. For example, for a long time the open-door policy was only applied to coastal cities and all were located in eastern areas. Those open-door regions accumulated capital resources more easily and quickly compared to other regions. In addition, the open regions used their resources more efficiently, further adding to regional inequality.

2.3 Evidence of the relationship between productivity, poverty and income inequality in the 1990s

This section provides some empirical evidence of the relationship between labour productivity, poverty and income inequality in the 1990s. We treat poverty rates (both 1$U.S./day and 2$U.S./day) as dependent variables and labour productivity and income inequality as explanatory variables to obtain estimates on how labour productivity and income inequality affect poverty. See CSLS (2003) for a discussion of this method as applied to a large sample of developing countries, and for a broad review of the effect of productivity growth, output growth and growth in GDP per capita on reducing poverty as well as the effect income inequality has on this relationship.

The poverty indicators and Gini coefficients in the following estimations come from the World Bank[23] and the labour productivity data are from Chinese Statistical Yearbook data.[24] It should be noted here that both the dependent and explanatory variables are based on the Chinese household survey data of relevant years (1990-1998). Thus while our method uses inconsistent resource data it is not ad hoc.

We use OLS estimation and apply different specifications in investigating the relationships between poverty and labour productivity and income inequality in level terms (Table 2-11).

Specifications (1) and (3) in each regression have coefficients of total economy labour productivity with negative signs that are statistically significant no matter if we control for inequality or not. This indicates that productivity improvement has had a strong influence in reducing Chinese poverty.

Different industries have differing effects on poverty. From specifications (2) and (4), we find that industrial labour productivity improvement had a significant influence in poverty reduction while this was not the case for agricultural labour productivity. Surprisingly, the coefficient of agricultural labour productivity shows a positive sign, which might indicate that higher agricultural labour productivity does not result in lower poverty rates, and may make the poverty situation worse. But all the coefficients for agricultural productivity in different specifications are statistically insignificant.

The positive relationship between agricultural labour productivity and poverty in the 1990s might reflect a terms of trade effect. Agricultural prices when compared with urban industrial prices are unreasonably low so that rural people cannot obtain a corresponding benefit from productivity increases.

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[23] Data can be found in the world Bank Poverty Monitoring website: http://www.worldbank.org/research/povmonitor/countrydetails/China.htm

[24] These productivity data can be found in Part One.

Table 2-11: Estimation Results from the Regression of Poverty on Productivity and Income Inequality (Poverty line= $1/day)

	Specifications			
	1	2	3	4
Constant	46.802 (6.930***)	48.592 (11.67***)	72.876 (3.052**)	35.736 (2.184*)
Total Labour productivity	-0.0096 (-3.462**)		-0.0085 (-2.993**)	
Agri-Labour Productivity		0.0347 (1.745)		0.05286 (1.740)
Industrial-Labour Productivity		-0.0104 (-3.929**)		-0.1310 (-3.047**)
Gini			-0.7152 (-1.136)	0.2863 (0.813)
R-square	0.6663	0.9694	0.7348	0.9737
DW-Statistic	1.34618	1.86133	1.47335	2.16694

Note: ***, **, * represent 1%, 5% and 10% significant level, respectively.

Table 2-12: Estimation Results from the Regression of Poverty on Productivity and Income Inequality (Poverty line= $2/day)

	Specifications			
	1	2	3	4
Constant	84.42 (11.67***)	91.302 (18.57***)	101.40 (3.678**)	65.419 (4.106**)
Total Labour Productivity	-0.0109 (-3.693***)		-0.01025 (-3.116**)	
Agri-Labour Productivity		0.0081 (0.3450)		0.04473 (1.511)
Industrial-Labour Productivity		-0.0077 (-2.453*)		-0.01310 (-3.123**)
Gini			-0.4657 (-0.6408)	0.5765 (1.6820)
R-square	0.6945	0.9659	0.7176	0.9800
DW-Statistic	1.5169	1.3908	1.5711	1.9834

Note: ***, **, * represent 1%, 5% and 10% significant level, respectively.

Now if we look at the effect of inequality on poverty, a more surprising finding is that all the Gini coefficients are statistically insignificant. That means income inequality in China during the 1990s, although increasing to near the warning line of a Gini coefficient of 0.4, does not seem to significantly affect poverty.

Our variables in both regression models have good explanatory power in our estimation, especially for the case with agricultural and industrial productivity, when the R-square values are near 1.

However, there are some statistical problems that need to be mentioned. First of all, there is likely to be reverse causation between poverty and productivity. Not only does productivity reduce poverty through its role in raising living standards, but poverty can also reduce productivity since poor families do not have access to skills-improving higher education for example. Also, using the most reliable data available has meant that only a short time period can be covered. The regressions cover only the 1990-1998 period and so are based on only 9 observations, implying that the results are quite likely biased. Finally, other work in the area of growth's effect on poverty, especially Hayes et al. (1994) who focus on productivity growth, has typically included variables to control for cyclicality and social policy, and where time series are available have also considered some sort of autoregressive process. Indeed, Hayes et al. (1994) employ vector autoregression to examine the bidirectional relationship between changes in productivity and poverty in the United States and also include the unemployment rate and tax and transfer indicators as additional explanatory variables.

Given these statistical qualifications, we still have confidence in the general relationship between productivity and poverty and the conclusion that productivity increases have played an important role in reducing poverty in China. Productivity reducing poverty is also supported by the work of Hayes et al. (1994), and the premise of economic growth in general benefiting the poor has recently received much support amongst researchers in this area.

PART THREE: SUSTAINABILITY OF PRODUCTIVITY GROWTH AND POVERTY REDUCTION

Growth in productivity has contributed much to the impressive Chinese economic growth since the beginning of reform. However, that economic growth is accompanied by increasing inequality. How can China sustain future productivity growth but keep inequality within an acceptable range? What future reforms should the Chinese government bring in?

3.1 Factors determining future productivity growth

3.1.1 Technological innovation

In both developing countries and developed countries, scientific and technical advancement exerts an important, supporting role in transforming traditional industry and promoting sustainable development.

Take agriculture as an example. Chinese agricultural productivity growth in the 1980s was mostly stimulated by non-sustainable factors. Although the introduction of the household responsibility system and higher prices of agricultural products had a great effect on improving agricultural productivity, their effects were rather transitory. It is not reasonable to expect another institutional reform like HRS. Nor is it possible to raise prices of agricultural products to a higher level in a more open economy since such prices would then not be competitive in the international market.

Over the past decade, technological application in agricultural production has led to a strong productivity growth trend with more persistent effects. Although China's population has increased by several hundred million in that period, the number of people involved in agricultural production has not increased accordingly. China’s annual per capita agricultural output has still increased. New agricultural varieties introduced every few years have contributed to the productivity advance.

Certainly, achievements gained from science and technology are closely related to the Chinese government’s general and deliberate development strategy for science and technology. The priority given to that area along with the response to the new situation of economic globalization and China's entry to the WTO enable China to take part in international economic and technological cooperation and competition on a broader scale.

In short, science and technology improvements will continuously serve as a long-term force for Chinese economic development through the enhancement of productivity growth.

3.1.2 Further structural adjustment

China will need to energetically push forward structural adjustment as an important factor in maintaining the sustained, rapid and sound growth of productivity. “China has already reached a point where it cannot further develop its economy without making further structural adjustments” (Government of China, 2001). Such structural adjustment would allow the Chinese economy to better distribute its resources so as to take the maximum advantage of changing patterns of technological progress.

Efforts to make structural adjustments in future reform need to be intensified to support the technological transformation of the key industries and enterprises. Such adjustments could help large industrial enterprises raise their capacity for product development and technological innovation. As well enterprises could focus more on quality and variety improvement while avoiding expanding only their production capacity. In addition, previous structural adjustments were done through government intervention, but future structural adjustment, if left up to market forces, could make enterprises more responsive, more competitive and more capable of innovation.

3.1.3 Human resource development as a vital impetus

In the theory of development, use of human resources has been widely accepted as crucial for sustainable growth. Human capital contributes to economic growth along with physical capital. Romer (1990) found that human capital is the major input to research and development that innovates technologies. Countries with a larger human capital stock are more likely to have new products and grow faster than other countries. In future years, little room is left for any economy to follow a growth path of intensive use of traditional inputs. Instead, human resource development that can increase human capital will be a more effective way to sustain growth.

The essential strategy to create and improve human capital is through education. In China, where there are incommensurately large human resources, the average level of education is quite low. Statistics shows that the Chinese labour force was 870 million in 2000 and this number is expected to increase to 1 billion by 2013. However, in 2000 only 18 per cent of working age (25-64) Chinese had a senior or higher level education. More than 42 per cent were at the primary or lower level (Ministry of Education, 2003).

Of those who were employed in 2000, 75 per cent had a junior or primary level education, no more than 12.7 per cent had a senior or vocational school level education, and only 4.7 per cent had received university education.

The low education level is mainly reflected in a low promotion rate for junior graduates (Table 3-1). The rate is slightly higher than 50 per cent, even in 2000. This means about half of the junior graduates began to work right after graduation or idled at home. In addition, for those who entered senior school, the promotion rate to universities prior to 1999 is not high – below 50 per cent except for the year 1996 and a surprising surge in 1999 and 2000.

Table 3-1: Promotion Rate of Regular School by Level & Type of Graduates

Year	Promotion Rate of Primary School Graduates (%)	Promotion Rate of Junior School Graduates (%)	Promotion Rate of Senior School Graduates (%)
1990	74.6	40.6	27.3
1991	77.7	42.6	28.7
1992	79.7	43.6	34.9
1993	81.8	44.1	43.3
1994	86.6	47.8	46.7
1995	90.8	50.3	49.9
1996	92.6	49.8	51.0
1997	93.7	51.5	48.6
1998	94.3	50.7	46.1
1999	94.4	50.0	63.8
2000	94.9	51.2	73.2

Source: Ministry of Education (2000)
Note: Promotion of junior graduates includes entering senior high schools, vocational schools, technical schools and specialized secondary schools.

As well, education in China is uneven across the country. A significant difference exists between rural and urban areas with rural residents at a significant disadvantage. For example, in 2000, total illiteracy (15 years old or above) in China is 87.0 million and three quarters of these are in rural areas (Ministry of Education, 2003). In terms of the total number of people who have received different levels of education, rural and urban comparisons are 29:1 for university or higher level education, 7:1 for senior and 1.92:1 for junior. Low education levels are a big hurdle for rural development. How the issue of education in the rural areas is handled will have a direct impact on the success or failure of the ongoing rural reform.

3.2 Government's role in economic growth

Good governance is essential for an economy that is aiming to create a healthy and equitable society. For the Chinese economy, governance is even more critical since China is still in the process of economic reform and many complicated problems are difficult to resolve. The most stubborn problem China is facing now seems not to be how fast the economic growth will be, but rather how to achieve growth in a healthy way. Reform will inevitably have an unbalanced influence on different economic groups. One role for the Chinese government is to help those who are inherently disadvantaged and those who become disadvantaged because of lack of equal opportunity in the process of reform.

3.2.1 Improvement of the basic social security system

China is at the critical stage of reform characterized by a high economic growth rate and high inequality. It is now necessary for the Chinese government to improve the present social security system so as to keep inequality levels within an acceptable range. Higher growth allows people to enjoy a better living standard. But growth with widening inequality means that not only will the disadvantaged groups benefit less from the growth, their situations may get even worse.

Previously, Chinese social security was tied to the firm not to the individual. Only if people were employed in state firms could they enjoy unemployment insurance, medical care and a retirement pension. If they quit, none of these benefits would be provided. Therefore, even those who did not feel satisfied working in state firms and had opportunities to be employed in non-state firms with higher wages chose to stay until retirement when all the benefits could be realized.

Since 1995, China has undertaken reform on its social security system and in 2002, a basic framework for a social security system was established and successively implemented, covering the vast majority of urban workers and retirees (Government of China, 2002). This new system consists of social insurance, social relief, social welfare, social mutual help and special care for disabled people and family members of revolutionary martyrs, and features the raising of funds through various channels instead of depending on enterprises and institutions only. Appendix 3 discusses the details of these recent social reforms.

In the future, the social security system should ensure more fundamental rights and interests for the disadvantaged. For the time being the country's social security system is not able to cover the population of 800 million in rural areas. Broadened coverage should be developed, with security programs applying to the general population. Specifically, the social insurance system should be applied to the whole employed population, with a basic social security system available to all members of society, not only those with urban employers. The social security system should strive to achieve sustainability.

3.2.2 Comprehensive taxation reform

The current tax system has resulted in the concentration of wealth with a small number of people, a situation which is harmful to a healthy development of the national economy and social stability. There is the same urgent need to enhance the reform of taxation policies and establish a sound mechanism that embodies government policies. Current problems mainly exist around personal income taxes where taxation starts at a low level of income. Mid- and low-level earners pay a significant proportion of their income in tax, but the government has no efficient control over higher-income taxation. No sufficient adjustments are made on higher income earners, hence serious personal income tax evasion occurs. The existing tax system definitely worsens the inequality situation.

The priority for future income taxation reform will be to formulate a reasonable income tax lower cut-off line while intensifying taxation management for high-income groups. If China fails to find a resolution to the unfair income tax situation, the widening gap between the rich and the poor will definitely affect the peace and security in society.

CONCLUSION

This paper began with providing a detailed view of Chinese productivity developments during the transitional period of economic reform. Relying on official statistics, we calculated labour productivity for agricultural production and for industrial production conducted by enterprises of different ownerships. Our major findings are that these production units all showed increasing trends of labour productivity and that comparatively, the industrial sector has been much more productive than the agricultural sector. Within industrial sectors, the smaller has been the state-owned share, the higher has been labour productivity. Due to data limitations, we treated non-state-owned and non-collective owned industrial enterprises as a single group and were not able to determine whether specific enterprises in each category demonstrated growing productivity over time.

Next we examined poverty in China. Evidence from the World Bank, the National Bureau of Statistics and independent researchers all support the conclusion that China has made great achievements in reducing poverty. In order to see whether the decrease in poverty resulted from increasing productivity, we carried out regressions and our findings were somewhat surprising. In terms of total economy labour productivity, poverty seemed to be significantly affected, i.e. higher labour productivity would lead to a lower poverty rate. But if agricultural labour productivity and industrial labour productivity were used as explanatory variables instead of total labour productivity, our results indicate that only higher industrial labour productivity is related to poverty reduction. Higher agricultural labour productivity might not make any significant contribution to reducing poverty, and may even make things worse due to terms of trade effects.

When we included the inequality variable into our regressions, the results were inconsistent with inequality having a significant influence on poverty. Certainly it needs to be pointed out that caution is called for due to the data and statistical weaknesses discussed, although the general result of productivity reducing poverty is supported in the literature.

In the last part of this paper, we discussed briefly the factors affecting future Chinese productivity growth: technological innovation, further structural adjustment and human resource exploitation through education. In addition, good governance is essential to help to maintain a healthy and equitable society in the progress of economic growth.

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Appendix 1: Estimating Total Factor Productivity (TFP) for Chinese State-owned Industrial Enterprises

There are many related studies in the literature, but almost all use data from before 1995. We have therefore calculated a TFP index with our own data from Table 1-6 and Table 1-7.

Here we assume a Cobb-Douglas production function as usual:

$$Y=A\,K^{\alpha}\,L^{\beta}$$

Where *Y is real output*
K is real capital input, proxied by real fixed assets
L is the number of workers employed
α *and* β *are the production elasticities of capital and labour, respectively*

To estimate the elasticities of capital and labour, further assumptions need to be made, i.e. if production is believed to exhibit constant returns to scale, $\alpha+\beta=1$ will be imposed as a restriction. In this circumstance, model (A) will be applied. If returns to scale varies, we will prefer Model (B) in estimating elasticities.

Models :

(A) $\ln (Y_i/L_i) = \gamma + \alpha \ln (K_i / L_i)+ \varepsilon_i$
(B) $\ln Y_i = \gamma + \alpha \ln K_i + \beta \ln L_i + \varepsilon_i$

where the errors in each model are assumed to be independent and identically distributed.

We use the Ordinary Least Squares (OLS) method and obtain the estimation results in Table A1-1. Theoretically, both of these two models are acceptable and both give us empirical estimates that are highly statistically significant. Most likely it is not a practical assumption that state firms produce with constant returns to scale: in this sense we think Model B is more appropriate.

The TFP estimates presented in Table 1-8 are calculated using these estimated elasticities, i.e. $A_i=Y_i/(K_i^{\alpha}L_i^{\beta})$. These TFP estimates should obviously be regarded as exploratory only, given evidence from the low Durbin-Watson statistics of highly autocorrelated errors and the fact that Cobb-Douglas production technology has been imposed. Further, note that the elasticities are estimated based on the restriction that A is constant across all years, an assumption that is clearly not valid when we wish to discuss TFP growth. Nonetheless, no other estimates of these elasticities are available for China for the period of interest, and it is likely that China's SOEs do have increasing returns to scale approaching the extent implied by these estimates. Therefore, although not to be regarded as precise, the growth in the estimated TFP series in Table 1-8 is at least indicative of the true TFP performance of SOEs in China.

Table A1-1: Estimates of Capital and Labour Elasticities for SOEs, 1980-2001

Parameters	Model A	Model B
Constant	0.3796 (11.11 ***)	-3.1045 (1.589)
α	0.6124 (7.329 ***)	0.7429 (8.307***)
β	0.3876 (implied)	0.6684 (4.036***)
R^2	0.8916	0.8340
D-W	0.8807	1.0720

Note: t-ratios of every parameter is listed in the parentheses, and *** means the estimation parameter is statistically significant at the 1% significance level.

Appendix 2: Comparison of Data Sources on Chinese Economic Growth

In section 1.1, we used official statistics and obtained China's GDP levels and growth rates. Between 1978 and 2001, nominal GDP increased from 362.4 billion yuan to 9593.3 billion yuan, which represents a 15.3 per cent average annual growth rate. In terms of real GDP, the level of 2871.7 billion yuan (in 1978 constant prices) was reached in 2001. This means that real GDP demonstrated an average annual growth rate of 9.4 per cent per year over the 1978-2001 period.

Now we want to compare the official statistics with those developed by Angus Maddison (2001). In Table A2-1, we provide levels of GDP and per capita GDP from both sources. Because different base years were used in these studies and constant price series are not expressed in the same base year, the two sets of data are not directly comparable. We therefore converted official GDP and per capita GDP values from 1978 yuan to 1990 yuan using the Chinese GDP deflator derived from Table 1-1, then into 1990 U.S. dollars using the 1990 PPP estimate from the Penn World Tables and shown in Table 2-2. The adjusted official GDP and per capita GDP estimates, as shown in Columns (3) and (4) of Table A2-2, are in principle comparable to Maddison's statistics.[25]

From Tables A2-1 and A2-2 we see that the official GDP and official per capita GDP estimates are much lower than those of Maddison. Based on Maddison's estimates, real GDP in 1978 was 935884 million U.S. dollars, while the adjusted official GDP estimate shows a level of only 153125 million U.S. dollars, the former being about 6.1 times the latter. And even in 1999, although there has been much convergence between the estimates at this point, Maddison's estimates are still 3.9 times the adjusted official estimates.[26] This shows that Chinese official GDP statistics have been highly underestimated.

In addition to level comparisons, we would also like to compare the growth rates between the two sources. Calculations are given in Table A2-3. Maddison's data show that real GDP grew by 7.3 per cent annually between 1978 and 1999 and GDP per capita grew by 5.9 per cent annually over the same period, compared to the official estimates of 9.6 per cent and 8.2 per cent. Maddison's estimates are 2.3 percentage points lower. Now if we look at the growth rates during 1980s and 1990s separately, the same conclusion is evident. For the 1980s (including 1978 and 1979), the average annual growth rates of GDP and per capita GDP are 7.0 per cent and 5.5 per cent, but in the same period, official growth rates are 9.0 per cent and 7.5 per cent. And for the 1990s, GDP and GDP per capita grew, respectively, at 7.6 per cent per year and 6.4 per cent per year according to Maddison and 10.4 per cent per year and 9.2 per cent per year according to official statistics.

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[25] The PPP we used to convert Chinese GDP comes from the Penn World Tables, and Maddison used the same source to obtain his own estimates. Therefore, the difference between official estimates and Maddison's estimates cannot result from the PPP factor.

[26] We should note that the population estimates used by Angus Maddison are very similar, both in levels and growth rates, to the official population statistics. The discrepancies in per capita GDP estimates are therefore approximately the same as in GDP estimates.

Table A2-1: Levels of China's GDP, population and per capita GDP

Year	Maddison (1990 U.S.$)			Official (1978 yuan)		
	GDP (millions) (1)	Population (thousand) (2)	Per capita GDP (unit) (3)	GDP (millions) (4)	Population (thousand) (5)	Per capita GDP (yuan) (6)
1978	935884	956165	979	362410	962590	376
1979	1007734	969005	1040	389953		
1980	1046781	981235	1067	420396	987050	426
1981	1096587	993861	1103	442503		
1982	1192494	1000281	1192	482368		
1983	1294304	1023288	1265	534917		
1984	1447661	1036825	1396	616097		
1985	1599201	1051040	1522	699089	1058510	660
1986	1703671	1066790	1597	761061	1075070	708
1987	1849563	1084035	1706	849127	1093000	777
1988	2000236	1101630	1816	944803	1110260	851
1989	2044100	1118650	1827	983218	1127040	872
1990	2109400	1135185	1858	1020909	1143330	893
1991	2232306	1150780	1940	1114773	1158230	962
1992	2444569	1164970	2098	1273509	1171710	1087
1993	2683336	1178440	2277	1445291	1185170	1219
1994	2950104	1191835	2475	1628308	1198500	1359
1995	3196343	1204855	2653	1799366	1211210	1486
1996	3433255	1217550	2820	1971873	1223890	1611
1997	3657242	1230075	2973	2146192	1236260	1736
1998	3873352	1242700	3117	2313993	1248100	1854
1999	4082513	1252704	3259	2479233	1259090	1969

Source: 1. Columns (1), (2) and (3) are from *The World Economy: A millennial perspective (2001)*, Table C3-b Table C3-a and Table C3-c.
2. Columns (4), (5) and (6) are from Table 1-1 in Section 1.1.

Table A2-2: Comparison of Maddison's Estimates and Official Estimates

Year	Official Series, converted to 1990 yuan with the Chinese GDP deflator (1978=100) value of 181.68		Converted to 1990 U.S. dollars with the 1990 PPP estimate of 4.3 yuan per U.S. dollar		Ratio (Maddison/Official)	
	GDP (millions) (1)	Per capita GDP (unit) (2)	GDP (millions) (3)	Per capita GDP (unit) (4)	GDP Ratio (5)	Per capita GDP Ratio (6)
1978	658437	684	153125	159	6.1	6.2
1979	708478		164762		6.1	
1980	763787	774	177625	180	5.9	5.9
1981	803952		186966		5.9	
1982	876380		203809		5.9	
1983	971852		226012		5.7	
1984	1119342		260312		5.6	
1985	1270125	1200	295378	279	5.4	5.5
1986	1382717	1286	321562	299	5.3	5.3
1987	1542718	1411	358772	328	5.2	5.2
1988	1716545	1546	399196	360	5.0	5.1
1989	1786338	1585	415428	369	4.9	5.0
1990	1854816	1622	431353	377	4.9	4.9
1991	2025351	1749	471012	407	4.7	4.8
1992	2313747	1975	538081	459	4.5	4.6
1993	2625846	2216	610662	515	4.4	4.4
1994	2958356	2468	687990	574	4.3	4.3
1995	3269139	2699	760265	628	4.2	4.2
1996	3582555	2927	833152	681	4.1	4.1
1997	3899262	3154	906805	734	4.0	4.1
1998	4204128	3368	977704	783	4.0	4.0
1999	4504341	3577	1047521	832	3.9	3.9

Source: Columns (1) and (2) are from Table 1-2 in Section 1.1.
Note: Official estimates are first converted from 1978 yuan to 1990 yuan using the Chinese GDP deflator, then to 1990 U.S. dollars using the 1990 PPP estimate from the Penn World Tables.

Table A2-3: Growth Comparison of China's GDP and per capita GDP

Growth Rate (%)	Maddison			Official		
	GDP	Population	GDP per capita	GDP	Population	GDP per capita
1978-1999	7.3	1.4	5.9	9.6	1.4	8.2
1978-1990	7.0	1.5	5.5	9.0	1.5	7.5
1990-1999	7.6	1.2	6.4	10.4	1.2	9.2

Source: These compound growth rates are calculated from Tables A2-1 and A2-2.

Researchers have tried to reconcile the two sets of estimates. For example, Wu (2000) argued that the downward bias of Chinese official GDP might result from the insufficient coverage of production activities and the distorted price system. As to the upward bias of GDP growth, it could be explained either by using deflators that under-deflated the levels of GDP or by enterprises intentionally exaggerating their output improvement so as to be rewarded.[27] In addition, the gradual movement from the old material product system (MPS) to the internationally adopted system of national accounts (SNA) may also have caused an upward bias in the estimation of China's GDP growth.

[27] Wu (2002) used his self-constructed dataset to test the upward-bias hypothesis of Chinese official industrial growth rates. His estimations strongly demonstrated that according to official statistics, the growth rates were overstated by 1.2 to 4.1 percentage points in different periods of post-reform time.

Appendix 3: Economic Reform and the Development of A New Social Security System in China

As is well known, a social security system is an integral part of a market economy. In the process of reforming its planned economy into a market economy, China has made great efforts to improve its social security system. A sound social security system is a means of maintaining social equality and social stability. In China, it also facilitates economic reform by allowing state firms to transfer responsibility for redundant workers from themselves to the state. This permits these firms to lay off the workers and improve productivity growth.

This appendix looks at the development of the Chinese social security system and the importance of establishing a new social security system for China's economic reform. A brief review of the Chinese social security system will be provided first. The following four sections explain the need for reform and the new look of the social security system in four major fields: the old-age pension system, the unemployment insurance system, the health insurance system and the minimum living standard security system.

A3.1 A Brief Review of the Chinese Security System Reform

The term "social security system" is defined as a very broad concept in China. The Government of China announced in April 2002 that a basic social security system had been established, which includes social insurance, social relief, social welfare as well as social mutual help and special care for disabled people and family members of revolutionary martyrs.

Reforms on the social security system were originally proposed during the economic reform of the early 1980s. But only when the objective of pursuing a market economy was made clear in the early 1990s were several essential reform procedures in the social insurance system and the social relief system finally undertaken.

The social insurance system is a system in which the government participates or enforces the participation of employers and affected individuals in raising funds so as to protect individuals against economic risks. The Chinese social insurance system consists of old-age pensions, unemployment insurance, health insurance, industrial injury insurance and maternity benefits. Of these, old-age pensions, unemployment insurance and health insurance are the main areas in which reform is crucially necessary and where reforms have actually focused.

The social relief system refers to the support by the government and society to citizens who are unable to maintain their basic living standard. The Chinese social relief aims to guarantee a

minimum standard of living to all urban citizens. This coverage is expected to be extended to the rural population in the near future.

A3.2 Old-age Pension System

A3.2.1 Economic reform and the necessity of pension system reform

The Chinese old-age pension system reform was proposed in 1984, in accordance with reform of state-owned enterprises. Before the pension reform, enterprises were responsible for paying pension premiums for their employees. The linking of old-age pensions to enterprises instead of to the beneficiaries greatly impeded labour mobility in China and made it quite difficult for state enterprises to lay off redundant workers to achieve higher labour productivity. Under the old system, workers faced a high risk of receiving no pension after retirement if they quit their current jobs. Seldom were people willing to leave until the benefits were realized. Even when workers were laid off, they would not take jobs in other firms because they would lose their pension rights. According to a survey carried out by the Ministry of Labour and Social Security in 1999, 83.0 per cent of the laid-off workers from state-owned enterprises worried that their old-age pension would not be guaranteed if employment relations with their former enterprises terminated.

At the same time, responsibility for paying pension benefits was a major financial burden for state enterprises. Economic reform brought more autonomy to state enterprises and enterprises' profits and losses became more and more a reflection of their production performances. For firms with losses, survival was an issue and their pension premium responsibility would only make matters worse. Others were unwilling to accept their responsibility since their contributions would be used to pay benefits to other employees. In this sense, their profits were shared by other enterprises. Therefore they would always find excuses to escape premium payment.

A3.2.2 The new pension system: a joint employer-employee contribution

The Chinese government, in realizing the necessity of reforming the old pension system, has taken a series of measures since 1991. The major effort was to introduce the joint employer-employee contribution system that combines general funding with personal accounts to replace the original pay-as-you-go system.[28]

Under this new system, employees themselves pay part of basic pension premiums, which will go directly to their personal accounts. The personal accounts are independent from the enterprises.

[28] The pay-as-you-go system is one of the two representative systems that prevail in the world. It was first introduced in Germany in the 1880s under the Rule of Bismarck. In the system, pension payment is totally determined by contributions at a certain point of time and there is no accumulation for future use. Essentially this mode means the current generation's workers support previous generation's retirees.

No matter where a worker is employed, his/her contribution to the personal account will be accumulated. Once workers retire, pension benefits will be paid directly from their personal account and the longer they have contributed, the more they will receive after retirement.

Enterprises contribute premium payments to both general funding and their employees' personal accounts, but they are no longer responsible for income support for those laid-off workers. If workers have made contributions to the new pension system over fifteen years, they will also receive benefit from the general funding in addition to the benefit from the personal account.

Since the adoption of the new pension system, more and more people have participated and become beneficiaries. As shown in Table A3-1, 77.8 million employees joined the new system in 1992, of which 65.4 million were from SOEs. And in 2002, the total number of contributors reached 111.3 million. The number of beneficiaries has increased too, from 16.81 million in 1992 to 36.08 million in 2002. From the table, we see that the ratio of beneficiaries to contributors in the new pension system increased more than 10 percentage points over 1992-2002.

Table A3-1 Number of Contributors and Beneficiaries In the New Pension System (1992-2002)

Year	Contributors (millions)			Beneficiaries (millions)			Beneficiary /Contributor (%)
		Of which:			of which:		
	Total	SOEs	Urban COEs	Total	SOEs	Urban COEs	
1992	77.75	65.4	11.77	16.81	13.39	3.38	21.62
1993	80.08	65.91	13.19	18.39	14.51	3.76	22.96
1994	84.94	70.06	13.25	20.79	16.67	3.94	24.48
1995	87.38	71.31	13.7	22.41	17.87	4.29	25.65
1996	87.58	70.45	14.55	23.58	17.57	4.67	26.92
1997	86.71	68.88	14.37	25.33	19.84	5.08	29.21
1998	84.76	66.47	13.7	27.27	21.44	5.25	32.17
1999	95.02	64.54	14.79	29.84	21.96	5.71	31.40
2000	104.48	64.67	14.7	31.70	22.84	5.94	30.34
2001	108.02			33.81			31.30
2002	111.28			36.08			32.42

Source: 1.Labour Statistic Yearbook of China, 2001, Table 8-16

2. Labour Statistic Communiqué 2001 and Labour Statistic Communiqué 2002

Table A3-2 shows the financial situation of the pension system. The new system received revenue of 317.2 billion yuan in 2002, while comparatively, it received 36.6 billion yuan in 1992. As to the expenses, they have increased from 32.2 billion yuan to 284.29 billion yuan over the period 1992-2002. Revenues and expenses are nearly balanced every year, reflecting that there is

still little accumulation in the new pension system.

A3.2.3 Existing problems and reasons for their existence

Introduction of personal accounts removed the barrier to labour mobility between enterprises and laying off redundant workers, which was believed to be an important contribution to higher labour productivity, now became possible for state enterprises. But the joint contribution system did not completely reduce the financial burden of state enterprises. New regulations require 20 per cent of enterprises' total wage bill to be paid for pension benefits. Of the total contribution, only a small proportion that is equal to 3 per cent of employees' wages will go to employees' personal accounts. All the remaining contributions from the enterprises are accumulated as general funding. Such a big proportion of contributions is much like an additional tax that is levied on enterprises. Therefore it may possibly lead enterprises to continue escaping or delaying premium payments.

Table A3-2: Financial Statistics of Old-age Pension System (1992-2002)

	Revenue (billion yuan)			Expense (billion yuan)		
		for which			For which	
year	Total	SOE	Urban COE	Total	SOE	Urban COE
1992	36.58	31.16	5.14	32.19	27.17	4.94
1993	50.35	41.21	7.38	47.06	38.25	7.61
1994	70.74	59.86	9.12	66.11	55.15	10.23
1995	95.01	80.26	11.13	84.76	71.62	11.82
1996	117.18	96.86	13.92	103.19	86.18	15.1
1997	133.79	113.08	13.63	125.13	105.86	16.75
1998	145.90	121.37	15.01	151.16	128.89	19.32
1999	196.51	156.7	17.99	192.49	159.08	23.63
2000	227.81	169.83	19.98	211.55	164.68	26.52
2001	248.90			232.10		
2002	317.15			284.29		

Source: 1. Labour Statistic Yearbook, 2001, Table 8-17
2.Labour Statistical Communiqué 2001 and Labour Statistical Communiqué 2002
Note: Pension revenues include both pension premium and general funding. Pension expenses include pension benefits and administrative cost.

Another problem of the current pension system may concern the personal accounts. As some researchers have pointed out, the personal accounts in China are actually empty accounts (Zhou, 1999), i.e. there are indeed no credits in the personal accounts because workers' contributions to their personal accounts are actually used for paying benefits of the current retirees. In this sense, the pension system in China is essentially a transformed pay-as-you-go system.

However, existence of these problems has its own reasons. Both problems derive from the needs of certain groups to bear the transition costs. As China rejected the old pay-as-you-go system, the most affected people were those retired and those still in working ages. Under the old system there was no accumulated funding that could be paid to retired workers and it was also not possible for the government to bear the high costs totally by itself. Therefore enterprises and current employees sharing part of the costs became necessary.

A3.2.4 Future policy choices

The current problems should be transitional. But the Chinese pension system needs other funding resources. One contentious method is to sell state-owned assets and to channel the earnings into the pension system. Supporters for this action argue it will make state enterprises face more market power once their assets are sold in the financial market, and at the same time, raised funds from the market would reduce financial burden in the current system. Opposers argue that before the Chinese financial market is fully developed and before the relevant regulations of dealing with state-owned assets are issued, selling state-owned assets will only result in devaluation or even value losses of the state assets.

In addition to searching for new funding resources, China may also try some methods from the pensioner's point of view. The flexible retirement policy, as discussed by Nicholas Barr (2001), might be one choice under China's current situation. To allow a gradual transition from work into retirement instead of a forced retirement at a certain age will reduce pressures on pension finance at the same time leading to more efficient use of labour. Another choice might be as proposed by Martin Feldstein (1998), namely replacing the full benefit payments with partial payments. In other words, the government can consider to only bridge the gap between retirees' previous contribution and their income after retirement. This will cost the pension system much less and will have no negative effect on the working population.

A3.3 Unemployment Insurance System

A3.3.1 Evolution of the unemployment insurance system

Unemployment has never been a real problem in China until the early 1990s.[29] As China gradually reformed its economy towards a more effective production pattern, enterprises began to lay off redundant workers. Especially after 1997 when reform accelerated and the laid-off policy was introduced widely throughout China, many workers lost their jobs.

[29] Before the late 1990s, the Chinese government did not treat the workers laid off in the process of economic reform as officially unemployed. Instead, they were defined as still employed but temporarily on leave. But in fact, those laid-off persons were unemployed according to the general definition of unemployment.

To protect the interest of those laid-off workers, the Chinese government developed a re-employment project in 1995. Setting up re-employment service centers was at the heart of this project. The re-employment service center is like an individual department in the enterprises. All the laid-off workers are asked to register and to sign 3-year contracts so that they would receive basic living expenses as well as labour skill training or job-seeking consulting services, both of which aim to help them to be re-employed. According to the statistics of Ministry of Labour and Social Security (MOLSS), 1.60 million laid-off workers from state-owned enterprises in 1996 found new jobs with the assistance of the re-employment service. This number increased to 4.34 million in 1997, followed by 6.10 million in 1998, 4.92 million in 1999 and 3.61 million in 2000.

In the first few years after its implementation, the re-employment project played an important role in maintaining income security of those laid-off. However, it could not prevent the continued declines in state enterprise employment. Because all the re-employment service centers were set up in the enterprises, enterprises still needed to pay basic living expenses for the laid-off workers and they were also responsible for part of the administration cost of re-employment service centers. In this sense, the re-employment project did not free enterprises of the financial burden. Instead it was rather an alternative form of realizing enterprises' obligation to its workers. Suppose if the enterprises were unable to make their payment, the heavy burden would have to be totally born by the government, causing a major strain on the government budget.

A3.3.2 The new Chinese unemployment insurance system

Starting in 2001, China began to close all its re-employment service centers. An effort was made to cover all the laid-off workers through the unemployment insurance system instead of channeling them into re-employment service centers.

The new Chinese unemployment insurance system is similar to the old-age pension system, i.e. the joint employer-employee contribution system. The system was officially established in 1999,[30] which required a standardized contribution not only from enterprises but also from employees themselves. Employees are now responsible to contribute 1% of their wages to the personal account as premiums and if they become unemployed, they can receive corresponding insurance payment that is based on their contribution.

Table A3-3 shows by 2002, 101.8 million people contributed to the unemployment insurance system and the total revenue has increased from 4.5 billion yuan in 1996 to 21.56 billion yuan in 2002. A total of 4.40 million received insurance benefits in 2002.

[30] Since 1993, the Government of China carried out reform on the unemployment insurance system to alleviate unemployment pressure. But not until 1999 was the legitimate regulation of Unemployment Insurance issued.

Table A3-3: Statistics of the Unemployment Insurance System

Year	Number of Contributors (millions)	Number of Beneficiaries (nillions)	Number of Beneficiaries (millions)	Revenue (billion yuan))
1996	83.33	3.31	4.52	2.73
1997	79.61	3.19	4.69	3.63
1998	79.28	1.58	7.26	5.61
1999	98.52	2.71	12.52	9.16
2000	103.26	3.30	16.04	12.34
2001	103.55	3.12	18.70	15.70
2002	101.82	4.40	21.56	18.66

Source: 1. Labour Statistic Yearbook of China, 2001, Table 8-19
2. Labour Statistical Communiqué 2001 and Labour Statistical Communiqué 2002
Note: Here what we mean by contributors refers to people who have their personal accounts and have paid premiums to those accounts. Beneficiaries refer to people who have received insurance benefits.

A3.4 Health Insurance System

A3.4.1 Free health care services for urban workers under the old health insurance system

Health insurance was another important issue in reforming the Chinese social insurance system. Under the old system, health care service was freely provided to workers employed in urban state enterprises. Workers enjoyed free health care no matter whether the health service was really necessary or not. Costs of employee health service fee payment took away a large proportion of enterprises' profit. MOLSS estimates that from 1978 to 1997, expense on health care increased 28 fold, while during the same period, the growth of GDP per capita was just 16 fold. It was believed that 20-30 per cent of the health expenditures were wasteful.

A3.4.2 New look of the health insurance system

The establishment of the basic health insurance system for urban employees in 1998 signaled the essential reform in Chinese health insurance. This new system ended the history of free health-care service and required workers to shoulder part of health-care costs by means of paying premiums to their personal accounts. The personal accounts accumulations are the first resource that rebates will come from. Only if the total expense exceeds the credits in the personal account, general funding will cover parts of the costs.

Under the new health insurance system, the incentive to receive unnecessary health service is curbed effectively. Enterprises now only need to contribute a fixed amount[31] of their wage bill to

[31] Enterprises pay 6 per cent of their wage bill to both the general funding and employees' personal account. See appendix table-1 for more details.

fulfill the general health funding instead of paying for all their employees' health service fees.

Since the new regulation took effect, there have been 94.0 million workers who participated in the system and total revenue of 60.8 billion yuan has been collected by 2002, ten times the 1998 level.

Table A3-4: Statistics of Health Insurance System (1998-2002)

Year	Number of Contributors (millions)			Number of Beneficiaries (millions)			Revenue (billion yuan)	Expense (billion yuan)
	Total	Employees	Retirees	Total	Employees	Retirees		
1998	5.09	4.02	1.08	132.34	105.55	26.79	6.06	5.33
1999	5.94	4.70	1.24	129.42	101.24	28.18	8.99	6.91
2000	23.06	18.18	4.88				17.00	12.45
2001	72.86	54.71	18.15				38.40	24.40
2002	94.00	69.26	24.74				60.78	40.94

Source: 1. Labour Statistic Yearbook of China, 2001, Table 8-19, Table 9-10
2.Labour Statistical Communiqué, 2001 and 2002

A3.4.3 Health care service in rural areas

Since 1998, reform on the health care insurance system has been gradually implemented and now the new health insurance system covers all urban employees. However, it remains difficult in rural areas to set up a health insurance system that is similar to that in urban areas, although the need for health care service in rural areas is actually much greater.

First, in rural China, most enterprises provide little or no health insurance to their employees. Due to the low income levels in rural areas, rural citizens are not able to pay any insurance premiums. Mandatory insurance premiums from rural people will only exacerbate the financial hardship they face. Financing the rural health care system hence has to depend mostly on the central government's subsidy. But the state subsidy is after all limited since it relies on funding collected by the local government in a certain degree.

Moreover, labour mobility from rural areas to urban areas has become very common. Therefore a unified rural health insurance system will face risks of distortion. Reform in rural areas moves many farmers out of agricultural production and these people are employed temporarily in urban areas. But working in urban areas does not mean that they are subject to urban health insurance and once they suffer from severe illness, they usually go back to the hospitals in their hometowns for treatments because few of these people can afford the expensive health care service in urban hospitals.

A3.5 Minimum living standard security system

In China, the minimum living standard security is regarded as the last resort for laid-off workers, the unemployed and the poor urban dwellers. In 1993, the Chinese government began to set up the minimum living standard security system. By 1999, a system that included all cities and organic county towns had been established.

The minimum living standard security system provides security on a needs basis. Unlike the pension benefit or the unemployment insurance benefits, the minimum living standard security is not determined on the basis of individual workers but households. No matter whether the family members are working or have been laid off, receiving unemployment insurance or having no income, only if the average monthly income of this family is lower than a certain level (often called the security line), will the minimum living standard security be offered.

Because different cities have different costs of living, the minimum living standard lines are not set at the same level throughout the country, instead, they vary across cities. For example, in 2002, the highest security line set by Shenzhen was about 299 yuan per person per month, but in Nanchang, the security line was much lower, at 143 yuan per person per month (Table A3-5).

The minimum living standard security system is tending to ensure more and more people basic living standards. As we can see from Table A3-6, the number of beneficiaries greatly increased from 0.9 million in 1997 to 20.7 million in 2002.

It is worth noticing that in 1998 and in 2001, the number of beneficiaries showed dramatic increases. In 1998, when the Chinese economic reform made essential advancement through laying off redundant workers in urban enterprises, this system absorbed those who failed to benefit from the unemployment insurance system. Later in 2001, when the Chinese government gradually closed all the re-employment centers, which deteriorated the living of unemployed people who had been masked by the re-employment centers but were now opened, many more people became beneficiaries of this system. The same trend continued in 2002. It can be expected that before all the laid-off workers are transferred to the unemployment insurance system, the number of beneficiaries will keep on growing.

Table A3-5: The Thresholds for Receipt of Minimum Living Standard Security in 36 Major Chinese Cities (2002)

(yuan per month per person)

City	Security Line	City	Security Line
Beijing	290	Guangzhou	300
Tianjin	241	Nanning	190
Shijiazhuang	182	Haikou	221
Taiyuan	156	Chengdu	178
Huhehaote	153	Chongqing	185
Shenyang	205	Kunming	190
Changchun	169	Guiyang	156
Harbin	200	Lasa	170
Shanghai	280	Xi'an	180
Nanjing	220	Lanzhou	172
Hangzhou	270-300	Xining	155
Hefei	169	Yinchuan	160
Fuzhou	200-220	Wulumuqi	156
Nanchang	143	Dalian	221
Jinan	208	Qingdao	200-210
Zhengzhou	180	Ningbo	260
Wuhan	210	Shenzhen	290-344
Changsha	180-200	Xiamen	265-315

Sources: Ministry of Civil Affair, 2002, http://www.mca.gov.cn/news/dibao/xinwen2002070801.html

Table A3-6 Number of Beneficiaries in the Minimum Living Standard Security System (1996-2002)

Year	Number of Beneficiaries (millions)	Average annual growth rate (%)
1996	0.85	
1997	0.88	3.53
1998	1.84	109.44
1999	2.66	44.43
2000	4.03	51.41
2001	11.71	190.78
2002	20.65	76.36

Sources: Statistical Communiqué of Chinese Civil Affair, http://www.mca.gov.cn/statistics/shuju.html, 1997 to 2002

A3.6 Conclusions

Through examining the four key components of the Chinese social security system, we conclude that reforming the social security system was highly necessary since the old enterprise-based system impeded the progress of economic reform. From what we have discussed, introduction of the joint employer-employee contribution model into the social security system was the most helpful change. In conclusion, Table A3-7 puts together specific features of its application in each insurance system so that the reader can easily appreciate the similarities and differences in the application of the new model. Table A3-8 summarizes specific regulations that have contributed to the current social security system.

Potential problems in the Chinese old-age pension system have been pointed out. Although the existence of these problems is thought to be a transitional phenomenon in the process of transforming the old pay-as-you-go pension system into the new funding based pension system, it remains uncertain as to how and when they will be resolved. Exclusion of rural people from the urban Chinese health insurance and the impossibility of setting up a rural health insurance system that is similar to the urban health insurance system have also been mentioned.

Actually, “there is no ideal model for pension reform” (qtd. in Barr, 2001:chapter 8). This is also true for reform of other systems. China needs to take its own economic situation into consideration and any reform that can facilitate Chinese economic reform at the same time as maintaining social stability will be a suitable choice.

Table A3-7 New Features of the Chinese Social Insurance System

Components of Social Insurance	Responsibility for Basic Insurance Premiums			Benefits
	Employers		Employees (Entire Contribution to the Personal Account)	
	Total Contribution	Percentage Contribution to the Personal Account		
Old-age Pension	Up to 20% of enterprises' total wage bill	Equal to 3% of employees' wages	8% of personal income	Two parts: (1) 1/120 of the accumulated sum of personal account credit per month. (2) If the length of contribution is 15 years or over, one can also receive general pension. The monthly general pension benefit equals to 20% of local average monthly wage in the previous year. If the length of contribution is less than 15 years, general funding may will be provided in the following way: (a) Every one year contribution will make a retiree qualify for 2 months pension payment from the general funding; (b) Pensioner will get a lump sum after retirement instead of monthly payment.

Health Insurance	Up to 6% of enterprises' total wage bill	Usually equal to 30% of enterprises' total contribution	2% of personal income	Two steps: 1. Deduct from personal accounts 2. If health care expense exceeds what the personal account can afford, the extra cost that is above 5% of the personal wages is paid by workers themselves but in different levels: (a) If total expense is less than 5000 yuan, workers themselves pay 10%-20% of the extra cost; (b) If total expense is between 5000-10000 yuan, workers themselves pay 8%-10% of the extra cost; (c) If total expense is more than 10000 yuan, workers themselves pay 2% of the extra cost. All the other extra cost will be rebated by general funding.
Unemployment Insurance	2% of enterprises' total wage bill		1% of personal income	Monthly payment at a rate that is higher than the minimum urban living standard but lower than local minimum wage rate. Length of receiving unemployment benefits depends on the length of contribution. (a) If contribute 1-5 years, can receive benefits for 12 months at most; (b) If contribute 5-10 year, can receive benefits for 18 months at most; (c) If contribute over 10 years, can receive benefits for 24 months at most.

Note: 1. The obligatory contributors to the social insurance system include the following economic units and their employees: (1) all urban enterprises (eg: SOEs, urban COEs, foreign funded enterprises and private-owned enterprises, (2) State administration department, (3) non-profit institutions, (4) social organizations.
Responsibility of contributions by Township and village enterprises (TVEs) and their employees are subject to local government's requirement.

2. If a worker has a personal income that is less than 60% of the average income level, the income base for calculating his pension premium will be 60% of the average income level. If a worker has a personal income that is over 300% of the average income level, the income base for calculating his pension premium will exclude the extra amount. As to the personal income that is over 200% but below 300% of the average income level, the income base for calculating his pension premium can include part or all the extra amount.

Table A3-8 : Regulations and Guidelines of Social Insurance and Social Relief

Items	Reform Initiation	Regulations
Old-age pension	1984	➢ Decision on Reforming Old-age Pension System for Enterprise Employees (State Council 1991 No.33) ➢ Notification on Further Reforming Old-age Pension System for Enterprise Employees (State Council, 1995 No.6) ➢ Decision on Establishing a Uniform Basic Old-Age Insurance System for Enterprise Employees (State Council, 1997 No.26) ➢ Notification on Decentralizing Management of Mutual Assistance Program (State Council, 1998 No.28)
Health insurance	1988	➢ Decision on Establishing the Basic Medical Insurance System for Urban Employees (State Council, 1998 No.44) ➢ Notification on Strengthening Management of Urban Employees' Personal Accounts for Basic Health Insurance (Ministry of Labour and Social Security, 2002 NO.6) ➢ Notification on Establishing a Mutual Medical System in Rural Areas (State Council, 2003 No.3)
Unemployment insurance	1986	➢ Regulations of Unemployment Insurance (State Council, 1999 No.258) ➢ Regulation on Application for Unemployment Insurance (Ministry of Labour and Social Security, 2000 No. 8) ➢ Notification on Establishing a Recording System for Unemployment Insurance (Ministry of Labour and Social Security, 2002 No. 69)

Industrial injury insurance	Late 1980s	➢ Trial Procedures for Industrial Injury Insurance for Enterprise Employees (Ministry of Labour and Social Security, 1996 No.266) ➢ Regulation of Industrial Injury Insurance (State Council, 2003 No.375)
Childbirth insurance	1988	➢ Trial Procedures for Childbirth Insurance for Enterprise Employees (Ministry of Labour and Social Security, 1994 No.504)
Urban minimum living standard security	1993	➢ Notification on Establishing a Minimum Living Standard Security System in Urban Areas (State Council, 1997 No.29) ➢ Regulation of Urban Minimum Living Standard (State Council, 1999 No.271) ➢ Notification on Further Strengthening the Minimum Living Standard Security System in Urban Areas (State Council, 2001, No.87)