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Katsuji Nakagane *Editor*

Studies on the Chinese Economy During the Mao Era

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Studies on the Chinese Economy During the Mao Era

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Preface

Barry Naughton, a prominent American scholar of the Chinese economy, writes that China, which grew rapidly following its reform and opening-up policy, inherited two types of legacies from the past as it achieved economic development.[1] The first came from old China that preceded the foundation of new China. Market-driven private enterprises were severely repressed under Mao Zedong, who advocated a planned economy and class struggle, but they were still operating under the radar like underground water. As soon as the government reversed course and adopted the reform and opening-up policy in 1978, this underground water spewed out in the form of private and township and village enterprises. The other type of legacy came from the Mao era. There were certain positive effects, but there were also negative effects of the legacy, such as the Great Leap Forward and the Cultural Revolution, which caused chaos and claimed many lives.

The present stands on a continuum with the past. In development economics, the term "initial conditions" refers to past conditions before development, as well as legacies inherited from the past. Which of the legacies that exist today came from the policies and institutions of the Mao era? Did such legacies destroy those from earlier periods? In other words, what were the initial conditions for the reform and opening-up? To examine this issue, this book takes up some of the policies and institutions that were characteristic of the Mao era and evaluates them from the vantage point of the present. This book is the result of a series of joint research projects with this issue in the center.

The Mao era was extremely unique in certain respects. The Great Leap Forward at the end of the 1950s and the Cultural Revolution that began in 1966, which are discussed in this book, were extraordinary developments in world history that claimed many lives. From an economic perspective, this was a unique era when unprecedented policies and institutions were established. Policies that ignored economic principles were developed on a grand scale under the direction and support of Mao Zedong. These included the People's Commune system, under which almost all peasants were organized to create a communist society, as well as the "backyard furnace" movement,

[1] Naughton, B. (2007). *The Chinese economy: transition and growth*, Cambridge, M.A.: MIT Press.

which mobilized a vast number of people, such as farmers, laborers, and government employees. In the 1950s, China followed the Soviet Union in introducing a planned economy and prioritizing the development of heavy industries. The country received economic and technological assistance from the Soviet Union and attempted to create a Soviet-style socialist economy. During the Cold War, however, China gradually moved away from the Soviet Union and took a path of self-reliance. This was when China developed unique policies of its own. What should we make of such a unique era, and what does it mean for modern China? This book will answer such questions.

This book is not an overview, much less an encyclopedia, of the contemporary history of China's economy. There are various legacies from the Mao era that are positive, but there are also those that are negative. Each chapter attempts to recapture the characteristics, as well as the merits and demerits, of the institutions and policies of the Mao era. The analysis will focus on special aspects of various fields, such as agriculture, industry, finance, and economic thought. Sometimes the emphasis will be placed on a comparison between the Mao era with the era after the reform and opening-up policy, and sometimes on the situations and changes observed in specific regions. Contemporary China has inherited many legacies from the Mao era. Thus, to understand China today, it is essential to understand China during the Mao era.

This book is organized as follows. The introductory chapter discusses the macroeconomic trends of the Mao era, the evolution of major economic institutions, and some of the basic models (framework) that formed the background for such institutions and policies. Chapter 2 compares and contrasts the political and economic vision of Mao with the economic policies of Deng Xiaoping. It argues that volatile economic fluctuations during the Mao era stem from Mao's "economics of contradictions," and that Deng put China's economy on a growth trajectory following the reform and opening-up based on the economics that rejected Mao's political and economic view.

Chapter 3 focuses on Chongqing City of the early 1950s, discussing how the old system gave way to the new after the revolution, thereby identifying the specific micro-routes to socialist transformation.

Chapter 4 uses production cost surveys regarding agricultural products to elucidate the characteristics of the agricultural earnings structure of people's communes, as well as the causes of earnings fluctuations. It also conducts a macroeconomic analysis regarding agricultural surpluses, an important factor in examining the transfer of funds from rural areas.

Chapter 5 uses accounting data of one of the people's communes in Jiangsu Province. It explains that the system of People's Communes enabled "primitive accumulation" in the Marxist terminology and that the communes allowed people to live equally although poorly (the poverty was shared among people).

Chapter 6 discusses the water-irrigation construction policies of the Mao era and analyzes the economic effects of rural construction projects known as "labor accumulations," which required huge labor.

Chapter 7 again examines the transfer of funds from rural areas. It analyzes the size and flow of rural capital funneled through financial institutions such as credit

unions and agricultural banks to discuss whether funds from rural areas were an important means of financing the industrial sector.

Chapter 8 reviews the policy of prioritizing the development of heavy and chemical industries, which was the core of the industrialization policy during the Mao era. It uses statistical data to analyze the investment efficiency and composition of the mining and manufacturing industries and examines the legacies that this policy left behind after the reform and opening-up.

Chapter 9 focuses on the development of light industries, which stand in contrast to heavy industries. In particular, the chapter examines the textile industry, which was developed during the three periods: before the founding of the country, the Mao era, and after the reform and opening-up. It discusses the impact of socialist industrialization policies on the development of the light industries and how their development affected the nation's entire industrialization process.

Chapter 10 again targets small-scale local industries that characterized rural areas during the Mao era, particularly the industry producing a chemical fertilizer called ammonium carbonate, and examines how these industries developed after the reform and opening-up policy.

Mao, facing military threats from the United States and the Soviet Union, launched the "Third Front" policy in the early 1960s, moved factories from coastal to inland areas, and built new factories inland. Chapter 11 cites the case of Shanghai factories that were relocated to a remote area of Anhui Province under this policy and discusses people's actual living conditions associated with the construction and operations of such factories.

The final chapter, Epilogue, based on a discussion of the above chapters and by referring to the views of researchers inside and outside China, presents the editor's view and hypothesis from a unique perspective regarding the significance of the institutions and policies of the Mao era as initial conditions for the modern Chinese economy after the reform and opening-up policy.

There have been studies on the modern economic history of China that organized and described historical facts of the economy during the Mao era.[2] However, there have been few studies, at least in Japan, that discussed China's history from the perspective of development economics or provided an econometric analysis. Similar studies on economic history published in China do contain many facts, but they lack economic analysis and are heavily ideological. Historian E.H. Carr writes that history

[2] For example, Japanese-language publications include Liu Suinian and Wu Qungan (eds.). (1986). *Chuugoku Shakai Shugi Keizai Ryakushi (1949–1984)* (A Brief History of Chinese Socialist Economy (1949–1984)), Beijing: Beijing Shuuhousha; and Okamoto Takashi (ed.). (2013). *Chuugoku Keizaishi* (Chinese Economic History), Nagoya: Nagoya University Press. Chinese-language publications include Wu Li (ed.). (2009). *Zhonghua Renmin Gongheguo Jingjishi (zengdingban)* (Economic History of the People's Republic of China (expanded edition) (Volume I and II), Beijing: Zhongguo Shidai Jingji Chubanshe. Additionally, there is Dong Zhikai et al. (eds.). (2011). *Zhonghua Renmin Gongheguo Jingjishi (1953–1957)* (Economic History of the People's Republic of China (1953–1957) (Volume I and II), Beijing: Shehui Kexue Wenxian Chubanshe, even though it only addresses the first-year plan.

is "a dialogue between the past and the present."[3] Today, the Xi Jinping regime, which advocates the Chinese Renaissance, encourages the worship of the nation's leaders and strengthens the Party's control over businesses. China appears to be pursuing a policy that dates back to the Mao era. Thus, it is becoming increasingly necessary to look at the past and consider the characteristics and problems of contemporary China's economy. This book will be published as a pioneering work in this field of research.

Katsuji Nakagane

[3] Carr, E.H. (1957). *The new society*, Boston: Beacon Press.

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Chapter 1
Introduction: Economic Performance and Background of the Mao Era

Katsuji Nakagane

Abstract What macroeconomic changes and achievements have the Chinese economy undergone during the Mao era? We first summarize the economic achievements and characteristics of the Mao era from several aspects, then consider the mechanisms that caused the growth and changes, and finally briefly review the institutional and policy backgrounds that enabled or created such a performance.

Introduction

The economy of the People's Republic of China (PRC) since its foundation in 1949 can be divided into two major periods: before and after the implementation of the reform and opening-up policy in 1978 (i.e., before 1978, the period of the "planned economy," and after that, the period of the "market economy"). Alternatively, we can consider that the former was an era of socialism, whereas the latter was that of (Chinese) capitalism. If we were to label the eras after people, we could say that the former was the era of Mao Zedong (Mao era) and the latter was that of Deng Xiaoping (Deng era). After the Mao era, which was marked by great turmoil and upheaval and relatively low growth (as discussed in Sect. 1.1), the Chinese economy under Deng, who boldly pursued reforms and openness, achieved sustained high growth that attracted global attention and is now the world's second largest economy, with the momentum to catch up with the United States. Therefore, in recent years, the struggle for supremacy between the U.S. and China has become increasingly widespread and serious. Although measuring economic performance only in terms of growth rates and GDP is challenging, at least in terms of commonly used economic indicators, it may be regarded that Mao failed and Deng succeeded.

What macroeconomic changes and achievements have the Chinese economy undergone during the Mao era? (In this paper, we refer mainly to the pre-1977

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period as the post-1978 period is referred to as the reform and opening-up era.) In this chapter, we first summarize the economic achievements and characteristics of the Mao era from several aspects, then consider the mechanisms that caused the growth and changes, and finally briefly review the institutional and policy backgrounds that enabled or created such a performance.

In the first section, we focus on the growth rate of the Chinese economy in general during the period 1952–1977. China is supposed to have achieved a relatively high growth rate of over 6%, but we wonder whether this was really the case. We consider the growth rate and its fluctuations during this turbulent 25-year period by changing the method for measuring the growth rate and by making our own estimates. Section 1.2 summarizes the economic performance and characteristics of this period regarding various structural changes in the economy (e.g., industrial structure, employment structure, and trade dependence). Section 1.3 uses four models to explain the economic framework known as the planned economy of the Mao era. Finally, Sect. 1.4 provides an overview of the institutional and policy background that serves as the framework for this growth and structural changes.

1.1 Reality of the Economic Growth of the Mao Era[1]

When evaluating a country's economic performance, the growth rate seems to be the most important factor to consider. This case is especially true for the economies of developing countries. If a country's economy stagnates and fails to grow despite that its external environment and natural conditions are not quite abnormal, the country is judged to have adopted the "wrong" policies. However, if, it sustains high growth, its economic policies are frequently highly evaluated as having been "right."

It has been officially stated that the Chinese economy was growing at a high annual rate of 6.2% during the Mao era, despite the catastrophes of the Great Leap Forward (GLF) (1958–1961) and the Cultural Revolution (CR) (1966–1976), which both caused innumerable sacrifices to China. This can be considered an official message that China's socialist economy has developed in the long run, despite that it has experienced extraordinary difficulties due to Mao's political misguidance. Meanwhile, some economists, such as Mao Yushi, the former president emeritus of the Unirule Institute of Economics in Beijing, have argued that China experienced little economic growth during this period.[2] In fact, peasant incomes barely rose during this era, and many urban workers did not benefit from wage increases under the so-called "rational low wage system."[3]

This scenario leads to the following question. Can China's official growth statistics be trusted? It is well known that Thomas Rawski insisted that the official growth rate for 1998–1999 was extremely overestimated and it was actually as low as approximately one-third of the officially published version (Rawski, 2001). Even within China, as once criticized by Premier Li Keqiang, the official GDP index has often been examined due to suspicion. This must have been much less reliable in the Mao

era. First, the statistical system was not developed yet at that time, and most of the statistical personnel were only allowed to go during the CR so that the statistical mechanism did not function properly for a while. In addition, Chinese officials, especially those in the provinces, have tended to overreport statistical figures related to their regional economic performance. Even today, they tend to overreport their regional GDP and growth rates, especially for their own political motives (e.g., career advancement or competition with rival regions). Therefore, even when examining the official GDP statistics of the Mao era, estimating growth rates, in a different manner than the official GDP statistics, is necessary.

Before making our own estimates of the growth rates, let us verify how different methods of estimation affect growth performance, even when the official statistics were used. We calculated the growth rates for the period 1952–1977 using three different methods. The first one is to simply average the annual growth rates over the period, referred to as the (averaged) "average growth rate," for convenience. Second, the growth rate can be measured based on the exponential growth rate, which is assumed to grow exponentially from the GDP level in the initial year to that in the end year. For the exponential growth rate obtained in this manner, the actual results of the years between the initial and final years are completely ignored. Finally, the third method is to apply the regression equation $\mathrm{Ln}(Y) = a + b \cdot t + \varepsilon$ (where Y is GDP and t is time) and calculate the average growth rate by the regressed coefficient b thus obtained. This growth rate is called here the "regressed growth rate." The results are summarized in Table 1.1.

If we simply average the annual growth rates, the growth rate during the Mao era is indeed 6.2%, as officially stated. The exponential growth rate from the first year of 1952 to the end of 1977 was also quite close to the average growth rate (5.9%). However, the regressed growth rate obtained by regressing the GDP on time (year) as the only explanatory variable is much lower than these two growth rates (2.3%).

The per capita growth rate is obtained by subtracting the population growth rate from the total growth rate above (refer to the lower part of Table 1.1). Surprisingly, even if we rely on official GDP statistics, the long-term economic growth rate during the Mao era was only 0.23% per capita. Hence, in this sense, Mao Yushi and his colleagues are almost correct. Basically, people had lived in poverty under Maoist regime, and the overwhelming majority of peasants particularly were forced to live near or below the poverty line (the level at which they could not even obtain enough calories to survive) until the reform and opening-up strategy began. Even for non-agricultural employees, their wages were raised only twice during the Mao era, but only for a few of them.

Therefore, the question is what would be the growth rate during this era, if estimated independently and in a different manner? In this study, we conducted an independent estimation using the following method. First, assuming that quantity data are more reliable than value data despite that these are official statistics, we collected five series of quantity data from 1952 to 1977 and calculated their growth rates. The physical quantity statistics used in this study are food production, iron and steel production, energy consumption, passenger turnover, and freight turnover. Then, we used the input–output table of 1992 to calculate the value added per unit

Table 1.1 GDP growth rates based on official statistics (%)

Year	Average of annual rates[a]	Exponential rate of growth[b]	Coefficient of regressed GDP[c]
1952–65	6.85[d]	6.03	1.79
1966–77	6.07	5.38	2.77
1952–77	6.23[e]	5.93	2.3
1978–2000	9.79	9.66	4.15
GDP growth per capita			
1952–65	5.04	4.23	0.20
1966–77	3.8	3.16	0.50
1952–77	4.28	3.9	0.26
1978–2000	8.52	8.4	2.85

Source Author's estimation
Notes
[a] Simple averages of yearly growth rates
[b] Exponential growth rates between the initial year and the end year
[c] Growth rates regressing GDP only with time(year) as an explanatory variable
[d] Between 1953 and 1965
[e] Between 1953 and 1977. Growth rates between 1978 and 2000 are out of the scope of our analysis, but calculated for reference

of these five types of data. We multiplied this unit value added by the quantity data of each year during 1952–1977 and obtained the value added of each year (based on 1992). We calculated the weights related to the five items for each year in this manner as well. Finally, by multiplying the growth rates of the five series of data by these weights, we obtained the physical index growth rate with value-added weights. This can be called "alternative estimates of growth" (AEG).

The AEG rates were calculated, and the average growth rates for the 1952–1977 period are shown in Table 1.2.

By contrasting this table with Table 1.1, we obtain the following findings:

(1) Regarding the average or exponential growth rates, the official growth rate is much higher than the AEG rate during the era of concern. This is probably because a relatively large weight is given to grain production, which grows more slowly than steel production and energy consumption.
(2) However, the results are quite the opposite for the regressed growth rate. That is, the official growth rate was unexpectedly lower than the AEG rate. This fact may lead to the conclusion that China's economy seems to have grown faster than the official growth rate during the Mao era. Nevertheless, the absolute AEG rate remained quite low. Moreover, this unexpected phenomenon may have occurred only in the severe economic decline of 1961 (i.e., −26.6%). If we regard this as an outlier, assuming that the actual rate declined only (e.g., −10%), the official

Table 1.2 Estimates of the GDP growth rate based on AEG* (%)

Year	Average of annual rates	Exponential rate of growth	Coefficient of regressed GDP
1952–65	3.19	2.82	2.04
1966–77	4.21	3.24	4.30
1952–77	3.68	3.41	3.52
1978–2000	1.92	1.47	1.36
GDP growth per capita			
1952–65	1.38	1.01	0.46
1966–77	1.94	1.02	2.03
1952–77	1.73	1.38	1.48
1978–2000	0.66	0.21	0.06

Source Author's estimation
Note *Alternative estimates of growth rate (AEG) based on quantitative data of five items. See text for more details

average growth rate in terms of the regressed growth rate from 1952 to 1977 would be higher than the AEG rate (reaching 6.4%).

(3) Regarding the GDP per capita growth, this conclusion holds true because the population growth rate is the same regardless of the official growth rate or AEG rate. Thus, China's per capita income probably increased at a rate of 1.48% per year during this era. Additionally, the average standard of living of the population has improved slightly, but still quite slowly, over the long term.

(4) Whether we rely on official statistics or alternative estimations described previously, the growth rate during the CR period (i.e., 1966–1977) was higher than that of the earlier period (i.e., 1952–1965). Hu (2008) emphasizes that the Chinese economy was able to grow despite that this tragic political movement severely undermined the overall system. His argument is based on official statistics, but also supported by our own estimates. Conversely, the GLF and its failures have handled a more devastating blow to the Chinese economy than the CR.

We cannot declare that all the physical quantity statistics of the Mao era were recorded correctly. Further, we cannot deny the possibility that, during certain periods, particularly during the abnormal periods of the GLF and the CR, some of the statistics may have been overestimated. Official statistics, even physical quantities, are not always reliable. However, given that physical quantity statistics are probably more reliable than value ones, the alternative estimate of the AEG growth rate suggests that the long-term average growth rate by official statistics during this period was probably overestimated. Basically, China may not have achieved a high growth rate of 6.2%, as officially claimed. The actual growth rate may have been about 3.5% on average, or about 1.5% on a per capita basis (incidentally, the annual growth rate of the AEG is depicted in Fig. 1.1 to be compared with the official rate).

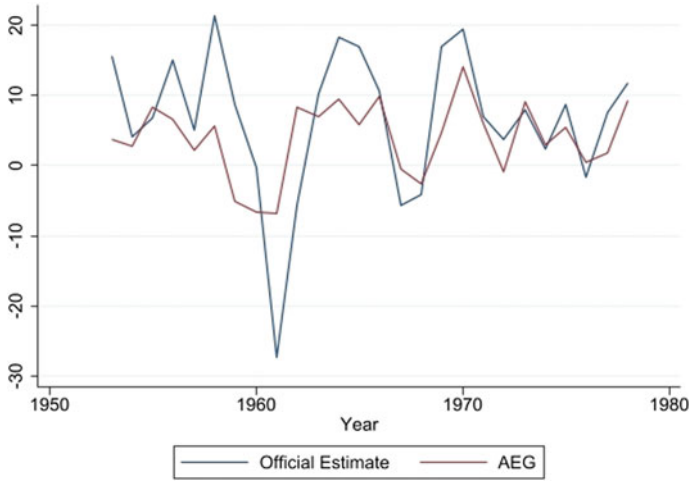

Fig. 1.1 Official growth rate compared to alternative estimates (AEG) (%). *Source* Author's estimation

Nevertheless, in the 25 years leading up to the end of the CR, the Chinese economy during the Mao era grew slowly, if any, compared with the average growth rate of the post-reform period (1978–2000). However, to achieve such a certain level of growth performance, Mao's economy had to pay enormous material and human costs, or make tremendous sacrifices, as described in detail below.

1.2 Structural Changes

The economy is composed of various structures; therefore, changes in these structures also vary. In this section, we examine various aspects of the Mao economy, focusing on structural changes in several aspects, such as industrial structure, growth structure, price fluctuations, development of medical care and education, etc. Unlike the growth rates discussed previously, all the data here are based on official statistics. All these data were from Guojia Tongjiju Guomim Jingji Zonghe Tongjisi (ed.) (2005) (hereinafter, Compendium 2005).

1.2.1 Changes in the Industrial Structure

The industrial structure is categorized into three: primary industry, mainly agriculture; secondary industry, comprising industry and construction; and tertiary industry, including commerce, transportation, public administration, education, and medical

Table 1.3 Change in industrial structure (1952–2000) (%)

Year	Primary industry	Secondary industry	In which manufacturing industry	Tertiary industry
1952	50.5	20.9	17.6	28.6
1957	40.3	29.7	25.4	30.1
1962	39.4	31.3	28.3	29.3
1965	37.9	35.1	31.8	27.0
1970	35.2	40.5	36.8	24.3
1975	32.4	45.7	41.5	21.9
1978	28.1	48.2	44.3	23.7
1980	30.1	48.5	44.2	21.4
1985	28.4	43.1	38.5	28.5
1990	27.0	41.6	37.0	31.3
1995	20.5	48.8	42.3	30.7
2000	16.4	37.9	43.6	33.4

Source Author's calculations based on Compendium (2005)

services. To measure the progress of industrialization among these four categories, we used only industry from the secondary industry category. During the Mao era, the Chinese economy was mainly agricultural until the beginning of the CR, although industrialization gradually progressed. During the CR, the secondary industry category surpassed the primary industry category. In 1985, soon after the start of the reform and opening-up policy, the tertiary industry category surpassed the primary industry category, similar to Petty's law of development economics. As shown in an international comparison, the industrialization rate in China during the entire era was higher than the standard pattern of development. This is a result of "socialist industrialization," which was consciously promoted by the Mao government (Nakagane, 2002) (see Table 1.3).

When the industrial sector is broadly divided into heavy industry (i.e., producer goods industry) and light industry (i.e., consumer goods industry), the ratio of heavy industrialization increases with the economic development, which is called Hoffman's law. This law is not as popular as Petty's law, but it is a standard pattern that can be applied to the development process of many industrial countries. When we calculated the ratio of heavy industrialization to determine whether this law can be applied to the Mao era, we found that it has increased significantly since the 1950s (see related figures in Chaps. 8 and 9). Clearly, this reflects the "heavy industry-oriented development" strategy of the period rather than Hoffman's Law and is a result of investment policy that prioritizes the heavy industry sector, partially for the purpose of strengthening national defense.

Table 1.4 Changes in employment structure (1952–2000) (%)

Year	Primary	Secondary	Tertiary
1952	83.5	7.4	9.1
1957	81.2	9.0	9.8
1962	82.1	7.9	9.9
1965	81.6	8.4	10.0
1970	80.8	10.2	9.0
1975	77.2	13.5	9.3
1978	70.5	17.3	12.2
1980	68.7	18.2	13.1
1985	62.4	20.8	16.8
1990	60.1	21.4	18.5
1995	52.2	23.0	24.8
2000	50.0	22.5	27.5

Source Author's calculations based on Compendium (2005)

1.2.2 Changes in the Employment Structure

As the industrial structure changes, the employment structure also changes naturally, as shown in Table 1.4. The table also shows that most of the labor force remained in the primary industry (i.e., in rural areas during the Mao era). It was not until 2000 that the labor force ratio of the primary sector declined below 50%. However, the employment ratios of the secondary and tertiary industries are almost the same. Given that the output ratios of the two industries are not significantly different, their GDP productivities are largely the same, greatly surpassing the productivity of the primary industry. Basically, a large amount of labor was maintained in rural areas. Consequently, labor-dependent agricultural production with low productivity was developed during this era (see Chap. 5). Clearly, the Chinese countryside can be considered to have been overflowing with surplus labor in the Mao era, still remaining in a stage long before the so-called "Lewisian turning-point," which is popular among the development economists.

1.2.3 Changes in the Regional Structure

The regional disparity measured in per capita income has attracted attention as a major problem in post-reform China. However, this disparity existed even in the Mao era. China's regions can be roughly divided into coastal and inland regions, which can be further divided into eastern (coastal), central, and western regions. Even before the founding of the country, the coastal areas had many plains, flourished with international interactions. And as discussed in Chap. 9, they were relatively developed

based on the manufacturing industry, mainly the light industry, but the inland areas were more economically backward. Mao Zedong argued in his speech "On the Ten Great Relationships" that 70% of the industry was in the coastal areas, while only 30% in the inland areas and the inland industry should be greatly developed to balance the industrial development. Nevertheless, he proposed a regional balance theory as he believed that the coastal industry has potential and thus should be actively developed to support the inland industry.

In the 1960s, when the "Third Front construction" policy (to be discussed later) was proposed from the national defense standpoint, the emphasis on construction shifted to inland areas, rather than to coastal ones (see Chaps. 8 and 11). Further, the regional disparity among provinces in China, as measured by per capita income, has been increasing. According to Kato Hiroyuki and Chen Kuanghui, this can be largely explained by differences in the industrialization level (Kato & Chen, 2002, p. 48). Basically, the regional structure of the coastal areas, where industrialization had progressed, leading to relatively higher per capita income even before the founding of the PRC, remained basically unchanged during the entire era covered, unlike the lagging inland areas.

1.2.4 Changes in the Growth Structure

According to Hollis Chenery and his colleagues, the standard pattern of growth in the development process is a shift from labor led to capital led and then to a productivity (technology) led (Chenery et al., 1986). When total factor productivity (TFP), which is regarded as a proxy indicator of technological progress, contributes more than 50% to growth, this type of growth is called "intensive." However, when production factor (capital and labor) contribution to growth exceeds 50%, this type of growth is called "extensive." In the standard development process, an economy generally shifts from extensive to intensive growth.

Young (1995) and Krugman (1994), among others, criticized the economic growth of East Asian countries, which were praised as the "East Asian Miracle" by the World Bank, for adopting Soviet-style growth policies that still depend heavily on capital. This argument sparked an alarm in China; Zhang (2002), for example, alleged that China's economic growth also followed the same pattern as in the former Soviet Union.

Several researchers have examined how China's growth structure and TFP have changed from the Mao era to the present day, reaching roughly similar conclusions. The most common approach is using the Solow-type growth model to determine the total factor productivity as a residual and to calculate the percentage of growth rate that contributed to growth by capital, labor, and TFP. In general, the official statistics of the GDP growth are used for the growth rate, and the number of workers is used for the labor force. However, different conclusions can be reached depending on the estimation of the capital stock, the production function applied, and what is added to the decomposition of the growth rate, other than capital, labor, and TFP.

Table 1.5 Economic growth and total factor productivity: annual average growth rates (%)

Period	GDP	Fixed capital	Labor	Human capital	TFP
1952–1957	6.5	1.9	1.2	1.7	4.7
1957–1965	2.4	5.2	1.5	2.1	−1.0
1965–1978	4.9	7.7	2.4	3.1	−0.2
1952–1978	4.4	5.8	1.9	2.5	0.5
1978–2005	9.5	9.6	1.9	2.7	3.8

Sources Perkins and Rawski (2008), p. 837, Table 21.1
Note Labor is the labor force at 16–65 years old; human capital is the labor force weighted by educational levels

Chow (1993) spearheaded this debate. He used official statistics to estimate the aggregate Cobb–Douglas-type production function for the period since 1952, with several alternative cases for the initial amount of capital. He concluded that no technological progress occurred during 1952–1980, that is, during the Mao era. Dwight Perkins and Thomas Rawski conducted a decomposition analysis of growth from 1952 to 2005 using a Cobb–Douglas-type production function with fixed capital, labor, and human capital as the factors of production. They found that the growth rate of TFP during the Mao era (1952–1978) was only 0.5%, whereas after the reform and opening-up policy (1978–2005), it rose to 3.8% (Perkins & Rawski, 2008). However, the highest contribution of capital to growth has been consistent since the pre-reform era (see Table 1.5).

Chinese researchers have also paid attention to this issue. For example, Wang Xiaolu and his colleagues applied Lucas's new growth theory, regressed the growth rate on physical capital and human capital, and used the residual as TFP, explaining its content as control variables (e.g., marketization, urbanization, dependence on foreign capital, and dependence on trade). They found that, in the 1953–1978 period, capital was the main source of growth, and its contribution combined with labor to growth was 72.5%. In the 1979–1988 period, labor was the main source of growth, and its contribution to the growth of factors of production combined with capital was 71.4%. In any case, the contribution of TFP to growth is less than 30% (Wang et al., 2009).

Jin Tao and Tao Xinyu considered physical capital, labor, human capital (proxied by expenditures on science and technology), and the following five factors, i.e., urbanization rate, degree of openness to the outside world, industrial structure (ratio of tertiary industry to secondary industry), financial structure (ratio of loans to gross industrial product), government leadership (ratio of fiscal revenue to GDP), and non-state ownership as components of TFP, then regressing these factors on GDP per capita for the pre-reform period (i.e., 1952–1981). They found that only two variables, specifically physical capital and industrial structure, were significant (Jin & Tao, 2015). Meanwhile, when the observation period was extended to 1952–2012, most of the variables became significant. This suggests that TFP, as a proxy for technological progress, was not effective during the Mao era and began to have

an effect only after the reform and opening-up policies started. However, capital remained the main driver of growth, even during the post-reform period.

Certainly, these studies did not provide definitive conclusions about the productivity of the Mao era. This is because, as noted previously, many questions have been raised about the statistics of the era, including GDP. Much debate has been going on about particularly the estimation of capital. Nevertheless, we cannot deny that the growth of the economy during the era concerned was extensive, relying on inputs of factors of production; however, the contribution of technological progress as expressed in TFP was small. Growth at that time was largely capital dependent. Moreover, this trend continued even during the post-reform period. Apparently, behind this lies the basic characteristic of Chinese industrialization that remained as the underlying current even after the reform and opening-up, namely, the industrialization of state-owned enterprises as a key.

1.2.5 Price Fluctuations and Economic Changes

Since the late 1953, markets had been eliminated in China and they could not play an active role except in rural fairs (*jishi*). These markets were closed for a particular period in certain areas. Therefore, provided that the official statistics were used, prices were strictly controlled during this era of the planned system, no inflation occurred, and the prices of consumer goods were kept low to support the low income of peasants and low wages of urban workers. However, in the socialist planned economy, the economy was in a state of what János Kornai called a "shortage economy" (where demand generally exceeded supply). Hence, there was invisible, or the so-called, "repressed inflation," which existed as rationed tickets and black markets. Although the scale of the shortage and/or illegal markets is difficult to estimate, it is almost certain that China did not have an "underground economy" on such a scale as was popular in the former Soviet Union.[4]

Conversely, the economic fluctuations during the Mao era were extremely large because of the major upheavals experienced during the GLF and CR. Based on the coefficients of variation (standard deviation/average), the coefficients of the Mao era were much larger than those of the post-reform era, both in terms of GDP per capita and annual growth rate. In particular, tremendous fluctuations during the GLF (Fig. 1.1) demonstrate how the economy was washed away by large waves during the Mao era (see Table 1.6).

1.2.6 Infrastructure Construction

Taking water supply, the total length of railways, and the total length of public roads as quantitative indicators of infrastructure construction, we can observe that the

Table 1.6 Trend of the coefficients of GDP variation

	GDP per capita	Annual rate of growth
1952–1957	0.054	0.058
1958–1965	0.143	0.153
1966–1977	0.071	0.072
1952–1977	0.092	0.097
1978–2008	0.026	0.025

Source Author's calculations based on Compendium (2005)

growth rate during the Mao era was higher than that after the reform and opening-up. Water supply in 1975 was 13.5 times greater than that in 1952, while in 2000, it was only six times greater than that in 1978. In the case of the total length of railways and public roads, the former was 2.1 and 6.2 times greater, while the latter was only 1.3 and 1.6 times greater. Clearly, the basic agricultural infrastructure, such as irrigation and flood control, was created under the Mao regime (see Chap. 6). Basically, infrastructure construction progressed at a considerable speed during this period, leading to the post-reform economic development.

1.2.7 Medical Care and Education

Let us consider the number of doctors and hospital beds per 100,000 population as quantitative indicators of the level of medical care and enrollment and graduation rates of primary school students, and the number of students in higher education institutions (mainly universities) per 100,000 population as indicators of the educational level of the population (see Table 1.7).

The following conclusions can be drawn from this table. First, the number of hospital beds increased rapidly during the Mao era, but although the number of doctors increased after the PRC was founded, it declined relatively during the CR and then increased again after the new policy of reform and opening-up started. This is due to the disruption of university education during the CR and the shortage of doctors.

Second, the school enrollment rate of primary school students increased remarkably after 1949 and reached the late 90% in the latter half of the CR, but it stagnated for a while in the post-reform era. This is also reflected in the number of primary school graduates and can be considered a reflection of the fact that, following the start of the new reform policy along with the booming economy, parents in rural areas used their primary school children as a necessary labor force to support their families. Therefore, the dropout rate of primary school students increased over time.

Third, the situation of students entering universities is completely different. During the CR, universities were closed, and university entrance examinations were suspended, so the proportion of university students in the population dropped significantly. In the latter half of the CR, universities were reopened, and the number of

Table 1.7 Development of basic medical care and education of primary schools

	Number of doctors	Number of hospital beds	Percentage of school-age children enrolled	Number of graduates of primary schools	Number of students enrollment by regular institutions of higher education
	Per 10,000 population	Per 10,000 population	%	10,000 persons	Per 10,000 population
1952	74	28	49.2	149	33.2
1957	81	46	61.7	498	68.2
1962	102	103	56.1	559	123.3
1965	105	106	84.7	667.6	92.9
1970	85	133		1652.5	5.8
1975	95	173	96.8	1999.4	54.2
1978	108	193	95.5	2287.9	88.9
1985	136	214	95.3	1999.9	160.9
1990	156	232	97.4	1863.1	180.4
1995	162	239	98.5	1961.5	239.9
2000	169	238	99.1	2419.2	438.8

Source Author's calculations based on Compendium (2005)

university students increased slightly. Nevertheless, after the post-reform era began, the rate of university enrollment and the number of universities increased drastically.

Hence, the characteristics of the level of medical care and education during the Mao era became clear. Although great achievements in basic medical care and education were observed, there were delays in higher education and advanced medical care. In summary, medical care and education in this period showed progress in terms of quantity, but they were inferior in terms of quality. This is because medical care and education were largely dependent on the educational policies of the time and political attitudes behind them. Such attitudes are typified by the priority given to medical care that served the masses and the strengthening of political education for intellectuals that repeated often under Mao's initiative.

1.2.8 Trade Dependence

Finally, let us look at the movement of trade dependence (total imports and exports/GDP) during the Mao era: trade dependence ratio, which was 9.5% in 1952, did not increase much thereafter, falling to 5% in 1970 during the CR and recovering to 9.7% in 1978 immediately after the new policy started. Moreover, during that

period, trade dependence never exceeded 10%. This had much to do with the fact that China's foreign trade during the period concerned was biased toward Eastern countries, and Mao Zedong stressed the importance of the self-reliance policy. However, after the reform and opening-up, China's foreign trade increased drastically, and the trade dependence ratio rose to 22.9% in 1985 and 39.5% in 2000.

1.3 Mechanisms of Growth and Structural Changes

On what model or strategy were the policies based and led to this pattern of growth and structural changes in the Mao era? Mao Zedong and other policy makers of his time probably based their policies on, at least, the following four models or basic strategies—of course, within the broad framework of the socialist planned economic system, specifically the system of public ownership and resource allocation by planning. These were (1) the Preobrazhensky model (hereinafter called P-model), (2) the so-called heavy industry-oriented development model derived from the P-model, (3) the closed (self-sufficiency) model that was also indirectly based on the P-model and the self-reliance policies for overcoming deficiencies derived from the above model, and (4) the politics-in-command (*zhengzhi guashuai*) model, which was unrelated to the P-model but Mao emphasized throughout his life, and the historical view of class struggle, which is closely related to the model of political priority. In the following section, we briefly summarize the substance of these models.

1.3.1 Preobrazhensky Model

In the Soviet Union, the first socialist regime on earth, the "Socialist Industrialization Debate" was fought fiercely between 1924 and 1927 over how industrialization should be promoted in a newly born socialist state. One of the Trotskyist theorists, Evgeny Preobrazhensky, first advocated the development of heavy industry (producer goods industry) and the necessity of transferring funds from agriculture to industry through price manipulation to make this possible. However, L.M. SP-hanin argued that agriculture should be developed first, and then foreign currency should be earned by exporting agricultural goods to import manufactured goods. Politically, Trotsky was defeated in a harsh power struggle with Stalin and was exiled, along with his colleagues. Preobrazhensky was banished to Kazakhstan, while Trotsky was finally assassinated in Mexico. After consolidating his power, Stalin changed his stance in promoting industrialization and accelerated the "agricultural collectivization drive from above," as well as the P-model of prioritizing heavy industry.

Preobrazhensky roughly argued in the socialist industrialization debate as follows: Advanced capitalist countries could acquire funds for industrialization by owning and expropriating colonies, but the socialist Soviet Union could not do so. However, the Soviet Union has vast "rural colonies" within its borders and can transfer funds

to the government (industrial sector). As there would be a strong resistance from the peasants against taking away their food and other resources through taxation and requisition, it would be easier and better to transfer value from rural areas to the government by manipulating commodity prices. As the government can set all prices in a socialist planned economy, it can also transfer funds by deliberately undercutting the price of agricultural products purchased by the government and deliberately overcutting the prices of productive goods purchased by peasants[5] (Preobrazhensky, 1967). To ensure that such a mechanism works well, the peasants should not be given the right to decide on their production and sales of products. Therefore, agricultural collectivization is an indispensable institutional precondition. In fact, in an attempt to adopt this model, Stalin forcefully promoted the "eradication of kulaks (rich peasants)" and the policy of agricultural collectivization, despite their fierce resistance since the end of the 1920s.

Despite the different methods of collectivization, Mao implemented a similar model in China in the early 1950s. He carried out the "unified purchase, unified sale (*tonggou tongxiao*)" and agricultural collectivization policies wherein private merchants were expelled from the countryside and the state monopolized the right to purchase, sell, and set prices for the three major agricultural products: food grains, cotton and oil crops (see Chap. 4). However, there is not necessarily a unanimous view on whether and how much there was a shear price difference between agricultural and industrial products in China and how much this contributed to industrialization finances.

1.3.2 Heavy Industry-Oriented Development Model

In the Preobrazhensky School in the Soviet socialist industrialization debate, Grigory Fel'dman advocated the strategy for allocating investment preferentially to heavy industries in a socialist planned economy to make the overall economy grow faster in the long run. Later, this strategy was formulated by Evsey Domar (known as the Fel'dman-Domar model; see Nakagane (2012) for more details). They proved that the higher the ratio of investment in the producer goods sector out of the total investment (investment allocation ratio), that is, the more investment is allocated to the producer goods sector, the more consumer goods can be produced eventually. However, the output of the consumer goods sector is initially lower than that of a policy with a lower investment allocation ratio.

However, at least the following three conditions were implicitly assumed for this model to be effective. (1) There would be no imports from abroad, (2) the productivity of investment and capital would remain constant, and (3) the government could make the people (consumers) patient with a limited level of consumer goods until those goods begin to be supplied enough. The original Fel'dman-Domar model was constructed in two industrial sectors: producer goods and consumer goods industries.

Certainly, the first assumption applies to China during the Mao era, as China was effectively a closed economy at that time, as we have noted previously. The third

premise is also valid. Rationing was imposed on peasants and urban residents, and the state restricted the supply of agricultural products, clothing, and other industrial consumer goods. However, the second assumption of constant productivity of investment is not necessarily true (see Chap. 8). This may be due to a planned economy because capital was not priced and consequently was not used effectively. Therefore, there was a tendency to accumulate capital (investment) in the industrial sector to the extent possible to fulfill the goals.

Regardless of the theoretical basis, however, this model of development that prioritized heavy industry was indispensable to the newly born revolutionary regime. This is because the defense of the regime and the nation was the most important issue for them. Hence, they had to increase their national defense capability, which in turn requires the heavy chemical industry, including particularly steel (see Chap. 8). During the Mao era, China was first threatened by the United States in the 1950s and then by the Soviet Union, alongside the United States, in the 1960s. Consequently, it never relinquished its heavy industry-oriented development strategy, although it emphasized the importance of agriculture and the light industry (see Chap. 2).

1.3.3 Self-reliance Model

As mentioned previously, the premise of the P-model was a closed economy, and the Soviet Union in the 1920s was surrounded by capitalist (imperialist, in their terminology) countries and was effectively a closed economy, making Shanin's model less effective in terms of the international environment. Similarly, Mao's China in the 1950s received Soviet aid and conducted trade mainly with the Soviet bloc, but its dependence on trade was remarkably low, and the country was actually self-sufficient. Moreover, exposed to military threats from abroad, especially with the intensification of the Sino-Soviet confrontation from the end of the 1950s, China leaned even more toward a policy of self-reliance to ensure its self-sufficiency.

The major difference between Mao's self-reliance and that of the Soviet Union was that he promoted a policy of self-sufficiency even in all domestic regions. The "Third Front construction" policy wherein factories were relocated from the coastal to the inland regions was also in line with this manner of thinking, as was the policy of "taking grain as the key link" (*yiliang weigang*), which was emphasized from the 1960s onward. This policy reflects the concept of guerrilla warfare developed and implemented by Mao during the revolutionary struggles. If each region had an independent, comprehensive, and well-organized economic system, even if the United States or the Soviet Union invaded China, some regions might be occupied, but other regions would be able to survive and continue to fight the invasion. In this situation, the most important goods are food grains.

1.3.4 Politics-in-Command Model

As discussed in more detail in the next chapter, Mao had no rational economics in his thinking: what he has in his mind was political economics with its discipline of "politics in command" (*zhengzhi guashuai*). The basis of this discipline was, in a sense, "non-orthodox" Marxism and historical materialism, which held that political struggles, or actually class struggles, could motivate people, consequently shaping the economic system and generating productive forces. Repeated political and ideological education movements, large-scale socialist transformation movements (e.g., agricultural collectivization), water conservancy construction projects by mass mobilization of peasants (see Chap. 6), and rural industrialization movements (see Chap. 10), plus the "Learn from Dazhai in Agriculture" and "Industry learns from Daqing" movements that celebrated spiritual uplift and self-reliance, all did so based on Mao Zedong's notions.

These four models provide a basic framework for the economy of the Mao era, which may explain, to some extent, the characteristics of the economic performance of that period. Initially, the rate of industrialization of the economy especially that of the heavy and chemical industries, was consciously and systematically raised by the model of prioritizing heavy industry development. Therefore, severe economic fluctuations were caused by Mao's politics-in-command model, ignoring fundamental economic principles. Meanwhile, whether the relatively low growth, even when it did occur, was due to the inappropriate functioning of the P-model or to problems regarding the productivity of capital, which was originally the premise of this model, cannot be determined. In contrast, the fact that the standard of living of peasants and urban workers was kept low for a long period of time seems to be a natural result derived from this model as well as the heavy industry-oriented development model. It is not surprising that the self-reliance model has reduced China's dependence on external economies. However, the policy of increasing regional self-sufficiency has moved regional disparities in the direction of widening, rather than narrowing, as discussed in the previous section.

1.4 Institutional and Policy Context

To understand the major theses in the following chapters, we will briefly summarize, albeit very roughly, how the economic system and policies of the Mao era developed from the founding of the nation in 1949 until the start of the reform and opening-up policy in 1978.

1.4.1 New Democracy Period (1949–1953)

The main economic and institutional policies that characterized this period were the nationalization of foreign and Kuomintang (KMT) capital, the seizure and control of the private economic sectors, land reform and the mutual-aid movement in the countryside, and the creation of a planned economic mechanism as well as the launch of the First Five-Year Plan.

First, the post-founding Communist government worked to eliminate the powers of the KMT government in various fields such as industry, transportation, commerce, and finance. In addition to the 2,400 national and local banks run by the KMT government, the communists seized and took control of major private banks, nationalized 2,858 industrial enterprises with 1.29 million employees, and nationalized railroads, ships, and airlines in the area of transportation. Simultaneously, the government launched the "Three Anti's and Five Anti's" movements, which were more of a political liquidation than an economic policy, and proceeded to destroy the old regime and purge personnel in the government and private sectors of the KMT era (see Chap. 3 for details).

Land reform in rural areas had already been carried out before 1949 in the liberated areas controlled by the Communist Party, but after the new China was established, similar land reforms were carried out in the newly liberated areas, forcibly transferring land, agricultural capital such as livestock from the relatively rich peasant class identified as landlords and rich peasants to the poor peasants and farm laborers. Officially, it was announced that the land reform was carried out "in an orderly fashion," denying a conventional wisdom that it was practiced often so violently that many landlords were killed, sometimes by "people's trials" (Wu ed. 2009: 93). In reality, however, a huge number of landlords and rich peasants (classified as such) were killed during this movement.[6]

As a result of the land reform, how much land was handed over from landlords and rich peasants to poor peasants and hired workers? According to published statistics, before the land reform, 14.3% of the land was occupied by poor and farm laborers, 30.9% by middle peasants, 13.7% by rich peasants, and 38.3% by landlords. After the land reform, however, the land of rich peasants decreased to 6.4%, while that of landlords decreased to only 2.2%, indicating that most of the land was taken away from the landlords (Wu ed. 2009: 95).[7]

When the land reform movement ended, the movement of mutual aid teams (MATs), which are traditional organizations for labor exchange in rural areas, began in rural China, and attempts were made to spread the MATs throughout the country. This was the initial stage of the full-fledged agricultural collectivization.

Third, the planned economic system was established, and the five-year plan started. As a new socialist country that had just been founded, China was trying to learn from the Soviet Union in many respects. At that time, the prestige of the Soviet Union and Stalin as the victors of World War II was extremely high, and China introduced a system similar to the Soviet Union's planned economic system. Specifically, the National Bureau of Statistics was established in 1951 and the National

Planning Commission in November 1952, and they were involved in formulating the First Five-Year Plan, which was to begin the following year. The centerpiece of this five-year plan was the introduction of 156 items of economic and technical assistance from the Soviet Union (see Chap. 8). The State Economic Commission was also created to administer annual plans. At the end of the same year, as will be discussed in Chap. 7, a banking management system was organized under the unified leadership of the People's Bank of China, foreign trade was placed under direct government supervision, and the right to manage foreign currencies was vested in the state.

1.4.2 The Period of Socialist Transformations (1953–1957)

Before 1953, the new democratic stage was thought to continue for a long time, and real socialization would be a distant prospect. But in mid-1953 when the economic recovery of 1949–52 was well under way and the Korean War, which had broken out in June 1950 and China had also been involved in, was coming to a ceasefire, at a meeting of the Central Political Bureau of the CPC of June 1953, Mao Zedong suddenly announced the "General Line of the transition period" to accelerate industrialization and, to this end, launched the "socialist transformation" policy to transform private ownership both in rural and urban areas. More specifically, this meant the collectivization of agriculture in the countryside, the transformation of private enterprises into joint public and private ownership in the cities, and the cooperativization of handicraft industries.

In October 1953, a policy was formulated for the spread of "Elementary Producer Cooperatives" in which land and agricultural capital remained privately owned, but production was to be carried out on a fully cooperative basis. Mao Zedong tried to accelerate collectivization by criticizing Deng Zihui, the head of the Party's Rural Work Department, who had dissolved many poorly organized cooperatives. In July 1955, Mao delivered a speech entitled "On the problem of agricultural collectivization," which triggered a tremendous "tidal wave of collectivization" throughout the country, far beyond his expectations. By the end of 1956, almost all the farmers had joined "Advanced Agricultural Producer Collectives" in which both land and agricultural capital were collectively owned and the scale of the cooperatives was several times larger than that of the Elementary Cooperatives. Fueled by this movement, the transformation of private urban enterprises into joint public–private ownership and the cooperativization of handicrafts also progressed rapidly.

Another important movement in economic policy and institutions during this period was Mao's speech, "On Ten Great Relationships," delivered at an enlarged meeting of the Political Bureau in April 1956 (see Chap. 2). It discusses ten economic and political relationships, including the relationships between heavy and light industries, between coastal and inland industries, and between economic and national defense construction. It is said to be a starting point from which China searched for its own way different from the Soviet Union's, stimulated by the shock of criticism of Stalin in the 20th Congress of the USSR Communist Party. It is also an important

form of speech that forms the basis of subsequent economic policies. For example, the doctrine of "agriculture as the key link (*nongye jichu*)" that was emphasized after the GLF and the decentralization of state-owned enterprises that was implemented in 1957 can be said to be based on this speech. In addition, under the policy of stimulating the "two positives" between the central and local governments proposed in the Ten Great Relationships, the large-scale transfer of central enterprises to the local governments, i.e., regional decentralization, was promoted (see Chap. 8).

1.4.3 The Great Leap Farward Period (1958–1961)

In the formulation of the Second Five-Year Plan (1958–1962), Mao Zedong, who had grown confident in the progress of agricultural collectivization, harshly criticized pragmatic leaders such as Zhou Enlai and Chen Yun, who were trying to adopt a realistic policy relying on the principle of "anti-rash advance (*fanmaojin*)" (opposition to the principle of "hasty progress"). At the CCP's Nanning Conference in January 1958, Zhou and his colleagues admitted the "error" of their "anti-rash advance" stance, subsequently forced to criticize themselves before Mao. In November 1957, top leaders of the socialist countries gathered in Moscow to celebrate the 40th anniversary of the Russian Revolution, where Khrushchev, the first secretary of the Communist Party of the Soviet Union, expressed a grandiose idea that the USSR would "catch up with and overtake the United States" in 15 years. Simultaneously, Mao Zedong, who was leading the Chinese delegation, launched the idea that China would catch up with and overtake Britain in 15 years. Subsequently, this concept itself made a "great leap forward" more specifically, developed into an even more ambitious plan to catch up with Britain in seven years in terms of steel production, and to catch up with the United States in 15 years.

These movements spread from Beijing to provinces, then to the grassroots levels, inducing each government department and region to set exaggerated targets and to send exaggerated reports to the center that grossly misrepresented their achievements.

In August 1958, when the Party's Beidaihe Conference was held to merge several Advanced Producer Collectives to form a huge rural community entitled People's Commune with a population of tens of thousands. The Commune was formed under the slogan "combine industry, agriculture, commerce, schools, and militia (*gong, nong, shang, xue, bing*)," "integrate government administration with commune management (*zhengshe heyi*)" and "one township, one commune (*yixiang yishe*)." The People's Commune was thus established nation-wide incredibly only in a month, in which almost all rural residents joined, whether actively or passively. This could be called another "Great Leap Forward" movement. Many communal dining halls were set up under the Communes, and this illusion and misunderstanding that a communist society was coming to arrive soon, where people could eat as much as they wanted for free (just in accordance with the communist principle: distribution according to need). In addition, the belief that food had been sufficiently produced as a result of the GLF movement led to the transfer of a large amount of agricultural labor to the

Table 1.8 Various estimates of non-normal deaths during the Great Leap Forward

Name of estimator	Year of publication	Period	Number of non-normal deaths (10,000)
Wang Weizhi[a]	1981	1959–61	3300–3500
Banister	1984, 1987	1958–61	2887
Coale	1985	1958–61	2697
Jiang Zhenghu	1986	1959–61	1700
Jin Hui	1993	1959–61	4060
Ding Shu	1996	1958–62	Below 3500
Li Chengrui	1997	1959–61	2200
Cao Shuji	2005	1958–62	3246
Ynag Jisheng	2008	1958–62	3600
Lin Yunhui	2009	1958–62	3000
Li Che	2012	1958–62	3457
Diköter	2015	–	4500

Source Added by the author based on Li (2012) Table 1. The original sources are omitted for brevity
Note Except for estimates by authors who doubt the occurrence of the great hunger and famines
[a] Recited from Yang (2008)

industrial sector, thereby mini-blast or backyard furnaces were constructed all over the country, and a huge amount of labor force estimated to be 90 million people was injected into the steel production campaigns.

However, because of these excessive and poorly implemented institutional reforms and reckless policies, the economy fell into turmoil and the growth rate declined drastically, finally plummeted down to less than 25% even in official statistics (see Fig. 1.1). It is difficult to estimate exactly how many people died of starvation (non-normal deaths) nationwide from 1958 to 1962, and there are various estimates of deaths ranging from 17 to 45 million (see Table 1.8),[8] but it is likely to have reached at least about 30 million as the average of those estimates implies. The number of people who died of starvation is said to have been particularly high in Sichuan and Anhui Provinces, followed by Henan and Hunan Provinces.

1.4.4 Adjustment Period (1962–1965)

To contain the chaos caused by the GLF and, above all, to restore agricultural production, Liu Shaoqi and Deng Xiaoping took the lead in implementing more realistic policies known as the adjustment, such as agricultural de-collectivization, e.g., land management under contract with individual peasants. Important state-owned enterprises were centralized again on the basis of the recognition that the decentralization of the economy promoted by Mao Zedong was one of the factors leading to economic chaos.

On the other hand, Mao, who sensed the danger of a "capitalist revival" brought about by pragmatic policies and the resulting loosening of society or the retreat of the People's Commune system, launched a socialist education campaign, in which he excessively emphasized the importance of class struggle, and finally came into conflict with Liu Shaoqi who actually led this campaign. Simultaneously, he developed the "Learn from Dazhai" movement, claiming that a poor production brigade located at Dazhai village in Shanxi Province had recovered from the disaster through self-reliance and was leading the members to collective production without relying on material incetives. He called on the whole country to learn from the spirit and style of this model brigade, so that Dazhai became a sacred village in the socialist countryside visited by many peasants from all over the country.

Another important policy put forward by the government during this period was "Third Front construction" (see Chaps. 8 and 11). Fearing that the United States and the Soviet Union might launch military attacks on China, Mao Zedong sought to decentralize the placement of factories and promote regional self-sufficiency from a national defense perspective by relocating factories from coastal to inland areas and investing in industry mainly in inland areas.

1.4.5 The Cultural Revolution Period (1966–1976)

The time had originally come for the Third Five-Year Plan (1966–1970) to begin, but Mao Zedong launched the CR to overthrow Liu Shaoqi, Deng Xiaoping, and as a result, China's politics and society fell into unprecedented chaos. The Party and administrative organs ceased to function for a time, the planning mechanism stopped working, and the economy suffered a major blow. However, as we saw in Sect. 1.1, it did not have the same impact as the GLF, and the Chinese economy grew to a certain extent despite the CR turmoil.

The following economic institutions were newly created during the CR: first, the development of enterprises run by the people's communes, as well as production brigades and local industries at the county level (see Chap. 10 for details). The second is the decentralization of the economy. Regional enterprises that had been recentralized to the center during the adjustment period were re-decentralized between 1969 and 1970. Large enterprises, such as the Daqing Oil Field and Changchun Automobile Factory, were also sent to the provinces. As a result, there remained only 500 central enterprises, a decrease of 86.5% from 1965, and their industrial output value accounted for only 8% of that of state-owned industrial enterprises (Wu ed. 2009: 529). Further, basic construction investment began to contract out to localities, and this decentralization contributed to the development of local industries, as described above.

Regarding economic policy, the "Learn from Dazhai" movement expanded further, moreover, learning from Dazhai some rural areas abolished private plots, banned family side jobs, and restricted rural free markets. Meanwhile, in the later stages of the CR, Deng Xiaoping revived and replaced by Zhou Enlai at the helm of the economy. As relations with Japan and other Western capitalist countries improved, the policy of importing industrial plants from overseas was adopted, and this policy was implemented in the subsequent opening-up era (see Chap. 8). Jiang Qing and the Gang of Four, probably in fact Mao himself, too, insisted on the continuation of the politics-in-command CR dogma and tried to oppose the pragmatic economic strategy pursued by Zhou Enlai and Deng Xiaoping, who strove to reconstruct the economy that had been damaged by the CR. However, their anti-reform attitude and policies were nothing but an ephemeral boom of the last stage of CR politics, which disappeared without a trace following Mao's death and the downfall of the Gang of Four in October 1976.

Conclusion

With the establishment of the restored power of Deng Xiaoping at the Party's Third Plenum of the Eighth Congress in December 1978, China embarked on a new economic policy of reform and opening-up and transitioned to a marketization and privatization system that was actually capitalist. The People's Commune, which Mao had clung deeply, was demolished, and the individual farming system was revived. Special Economic Zones were created to actively attract foreign capital and expand foreign trade. These paths were created under the leadership of Deng, who was known in China as the "general architect of reforms." However, he did not precisely set the direction of reform from the beginning of this era, but transformed the system by selecting policies in a gradualist and pragmatic manner.

Naughton (1995) declares that the partial introduction of the market mechanism resulted in the opening of a hole in the dike of planning, which gradually became increasingly large, leading to the collapse of the entire planning system. Basically, the market created by itself the systemic transition path as a natural process, rather than to say that a political leader called Deng Xiaoping drew up an elaborate blueprint for the entire systemic reform. However, it was exactly Deng who created the impetus for the transition and certainly regulated the marketization trend from time to time. In particular, his 1991 "Southern Tour" speech had a profound impact on the explosive marketization of the economy that began in 1992. In this speech, he addressed "Capitalism has also a plan, socialism has a market, too" and hence developed the theory of the "socialist market economy." Thus, a type of state capitalism or developmental dictatorship was established wherein the political system remained a one-party dictatorship while the economy was market-oriented. Additionally, people began to become united for profit and money. Around this time, ordinary people began to feel happy and/or sad about the daily price movements of the newly introduced stock markets. This wave of marketization spread to various sectors of the society,

and consumer prices, which were controlled during the Mao era, were largely liberalized. Further, the rural labor force became active, and private enterprises sprung up like mushrooms after a rain.

With such a historical trend, we cannot help but wonder what the Mao era was all about. Was it merely an experiment in a failed socialist planned economy? Was it just an era of madness, driven by a singularly charismatic leader, Mao Zedong? Was it a period of futility that followed a circuitous route to capitalism? Or was it a time when China was preparing for the leap forward after the new era of reform and opening-up? Let us reconsider what China did during the Mao era and what significance this might have for post-reform China. The following chapters attempt to provide a tentative answer to these questions.

Notes

1. This section is based on the paper "Did the Chinese Economy Grow during the Mao Era?" presented at the 2020 Spring Meeting of the Japan Association for Asian Studies (in Japanese). I would like to express my gratitude to my co-author, Mitsunami Kohei, assistant professor at Teikyo University, for his cooperation.
2. His report at the Japan–China Academic Workshop on "Assessing Economic Institutions and Policies in the Mao Era" held at Toyo Bunko (Oriental Library) in February 2014. His institute (i.e., Unirule Institute of Economic Research in Beijing), which had been an influential base of reformist economists in China, had to close its door in 2019 due to obstinate political pressures by public authorities.
3. During the Mao era, foreign trade and capital inflows from abroad (e.g., aid and investment) were minimal. Hence, given the slower rate of consumption growth, the only growth factor remaining was domestic investment.
4. The rationale for this is that China was "young" in that social controls were tighter and its experience of a socialist-planned economy was shorter than that of the Soviet Union. Clearly, from many information sources, small-scale black markets for food grains existed even during the Mao era (e.g., rationed food coupons and other items). However, unlike in the former Soviet Union, Chinese urban workers did not work overtime using factory materials and machinery to sell the products in the black market.
5. When the price of industrial goods rises and that of agricultural products stagnates or falls, the difference between the two prices naturally widens, which is called a "price scissors" (*jiandaocha*).
6. Gao Wangling says that 3–5 million people lost their lives in the process of land reforms, the majority of whom were small and medium landowners and were beaten to death (Gao, 2013: 6). There are quite a few other sources that report the human sacrifices of landowners and those who were regarded as "landlords". See Song (ed.) (2019) for more details.
7. In fact, whether the landowners owned nearly 40% on average of the arable land before the land reform is unknown.
8. Most of the "non-normal deaths" are starvations, but they also include deaths from diseases caused by malnutrition or suicide due to despair.

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Chapter 2
Mao Zedong's Political Economics and Deng Xiaoping's Economics

Katsuji Nakagane

Abstract Often described as an "anti-economics" person, Mao Zedong caused the national economy to fall into chaos, such as the Great Leap Forward and Cultural Revolution. He thought that the economy was nothing but a means for his politics. Deng Xiaoping, on the other hand, succeeded in reconstructing the Chinese economy confused by Mao's politics by displaying his economic thinking. We first analyze Mao's "political economics", contrast it with Deng's economics, and finally evaluate Mao's political economy from today's perspective.

Introduction

Mao Zedong was a revolutionist, politician, and military strategist, but he had little knowledge on economics. Often described as an "anti-economics" person, Mao caused the national economy to fall into chaos, such as the Great Leap Forward (GLF) and Cultural Revolution (CR). Ultimately, he must, then, be called a "destroyer" and not a "constructor" in the sense of the management of the national economy. From this perspective, saying that he did not contribute anything to economic outcomes in his era may be natural, leaving only tremendous negative legacies to post-reform China. Following economist Lionel Robbins' definition of economics as "the science which studies human behavior as a relationship between ends and scarce means which have alternative uses," it is then doubtful that Mao—who was totally indifferent to the scarcity of resources, whether physical or human—had any sense of economics in his mind. In fact, Mao's works and speeches do not contain any words related to scarcity (e.g., efficiency, productivity, or (economic) effectiveness). A well-known slogan addressed during the GLF movement, which Mao promoted aggressively, was achieving "greater, faster, better, and more economical results" (*duo, kuai, hao, sheng*). However, he committed to only the first two words: "greater and faster." His

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"economics" clearly reflects "politics"; hence, Mao's "economics" involves a unique "political economics," and the economy was nothing but a means for his politics.

Comparing the economy in the Mao era with that in the subsequent Deng era, the difference in economic outcomes between these two eras is clearly reflected by the difference in the nature of their economics between two big political leaders. Hence, let us first analyze Mao's political economics, then compare it with Deng's economics, and finally evaluate Mao's political economy from today's perspective.[1]

2.1 Characteristics of Mao Zedong's Political Economics

Mao Zedong's political economics is outlined in his <<Reading notes on the *Soviet Union's Textbook of Political Economy*>> (Mao, 1974; hereinafter, Note). Based on this Note, let us summarize and analyze (a) his basic economic thought or philosophy, (b) the economic institutions he idealized, and (c) macroeconomic policies he attempted to implement in the Chinese economy. Hence, what are the features of the aspects that characterized the Chinese economy in his era?

2.1.1 Mao's Economic Thought and Philosophy

A word appearing repeatedly in Mao's Note is "contradiction" or "struggle." For example, he says "there is no movement without contradictions. The society moves and develops usually. The contradiction is a driving force even in the socialist era" (Note: 40). He continues to say that "equilibrium and disequilibrium are the two sides of contradictions; disequilibrium is absolute while equilibrium is relative. Otherwise, productive forces, production relationships, and superstructures cannot develop and will become solid—Contradictions and struggles are absolute, while unity, conformity, and solidarity are transitional, accordingly relative. Various equilibriums in the planning work are temporary, transitional, and conditional; therefore, they are relative. We cannot imagine that a certain equilibrium is not conditional but eternal" (ibid.: 78–79). Certainly, Mao's philosophy in "On Contradiction" is fundamental in his political economics.

While "economics of contradictions" sounds quite odd to us, practically everything on the earth is in motion if we examine it from a long (or ultra-long) perspective; hence, a stationary state is only temporary. The economic situation is not exceptional. It is moving by the minute so that although an economic plan is formulated after a long process of calculation of a huge amount of data, the plan thus made becomes inconsistent with reality when it is publicized. Hence, is it meaningless to set a plan? Overall, Mao recognized the effectiveness of plan setting. He says "(in socialist countries) as private proprietorship disappeared and planned economy can be organized, the objective laws of disequilibrium can be controlled and utilized to generate many relative and temporary equilibriums" (ibid.: 78). However, if disequilibrium

is regarded as absolute, planning, which is an art of equilibration, would be deemed as only temporary; hence, breaking plans and destruction of equilibrium planning (and praise for such acts) occurred during the Mao era. When Liu Shaoqi and Zhou Enlai strongly opposed any policy to make a hasty progress (*maojin*) in February 1956, Mao got mad and severely criticized their views of "anti-rash advance" at a conference in Nanning in January 1958 (see the previous chapter, Introduction). He further suggested that the pro-rash advance policy entitled "Great Leap Forward," was almost identical to intentionally creating contradictions and destructing equilibriums. Thus, historically unprecedented great famines and hunger struck the Chinese mainland. Simply and bluntly, the tragedy invited by the GLF was merely a product of Mao's "economics of contradictions."

In addition to "contradiction," another word often appearing in Mao's Note is "class." For instance, he says "transition to communism, of course, does not mean a process of one class being overturned by another, but it does not necessarily negate a social revolution, since replacement of one production relationship by another is a qualitative jump as well as a revolution" (ibid.: 42). Moreover, he notes that "even though the class disappears in the socialist society, a problem of 'vested interest groups' still remains during the development process" (ibid.: 43). He further argues that "although socialization of the capitalist industry and commerce has been completed, they (bourgeoisie named national capitalists) would launch a crazy counterattack on us if they get a chance. We repelled an attack by the Rightists in 1957, but they attacked us again in 1959 through their representatives within the Party. Our tactics toward the national capitalists is to draw them in and catch them in a trap" (ibid.: 45).[2]

Mao believed that any persons of any class must be counted on as "the people," provided that they obey the Party, or more specifically Mao himself, so that their contradictions with the present regime can be solved peacefully as "contradictions within the ranks of the people." However, when they are opposed to the Party and Mao, their conflicts with the present regime are to be treated as "antagonistic contradictions," and they must be oppressed by the regime fiercely.

After the GLF, particularly when the CR occurred, Mao began emphasizing a doctrine of "uninterrupted revolution" and urged to continue fighting the "reviving bourgeoisie," to the extent that he defeated even Liu Shaoqi, Chairman of the State and his sworn friend during the revolutionary days. A series of these acts are based on his peculiar view of class and originated from his philosophy of contradictions. It is he who addressed just before the death "Don't forget the class struggle."

2.1.2 Economic Institutions

Mao Zedong adhered to four economic institutions. The first is the incentive system. Mao criticized material incentives severely and particularly emphasized the roles of moral incentives, praising payments-in-kind instead of wages. This seems to reflect the beautiful memories he cherished during the revolutionary struggles until 1949.

For example, he said, "When we were in the base areas, we carried out the payment-in-kind system, but the people were healthy and never struggled for better treatment. After liberation, we innovated the wage system and evaluated workers by ranking, and many problems emerged. Until the initial stage of liberation, we continued living an egalitarian life, but we made efforts in our work, fought bravely, and relied on the revolutionary spirit, not on the material incentives at all. In the latter period of the second civil war, we happened to be defeated or to win victories, but we found that the victory or defeat in wars did not depend on how much material incentives were provided but on whether our political and military lines were aligned or not. These historical experiences are extremely significant when we try to solve any problems surrounding socialist constructions" (ibid.: 82–83).

The second is ownership. As a Marxist, Mao strictly adhered to public ownership, as he considered that only public ownership was fundamental for developing production. In his Note, he highlighted that "Taking away the political power by winning public opinion, then solving the ownership issue, and developing productive forces greatly—this is a general law" (ibid.: 47–48). Basically, he considers that for productive forces to be developed first, the superstructure must be transformed (seizure of the political power) followed by ownership (relinquishing private ownership, that is, establishing public ownership). This contradicts the logic of historical materialism. He strongly insisted on agricultural collectivization as he believed that relinquishing private land and capital ownership could enable large-scale production, leading to much higher productive capacities than under individual farming systems.

The third is regional decentralization. This idea is derived from his speech "On the Ten Great Relationships" (hereinafter TGR), as discussed in the Introduction. After that speech, in a meeting with the Central Political Bureau in April 1956, Mao asserted that China began departing from the Stalinist type of economic system adopted in the Soviet Union and started searching for economic policies appropriate for its own conditions. In that speech, he stressed the importance of "two positives," namely, the positivism of central and the regional economies. China relinquished a part of central state-owned enterprises (SOEs) to the hands of the regional governments (or joint management by both central and regional governments). The Introduction showed that regional decentralization was introduced and reinforced in 1969–1970, to the effect that almost all central SOEs were "sent down" to regional authorities.

This sort of regional decentralization was a natural policy in essence for a country with a vast area and a huge population like China. This had a significant impact on the subsequent Chinese economy. Most importantly, it created a similar industrial structure in every region, which, in turn, became one of the causes of harsh inter-regional competition. By the same token, it encouraged each region to be self-sufficient in association with the doctrine of self-reliance referred to below.

The fourth is the People's Commune system, wherein the three previous institutions are included substantially, and which Mao imagined as a utopia (see Chaps. 4 and 5). In his youth, Mao is said to have been deeply impressed by a movement to create "New Villages" driven by a Japanese novelist, Mushanokoji Saneatsu and also influenced by Kang Youwei's ideal of "Great Harmony" (*datong*), in which he dreamed of an egalitarian society that was free from private proprietorship and

any pecuniary motives. When he discovered a commune-like rural society in Henan Province in the summer of 1958, which was characterized by slogans such as "large in size and collective in nature" (*yida ergong*)," "combining industry, agriculture, commerce, schools, and militia" (*gong, nong, shang, xue, bing*), and "integrating government administration with commune management" (*zhengshe heyi*), he must have been preoccupied with the idea that a shortcut to a "communist society" was found and his fantasy was going to become a reality in the near future.[3] Mess halls (communal dining halls) were established in People's Communes, and any member could enjoy free meals. This was praised as the system had realized a part of the communist principles, i.e., "distribution according to needs."

However, reality was unforgiving. When the Great Famine (as covered in the Introduction after the GLF movement) occurred, the basis of the People's Commune system began to collapse in many areas, typically in Anhui Province, where the mess halls were closed or abolished, and the collective agricultural production system was retreated to the pre-commune stage, and even decollectivized so that individual farming systems were revived in certain villages. As people had to acquire grains at all costs to live, they depended on the activeness inherent to the individual farming system. They were not provided with enough food grains to eat even though they were given the dream of communism.

2.1.3 Macroeconomic Policies

The economic policies that Mao Zedong discussed in the Note and emphasized in his speech on the Ten Great Relationships are three. One concerns the industrial structure, the second is the accumulation rate (savings rate), and the third is related to technology.

Mao's "economic policy" on industrial structure can be summarized as the establishment of an appropriate balance among agriculture and the light and heavy industries, but ultimately prioritizing the heavy industry (as discussed in the Introduction). He criticized such a heavy industry-oriented policy as adopted by the Soviet Union, pointing out that they treated light industry lightly and in reality neglected agriculture. Mao stated the following:

> Giving priority to the development of production means is a common economic law for extended reproduction in any societies. A capitalist society cannot extend its reproduction without prioritizing the producer goods industry. During the Stalinist era, they especially emphasized heavy industry, consequently neglecting agriculture-----By developing agriculture and the light and heavy industries at a high speed simultaneously, we can develop the heavy industry rapidly and improve people's life moderately at the same time. Experiences of the Soviet Union and China prove that underdevelopment of agriculture and light industry is unfavorable for the development of heavy industry (ibid.: 72–73).

The theoretical and historical background of prioritizing the development of production means (or heavy industry) is discussed in Sect. 2.3 of the Introduction. As stressed in Chap. 8, this policy was originally intended to strengthen national

defense. What interested Mao most was how to protect the newly born nation as well as his own power. To achieve this objective, it was necessary to strengthen the military power. For this purpose, the production of bullets, canons, tanks, warships, and military planes was indispensable, which primarily required iron and steel. Therefore, the development of heavy industry, particularly steel production, is necessary. This simple and clear logic was the basis for his political economy. Agriculture and light industry were requisites, because keeping people's lives by securing their minimal living standards was vital before maintenance of the national defense. Additionally, the fact that the Soviet Union succeeded in defeating Nazi troops under the heavy industry-oriented policy—plus the authority that Stalin had established in the late 1940s among the socialist countries—made this policy become an absolute "economic law" for those countries to learn.

To obtain sufficient funds for heavy industries, cheap labor force and grains were required. Mao's policy of capital accumulation emerged in this regard. He says

> Developing agriculture and light industry and accumulating funds for the heavy industry are favorable for the people in the long-run—Lenin and Stalin had said that peasants had to pay tribute to the state during the period of socialist construction. A majority of our peasants are paying "tribute" actively while only 15% of rich middle peasants are unhappy and opposing the GLF and the People's Commune (ibid.: 110).

He continues,

> The share of accumulation in the national income was 27% in 1957, 36% in 1958, and 42% in 1959, and we will be able to accumulate at 30% or more in the future. The major issue is the overwhelming development of production, and only if we could increase production, we would face a selection either to extend the rate of accumulation or to improve the living of people (ibid.: 110).[4]

The above citations clearly demonstrate that from Mao's perspective, the accumulation itself was far more important than "the living of people" or their consumption. Minami Ryoshin named this policy "forced accumulation" (Minami, 1990). To implement these kinds of policies, peasants were required to pay "tribute" to the state. For this reason, China exiled merchants from the countryside, introduced a forceful grain procurement system in 1953, and decided to collectivize agriculture. This was done to enable the state to control everything about grain products, from production and sale to setting the prices. China introduced these policies in accordance with the Preobrazhensky model, as described in the Introduction.

The state procures food grains from peasants at government-set low prices, while simultaneously transferring the right to sell grains from individual peasants to collectives called Elementary Producer Cooperatives in the beginning, sell those grains to the cities, and then provide urban workers of SOEs who could live with low wages with cheap grains. Hence, the state could obtain more profits, which would then be stored in the national treasury. Thus, an interlinking and self-propagating mechanism among food grains, wages, profits, and budgets was created during the Mao era. The economic growth mechanism at that time could be simplified as so described. Mao repeated to emphasize "agriculture as a basis" (*nongye wei jichu*) and "take grain as the key link" (*yiliang weigang*); however, his belief of this kind originated not from

his family origin as a peasant, nor from his conception of the rural sentiment, but from an idea of such an economic mechanism as well as the doctrine of self-reliance.

The third and last part is his technology policy. In his Note, Mao recommended "indigenous methods (*tufa*) should be parallel with modern methods (*yangfa*)"; large-scale should be parallel with small and medium one." Basically, he insisted that China should not depend on modern technologies and large-scale enterprises alone, like the Soviet Union, but it should attach more importance to traditional technologies and small and medium-scale industries, adapting to the Chinese real conditions. He says

> In 1959, a half of the pig iron output of 20 million tons was produced by small and medium scale firms. In the coming years, such small-and medium-scale technologies will be key in the development of steel production. Meanwhile, small-scale firms will change into medium ones, many medium ones into large-scale ones, backward firms into advanced ones, and indigenous technologies into modern ones. This is the objective law (Note: 99).

This choice of technology in the development process reminds us of such an issue of "intermediate technology" or "appropriate technology," which attracted international attention in the 1970s (see Chap. 10). Such technologies are easy to learn and can contribute to solving employment problems in developing countries. Moreover, as Mao highlighted, they could serve a gateway to more advanced large-scale technologies. The "backyard furnaces" that flourished in every corner of the Chinese mainland was a typical example of such technologies.[5]

Certainly, such technologies are undeniably significant from a developmental perspective. For example, it may be less expensive and more effective to build 100 small as well as mud-made dams or reservoirs (if conditionally possible) for most Chinese villages than constructing a large concrete dam. However, not all technologies are classified as small to large or backward to advanced. For example, in the case of iron, pig iron produced by the backyard furnaces became nothing but scrap iron, as it is theoretically as well as practically impossible to make high-quality pig iron using substandard small furnaces. Laborers mobilized nationwide in the steel-making campaigns were said to be as many as 90 million in number. Additionally, valuable forests were cut down in many places for these blast furnaces, making many mountains bare, the railroads for transporting iron ore and coal were disrupted, but the iron thus produced was unusable. Therefore, enormous amounts of human and material resources were wasted for this tremendous scale of national campaigns.

2.2 Mao's Economic Goals

We have summarized the characteristics of Mao's "political economics" from three perspectives: thought and philosophy, institutions, and policies. Generally, he seemed interested in four economic aspects. The first was high-speed development, or the "great leap forward" of an economy. He became furious about the criticism by Liu Shaoqi, Zhou Enlai, and others of his "rash advance" doctrine, so he executed decisively rash policies. This was based on his firm belief that China would be able to

grow much faster than capitalist countries as its economy was socialized. According to Marxist theory and historical materialism, Mao firmly believed that socialist economies without private ownership, along with large-scale units, were definitely superior to their capitalist equivalents. He then dreamed that China would be able to approach the ideal of "communist" society that Marx had indulged in. When China was flooded with exaggerated figures of output during the GLF, he must have been carried away by such a communist dream for a while.

Mao continued to harbor ambitions to make China catch up with the United States in the future. In October 1955, he addressed a round-table talk on "an issue of socialist transformations of capitalist industry and commerce" as follows:

> Our objective is to catch up with the United States, and even surpass them. They have population of only one hundred million, but our population is about six hundred million. So, we should be able to catch up with them. …How many years are necessary for that? It depends on everyone's efforts. It needs at least 50 years, or 75 years, that is 15 five-year plans. We cannot take out frustration until we can catch up with and surpass the United States someday (requoted from Shen, 2008: 16).

This statement seems to reveal his true feelings. He must have felt, "China is backward, so we have been mocked by foreigners. However, we are full of not only the population, but also natural resources. Therefore, if we strive to catch up with the United States, we will not be looked down on anymore." How can China do so economically? His answer was simple, "rapid growth, great leap forward!'.[6]

The second is a goal of self-reliance of the Chinese economy. This idea originated from his experiences during the past years of revolutionary struggles. When Mao's troops were surrounded by the Nationalist (Kuomintang) army or pursued by them, and insufficiently or rarely supplied from outside with necessary materials, they had to overcome various hardships and kept the spirit of self-reliance in mind. In his speech, he told his people that "we should learn how to do economic works" (January 1945), and he said

> We cannot learn from the Nationalist Party which was not active by themselves, mainly relying on foreigners, and depending on foreign countries even in supply of daily necessities like cotton cloth. We insist on self-reliance, and depend all on our own efforts and creativity of the soldiers with the people (Mao, 1964: 1015).

Clearly, it was during the days of the intensified Sino-Soviet dispute since 1960 that this policy was especially emphasized in China. As Khrushchev refused Mao's request to provide the technology for developing atomic bombs, China decided to develop this technology by themselves. Moreover, this policy was adapted while targeting domestic regions, which were requested to supply grains self-sufficiently, and to establish comprehensive and integrated industrial systems in their own areas.

Third, Mao stressed moral incentives, which were essentially anti-material incentives as discussed, or subjective activity, which may be equivalent to voluntarism in philosophy. Ding Shu says that "Mao's thought" can be characterized in part by his blind belief that "spirit can be transformed into material" (Ding, 1991: 12). Mao believed that once people's thoughts changed, their power would have no limits. He believed that if people awoke and stood up, they could perform miracles. He

was confident that only by motivating the people and transforming their energy into material forces can the Communist Party maintain and develop poor bases during the revolutionary struggles, and they finally gained victory over militarily stronger nationalists in the civil war. After the founding of the country, they promoted a grand scale of construction by mobilizing a tremendous amount of labor force. Robert Guillain described this as "six hundred million ants" (Guillain, 1967); people were used instead of the "insufficient" machines. Activities of this kind are against the background of Mao's thought, as illustrated above.

The fourth is socialization. Mao pushed forward with class struggles against the "class enemies" with bitter hostility, evaded individual farming by peasant families, while bearing the goal of totally nationalizing People Communes with collective nature, and adhered to egalitarianism and abolition of markets. All of these ideas and acts are derived from his pursuit of classical socialism. As a classical Marxist, he assumed that socialism is identical to public ownership, which enables enlargement of scale (which in turn brings about the development of productive energy), while private ownership enables the survival of capitalist powers, which may put society in danger of reviving anti-revolutionary forces.

From a different perspective, we can say that Mao's political economics is lacking in the realistic and "economic" viewpoints with regard to interconnections among various institutions and elements consisting of the overall economic system and mechanism. For example, as motivating people in the long run with moral incentives is impossible, rapid economic growth cannot be achieved. Allocating resources effectively only with the self-reliance principle; thus, it is difficult to introduce and diffuse new technologies, and a high rate of growth cannot be attained. He proposed maintaining a balance among agriculture, light industry, and heavy industry, while insisting on the priority of heavy industry. This policy was necessary for better industrial linkages and structures to secure sustainable rapid growth. However, he actually disproportionately emphasized accumulation, and hence neglected the consumption, particularly that of the peasants. If the abovementioned three aspects, i.e., economic thought, economic institutions, and economic policies had been linked in a balanced way, such a reckless rash advance policy as the Great Leap, and such anti-human institutions as the People's Commune would not have appeared in China. Basically, Mao's economic thought, more specifically his economics of contradictions, destroyed a rational linkage between institutions and policies.

On the GLF, Li Rui, who had acted as a secretary for Mao and was deeply involved in the movement, retrospectively described a dreamer called Mao Zedong in the following manner:

> The GLF and the People's Commune movement was a practice of Mao's thought of socialist construction, colored with his strong idealism late in life. During the movement, he had often told me about his own social fantasy…(He said) on the whole, a utopian fantasy of the people in the past would be realized. Moreover, he proposed theoretical perspectives to realize this beautiful future, such as breaking down the bourgeois rights, removing commodity-money relations, and abolishing the eight-grade wage system[7] and private farming economy, etc. (Li, 1999: 325).

If his ideal remained as a dream, both the GLF and CR would not have failed. However, he tried to recklessly fulfill his dream, and nobody could stop him. This was because it was only Mao who could define what was correct, what was right, and what justice was.

2.3 Deng Xiaoping's Economics

Describing Deng Xiaoping's words and deeds as "no big logic and slogan, no poem-like words, and no flowery theory," Zhang Wenkui accurately depicts the character of a realist Deng who was inclined to "adapt himself to the realities" (Zhang, 2018: 205). Mao Zedong, who attempted to change people's minds and spirits (superstructure) versus Deng Xiaoping, who emphasized productive forces (infrastructure), rather than mind. A deep divergence of thought between these two leaders existed.

Deng's famous words are "It does not matter whether a cat is black or white, as long as it catches mice." If we translate these words into political economic terms, he would have said "It doesn't matter whether a system is socialist or not, as long as it works to raise production and income." When the People's Commune that Mao promoted failed to prevent catastrophic famines and awful hunger in 1959–1961, a spontaneous move to decollectivize agriculture and revive individual farming in certain rural areas found success. Deng tolerated this move on the basis of the "black cat, white cat" doctrine. Certainly, Deng's pragmatism was not limitless but permissible only within the framework of socialist principles and the Communist Party regime. However, the pragmatic doctrine must have harmed the socialist ideal that Mao had long dreamed of, as it became one of the causes that he fell into disgrace in the CR.

Hua Guofeng, Chairman of the Party after Mao's death in 1976, was demoted afterward by Deng and his colleagues through bitter debate inside the Party. Deng criticized and defeated Hua, who had insisted "all that Chairman Mao has told is correct," by using his pragmatic logic, wherein the "only practice is the single standard to testify the truth." Consequently, he succeeded in terminating Mao's uninterrupted revolution and class struggle theory to shift emphasis to the economy rather than to politics. He also began introducing the two essential capitalist institutions most effective for economic development, specifically private ownership and market mechanism, to the Chinese economy, gradually but on a large scale. Further, he proclaimed a new policy called "become prosperous first" (*xianfulun*), that was a policy to accept the widening income disparity, which is just contrary to the supreme ideal of socialism. From Deng's perspective, what Mao had attempted to implement must have appeared to be nothing but "poor socialism," namely, to construct a "poor but equal society." He insisted, "it is not true socialism. True socialism must be a system that is far more productive than capitalism, as Marx and others have assumed." Basically, he denied the theme of Mao's political economics and returned to classical Marxism and stated the following:

> …the tasks that socialism must do are many, but the most fundamental one is to develop productive forces. On the development of such forces, socialism can achieve superiority over capitalism and prepare the material foundation for constructing a communist society (Deng, 1993: 137).

Contrary to his claims, he did not really understand at the beginning of the post-reform period that only the market can be effective in the place of planning. In the 1980s, many economists in China were spending much time in irrelevant discussions on an issue about planning vs. market, that is, which is necessary for a socialist economy, planning, or market, how to combine these two mechanisms if both are required, and how to balance them to make the work more effective. From the perspective of conservative theoreticians such as Chen Yun, a socialist economy must be based on public ownership and planning. Therefore, it can use markets as a complementary tool, but it must adopt a planning mechanism as a major engine. Chen advocated a metaphor of "birdcage," saying that a bird (an economy) will be dead if it is bound tightly (with planning), but it may fly away if it is free (in the market). Therefore, it should be kept in a cage (planning mechanism) with certain free space (market), to allow us to control it effectively.

However, Deng Xiaoping, far more realistic than Chen Yun, seems to have realized that a bird cannot fly freely inside the cage. He then accepted the idea that China should establish an economic system with the market as the main mechanism. In the southern tour speech (1992), he stated the following:

> …the difference between capitalism and socialism does not lie in whether market or planning exists. There are markets in socialism, too, and there is also planning control even in capitalism …both planning and market are required. Without markets, we cannot get information about the world, so we will have to content ourselves with the backward status (Deng, 1993: 364).

Thus, he encouraged cadres not to fear risks but to bring in the market system. His new policy of "socialist market economy' was then created, enabling China to abandon their stagnant economic situation since the June fourth incident (Tiananmen Square protests) in 1989, and to realize the subsequent high speed of economic growth attracting worldwide attention. After all, marketization saved the Chinese economy and drove it to leap forward. Stockholding and market systems began to be introduced, and the people were absorbed in stock prices every day. The masses began seeking primarily economic interests, as was typically indicated by a Chinese phrase "put money above all" (*xiangqiankan*), which became very popular among the people at that time.

Contrary to the abovementioned four substantial institutions and policies characterizing Mao's political economics, Deng's economics contained the following distinctive features:

First and foremost, Mao's economics of contradictions was regarded as not only ineffective but also harmful to the economy, since Deng emphasized stability. However, he was not a classical planner prioritizing economic equilibrium absolutely, but supported such institutions and policies that accepted disequilibrium to a great extent as markets and pragmatic thinking in policy-making, which is best

represented by the phrase, "groping for riverbed stones to pass a river" (*mozheshitou guohe*). That is, Deng recommends that when one implements a policy, one must experiment with it first in certain areas or organizations, and only if one finds it effective, one can spread it to other areas or organizations. After his era started, many new policies were adopted and spread nationwide in this way.

Second, Deng Xiaoping neglected totally or denied Mao's subjective initiative theory. There was no element of thought or spirit in his economics from the beginning. As a literally "materialistic" leader, he believed that "development is the most important thing (*yingdaoli*)," therefore he overly prioritized materialistic growth and wealth. According to Zhang Wenkui,

> Humans and humanity must be transformed if we want to perform Mao's economics. In Deng's economics and his economic policies, on the other hand, such transformations should be performed moderately. This is the main difference of economics between these two persons (Zhang 1993: 178).

Basically, Mao believed idealistically that generating unlimited power by transforming human thought was possible, while Deng believed firmly as a realist leader that activating the economy only by stimulating human original desires was impossible as he understood that human thought could not be easily changed. We can find an essential difference between idealist Mao and realist Deng.

For him, it was natural to have discovered the market mechanism and income disparity as efficient tools for economic development as these tools could stimulate such human desires effectively. Moreover, as he had admitted, he was not studious, did not read classics of Marxist theories, and was an agitator or organizer in his youth. He probably had not been interested in what Marx or Engels discussed. Paradoxically, as he had neither aptitude for theoretical thinking nor enough knowledge about Marxism, he was able to lead the Chinese economy to a realistic and pragmatic road toward rapid growth. As a result, "greedism," or mentality of thinking economic rewards as a key, which Mao had hated during his era, now became the social ideology all over the society once he gained the absolute political power.

Third, Deng denied Mao's self-reliance doctrine. Considering systemic reform, Mao promoted economic reforms to some extent in his own way. Regional decentralization, as we have taken up above, is one such example. However, Maoist China did not open up on such a scale as in the post-reform period. On external trade, China opted for an economy with self-sufficiency during the Maoist era. Additionally, China was more negative in accepting foreign direct investment (FDI) then, as it recognized that the acceptance of FDIs would lead to the domination of the economy by foreign capitalists.

However, when Deng gained power, China changed its external policy toward opening-up. This expanded the external trade rapidly and accepted foreign capital very actively. These two policies were closely interrelated to the establishment and extension of Special Economic Zones and Development Zones. After Deng's death, the word "opening-up" should be translated into globalization, and a large-scale outward foreign direct investment from China has been underway.

Deng abandoned the previous self-reliance policy as he understood that it was an obstacle to accelerating economic development. As the comparative advantage theory in textbook economics tells us, free trade or international division of labor can increase the efficiency of allocating domestic resources, enabling an economy to grow faster than self-sufficiency or self-reliance.

Clearly, the change in the international environment allowed China to change its external policies. In the Mao era, China had long belonged to the Socialist Bloc with the Soviet Union as the leader, but as the Sino-Soviet conflicts intensified, it had to face military pressures from both the Soviet Union and the United States, and Mao had to choose a self-reliance policy. However, in the Deng era, as international tensions of the Cold War were gradually reduced and Sino-US diplomatic relations were established, China's international environment was improved to the extent that it could be associated with the world peacefully. In 2001, China entered the WTO to compete extensively in the world market, gaining the maximum benefits of free trade. In this type of era, self-reliance has become an outdated policy, setting the spirit of leaders aside.

Fourth, China began seeking efficiency while also emphasizing growth. In this sense, we can say that full-fledged true economics finally started to work in this era in China. Although some large projects such as the Sanxia (Three Gorges of the Yangzi River) dam construction were launched even after the marketization proceeded, huge labor-intensive projects such as mobilizing "600 million ants" during the Mao era were no longer conducted, because they found that labor was not free and constructing those projects by substituting machines for labor were far more efficient not only economically but also technologically. Based on Deng's pragmatism, China began actively introducing various management methods, whether capitalistic or not, if they were really effective in business. After the 1990s, US, European, and Japanese books on management control were translated into Chinese and published consecutively.

This type of policy trend demonstrates that China changed the definition of socialism in practice, giving up the ideal of realizing a traditionally imagined socialist society. Secretary General Zhao Ziyang addressed a theory of "primary stage of socialism" in the Party's 13th Congress in 1987. Simplifying this theory, it can be summarized as follows, "China is still very poor. Socialism must have passed the stage of highly developed capitalism, as Marx and Engels predicted. If so, China should transfer to the socialist stage after it becomes rich." However, clearly the richer an economy becomes, or the more developed its division of labor becomes, the farther it departs from socialism in the original Marxist sense. Therefore, this theory can be justified only under the doctrine of "Chinese style of socialism." It is the Party's central committee who defined socialism in China. Officially, their socialism is called now as "socialism with Chinese characteristics," but actually and more appropriately, "capitalism with Chinese characteristics" came into existence in this country.

Let us recognize again that Mao Zedong was a dreamer who admired Mushanokoji's ideal of "New Village" and advocated a fantasy of Kang Youwei's "Great Harmony". To put this the other way around, we should say that only if Mao was a dreamer he could dream of the Chinese Revolution and strive to realize fantasy

in his mind. Meanwhile, Deng Xiaoping was a thorough realist, so he reconstructed the economy, which Mao had destroyed harshly, in his realistic way to return it to the normal course of development.

Examining the two eras of China's modern economic history easily reveals why the Chinese economy was unable to accelerate (and rather faced serious fluctuations) during the Mao era, as observed in the Introduction. Under the economics of contradictions, stable growth cannot be expected, and against the background of moral incentives and self-reliance policy, wherein external trade and foreign direct investment were avoided, dynamic economic development was unexpected. However, Deng boldly brought in market mechanisms and private ownership, stimulated people's materialistic desires, implemented the opening-up policy, and introduced foreign technologies, capital, and information through interchanges with the outside world. These policies became a significant lever for the long-run high rate of growth in post-reform China.

Conclusion: Evaluating Mao's Political Economics

As referred to above, Mao's speech on the "Ten Great Relationships" prompted China to construct its own socialist model. What must be highlighted here is that a major part of the "great relationships" had already been addressed in the 20th Congress of the Soviet Communist Party in 1956. The platforms proposed in this Congress include the following policies: (1) to develop light industrial production rapidly, on the basis of the development of heavy industry as a key; (2) to overcome the backwardness of agriculture, thereby reducing disequilibrium of agro-industrial relations; and (3) to transfer of many central enterprises to the hands of local governments. Obviously, these policies are identical or similar to those addressed in Mao's TGR (Shen, 2008: 87–88). As the above platforms were publicized earlier than the TGR, assuming that Mao Zedong proposed an idea of the "Ten Great Relationships" with reference to the Soviet platforms is natural. Clearly, the policies described in the platforms were nothing but goals, regardless of whether they could be realized or not. In fact, the Soviet-centralized system continued substantially even after the Congress, and a large quantity of grains needed to be imported, and agriculture was still Achilles' heel for the USSR economy.

Thus, Mao's economic policies and thoughts were not as unique as we have imagined so far.[8] Mao Zedong himself said, "We proposed the idea of Ten Relationships and began presenting our own line of construction. In principle, it is the same as that of the Soviet Union, but different in their ways" (Li, 1999: 514). According to Li Rui, "we did not discover a new development model. We were on the same rail of the planning system as before. This is what Mao said <same as that of the Soviet Union in principle>" (ibid. 515). Shen Zhihua stated that "from Mao's eyes, the Stalinist model was not bad, but its way of performing was problematic" (Shen, 2008: 146). In fact, Mao was essentially a Stalinist.

In the final analysis, the uniqueness of the Mao model lies in his emphasis on moral incentives and class struggles. He was not very interested in such words as

technologies, machines, and productivity as added to the platforms of the Soviet Communist Party's 20th Congress. The "Relationships" from the sixth to the tenth he picked up in the speech TGR are, that between the Han nationality and the minorities, that between the Party and non-Party, that between revolution and anti-revolution, and that between right and wrong. This implies that he had a keen interest in politics and thought. It seems to imply, too, that politics, rather than economy, and more specifically the holding of powers, was his first priority.

Mao Zedong's spiritualism advocated and promoted changing human spirits, stimulating people's enthusiasm, or relying on their zeal, appears to be working effectively as long as we read the official documents published then. However, this doctrine was frail in reality. This is obvious from the fact that people's minds changed drastically as soon as reforms and opening-up as well as marketization policy started.

Mao's dissatisfaction with the planned economy that he showed in the 8th National Congress of the Chinese Communist Party did not target the system itself, but it illustrated his discomfort in "harmless (*siping bawen*)" balance theory (Shen, 2008: 347). What he emphasized is "stimulating regional activism, breaking through balanced plans by the mass movement, making up for deficient funds, and creating miracles as well as rapid growth" (ibid.). After all, he drove the economy by means of administrative orders, moreover in an anti-balancing way, namely, based on his "economics of contradictions." Meanwhile, believers in planned economics, such as Liu Shaoqi and Chen Yun, were not necessarily able to understand the planned economy imported from the Soviet Union. Hence, as they were completely subservient to Mao, they could not imagine any model of economic system more competitive with Mao's, and hence promoted the GLF policies.

After Stalin was openly criticized in 1956, a new idea of decentralized socialism incorporating market mechanisms such as the Brus model emerged in Eastern Europe, leading to the new designs of economic reforms in Hungary and Czechoslovakia in the 1960s (See, for example, Nakagane, 2010). However, in China, Mao attempted to promote administrative regional decentralization rather than market decentralization. This idea was based on his mistrust in the market and the idea that it would bring about disorder and non-planning. How he did not trust the market law—namely, the supply and demand coordination mechanism through prices—is demonstrated typically in the following view:

> The value law (read it as market law—the author) can be used as a tool for planning work, but it cannot be an important basis for planning. We executed the GLF, not based on our needs of the value law but on the necessity of expanding our production, which is the basic law of socialism—The reason why no crisis occurs in socialist economies is not that we could not grasp the value law, but that ownership is socialized and the basic economic law of socialism, namely, nation-wide planned production and distribution is implemented, and there is neither free competition nor anarchical situation (Note: 86–89).

The Note was written amid the turmoil generated by the GLF. Paradoxically, it is just the GLF policies promoted by Mao that the "anarchical situation' was brought about in China. Apart from this paradox, his view that socialism is planned while capitalism is anarchic because of its market system is a perfectly classical Marxist understanding of economics. It neglects a diversity of capitalism, such as

Keynesian economics or welfare state doctrine, as in North European countries. Mao insisted that holistic and planning viewpoints not subject to the market law was required from the long-run perspective, but he did not notice or was not able to understand the essential nature of market economies, that is the "contradiction," or spontaneous dynamic inherent to the market, when he developed the "economics of contradictions." In addition to Mao, prominent and active reformist economists in Eastern Europe then, such as W. Brus in Poland, J. Kornai in Hungary, and Ota-Sik in Czechoslovakia recognized the importance of the market for socialist economies as an indispensable mechanism for demand–supply coordination. However, they did not recognize the dynamism and creativity produced by the market, such as entrepreneurship and animal spirits, as stressed by Joseph Schumpeter and J. M. Keynes, respectively. It was Deng Xiaoping who discovered in effect such activeness as inherent to the market while proposing a new doctrine titled "socialist market economy" during the post-reform period, particularly since 1992.

Notes

1. This chapter is a revised version of Chapter 7 "Mao Zedong's Political Economics–-Anatomy of His Economics of Contradictions" in Nakagane (2021). Refer to the book's Epilogue on my overall appraisals of Mao's thought and behavior.
2. "An attack by the Rightists in 1957" means a historical incident that democratic people and students criticized the Party leadership. "Representatives within the Party (in 1959)" refers to Peng Dehuai and others who criticized the GLF policies, but were finally attacked severely by Mao in the Party meeting at Lushan.
3. This sort of recognitions is expressed in the "Beidahe Resolution," adopted by the Central Committee of the Chinese Communist Party at Beidahe in August, 1958. While it is uncertain whether it was Mao who first raised this view, he must have used these kinds of expressions in his speech in the meeting. In Chinese, "commune" is translated into *gongshe* (corporation). However, "communism" was translated into "public-property-ism" (*gongchan zhuyi*). Consequently, a belief appeared that if only property was publicized, communism could be realized.
4. The "rate of accumulation" is a term of Marxist economics, different from investment rate of the SNA terminology, which is used even in post-reform China. The investment rate measured by dividing capital formation by gross domestic product is 25.4% in 1957, 33.5% in 1958, 42.8% in 1959. These figures are almost equal to the rate of accumulation in corresponding years. Incidentally, the investment rate in 1960, when catastrophic famines and hunger had already happened, is 38.1%, surpassing the level of normal year 1957.
5. There existed even mud-made furnaces with a capacity of only one cubic meter.
6. The year 2030 would mark 75 years after Mao made this speech in 1955. There are various forecasts of China's GDP in the future, but if China could continue to grow at today's speed, it may catch up with the United States, sooner or later, as Mao predicted. One of the recent predictions shows that China will be able to overtake the US in terms of aggregate GDP value probably in 2028.
7. In the Mao era, urban workers were generally ranked by eight grades, from grades 1 through 8, which is the highest for the oldest and the most skilled but few workers.
8. We should be reminded of the fact that Mao's paper "On Contradiction" was essentially a copy of a philosophical textbook published in the Soviet Union in the 1930s. We believe his theoretical

contribution should be regarded as very limited, apart from his military theses represented by the "guerilla war" theory. Mao was mostly a man of practice, rather than of theory.

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Chapter 3
From "New Democracy" to "Socialist Transformation": Bankers and Commercial Associations in 1950s Chongqing

Koji Hayashi

Abstract This chapter examines the socialist transformation by the Chinese Communist Party (CCP), focusing on the case of the reorganization of intermediate associations in Chongqing. The socialist transformation of the Trade Associations promoted in the 1950s brought together the various organizations, practices, and social relations that had colored China's social economy into a consolidation centered on the CCP. In this sense, the socialist transformation by the CCP was an attempt to ensure stability by restricting the free operation of the social economy and keeping economic activity within each region through centralization of power and profit in the regime and the containment of critical forces. In contrast, the socialist transformation promoted by the CCP was also an attempt to introduce other-oriented and broad-based rules backed by state power. This seemingly contradictory situation glimpsed in the socialist transformation led to the formation of another principle of decentralization and the development of the so-called "Economies of Feudal Princes (*zhuhou jingji*)" after the Reform and Opening-up policy, which coexisted with the orientation toward the integration of development dictatorship. In this sense, the 1950s can be said to be the starting point for the formation of "regions" in modern China.

Introduction

As described further in the introduction, in the early years of the Peoples Republic of China, the Chinese Communist party tried to abolish private ownership. It transformed it into public ownership under "New Democracy" from 1949 to 1953. In this context, the gradual transition to socialism was aimed at through such modifications such as the collectivization of agriculture, the integration of public and private management of capitalist industrial commerce, and the joint management of handicrafts.

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Muramatsu Yuji once emphasized the importance of "the quantitative form of economic events, their specific gravity, and constitutive relations" and "social relations in economic activities - various organizations, customary orders, and human bonds by social groups" in his theory of the "social system" as a characteristic of the Chinese social economy (Muramatsu, 1949). The existence of social groups as an accumulation of human bonds and various intermediate groups as their expression has remained an important point of discussion in terms of understanding the "immeasurable elements" of the Chinese social economy that are difficult to explain in a single word.[1] Such a perspective can also be useful in rethinking China in the 1950s.

How were these intermediate organizations reorganized when the Chinese Communist Party transitioned to socialism? And what problems arose there? In this chapter, based on the micro case of Chongqing, a major city in the southwestern region, I would like to examine the above issues by dealing with the process of reorganization of intermediate organizations. Such organization includes the Trade Association,[2] which had establish human and economic relations into the Federation of Industry and Commerce in the early stage of the transition to a socialist economy.

3.1 The CCP's Policy of Urban Expropriation: "*Jieshou*" and "*Guanli*" in Early PRC

In 1946, the civil war broke out in China. The Chinese Communist Party (CCP) took the advantage of Kuomintang after 1948; on September 1, 1949, in Beijing, the central people's government declared the establishment of the People's Republic of China (PRC). Simultaneously, CCP took possession of the whole area of the Chinese Mainland apart from Taiwan or Tibet, establishing the leading position for the consolidation of the state hegemony. In this way, CCP succeeded the revolution in Mainland China, and had various unstable elements. From a political view, Mao Zedong did not assume the leadership completely under the system of greater administrative areas,[3] the central government could not rule the whole region under control directly. From an economic view, PRC was in process of establishing the fundamentals for the recovering of production by using the "property" of Kuomintang. From a social view, PRC was plagued by the enemies, and the remnants of resistance, such as "Bandits," needed to be suppressed immediately. In these circumstances, how did the CCP carry out the revolution in rural areas, and what influence did it have on regional society's political and economic structure?

At first, CCP expropriates (*jieguan*) the national and public enterprises of the National Government, and after that, screens and organizes them in the pretext of the "Liberation" from Imperialism, Feudalism, and Bureaucratic Capitalism. The CCP's policy of expropriation was the fundamentals of the CCP government and socialist transformation. The following is the process of establishing a *jieguan* policy.

3.1.1 The Opportunity of Establishing a System for Urban Expropriation

The CCP established the system of urban expropriation through expropriation in the Northern China area. The first opportunity was the expropriation of Shijiazhuang in Hebei province, 1948. The experience of Shijiazhuang was made into the model case for learning urban expropriation, the report of Shijiazhuang expropriation (Central Working Committee, *About the Experience of City Operation in Expropriating Shijiazhuang*, February 19, 1948) for circulation among the cadres of various areas emphasized that there were so many problems below:

The first problem is the lack of unification for expropriation. After the People's Liberation Army occupied Shijiazhuang, many procurement troops gathered from neighboring Liberated Area (*jiefangqu*), took the plant facilities or components away. Each Liberated Area had separate policies. They tended to make much account to keep their interest in their own territories. Before the tide of the battle has turn in CCP's favor, their base was on rural farming areas. The cities they occupied were relatively small, and often could not keep possession for a long time. Consequently, city management of CCP was on a short-term view; they considered that city expropriation was one of the ways of supplying goods. The reason the CCP could not control the scramble for resources in Shijiazhuang was the lack of location of responsibility for urban expropriation, and that of difficulty to protect and distribute resources unitedly.

Second, the problem of urban expropriation through the way of class struggle. Before the expropriation of Shijiazhuang, the CCP adopted the "*zi xia er shang* (from bottom to top)" class struggle in a rural farming area. CCP cadres in Shijiazhuang constituted Poor's Association (*pinminhui*) or Labor Union (*gonghui*) based on the theory of class struggle and mobilized them for expropriation. But "the poor" who participated in these associations plundered urban goods and took the law into their own hands under the color of liquidation. There was widespread panic in the whole city.

At that time, the CCP tried to possess the whole area of China mainland. To establish a steppingstone to "build an advanced socialist state," Central CCP tended to protect and utilize industry and commerce (Liu et al., 1949). Therefore, Central CCP started to establish the system of expropriation to prevent destruction and confusion.

3.1.2 Providing a System of Urban Expropriation

At first, CCP came up with the theses that "each system should be carried out in accordance with the original system (*ge an xitong*)," "adopting the order system from the top to the bottom *(zi shang er xia)*," "no change in the original position or job (*yuanfeng budong*)," "expropriate first, distribute second (*xian jie hou fen*)," and adopted the military control system to concentrate the authority and responsibility on the

Military Control Commission of each area. The supreme commander (*Silingyuan*) of each Field Dispatch Army (*yezhanjun*) appointed to the Chief (*zhuren*) of the Military Control Commission, governmental officers appointed to the vice chief, secretary, commissioner. The ratification of Central CCP was needed for the appointment of the member of metropolis expropriation. The Military Control Commission took charge of various duties such as military, constabulary, culture and education, and finance. Following each city's needs, the substructural officer was appointed and takes charge of the actual operation. The Expropriating Group (*jieguanzu* or *jieguan xiaozu*) were dispatched to the field of expropriation. The duration for military control should be in 3–6 months for the metropolis and 2–3 months for the small city. There were no clear regulations on the criteria for the termination of military control. However, after completing the mission and stabilization of order, military control was declared to be canceled, and all authority was then transferred to the Party committee and people's government of the city concerned.

To carry out the above-mentioned military control in a unified manner, the Communist Party Central Committee began to establish a reporting system; in January 1948, Mao Zedong referred to the necessity of developing a reporting system (Mao Zedong, *Establishing Reporting System*, January 7, 1948). After February 1948, when the experience of the seizure of Shijiazhuang was transferred to the various departments, the establishment of a reporting system for urban expropriation was advocated in earnest, and it was made obligatory to summarize and report to the central government on expropriating activities in cities with populations of 50,000 or more. In addition, at the suggestion of Chen Yun, who was in charge of the expropriation of cities in the northeast at the time, the "Northeast Southward Executive Battalion," a unit specializing in expropriation, was established. Since then, the People's Liberation Army has formed cadres in various regions. In addition, at the end of 1948, the Central Policy Research Office was established to formulate a unified urban confiscation policy, draft various central documents, conduct statistical research, and organize materials.

Against the background of the development of such a seizure system, the urban seizure operations carried out in various regions were publicized as effective with the peaceful "liberation" of Beiping (Beijing) in January 1949. It also gave great strength to the subsequent southward campaign by CCP.

The method and content of the control in each city varied according to the size of the city and the organization being targeted. Many of the former employees of the administrative system and enterprises remained and were retained to take charge of practical matters, and control over the military, police, and press was exercised early on. This policy of urban confiscation also had a major impact on the socialist transformation of the intermediary groups we will see below.

3.2 Establishing the Preparatory Committee of the Chamber of Commerce and Industry

3.2.1 Organization of the Central Chamber of Commerce and Industry

In 1949, the CCP kept on developing the policy of the United Front, while it built a new nation, the "People's Republic of China." The CCP held the People's Political Consultative Conference to get support from the broad masses and adopted a common program. It was envisaged that the policy of the United Front would be taken charge of by people's organizations such as labor unions, farmers' unions, youth leagues and women's leagues; by liberal parties; and by the Chamber of Commerce and Industry (CCI) representing commercial and industrial enterprises.

In 1950, the CCI's principal function in United Front policy was educating and supervising commercial and industrial entrepreneurs, and it had the meaning of an "organizing institution" (Li, 1950: 150). In the 1920s, the Soviet Union formed "trusts" that united industry and commerce under the New Economic Policy (NEP) era (Kimura, 1995). Trusts were organizations positioned between the state and productive units, granting autonomy and responsibility to enterprises, while simultaneously seeking to integrate productive units that were getting more difficult to control directly as they became more decentralized.

Additionally, the Soviet Union established "syndicates" as collaborative organizations among the trusts. These organizations in the Soviet Union were primarily for national enterprises. Hence, it was different from the situation in the early years of the PRC, where there were so many private enterprises. But it could be said that the CCI was based on the trusts and syndicates of the Soviet NEP, providing a means for consolidating commercial and industrial operations.

After 1951, the CCP changed its policy from nation-building to socialism. From this time on, the CCI started to make clear its position, which was to be responsible for commercial and industrial policy in general—including economic development, conversion of business categories, overseeing the transfer of capital and strengthening the state economy as well as strengthening planning and leadership of the state economy.

In August 1949, the CCP issued a directive to establish the CCI. However, it was not until June 1952 that the Central Preparatory Committee of the Chamber of Commerce and Industry (PCCCI) was launched. At the time of its launch, the PCCCI had between 135 and 160 delegates, from among whom one chief delegate and 13 deputies were elected. Chen Shutong[4] was chosen as chief delegate, while Nan Hanchen,[5] Zhang Naiqi,[6] Rong Yiren[7] and Hu Zi-ang[8] were among the deputies.

It took almost three years from when the CCP issued its directive until the Central PCCCI was launched. The office in charge of preparations discussed how to elect delegates for the national chamber of commerce, how to communicates with them,

how to draw up general rules for organizational activity, and how to supervise lower-level organizations that were gradually being established. In these developments, the Chongqing PCCCI was established on May 8, 1950.

3.2.2 PCCCI's Organization in Chongqing

The Chongqing PCCCI was to prepare for the organization of the Chongqing CCI and to unite commerce and industry. After the CCI was formally established, the PCCCI would be dissolved. The PCCCI consisted of 81 delegates and 33 standing committee delegates; a chief delegate and 3 deputies were chosen from among the latter. Hu Zi-ang, a central figure of the China Democratic National Construction Association, was elected as chief delegate. The three deputies were Wen Shaohe, former chief of Chongqing Chamber of Commerce and chief delegate of Chongqing China Democratic National Construction Party after "liberation;" Li Zhiqing, manager of Yuxin Steelworks; and Zhang Maofu, a CCP cadre in the southward movement.[9] They also held the post of People's Delegate of the Chongqing Municipal People's Congress and participated in policymaking for commerce and industry in Chongqing.

To carry out its activities, the PCCCI had several committees, as follows: (1) a reorganization committee (in charge of expropriations); (2) an education committee (in charge of education); (3) a finance committee (in charge of finance); (4) a policy-making committee (in charge of policy-making and propaganda); and (5) an engineering committee (in charge of studying industrial engineering). These committees were overseen by the standing committee members, who also carried out the work.

Many of the PCCCI delegates also held positions in their own enterprises, so the PCCCI did not pay them a salary. The PCCCI's expenses were covered by membership dues collected monthly from the business enterprises of its members. These membership dues were put toward the wages of clerical staff, propaganda expenditures, and publications. In the early days of the PCCCI, the organization faced financial difficulties,[10] and it became a "political mission" to collect membership fees, even after the situation stabilized. Once the situation stabilized, it became a "political mission" to collect membership fees.

The standard membership fee was regulated at one-thousandth of the profits of each enterprise. The obligation of paying the membership fee rested not on members themselves, but on the enterprises to which they belonged. This is the important point for understanding the activities of the PCCCI.

3.3 Reorganizing "Trade Association" in Chongqing

3.3.1 Reorganizing Former Guilds

The PCCCI had several missions: (1) to establish the CCCI; (2) to expropriate the former Chongqing Chamber of Industry, former Chamber of Commerce, and other commercial organizations that the People's Government deemed should be expropriated; (3) to reorganize former trade associations; (4) to explain and promote the policies of the People's Government to each commercial and industrial enterprise, and implement the mission of the People's Government; (5) to provide the government with information gathered from each commercial and industrial enterprise for decision making; and (6) to foster cooperation between each enterprise to accelerate the reconstruction of commerce and industry. The most important mission was the third—reorganizing former trade associations.

In early PRC Chongqing, the situation was complicated: approximately 40,000 commercial and industrial enterprises, 156 categories of business, and 126 former trade associations. The PCCCI oversaw the expropriation of these former associations. Because of the cadres' lack of experience, and the necessity for organizing military industries given the growing tensions on the Korean Peninsula, the PCCCI selected seven categories of business—coal mining, financing, shipping, textile manufacturing, Chinese textile dyeing, coal trading and vegetable oil—for reorganization.

First, the PCCCI held discussion meetings of each business category to understand the general situation, reorganization problems and to negotiate detailed activities. As a result, the Shipping Industry, Coal Mining Industry, and Financing Industry Associations established a Preparatory Committee on September 25, 1950; the Textile Manufacturing Association established a Preparatory Committee on October 17; and the Machine Textile Manufacturing Association and Chinese Textile Dyeing Association on October 21. By December 5, 42 categories of business had established Preparatory Committees for their trade associations.

What kind of changes did this reorganization bring to these former institutions? Let us examine the case of the financing industry. Toward the end of the Civil War in China, the situation of Chongqing banking fluctuated intensely. Before "liberation," the Chongqing Banking Association was controlled by three men, but two of them—Liu Hangchen and Pan Changyou—fled from Chongqing to Hong Kong and elsewhere. Szechuan Bank of Salt, Szechuan Meifeng Bank, Sichuan Construction Bank, and Chuankang Public Commercial Bank suspended operations. The Bank of China, the Central Bank and the Bank of Szechuan were expropriated by the Chongqing Branch of the People's Bank of China.

Under these circumstances, the PCCCI's reorganization greatly influenced the Bankers' Association. The Preparatory Committee of the Financial Industry Association was established by a combination of the former Bankers' Association and Money Shop (*qianye*) Association. In addition, over half the delegates were from

non-Sichuanese banks, and the CCP's Southward Movement Cadre Yu Yueze took charge as the chief delegate of the Preparatory Committee.

Previously, it was usual for the delegates of Chongqing's trading associations to consist of influential members of the local economy. But many of these influential people had since left Chongqing, requiring the reorganization of personal connections in the business to facilitate corporate activities.

In this way, the CCP could bring the personal networks of private enterprises into the new institution. From the CCP's perspective, it wanted to show that many managers of private enterprises had joined the new government, thus enhancing the new government's credibility.

3.3.2 The Study Campaign and the Land Reform Inspection

The PCCCI also carried out various studying activities. It formed organizations for study under the supervision of the Education Committee. By the end of July 1950, 19 categories of business had established 29 learning groups and were carrying out studying activities one to three times a week.

Most of these learning activities consisted of lectures by members of democratic parties such as the United Front or China Democratic National Construction Association. The contents of these lectures included the theory of revolution and industrial and commercial laws and regulations. For instance, a famous sociologist Fei Xiaotong[11] gave a lecture titled "Learning and Remolding." Audiences for these lectures totaled over 20,000. Apart from these lectures, each studying group carried out group discussions and studied texts, summarizing the results for circulation.

As one segment of these studying activities, the PCCCI carried out Land Reform Inspection. According to what had been planned, the CCP would carry out land reform in southeast China after 1951. Beginning in the Chongqing area, the CCP carried out rent reduction in the countryside around the city from around March 1950, completing the project around March 1951.

Meanwhile, Land Reform Inspection had already been carried out in the Northern China area, with the participation of the city's intellectuals, industrialists, and entrepreneurs (Li, 1950). Based on these experiences, the PCCCI formed a "Land Reform Inspection Team" in Chongqing (Table 3.1). The inspection team was divided into four groups. Group 1 went to northern Chongqing (Jiangbei District); Group 2 went to western Chongqing (Shapingba District); Group 3 went to southwest Chongqing (Shapingba and Dadukou Districts); and Group 4 went to southern Chongqing (Jiulongpo District). Group 3 comprised delegates representing commerce and industry, among them were members from the PCCCI and the China Democratic National Construction Party, such as Xu Zonglin and Yuan Xiaozhi. Group 3 departed Chongqing city on March 14, 1951, returning to Chongqing city six days later on March 20.

Many commercial and industrial business people owned land in rural areas, so they found themselves in a delicate position in the land reform struggles. Members of the

Table 3.1 Overview of land reform inspection

Group	Districts of inspection	Time	Name of delegates
1	Northern area (Maoershi Xiang, Shimahe Xiang, Guanyinqiao Xiang, Jiangbei district)	14th–20th March	Pan Dachi (Professor of Chongqing University, China Democratic Alliance), Ma Gengliang, Yang Fuquan, Zhang Zengmin, Feng Kexi, Hu Kelin, Gong Chenhua, etc.
2	Western area (Geleshan Xiang, Shapingba district)	Around 25th March	Jin Xiru (Professor of Chongqing University), etc.
3	Southwest area (Daping Zhen, Shiqiaopu Zhen, Hualongqiao Zhen, Liziba Zhen, Xietaizi Xiang, Yangjiu Xiang, Shapingba and Dadukou district)	14th–20th March	Xu Zonglin (Executive committee of PCCCI, Manager of Dacheng Tannery, China Democratic Alliance), Wang Daoheng (Manager of Tianyong Chemical, China Democratic Alliance), Yuan Xiaozhi (member of PCCCI, manager of the Chongqing Branch of Chinese Standard Pencil), Zhang Qunhua (Manager of Tianquan Paper Corp), etc.
4	West and central area (Longmenqiao Xiang, Lijiatuo Xiang, Jiulongpo district)	Around the end of March	Xia Chongshi (President of Qiantaiyu Commercial Bank), Du Gangbai (Professor of Sichuan College of Education), etc.

Source Xinan Renmin Chubanshe (ed.) (1951), pp. 85–104

Inspection Team jointly published a report in which they emphasized that "generally, in the process of a rent reduction, commercial and industrial businessmen did better than pure landowners." They went on to say that "through land reform, the peasant masses had not disrupted the interests of commercial and industrial businessmen. The businessmen could cut off their feudalistic tails, to concentrate on managing their works" (Xinan Renmin Chubanshe, 1951).

In Daxian, a rural city in northern Chongqing belonging to Chuanbei Administrative Office, the land reform struggles waged by the CCP were fierce (Fukuchi, 1984). By contrast, with its small population of peasants, the level of land reform in Chongqing was relatively moderate, considering the interests of commercial and industrial business people. Chongqing's business people were in a delicate position politically but were on the high ground otherwise. This situation clearly influenced their activities.

In addition, we also need to focus on the PCCCI's role in connecting the city and the countryside.

3.3.3 The Movement of Purchasing Government Bonds and the Korean War

There is an intimate relationship between the Learning Movement of the PCCCI and the international political situation surrounding China at that time. The situation in East Asia and the Korean Peninsula was becoming more strained. On June 25, 1950, Kim Il-sung led North Korean troops southward, and the Korean War broke out. On June 27, the United States unveiled the "Truman Doctrine." This was a policy to dispatch ground forces to the Korean Peninsula, neutralize the Taiwan Strait, and support France in Indochina. In the beginning, the war situation favored North Korea. However, on September 15, the United Nations forces consisting mostly of U.S. troops, began a major landing at Incheon and the war changed course. On October 9, U.N. forces crossed the 38th parallel, advancing toward the border with China.

Ten days after the declaration of the Truman Doctrine, China decided to establish defense units in Northeast China to deal with the expansion of the Korean War (Shu 1991). On October 10, Chinese People's Volunteers crossed the Yalu River into Korean territory, and China became involved in the war. The Chinese government needed to purchase and produce military materials as quickly as possible from that time on. It issued a huge amount of national bonds to cover its military expenditures.

The Learning Movement in Chongqing and the international situation went hand in hand. The most important activity of the Learning Movement was to prompt commercial and industrial businessmen to support the wartime economy through "practical action."

The most practical action was to join the Movement to Resist United States Aggression and Aid Korea. On July 20 and November 15, 1950, the PCCCI held, respectively, the "Congress to Resist U.S. Imperialism's Aggression toward Taiwan and Korea" and the "Congress of the Chongqing City Business Community to Resist U.S. Aggression and Aid Korea." In June 1951, the PCCCI established "The Committee for the Movement to Donate Airplanes," which raised sufficient money for 20 combat aircrafts.

The second was to pay tax. Hu Zi-ang, the chief delegate of the PCCCI, pointed out that, "Commercial and industrial business people must recognize 'Resisting United States Aggression and Aiding Korea' is the most important mission of the people at the present time." At the same time, he also pointed out the necessity of "consolidating price stability, remolding business people's ideology, and strengthening political awareness" (Hu, 1950). However, he added that paying taxes was the way to effectively guarantee resistance to U.S. aggression. From the government's point of view, business people were duty-bound to pay taxes. However, Hu's words indicate that tax evasion was a common phenomenon in Chongqing in those days. Given the situation, his logic appeared to be that if business people fulfilled their duty of paying taxes, they would majorly contribute to the wartime economy.

The third was to purchase "Patriot Bonds on a Parity with Commodities".[12] Through the Learning Movement, Chongqing businessmen "enhanced understanding

that the People's Government strongly supported commerce and industry and that "the way to overcome our individual difficulties is to resolve the difficulties the country faces." Purchasing bonds were allocated to each enterprise via the PCCCI or learning groups. The allocation was proportionate to the size of each enterprise. The highest allocation was for the shipping industry at 220,300 units, followed by the cotton textile industry (207,287 units), the mountain product industry (188,900 units), the banking industry (187,348 units), and the salt trading industry (144,051 units). Together, these five industries accounted for 45 percent of the total amount of 2,107,448 units.

Although enterprises were not obliged to buy bonds, it was mandatory. That said, there was little inflation because they were issued by the state and converted on a par with actual commodities. In a recession, when the risks associated with using idle capital were relatively lower, industrialists and business people immediately accepted purchasing Patriot Bonds.

Through researching the Learning Movement, we can see that the most important task of the CCP was to concentrate the capital of industrialists and business people into the People's Government as soon as possible. At the time, the managers of each company also saw the practical benefits and so they joined the activities of the PCCCI.

3.4 Becoming a "Chamber of Commerce"

3.4.1 The PCCCI and the Policy of Processing, Ordering, and Purchasing

Another important mission of the PCCCI was to mediate in the "processing, ordering and purchasing" by the government.

Early in 1950, the Chinese government adopted an austere fiscal policy and withdrew the former currency; the economy went into recession, triggering the so-called "April emergency" (Izutani, 2007). Meanwhile, the CCP and Kuomintang were still fighting in Sichuan; in addition, March was the time between crops in rural areas when the price of grain and textile soared. In January, 1 parity unit was converted at the rate of 2,000 RMB, but this had rose to 8,000 RMB by March. After April, prices stabilized, leading to a slow-down of speculative activities; this, together with the delay in the recovery of transport infrastructure, disrupted the distribution of goods and the flow of funds. The market fell into a panic. For instance, the cotton spinning industry had a manual production capacity of 5,700 bales of No. 20 count cotton yarn per month, but could only manufacture 4,412 bales in May. The industrial screw industry had a production capacity of 469 tons per month, but only produced 194 tons in May, of which it sold 115 tons. Every industry cut back production one after another; some enterprises suspended operations, and many started to sell their real-estate holdings.

Under these circumstances, the People's Government adopted the policy of "processing, ordering and purchasing" vis-à-vis private enterprises to stimulate the economy (Kajima, 2018). After the "liberation" of Chongqing, the People's Government consistently carried out its policy of "processing, ordering, and purchasing;" in the beginning, however, each section of the People's Government carried out the policy separately, based on their needs. After July 1950, the People's Government decided to consolidate the policy allocation under the Department of Commerce and Industry supervision. From around August, because of the outbreak of the Korean War, the amount of the "processing, ordering and purchasing" increased, which had a big impact on the operations of enterprises.

From July 15 to the end of October, the amount of processing, ordering and purchasing carried out by the Department of Commerce and Industry was as follows: 11,720,562,578 RMB (processing), 25,341,821,300 RMB (ordering), and 18,267,100,357 RMB (purchasing), with the total amount coming to 55,329,484,235 RMB. Seeing that the tax revenue of Chongqing city from January to October 1950 came to 298,538,150,880 RMB, the extremely large scale of the policy of processing, ordering, and purchasing is evident.

The contracts drawn up in connection with this policy were not directly between the government and the contracted enterprises. Concerning contract procedures for ordering, the Department of Commerce and Industry first gathered orders from each section, allocated by bidding in the "Meeting of Processing and Ordering" held several times a month. The PCCCI dispatched representatives to this meeting who, after they received the bids, allocated the work to each member enterprise. In addition, when the government concluded a contract with an enterprise after the PCCCI had allocated the work, the PCCCI's signature was needed.

Regarding processing and ordering by the PCCCI from August to October 1950, many orders were placed by military-related institutions, including the Department of Munitions, and infrastructure institutions such as the Southwest Railroad Bureau. Most of the commodities ordered were industrial products such as canvas, medicinal supplies, military uniforms, tobacco, pots, and electric wire. The amount of processing, ordering and purchasing increased rapidly from September 1950, totaling 39,049,349,048 RMB (+6,000 parity units + 611,053 shi [1 shi = 1,00 l]). This amount accounted for over 70% of Chongqing city's total processing, ordering, and purchasing. From this standpoint, it can be thought that the PCCCI had the authority to carry out the processing, ordering, and purchasing on behalf of the People's Government.

3.4.2 Commercial and Industrial Loans

The PCCCI also carried out another promotion for commerce and industry. As mentioned above, the distribution of goods and the flow of funds were still disrupted in the early 1950. In May, when raw silk was listed on the commodity market, there was an increase in demand for funds for purchasing and soon there was insufficient

money in circulation. The PCCCI, the People's Bank of China, and the Department of Commerce and Industry coordinated a "Commercial and Industrial Loan" to make up for the shortage of funds.

The Commercial and Industrial Loan was coordinated by the United Banks Syndicate consisting of the People's Bank of China, Young Brothers Banking Corporation, Xinhua Bank and the Chinese Industrial Bank, under the supervision of the PCCCI. Key industries such as transportation and the coal mining industry became the object of the loan. At first, United Banks Syndicate made 48 billion RMB in loans to the shipping industry. After that, they also allocated 80 billion RMB in loans to PCCCI member enterprises, with a ratio of 80% to industry and 20% to commerce. In addition, they granted further loans secured by contracts for processing, ordering and purchasing.

These loans were screened and guaranteed by the PCCCI. For member enterprises, this meant they had access to operating capital immediately; for bankers, it meant they could avoid the risk of loan loss.

As examined above, the PCCCI used its function of economic intermediation to strengthen its influence. That is why the managers of each enterprise were drawn into the PCCCI.

3.5 Five Antis Campaign, Socialization and the End of Trade Associations

3.5.1 Five Antis Movement

The Chongqing CCI, which reorganized and absorbed the trade associations in Chongqing, became the Chongqing Municipal Chamber of Industry and Commerce (CCCI) in January 1952. It can be said that the CCCI was an organization for the Communist Party to establish indirect control between the government and private business owners to integrate the operations of enterprises that the government could not control. At the same time, the Three Antis and Five Antis Campaign that tried to treat economic activities as political issues. These were the nationwide mass movement to develop the Three Antis Campaign (against corruption, wastefulness, and bureaucratism of the party cadres) started in November 1951. The Five Antis Campaign (against bribery, tax evasion, embezzlement of state materials, cutting corners on projects and materials, and leakage of state economic information by the bourgeoisie) started in January 1952. The latter had a great impact on the national capitalists and industrialists.

In Chongqing, the campaign began in February 1952, one month later than central China. At the campaign time, the Chongqing government organized the inspection teams consisting of 3,000 executives from various Chongqing municipal organizations and students from universities and junior high schools. It developed into a

large-scale campaign through mass mobilization, including holding various meetings such as the expanded meeting of Chongqing Municipal People's Consultative Committee members and the organization of demonstration marches. In this context, the enterprises were classified into five categories: (1) legal enterprises (those that have not committed any illegal activities); (2) basically legal enterprises (those whose total illegal income is less than 2 million yuan and not malicious according to their confession and the government's records); (3) half-legal, and half-illegal enterprises (those whose illegal income exceeds 2 million yuan and whose illegal activities have not caused serious harm, except for direct harm to the state as well as the people); (4) Strictly illegal enterprises (those whose illegal income is large and causes serious harm, or those who refuse to confess even if there is no serious harm); (5) Completely illegal enterprises (those who have caused serious harm to national social construction projects—especially national defense military facilities—, the people's safety, or those who have organized mass-theft). In addition to being ordered to pay fines and restitution of ill-gotten gains according to their respective categories, those who fell into categories (4) and (5) above were tried in the "Five Antis" People's Court and subjected to criminal punishment, including fines, imprisonment, and the death penalty (Beijing Shi Renmin Zhengfu, 1952, pp. 15–17). In Chongqing, 37,155 industrial and commercial enterprises participated in the Five Antis Campaign, of which (1) 10,709 (28.8% of the total) were the legal enterprises, (2) 21,276 (57.3%) were the basically legal enterprises, (3) 4,477 (12%) were the half-legal, and half-illegal enterprises, (4) 556 (1.5%) were the strictly illegal enterprises, and (5) 137 units (0.4%) were the completely illegal enterprises (Chongqing Shi Zengchang Jieyue Weiyuanhui, 1952).

Under these circumstances, the member companies of the Chongqing CCI took hard to damage. For example, in June 1952, the Young Brothers Banking Corporation, a Chongqing Financial Industry Association member, began to be held legally responsible for banking management. In the board of directors meeting of the bank, it was reported that the government's approval of the bank had been changed from "completely illegal" to "strictly illegal" and "half-legal, half-illegal." Efforts were underway to approve the bank as "basically legal" and plan to return any ill-gotten gains. At the board of directors' meeting of Young Brothers Banking Corporation, it was reported that key managers, such as accountants were unable to carry out their duties. This is because they had to confess to the Five Antis Campaign, and that some of the board members' qualifications had been revoked because of the judgment on the Five Antis Campaign. These reports indicate that the management of Young Brothers Bank was affected by the Five Antis Campaign to a considerable extent. It is not difficult to imagine that the Five Antis Campaign exerted great pressure on private enterprises to convert to socialism.

3.5.2 The Joint Operation, Joint State-Privately Operation, and the Demise of Trade Associations

At the same time, the Communist Party was promoting mergers and unification of enterprises by using joint operations (*lianying*) and integration of joint public–private operations (*gongsi heying*). The Joint operation integrates personnel rights and management rights among several enterprises on the premise that each enterprise retains its legal status and profits. Based on the shares of each enterprise acquired through the confiscation of hostile assets and capital increase, the Communist Party dispatched a "Government representative" (*Gonggu daibiao*). He was to represent the government shares to have a say in the shareholders' meeting and strongly promoted the participation in Joint operations by utilizing the structure of indirect control obtained through the CCI. In Chongqing, for example, by participating in Joint operations, the nine private banks were integrated into three: "Chongqing Public and Private Bank Xinhua Bank," "Chongqing Public and Private Bank Hecheng Bank," and "Chongqing Public and Private Bank Young Brothers Bank." These banks were placed under the centralized control of the General Administration of Public and Private Banking Union, established in Shanghai in May 1951. These banks were then merged into the General Administration of Public and Private Bank, established in Beijing in December 1952. They became a branch of the General Administration of Public and Private Bank. In this way, the management rights of private banks were completely taken out of the hands of the capitalists, and the entire commercial banking industry was merged into the public–private sectors in 1953.

The Chongqing Association of Industry and Commerce became an obscure entity in this process. First, in August 1952, the Association was made a subordinate organization of the Chongqing Municipal Federation of Industry and Commerce. Furthermore, in November 1953, the personnel and property rights were unified with those of the Chongqing Municipal Federation of Industry and Commerce, and it lost its position as an independent organization. And in November 1958, it was resolved to abolish the Association of Industry and Commerce. Here, the trade association, which had continued to function as an autonomous organization in Chinese history, finally disappeared from the scene.

Conclusion

This study has examined the socialist transformation by the CCP, focusing on the case of the reorganization of intermediate associations in Chongqing. First, the Communist Party "expropriated" Chongqing against the backdrop of its military power. At the same time, it developed a huge amount of public works, such as railway construction and processing outsourcing orders. This had a major impact on the Chongqing economy under the recession, and at the same time created new business opportunities around the Communist Party's administration. The Chongqing PCCCI increased its influence by acting as an intermediary for these activities. Most of the members elected to the council were managers of large and influential enterprises

in Chongqing. Once they became council members, they were required to participate in various study campaigns, clarify their financial situation, and purchase public bonds. Despite this, the Chongqing PCCCI attracted people to join it because it was of great significance for the business of private enterprises to survive the new trend that emerged after the change of government.

The socialist transformation of the Trade Associations promoted in the 1950s brought together the various organizations, practices, and social relations that had colored China's social economy into a consolidation centered on the CCP. In this sense, the socialist transformation by the CCP was an attempt to ensure stability by restricting the free operation of the social economy and keeping economic activity within each region through centralization of power and profit in the regime and the containment of critical forces. In contrast, the socialist transformation promoted by the CCP was also an attempt to introduce other-oriented and broad-based rules backed by state power. This seemingly a contradictory situation glimpsed in the socialist transformation led to the formation of another principle of decentralization and the development of the so-called "Economies of Feudal Princes (*zhuhou jingji*)" after the Reform and Opening-up Policy, which coexisted with the orientation toward the integration of development dictatorship. In this sense, the 1950s can be said to be the starting point for the formation of "regions" in modern China.

Notes

1. Masubuchi Tatsuo's theory of "chivalrous customs" (Masubuchi, 1996) and Kato Hiroyuki's theory of "ambiguous institutions" (Kato, 2016) are expressions of this awareness of the problem.
2. In premodern China, there were various intermediate institutes such as *huiguan* (institutions from the same province), *gongsuo* (business association). These institutions kept the interests of their members with the "*Bang*" organization, also played a role in the associations of urban autonomy. After the National Government era, these institutes were reorganized into the official institutions through the governmental registration. In this chapter, the Tongyegonghui means such official institutions. (Shanghai Shuppan Kyoukai Chousabu, 1925).
3. Early top-level administrative divisions of the People's Republic of China that directly governed provinces and municipalities under the control of the Central People's Government. There were six greater administrative areas such as *Dongbei* (Northeast), *Huabei* (Northern China), *Xibei* (Northwest), *Huadong* (Eastern China), *Zhongnan* (Central and South), *Xinan* (Southwest), and each had the People's Government and the Military and Political Committee. They were dissolved in 1954. (Amako et al., 1996, p. 682).
4. Born in Zhejiang Hangzhou in 1876. Joined Hanlin School. After the Qing-Japanese war, he went to Japan to study, entered Hosei University, and subsequently joined the Wushu Revolutionary Movement. After the Xinhai revolution, he became a senator of the first national congress, president of Shanghai Commercial Press, and president of Zhejiang Xingye Bank. In the Sino-Japanese war era, he joined the anti-Japanese savings movement, which led to the Shanghai Municipal Association of Peoples Unification formation. After the establishing the PRC, he became a senator of Central People's Government, vice chief of the committee of All National Congress, and chief delegate of the All-National Chamber of Commerce and Industry. He died in Beijing in 1966. (Amako et al., 1996, p. 891).

5. Born in Hongdong, Shanxi Province in 1895. He participated in the Xinhai Revolution and joined the Communist Party of China in 1926. He worked under Feng Yuxiang, and at the time of the Xi'an Incident, as secretary to Yang Hucheng, he worked to imprison the former President Chiang Kai-shek. He later became the deputy director of the Central United Front Department of the CPC, the director of the Finance and Administration Office of the Shanxi Gansu Ningxia Border Regional Government, and the secretary-general of the Council. After the founding of the People's Republic of China, he served as the general manager of the People's Bank of China, the chairman of the Bank of China, and the chairman of the China Council for the Promotion of International Trade. In 1963: vice president of the China-Japan Friendship Association. Persecuted during the Cultural Revolution and died in 1967. (Amako et al., 1996, p. 974).
6. Born in 1897 in Qingtian, Zhejiang Province. In 1936, he participated in founding of the Shanghai Association for the Salvation of All Spheres. He was counted as one of the seven sovereigns of the anti-Japanese war era. He was criticized for his anti-rightist struggle in 1957, and his honor was restored in 1980. He died in 1977. (Amako et al., 1996).
7. Born in Wuxi, Jiangsu Province, in 1916, he graduated from Shanghai St. John University in 1937, and worked as an accountant and director of Wuxi Maoxin Flour Company and Shanghai Sanxin Bank. After founding of the People's Republic of China, he joined the China Democratic National Construction Association and became a member of the Eastern Military Commission's Finance and Economic Committee. 1957, Deputy Mayor of Shanghai; 1959, Deputy Director of the Textile Industry Department of the State Council. After being disqualified by the Cultural Revolution, he became the first chairman and general manager of CITIC in 1979, vice president of the State Council in 1993, and died in 2005. (Amako et al., 1996, p. 46).
8. Born in Chongqing, Sichuan Province, in 1897. After graduating from Peking University, he was involved in managing several enterprises, including Chairman and General Manager of Chuankang Industry Corporation, and served as a councilor of the National Consultative Assembly, Director of the Sichuan Provincial Construction Agency, and Chairman of the Chongqing Municipal Council. After the founding of the People's Republic of China, he served as a member of the Southwest Military Commission, a member of the Southwest Administrative Commission, the vice mayor of Chongqing, the central vice president of the Democratic People's Republic of China, the president of the National Federation of Industry and Commerce, and the chairman of the China Industry and Commerce Economic Development Corporation. (Amako et al., 1996, p. 355).
9. The term refers to Communist Party cadres who moved from the "Old Liberated Area" in northern China to the "New Liberated Area" in southern China as the People's Liberation Army moved southward. In Chongqing, the mainstream cadres were those in the Second Field Dispatch Army of the People's Liberation Army (commander: Liu Bocheng, political commissar: Deng Xiaoping).
10. According to a report, because of the lack of expenditure, PCCCI obtained loans of 100 million RMB from banks in the beginning. "Report on the Work of the Preparatory Committee of the Chongqing Municipal Confederation of Industry and Commerce (6) (31 July to 12 August 1950)," *Chongqing Municipal Confederation of Industry and Commerce Archive* (Chongqing Municipal Archive, [1040-1-6]).
11. Born in 1910 in Jiangsu Province. After studying anthropology at Yanjing University and Tsinghua University, he studied social anthropology under Malinowski at the London School of Economics and Political Science, where he received his doctorate. After returning to China, he served as a professor at Southwest Union University and Tsinghua University, joined the Chinese Democratic League in 1945, and from the 1950s onward, while serving as a professor at Peking University, focused on ethnographic research and became deeply involved in ethnic identification. He was criticized for his anti-rightist struggle, but in 1978 he joined the Chinese Academy of Social Sciences and revived sociology as director of the Institute of Sociology. He was influential in establishing new perspectives in China after the Reform and Opening-up

Policy, such as the Chinese-style intrinsic development model and the theory of the Chinese ethnic pluralistic integrated structure theory. (Amako et al., 1996, p. 1065).

12. To hedge the risks of the currency inflation, CCP established "Parity Unit Rates" (Zheshi Danwei Paijia). In southwest China, 1 parity unit formally was converted into the amount of RMB of the commodities as follows: 3jins (=1.5 kg) of Dahe fine rice, 1 shichi (=1/3 m) of Shuangxi white textile, 1liang (=50 g) of oil, 1liang of salt, 3jins of coal. "The Regulation of the Salary Standard of the Military Committee of Chongqing (January 1950)". (Zhonggong Chongqing Shiwei Dangshi Gongzuo Weiyuanhui, 1985, pp. 168–169).

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Chapter 4
Examination of Collective Farming from Production Cost Survey

Hisatoshi Hoken

Abstract This chapter examines the profit structures of farm management under the People's Commune by using a production cost survey and re-calculated the amount of net revenue utilizing our hypothetical wage for agricultural labor. The estimated results showed that the levels of hypothetical wages were consistently lower than those of official standard wage for major crops. Moreover, the amount of net revenue for major crops by use of the hypothetical wage recorded consistent surplus during the Mao era. These results suggested that production teams generated positive revenues from agricultural production and the surpluses were siphoned off through higher-level organizations such as brigades and communes to urban areas.

Introduction

The People's Commune was the most powerful and influential administrative and socioeconomic organization in rural China during the Mao era. Collective farming under People's Commune formulated the structure of agricultural production and marketing in China. Therefore, to evaluate the efficiency of agriculture during the Mao era, it is essential to examine the functions of the People's Commune as a principal entity of agricultural production as well as an important player in agricultural marketing.

In the context of agricultural organization, land-owned farm households, which were created as a result of land reform in the 1940s and the early 1950s, were forced to undergo a fundamental change by the radical agricultural collectivization movement that began in the mid-1950s. During this movement, all farmers and rural residents were forcibly absorbed into rural cooperatives and were obliged to join the People's Commune. It encompassed a vast range of rural activities, including industry, agriculture, commerce, schools, and the militia, as well as the administrative functions of the township government to control all aspects of rural society.

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Simultaneously, the Chinese government implemented strict controls over agricultural marketing in 1953. The system was called the "unified purchase and unified supply system" (*tonggou tongxiao*), and free market transactions of agricultural products were strictly restricted since the mid-1950s. Under this system, government departments monopolized the procurement of agricultural products, mainly grain, from agricultural producers at official prices and distributed these to urban residents.[1] The People's Commune and this marketing system worked closely together to form a mechanism by which the government directly controlled all aspects of agriculture and the rural economy.

Until the early 1980s, there were few academic studies on People's Commune. This is mainly because the Chinese government severely restricted both domestic and foreign academic field surveys to investigate real situations in rural China, and maintained tight control over information on the rural economy for political purposes. However, since the 1980s, field surveys and academic research on rural China have been officially permitted, and academic literature on the examination of the people's commune has begun to develop considerably (Tajima, 1996). The representative literature that focuses on People's Commune is Putterman (1989), Putterman (1993), Cao et al. (1995), Zhang (1998), Zhang (2007), Huang (2011), and Huang and Zhang (2016). These micro level studies have revealed the practical administration of labor allocation and its reward, social functions as a rural community, and the intermediate role of capital transfer from rural to urban areas during the prevalence of People's Commune.

However, macro-level analysis of agricultural production and its marketing during the Mao era has received less attention from academic researchers. Hence, some aggregated statistical data have not been fully utilized despite their importance. One of these is the production cost survey of agricultural products (published as *the Compilation of Production Cost Data on Agricultural Products*), which started in 1953 and continues to date. The survey was suspended during the period of the Cultural Revolution, and the survey design has also changed over time. Until the early 1990s, detailed summary data from this survey were treated as internal documents and only selected summary data were disclosed and utilized in statistical analysis and research articles. The survey includes information on production costs for major grains (rice, wheat, and corn), major crops (e.g., cotton, tobacco, and oilseed rape), and livestock products (pig and poultry farming). Thus, it is useful for understanding the actual status of agricultural activities during this period.

Han and Feng (eds.) (1992) was probably one of the earliest studies to conduct a systematic analysis of agricultural management and marketing using survey data. Some Japanese researchers, such as Nakagane (1992) and Matsumura (2011), also utilized the survey data to examine agricultural management in the 1960s and the 1970s. These macro-level studies complement micro-level analyses to examine the efficiency of collective farming under the People's Commune, contributing to an accurate re-evaluation of development policies during the Mao era.

Considering the importance of collective farming in rural society and the economy, this chapter aims to elucidate the characteristics of agricultural management and calculate the amount of economic surplus under People's Commune based on a production cost survey. More specifically, we utilize the data of commodity-specific production cost to decompose agricultural income into yield and margin and clarify the determinants of its variation. Furthermore, by calibrating the hypothetical wages of farm labor, we measure the labor remuneration that could be distributed to agricultural workers and estimate the amount of agricultural surplus. These analyses would enable us to provide new macroeconomic insights into collective farming and people's lives.

The remainder of this chapter proceeds as follows. Section 4.1 outlines the characteristics of agricultural production and its management under People's Commune and examines the living conditions of rural people on a statistical basis. Section 4.2 explains the design of the production cost survey and summarizes the characteristics of agricultural management. Section 4.3 describes the factor decomposition of agricultural net revenue into yield, margin, and cross term and examines the amount of agricultural surplus under the hypothetical wage. The final section concludes the discussion and explains the remaining issues to be addressed.

4.1 Agricultural Organization and Marketing System During the Mao Era

4.1.1 Agricultural Marketing Under the "Unified Purchase and Unified Supply System"

In examining agricultural management under People's Commune, it is necessary to summarize the structure of the agricultural marketing system at that time. After the establishment of the People's Republic of China (PRC) in 1949, the total amount of grain production steadily increased until the mid-1950s but the amount of commercial grains available for urban residents was still insufficient due to rapid urbanization and industrialization, causing frequent hikes of grain prices in urban areas (Sun, 1991).

To ensure an equitable and efficient distribution of grains among urban consumers, the Chinese government formally introduced the "unified purchase and unified supply system" in 1953, which gave state agencies a monopoly in grain procurement and distribution. Under the system, a delivery quota, known as "fixed quota for purchasing" (*dinggou*), was assigned to each individual farmer (later to each production team) specifying the amount of grain and the official fixed price. Meanwhile, grain coupons were allocated to urban residents at a low price for use only in state grain shops, food stores, and restaurants. Oil crops and cotton were also included in this monopolistic marketing system (Zhong, 2004). All shops and factories that were involved in the distribution or processing of grain, including public–private joint

capital, were under the control of the state grain department and prohibited from engaging in independent activities (Ikegami, 1989; Zhou, 2000).

In addition, the "purchase by state quota system" (*paigou*) was introduced at the end of 1955, and the more than 100 items of major agricultural produce (e.g., pork, major fruits, marine products, vegetables, tea, hemp, cocoons, and sugar cane) were administratively controlled. Under the state quota system, the government determined the items, quantities, and prices of the purchased crops and allocated a specified quota to peasants and producers to supply their products to the state. The remainders of the agricultural products after fulfillment of their quotas were allowed to be shipped to the market for sale (Zhou, 2000).

The intensification of direct control over agricultural products was closely related to the substantial increase in population and stagnation in grain supply per capita. Grain production experienced a significant decline during the Great Leap Forward (GLF) and recovered in the mid-1960s. Meanwhile, China's population growth rate also remained high. Thus, grain production per capita did not exceed the level existing in the mid-1950s, throughout the Mao era. More specifically, the amount of grain production per capita exceeded 300 kg for the first time in the mid-1950s and remained at this level thereafter, but fell to around 200 kg during the GLF. Although the amount of grain production per capita recovered to 287 kg in 1966, growth remained stagnated until 1974, when the grain production per capita exceeded 300 kg.[2] Therefore, it appears that the major purpose of implementing a monopolistic marketing system was to maintain a steady food delivery to urban residents at the cost of rural people.

The changes in the official procurement price and retail price (rationing price) for major grains are summarized in Fig. 4.1. These prices are the weighted averages of six items from 1950 to 1984 and four items from 1985 to 1988.[3] From the early 1950s to the GLF, the retail price of grain was set about 40 to 60% higher than the procurement price from farmers. Therefore, the government was able to obtain a positive margin from transactions (Zhou, 2000). However, reflecting the serious reduction in agricultural production during the GLF, the government decided to increase the procurement price of grain by 24.6% and 16.1% in 1961 and 1966, respectively.

Meanwhile, the retail price of grain was slightly raised by 7–8% in 1965–1966 and was preserved at almost the same level throughout the Mao era. As a result, the margin between retail and purchase prices was considerably diminished, accounting for only 11–14% from 1960 to 1978. Considering the transaction costs involving grain procurement and its distribution, China experienced substantial losses from the transaction.[4] Under the direct control of agricultural marketing, urban residents were able to enjoy relatively cheap food, but the system was sustained with the help of tremendous policy interventions. It also imposed a financial burden on agricultural production and marketing.

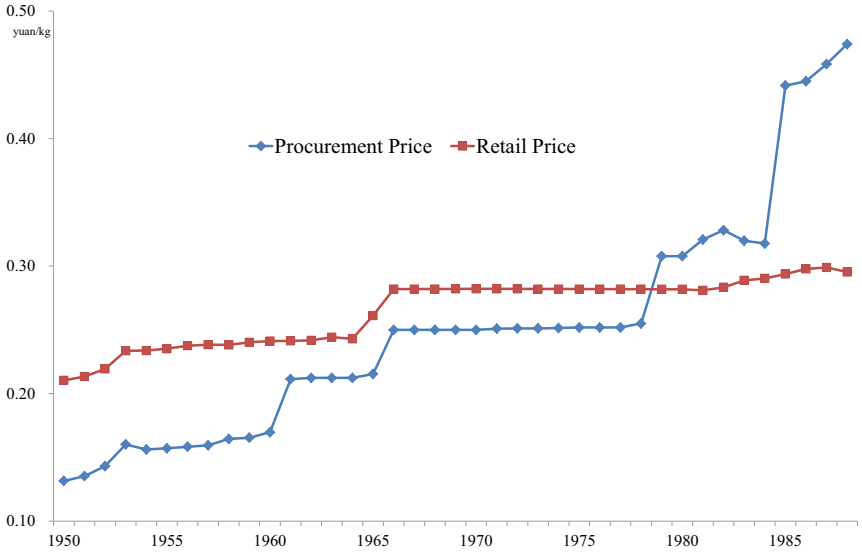

Fig. 4.1 Changes in procurement and retail prices for major grains. *Source* Author's Estimation based on Han and Feng (eds.) (1992).

Notes

1. The procurement prices are calculated based on the weighted average of the current year's volume of procurement for six items (wheat, rice (unhulled), millet (unhulled), corn, kaoliang, and soybeans) during 1950–1984 and the weighted average of the current year's volume of government purchase for four items (wheat, rice (unhulled), corn, and soybeans) during 1985–1988.
2. The retail prices are calculated based on the weighted average of the five-year retail volume for six items (flour, rice, millet, corn, kaoliang, and soybeans) during 1950–1984, and the weighted average of the current year's retail volume of four items (flour, rice, corn, and soybeans) during 1985–1988.
3. The conversion rate from "raw grain" to "trade grain" is set to 0.844

4.1.2 Production Team as an Independent Profit-Accounting Unit

Meanwhile, the modifications of agricultural institutions were substantially implemented according to changes in the political atmosphere since the mid-1950s, and the institutions experienced several twists and turns. This subsection focuses on the period after the 1960s when the normalization of People's Commune was advanced. We summarize the characteristics of the three-tier structure of People's Commune (commune, brigade, and production team).

At the Party Congress held in September 1962, the "Regulation on the Rural People's Commune (Revised Draft)" (commonly referred to as "Article 60 on Agriculture") was adopted and referred to as the basic legal rule for People's Commune. In Article 60, the production team was defined not only as an organization of the rural labor force but also as the basic profit-accounting unit of the People's Commune,

which owned the means of production. The production team was also directly responsible for preparing specific cultivation plans and determining the method of profit distribution. Article 60 also stipulated that the production team would collectively own the land and have decision-making power over production and residual distribution. The brigade above the production team would own and manage relatively large capital equipment such as irrigation systems and tractors. One production team comprised approximately 20–30 farmers, and one brigade consisted of approximately 10 production teams. Moreover, the Party branch was supposed to be established at every brigade to enforce orders from the Chinese Communist Party (CCP). One commune was made up of approximately 10 brigades, and the coverage of the commune normally corresponded to the township government.

In addition, the production team was obliged to pay agricultural taxes and submit specific volumes of grain, cotton, oilseed rape, and other products to state agencies to achieve production plans. The production team received various instructions from the brigade and commune. It also ensured employment and food distribution for their team members. All production teams had to withhold a certain amount of revenue or food under the pretext of common accumulation fund, common welfare fund, and emergency food stock at the end of the fiscal year.[5] Meanwhile, members of the production team were allocated private plots for their own use, and the total size of these plots was less than 5% of the total size of farmland in the region (Sun, 1991; Yan, 2002).

The efforts of agricultural workers in collective farming were evaluated as work points in the production team. The maximum value of the daily work point was set at 10 points, and the actual value allocated to workers was adjusted according to the quality of their labor as well as the type of work. The unit price of work points was the amount of total disposable revenue divided by the total number of work points distributed to the workers. However, it was considerably difficult for team leaders to properly monitor the practical contributions of each worker because the farming workplace was geographically dispersed and its outcome was influenced by weather conditions. Furthermore, it involved considerable difficulties in fairly and precisely evaluating the contents of each work and its labor intensities. Therefore, in practice, a simple method was widely adopted to evaluate work points. Specific and normalized points were given according to gender, age, and burden of labor, such as 5 points for men's half-day labor and women's full-day work (Huang, 2011; Shimakura, 1980).

The difficulty in strictly assessing labor contributions and the convenient allocation of work points caused a serious deterioration in work motivation for farmers. This evaluation system induced farmers to eagerly engage in sideline jobs using their own plots and housing. Sideline jobs included animal husbandry, fruit and vegetable cultivation, weaving, basket making, sewing, and embroidery services. During the GLF and the Cultural Revolution, sideline jobs were severely criticized as "tails of capitalism." The farmers were discouraged to engage in these jobs during the period. However, income from these sideline jobs was indispensable for rural residents to maintain their livelihoods throughout the Mao era, accounting for more than 30% of their income (Hamaguchi, 2019; Sun, 1991).[6]

Alternatively, the mechanization of agriculture was supposed to facilitate economies of scale and improve the efficiency of collective farming. However, the introduction of agricultural machines, especially combine harvesters and rice planters, did not advance during the Mao era. Hence, collective farming continued to adopt labor-intensive technology utilizing manual labor. This was mainly because fiscal support from central and local governments was considerably deficient and geographic conditions severely restricted the adoption of farm machinery. This labor-intensive approach was also utilized for the formation of fixed capital, such as irrigation construction and land improvement (Tajima, 1989).

At the field level, collective farming was mainly conducted under the direction of the production team leaders. Severe comments and complaints of farmers concerning collective farming were generally directed to their leaders. Hence, the leaders were always caught in a dilemma between orders from upper organizations and demands from their team members, leaving them in a difficult position. In addition, team leaders needed to exert strong leadership in motivating rural workers (Hamaguchi, 2019; Kobayashi, 1997; Tahara, 2008). However, it was difficult for the CCP to prepare a large number of capable leaders in all rural regions, resulting in weak and insufficient cohesion of production team management (Nakagane, 1992).

4.1.3 Food Expenditure of Urban and Rural Residents

To depict the standard of living of Chinese people during the Mao era, the changes in Engel's coefficients for urban and rural households are summarized in Fig. 4.2. Because political turmoil interrupted official statistical activities including household survey, several discontinuities in Engel's coefficients are observed in the figure. As shown in Fig. 4.2, Engel's coefficients were considerably high during the early 1950s through the mid-1960s, accounting for 58.4% (urban) and 68.6% (rural) in 1954 and 59.2% (urban) and 67.1% (rural) in 1964. Compared with the Engel's coefficients (35–40%) of non-farm Japanese households in the 1960s (high economic growth period), it is apparent that the Engel's coefficients of China during the Mao era were remarkably high.[7]

Due to the interruption of the household survey, the trend of Engel's coefficients during the Cultural Revolution could not be identified. However, considering the levels of the Engel's coefficients in 1978, which accounted for 57.5% of urban households and 67.7% of rural households, no remarkable gap was observed before or after the Cultural Revolution. Therefore, it can be inferred that food consumption was the most important expenditure for both urban and rural households throughout the Mao era, and the provision of sufficient and cheap food to the people was one of the most important policy duties for the Chinese government.

To examine the living standards of rural households in detail, Fig. 4.3 summarizes the changes in the amount of per capita annual income and grain consumption from the mid-1950s to the mid-1980s. As shown in the figure, the income (nominal) increased from approximately 70 yuan in the mid-1950s to 100 yuan in the early

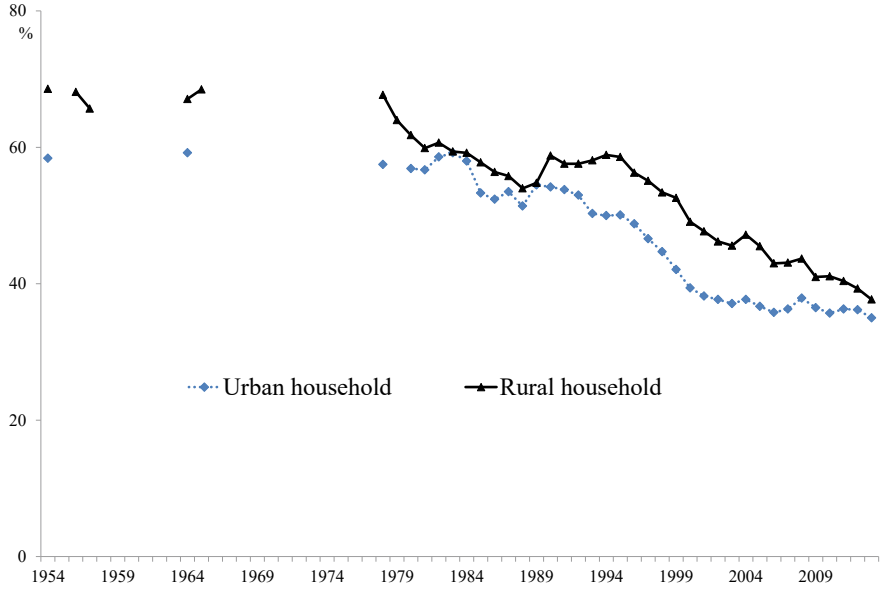

Fig. 4.2 Engel's coefficients for urban and rural households. *Source* Guojia Tongjiju Guomin Jingji Zonghe Tongjisi (ed.) (2010) and *Zhongguo Tongji Nianjian* (China Statistical Yearbook) (various issues).
Note Food consumption in the rural household survey includes self-consumption. The amount of eating-out is not included in the food consumption for both urban and rural household surveys

1960s. However, the amount remained at almost the same level in 1976 and 1977, accounting for approximately 115 yuan. Meanwhile, the amount of per capita grain consumption ranged from 230 to 250 kg in the mid-1950s and deteriorated to 210 kg in the early 1960s. In the late 1970s, the amount of grain consumed recovered to the mid-1950s level. From the rural household survey, almost the same trend can be observed for other major foods such as oilseed, meat, and eggs, suggesting a severe livelihood in rural China during the Mao era.

Comparing per capita income before and after the late 1970s in Fig. 4.3, we notice that the nominal per capita income (nominal) exhibited a substantial and rapid increase from 160 yuan in 1979 to 270 yuan in 1982 and further to 398 yuan in 1985. By contrast, the amount of grain consumption stagnated at around 260 kg from the late 1970s to 1985. However, it should be noted that the composition of grain consumption changed drastically during this period. More specifically, as shown in the line graph in Fig. 4.3, the percentage share of fine-grain consumption, including rice and wheat, steadily increased from 50% in the late 1970s to more than 80% in the mid-1980s. These results indicate that rural residents were able to enjoy more fine grains while reducing the amount of coarse grains (e.g., corn, millet and sorghum). The improvements in food consumption of rural households can be observed not

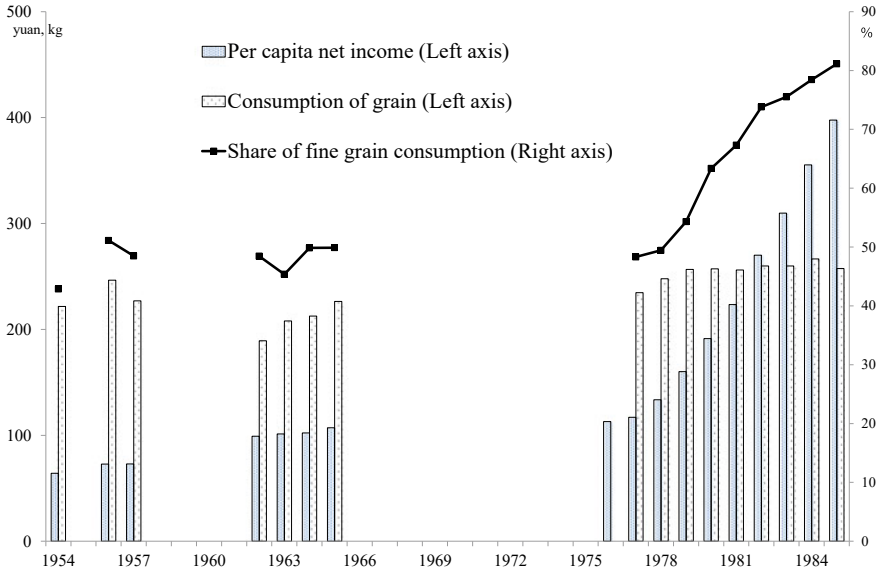

Fig. 4.3 Per capita income and grain consumption of rural residents. *Source* Guojia Tongjiju Nongcun Shehui Jingji Diaochasi (various issues) and *Zhongguo Tongji Nianjian* (China Statistical Yearbook) (various issues)

only for staple food, but also for other food such as vegetables, oilseeds, meat, eggs, and dairy products since the early 1980s as indicated by the rural household survey.

4.2 Characteristics of Collective Farming from Production Cost Survey

4.2.1 Overview of Production Cost Survey

Based on an examination of the institutional features of agriculture, this section utilizes a production cost survey to examine the actual situation of agricultural management during the Mao era from a macroeconomic viewpoint.

The varieties of crop included in the production cost survey (1953–1978) were rice (early indica rice, late indica rice, japonica rice, and the average of three varieties of rice), wheat, corn, soybeans, cotton, tobacco, peanut, oilseed rape, and sugar cane. Average data for major grains (rice, wheat, and corn) and major oilseeds (peanut and oilseed rape) were also reported in this survey. However, because of mismanagement of the original datasheets, there were several missing data points in this survey. Specifically, only the national average data were reported (no province-level data) for 1953–1965, and the breakdown data of material costs for some regions were missing

for 1975–1978, causing several inconsistencies between the national average and the sum of material costs. For these reasons, we utilize national average data for the examinations.

The survey's production data consisted of the volume and value of the main products and their by-products, and the average price of sales data is also included in the survey. Meanwhile, production costs can be disaggregated into material input expenditures, labor costs, and taxes. The material input expenditure consists of direct costs (seeds, fertilizers (farmyard manure and chemical fertilizer), pesticides, agricultural plastic, livestock, machinery, irrigation, fuel, and power) and indirect costs (depreciation of assets, repair of small farm machinery, administrative costs, and marketing costs). Labor cost was calculated by multiplying the average number of working days for each crop by the "standard wage" per day (explained later), and tax expenditure is aggregated in total, with no breakdown data.

Two types of crop-specific revenue indicators were presented in this survey: "net output value" (*xianjin shouyi*) and "net revenue" (*jing lirun*). The net output value denotes the total value of production minus material input expenditure, and net revenue denotes the net output value minus labor costs and taxes. Although land rent fees and imputed values of self-cultivated land should be included in the standard production cost survey, these items were not surveyed or reported until 2004. Therefore, the impact of land rental fees on collective farming cannot be examined in this study.[8]

4.2.2 Factor Decomposition of Agricultural Income

To identify the determinants of net output value (or net revenue), we decomposed it into land productivity and profitability. More specifically, we denote the amount of net output value (or net revenue) as π, the size of cultivated farmland as T, the amount of production volume and its sales price as Y and p, respectively, and the production cost as c. Net output value or net revenue per cultivated farmland can be decomposed into the following:

$$\frac{\pi}{T} = \frac{(pY - c)}{T} = \frac{Y}{T}\left(p - \frac{c}{Y}\right) = \text{yield} \times \text{margin} \tag{4.1}$$

The net output value per cultivated farmland can be divided into the product of yield (Y/T) and margin (the gap between the sales price and unit production cost). Furthermore, when Eq. (4.1) is fully differentiated for time and divided by the net output value (or net revenue) per farmland, the following equation can be derived:

$$\begin{aligned}\Delta\left(\frac{\pi}{T}\right)\Big/\left(\frac{\pi}{T}\right) = \Delta\left(\frac{Y}{T}\right)\Big/\left(\frac{Y}{T}\right) + \Delta\left(p - \frac{c}{Y}\right)\Big/\left(p - \frac{c}{Y}\right) \\ + \Delta\left(\frac{Y}{T}\right) * \Delta\left(p - \frac{c}{Y}\right)\Big/\left(\frac{\pi}{T}\right)\end{aligned} \tag{4.2}$$

Equation (4.2) indicates that the rate of change in net output value per cultivated farmland can be decomposed into three parts: the percentage change in yield, the percentage change in margin, and cross term between percentage changes in yield and margin. In decomposing the amount of net revenue, it is necessary to carefully treat the composition of costs, especially labor costs. It should be noted that the wage level of the production cost survey was not evaluated based on field survey but utilized specific wage level (the "standard wage"), which was set at 0.7 yuan per day in 1953–1954 and 0.8 yuan per day in 1956–1980 for all crops.

However, as mentioned above, wages distributed by the production team to its members were calculated based on the total disposable revenue divided by the total number of work points distributed to their workers. Thus, the practical remuneration paid to team members was changed according to the unit price of work points earned by agricultural workers. Furthermore, production teams needed to pay agricultural taxes to the government and achieve a food quota assigned by the government. At the time of settlement, production teams also had to withhold a certain amount of revenue or food as a common accumulation fund, common welfare fund, or emergency food stock, and the remainder became the source of funds available for payment.

To determine the distribution of the residuals, a combination of "distribution according to labor" (*anlao fenpei*) and "distribution according to need" (*anxu fenpei*) was widely adopted for most production teams, and specific share of the combination was determined according to local situations. The term "distribution according to labor" means the way of distribution based on the number of work points, while the term "distribution according to need" indicates the distribution method considering the necessities of food and cash based on the number of household members. Hence, distribution by production teams reflected a form of social security support for poor people (Huang, 2011; Shimakura, 1980). However, because the production cost survey covered only the number of working days per farmland and the amount of wage expenditure, it was difficult to conduct detailed examinations on a complex distribution within the production team. For these reasons, this article examines potential economic rewards to rural residents by use of "hypothetical wages," based on strong assumptions of economics.

Specifically, we assume a Cobb–Douglas production (net output) function for each crop with labor (L), land (T), and capital (K). The elasticities of labor, land, and capital are α, β and γ, respectively, and A is a constant term (technological progress). Thus, the production function can be specified in Eq. (4.3). Furthermore, we assume a perfectly competitive market for agricultural production; thus, the production elasticity of labor coincides with the labor's share (α) of the production distribution. Employing the number of working days of labor and the amount of net output from the production cost survey, the "hypothetical wage" (w^*) can be specified in Eq. (4.4).

$$\pi = A \cdot f(L, T, K) = AL^{\alpha}T^{\beta}K^{\gamma} \tag{4.3}$$

$$w^* = \alpha \frac{\pi}{L} \tag{4.4}$$

In this chapter, we assume the labor's share of the distribution (α) as 40% and calculate the amount of hypothetical wage. Detailed reasons for this setting are described in Sect. 4.3, and a robustness check by changing the labor share is performed. By comparing the hypothetical wage with that of the standard wage of the production cost survey, we can evaluate the extent to which farmers could receive rewards from collective farming over time. By utilizing these procedures, it would be possible to examine the amount of economic surplus from collective farming under People's Commune.

4.2.3 Basic Features of Production Cost Survey

To confirm the characteristics of the production cost survey data, we compared it with nationwide production data published by the National Bureau of Statistics of China. The changes in rice yield as per the production cost survey and the nationwide data are summarized in Fig. 4.4. The amounts of yield for the production cost survey are prone to be approximately 20% higher than that of the nationwide data throughout the Mao era. This is mainly because the survey spots of the production cost survey were not necessarily selected randomly, and major rice-growing regions appear to be intensely chosen to save costs involving field surveys. This resulted in a considerable discrepancy between the production cost survey and the national average.

Meanwhile, the changing trends in the rice yield were almost parallel between the two statistics. A gradual increase in rice yield was observed since the mid-1950s, but the yield fell sharply during the GLF, after which rice yield recovered again in the early 1960s. Although the production cost survey was not conducted during the Cultural Revolution, it was resumed in the 1970s. However, the yields of the production cost survey still surpassed those of the national average since the mid-1970s, showing trends similar to the previous period.[9] Because of space limitations, only rice yield is discussed in this section, but almost similar yield patterns are observed for other major grains (wheat and corn). From these comparisons, it is safe to mention that the reliability of the production cost survey is partly ensured. However, we must also pay attention to the upper bias of the survey.

Next, Fig. 4.5 summarizes the changes in average sale prices (nominal) of the three major grains per kilogram based on the production cost survey. It is apparent from Fig. 4.5 that the sales price of wheat was the highest among grains, and the sale prices of rice and corn were second and third, respectively, without changing the ranking since 1955. The average sales prices of the three grains increased substantially in 1961. Due to the significant failure of the GLF, the Chinese government decided to raise the procurement prices of agricultural products, and the adjustment in sales prices was reflected in the production cost survey. More specifically, the sales price of wheat per kilogram was increased by 26%, resulting in an increase from 0.18 yuan in 1959 to 0.23 yuan in 1961. Similarly, the sales price of corn was also raised to the same extent, but the rate of price increase for rice was relatively smaller, accounting for only 15%.

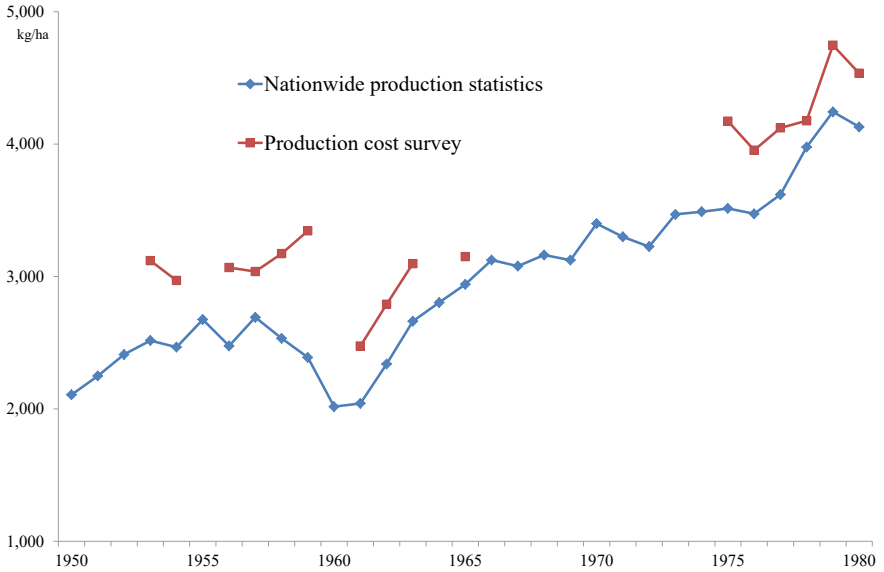

Fig. 4.4 Changes in rice yield. *Source* Guojia Fazhan he Gaige Weiyuanhui Jiagesi (ed.) (2003), Guojia Tongjiju Nongcun Shehui Jingji Diaocha Zongdui (ed.) (2000), and *Zhongguo Tongji Nianjian* (China Statistical Yearbook) (various issues)

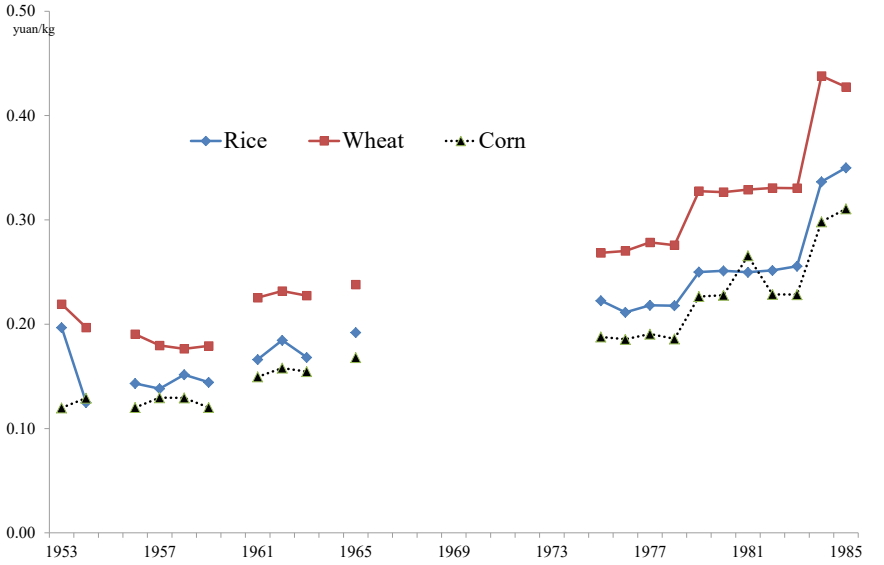

Fig. 4.5 Changes in sales prices for major grains. *Source* Guojia Fazhan he Gaige Weiyuanhui Jiagesi (ed.) (2003)

Due to the interruption of the production cost survey during the period from 1966 to 1974, the sales prices of major agricultural products were missing. However, according to official procurement prices (Fig. 4.1), the Chinese government maintained the procurement price for major grains at almost the same level during the missing period and then began to raise the prices by about 12 to 16% for the first time in the late 1970s. Therefore, the trends in sales prices of the three major grains in Fig. 4.5 were generally consistent with those of government procurement prices in Fig. 4.1.

Furthermore, the changes in labor days per farmland (days/ha) for the three major grain types are shown in Fig. 4.6. The intensity of labor per area for rice was the highest, and those for wheat and corn were relatively low and remained at almost the same level. It is also apparent from Fig. 4.6 that labor intensity exhibited a sharp increase from the mid-1950s to the mid-1960s. Specifically, the number of labor days for rice in 1953–1954 was approximately 200. Since then, labor intensity rose considerably, reaching around 300 days in the late 1950s and more than 400 days in the 1960s. Comparing the intensities before and after the Cultural Revolution, the labor intensity for rice in 1965 and 1975 was 519 and 572 days, respectively, suggesting a gradual increase during the period.

After the introduction of the household responsibility system (HRS) in the late 1970s, the intensity of labor days began to decrease markedly for all major grains. The intensity for rice fell from 501 days in 1979 to 381 days in 1982 and 328 days in 1985. The pattern in which labor intensity continuously increased during the Mao

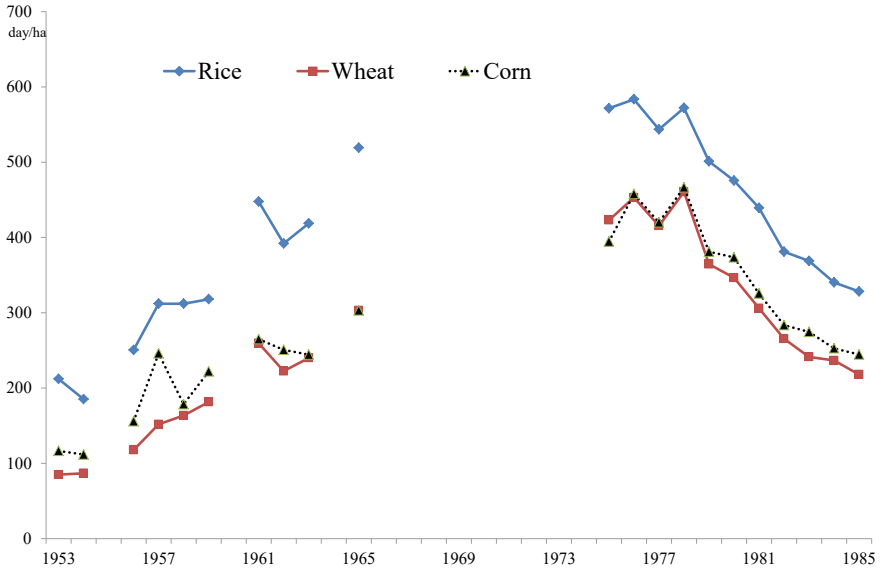

Fig. 4.6 Changes in labor days for major grains. *Source* Guojia Fazhan he Gaige Weiyuanhui Jiagesi (ed.) (2003)

era and then began to decrease rapidly after the introduction of the HRS was also applicable to other major crops such as cotton, sugar cane, and oilseeds. This suggests that labor-intensive agricultural technology was widely adopted and promoted to improve land productivity during the period per the growing rural population and labor force. However, the mechanization of farming was considerably suppressed and underdeveloped due to the deficiency in fiscal support.

4.3 Decomposition of Agricultural Income and Estimation of Agricultural Surplus

Based on the analytical framework described above, this section examines the composition of net production values and net revenue by crop and estimates the more practical economic surplus of collective farming. To clarify the differences between the major grains and other commercial crops, we used the average data of three major grains (rice, wheat, and corn) and compared the estimated results with those of other major crops.

4.3.1 Factor Decomposition of Agricultural Income by Crop

First, we calculated the extent of the crop-specific margin specified in Eq. (4.1). In this procedure, two types of income are examined: Case (1) (net production value = output–physical costs) and Case (2) (net revenue = net production value–labor costs (assessed at the standard wage)–taxes). Figure 4.7 summarizes the trends in the margins of the major grains. As shown in this figure, the margin of Case (1) was positive throughout the period, while the margin of Case (2) had negative values during 1961–1965 and 1977–1978. As explained in Sect. 4.1, the procurement price of grains (the sales price for farmers) was considerably raised in the early 1960s after the GLF. However, this adjustment was still not enough to cover the increases in production costs (mainly labor and material costs). Thus, the margin of Case (2) fell into deficit since the early 1960s. Almost the same trend can be observed when disaggregating the three major grains, and the extent of the margin tends to be larger for rice and smaller for wheat. Since 1979, a significant improvement in the margin for major grains was observed (Fig. 4.7). This tendency was more apparent in Case (2), showing a significant increase in the positive margin. It is mainly due to the introduction of the HRS and the increase in the procurement price of major agricultural products.

To confirm the trends in margins among crops, Fig. 4.8 illustrates the changes in margins (Case 2) for five crops (cotton, tobacco, peanut, oilseed rape, and sugar cane). The overall trends of these crops were similar to those of major grains, showing negative or fewer margins during the early 1960s and the mid-1970s. However,

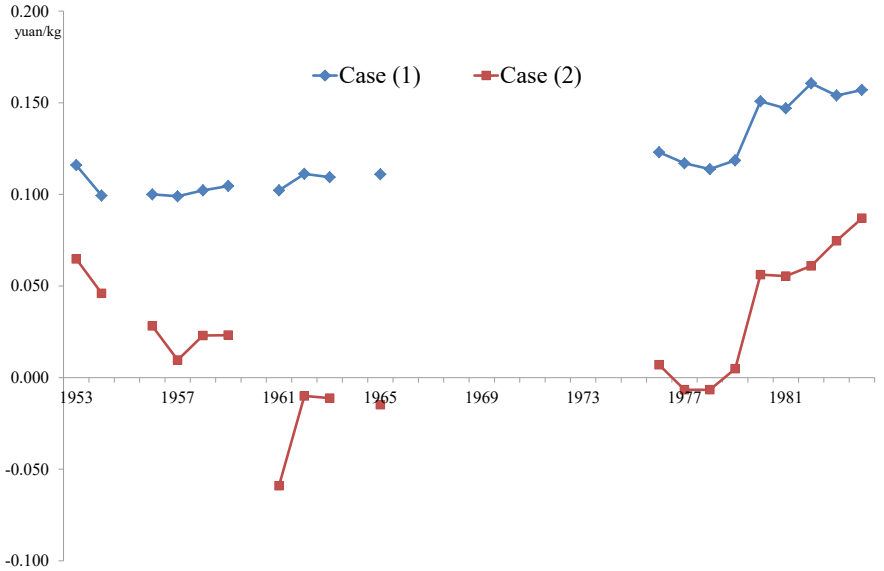

Fig. 4.7 Changes in margins for major grains. *Source* Author's calculations based on Guojia Fazhan he Gaige Weiyuanhui Jiagesi (ed.) (2003)

substantial margin gaps were observed for specific crops. Cotton and sugar cane achieved positive margins throughout the period, while tobacco was in the red from the mid-1950s to the early 1960s, and thereafter began to produce a surplus in the mid-1970s. Meanwhile, the results for the two major oil crops were contrasting, illustrating a consistent positive margin for peanut throughout the period (except for 1961), while showing a steady negative margin for oilseed rape until 1978. After the introduction of the HRS, the margins for all commodities improved rapidly, with cotton showing the fastest improvement in the price margin.

As shown in Eq. (4.2), the net production value and net revenue can be decomposed into yield and margin, and we can evaluate the contributions by employing the method. However, as explained above, the production cost survey was interrupted for several years because of political movements, such as the general line of transition, the GLF, the Four Clean Campaign, and the Cultural Revolution.[10] Therefore, we divide the time series data into six periods following the political movements and calculate the contributions of each factor to the changes in net production value and net revenue.

The estimated results of the decomposition of the major grains are listed in Table 4.1. In Case (1), the contributions of yield changes are generally higher than those of the margin, even though there were some differences during the late 1950s and the early 1960s. Meanwhile, the contributions of the margin were also relatively large except in 1963–1965. By contrast, the estimated results of Case (2) show that the contributions of the margin to the changes in net revenue are consistently larger than

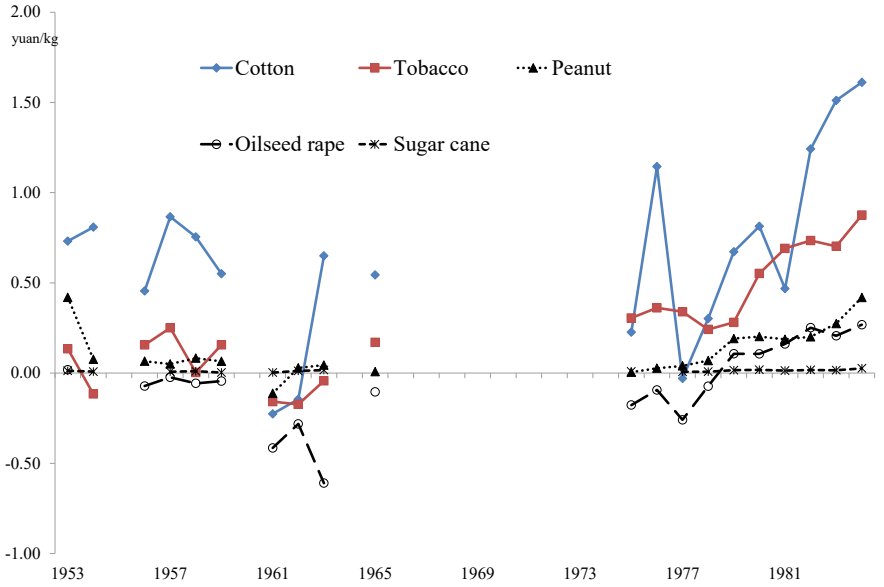

Fig. 4.8 Changes in margins for other crops. *Source* Author's calculations based on Guojia Fazhan he Gaige Weiyuanhui Jiagesi (ed.) (2003)

those of the yield and cross term throughout the period. This is mainly because labor costs and taxes are not deducted from the net production value, and the absolute values of both net revenue and margin become smaller than those for Case (1). This resulted in a more intimate correlation and larger contribution of the changes in margin for Case (2). This tendency was more apparent during 1961–1962. As explained above, the increase in the unified purchase price of agricultural products in the early 1960s improved the margin amounts. Thus, the contribution of margin to the changes in net value would become higher than in other periods.[11]

Table 4.1 Decomposition of net production value and net revenue per farmland

	Unit: %					
	Case (1)			Case (2)		
	Yield	Margin	Cross term	Yield	Margin	Cross term
1953–1954	36	69	−5	21	85	−6
1956–1959	80	20	0	27	71	2
1961–1962	60	34	5	−19	103	16
1963–1965	93	6	1	37	51	12
1975–1978	43	56	1	31	65	4
1979–1984	62	38	0	25	71	3

Source Author's estimation based on Guojia Fazhan he Gaige Weiyuanhui Jiagesi (ed.) (2003)

4.3.2 Calculation of Hypothetical Wages and Net Revenue

It is apparent from our examinations that wage settings for agricultural labor are crucial for determining the margin of net revenue. As we described in Sect. 4.2, the production cost survey utilized the "standard wage," which would not adequately reflect the situation of the rural economy. To calculate more reliable values of agricultural revenue, we utilize the hypothetical wage under the strong assumption of a perfectly competitive market and examined trends in net revenue.

We suppose the labor's share of the distribution is 40% and calculate the amount of hypothetical wage. The reason is that the amount of the hypothetical wage of three major grains (0.69 yuan/day) in 1954 was almost equivalent to that of the standard wage at that time (0.7 yuan/day), and the hypothetical wages calculated from other items were also approximately 0.7 yuan/day except for tobacco. Therefore, the settings of the labor share (40%) reflect market conditions before the transformation into the People's Commune, and this setting would be appropriate to examine the net revenues of agriculture during the Mao era. In addition, the amount of hypothetical wage for three major grains (assuming 40%) was also equivalent to almost the same level of standard wage after the introduction of HRS, accounting for 1.0 yuan/day in 1983 and 1.5 yuan/day in 1984. These results support the validity of our assumptions regarding agricultural wages.

Next, Fig. 4.9 summarizes the changes in the hypothetical wages by crop based on the assumption of a 40% labor share. This figure shows that hypothetical wages were generally lower than standard wages throughout the Mao era. Considering the changes in the hypothetical wages of major grains, the amounts of the hypothetical wage fell below 0.5 yuan/day since the late 1950s and further declined to 0.2–0.3 yuan/day in the early 1960s. Although the hypothetical wage for major grains stagnated around 0.4 yuan/day during the mid-1970s, the amounts of the wage exhibited a remarkable upward trend since then, reaching 0.57 yuan/day in 1979 and 1.0 yuan/day in 1983, which were almost the same level with those of the standard wages. The hypothetical wages for cotton, peanut, and sugar cane were generally higher than those for major grains during the Mao era, except for sugar cane in 1963. Even though we can observe some differences in the hypothetical wage among crops, it is common that the hypothetical wages were consistently lower than the standard wages until the late 1970s.

It should be noted that the shapes of hypothetical wages in Figure 4.9 remain unchanged but there is a shift in a parallel manner when we adjust the percentage share of the labor distribution. Namely, the levels of hypothetical wage approach those of standard wage if the labor share is set higher than 40%, while they move away from the standard wage if the labor share is adjusted lower than 40%. The frequency of the hypothetical wages exceeding the level of standard wages increased in the late 1950s assuming the labor's share of distribution at 60%. However, we confirmed that the hypothetical wages of major grains and several other crops at 60% labor's share were still generally below the standard wage during the Mao era.

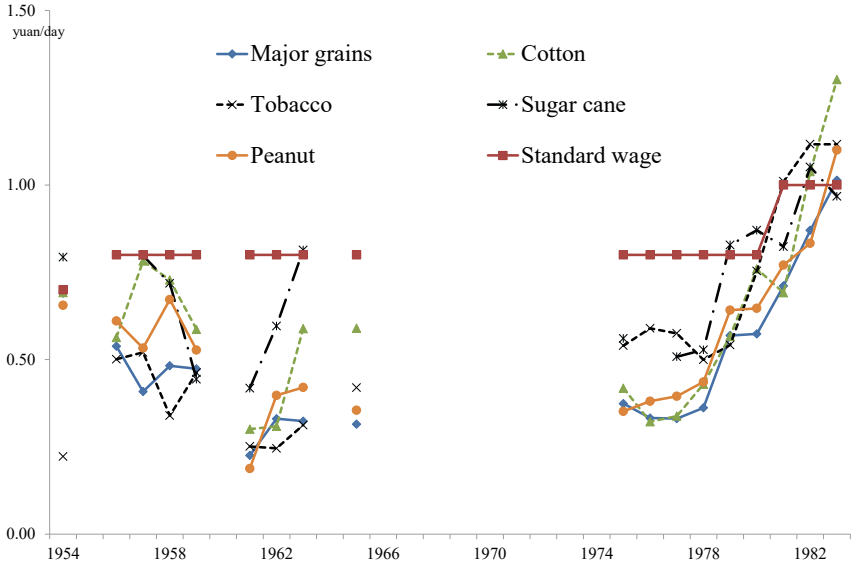

Fig. 4.9 Comparison between hypothetical and standard wages. *Source* Author's calculations based on Guojia Fazhan he Gaige Weiyuanhui Jiagesi (ed.) (2003)

Considering the results of these calculations, it appears that the standard wage adopted in the production cost survey did not properly reflect the economic situation surrounding agriculture in the Mao era. The tendency was more apparent during the period of the People's Commune, and the standard wage overestimated the remuneration to agricultural laborers compared to the real situation. Thus, it is reasonable to employ our calculation procedures to evaluate more realistic revenues for agricultural production.

As depicted in Fig. 4.6, labor-intensive technologies were introduced during the Mao era to absorb the growing rural population in the agricultural sector. The increase in the number of working days for agriculture could compensate for the decline in wages to maintain their standard of living. However, because of the lack of detailed information, we could not deduce clear results regarding this issue. Meanwhile, our calculations enable us to examine the changes in the amount of net revenue for each crop using hypothetical wages more realistically. To conduct a robustness check, we will present the results when the labor's share of the distribution is 60%.

Figure 4.10 summarizes the changes in net revenues for major grains based on three types of wages (standard wage, 40 and 60% labor's share). As shown in Fig. 4.10, the net revenues for Case (2) recorded negative values during the early 1960s and the late 1970s. By contrast, net revenues based on the hypothetical wages, both by 40 and 60% labor's shares, maintained positive numbers throughout the Mao era. The results were unchanged even if we disaggregated the major grains into individual grains (rice, wheat, and corn). We have also confirmed that almost

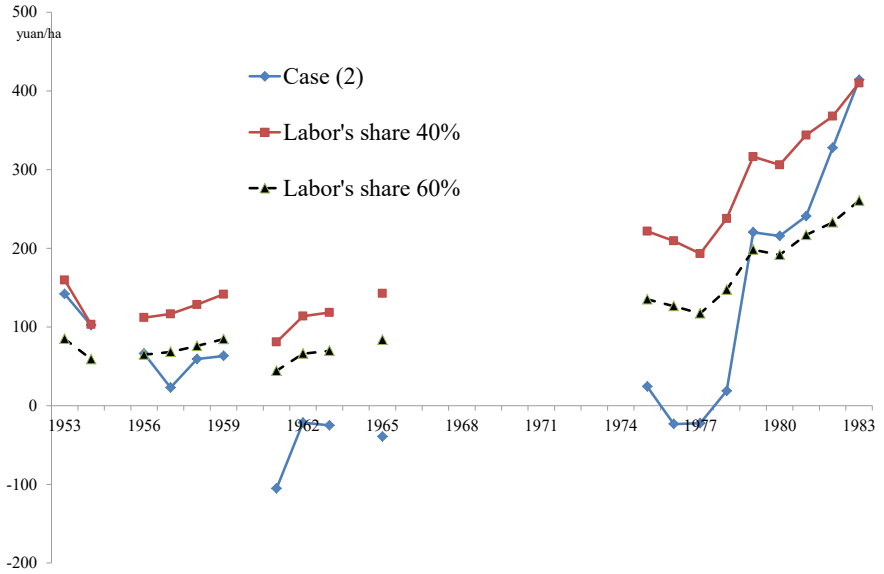

Fig. 4.10 Changes in net revenue for major grains. *Source* Author's calculations based on Guojia Fazhan he Gaige Weiyuanhui Jiagesi (ed.) (2003)

similar trends are observed for other crops, such as cotton, tobacco, and sugar cane, suggesting positive net revenues for the hypothetical wage, even for 60% labor's share.

Hence, it is reasonable to conclude that the production cost survey overestimated wages for agricultural labor under the People's Commune system and that collective farming could achieve consistent positive net revenues based on our more practical setting. The surplus of production teams were likely transferred to brigades and upper-level organizations for public projects such as infrastructure construction and public health management.

Conclusion

This chapter examined the profit structures of farm management under the People's Commune by using a production cost survey and re-evaluating the image of agriculture during the Mao era. More specifically, we decomposed the variations in agricultural incomes for major grains and then re-calculated the amount of net revenue utilizing our hypothetical wage for agricultural labor. The major results of our analysis can be summarized as follows.

First, the contributions of the margin to the changes in net revenue are consistently larger than those of yield and the cross term throughout the period, while the

contributions of yield to the changes in net production value are generally higher than those of the margin. These results suggest that the treatment and setting of agricultural wages would closely affect the determinants of income decomposition. In addition, the amounts of official margins based on the standard wage of the production cost survey were small or negative for major crops because of strict state control over agricultural marketing, and such a tendency was more obvious for major grains in the early 1960s and the late 1970s.

Second, assuming that agricultural workers could obtain 40% of net production value, the levels of hypothetical wages were consistently lower than those of the standard wage for not only major grains but also for other crops such as cotton and peanut. This trend was particularly apparent in the early 1960s and the mid-1970s. These results indicate that the standard wage adopted in the production cost survey would overestimate the remuneration for agricultural workers, resulting in lower net revenue for agricultural production.

Third, the amount of net revenue for major grains by use of the hypothetical wage recorded consistent surplus during the Mao era, and the outcomes were unchanged even if the labor's share of distribution was raised to 60%. These results imply that production teams generated positive revenues from agricultural production and the surpluses were siphoned off through higher-level organizations such as brigades and communes to urban areas.

Considering the trends of Engel's coefficients and the changes in labor days per cultivated farmland, we can infer that the increase in the rural population and number of rural workers caused a decline in the rewards for agricultural labor in the 1960s and the 1970s. Under these conditions, the preservation of labor-intensive farming technologies resulted in a "shared poverty" of the rural economy in which everyone was equally poor. Certainly, it is evident from the comparison of labor days for farming before and after the late 1970s that "shared poverty" was not a rational choice from a macroeconomic viewpoint. The number of agricultural labor days per cultivated farmland decreased considerably, while the amount of off-farm employment continuously increased after the introduction of the HRS. Under strict control over agricultural production, severe restrictions on market transactions of agriculture, and strong limitations on the rural industry, the Chinese government was obliged to adopt labor-intensive farming technology and enforced "agricultural involution" among production team members.

However, there is a caveat to generalizing our results to situations throughout the Mao era. The hypothetical wage for agricultural labor is based on the assumptions of a completely competitive market, which might be inconsistent with the "unified purchase and unified supply system" during the Mao era. Although we paid attention to the robustness of the results, our hypothetical wage settings appear to be preliminary and expedient for the calculations. It should be also noted that the production team changed and adjusted its cropping patterns according to climate conditions and regional-specific risks, which were not reflected in our calculation. Furthermore, the

activities of production team management were not only restricted to farming but also covered rural industry and public administration.

Therefore, it is necessary to examine the characteristics of cropping patterns, differences in regional features, and effects of non-agricultural revenues from the rural industry to evaluate the management of collective farming. These aspects are partially discussed in Chap. 5, which focuses on specific production teams in Jingjiang County, Jiangsu Province. We hope that the examinations of collective farming management from our macro perspective along with the next chapter will contribute to a more practical re-evaluation of the rural economy and agricultural management during the Mao era.

Notes

1. The Chinese term "grain" (*liangshi*) does not only include major grains (rice, wheat, and corn), but also cover minor grains (millet, other cereal), beans (converted to dried beans), and potatoes (including sweet potatoes). The amount of potatoes was converted to one-fourth of their weight before 1963 and to one-fifth of their weight after 1964.
2. The amount of grain production and the number of total population are based on Guojia Tongjiju Guomin Jingji Zonghe Tongjisi (ed.) (2010) and *Zhongguo Tongji Nianjian* (China Statistical Yearbook) (various issues).
3. China has two series of statistics on grain. The first is production statistics as defined at footnote #1 (also called "raw grain", *yuanliang*). The other is distribution statistics (called "trade grain" (*maoyiliang*)), that includes all items of production statistics, but the amount of rice and millets are converted to their polished state.
4. Concerning the trade surplus of grain marketing, Minami (1990) insisted that the marketing agencies could obtain regular spread and the Chinese government was able to transfer agricultural surplus to the development for other industries. By contrast, Nakagane (1992) proposed negative spread of the grain marketing. Because we do not have detailed information on the management of state marketing agencies at that time, it is difficult to examine the extent of the spread and draw a clear conclusion. However, we focused on eggs and pork, whose marketing was relatively less-controlled than that of major grains, and calculated the spread between procurement price and sales price during from the 1950s through the mid-1980s. The results show that the shares of regular margins for eggs and pork accounted for approximately 25% and 60%, respectively (Han and Feng (eds.) (1992), much larger than that of major grains. Therefore, it can be inferred that the margins of grain marketing in the 1950s would be positive, while those in the 1960s and 1970s would be negative.
5. Public reserve fund denotes a fund for the improvement of fixed assets owned by production team. Public welfare fund means a fund of the activities for social security and welfare, targeting at poor families who maintained their livelihood below the minimum living standard (Shimakura 1980).
6. According to rural household survey (*the China Yearbook of Rural Household Survey 2000*), the percentage shares of "income from collective management" and "net income from household management" to the net household income accounted for 50–60% and 30–40% in 1962–1965, respectively. During the period in 1975–1978, the percentage shares of "income from collective management" increased slightly, while the shares of "net income from household management" maintained almost the same level. These results suggest that incomes from sideline business contributed to support the livelihood of rural residents.
7. The Engel's coefficients for Japan are referred from the website of the Statistics Bureau of the Ministry of Internal Affairs and Communications, Japan ("Long-Term Statistical Series for

Japan," https://www.stat.go.jp/data/kakei/longtime/index3.html) (accessed on November 24, 2021).

8. The production cost survey does not include data on public reserves, public welfare, and grain storage. However, it can be considered that these reservations by production teams would be returned to team members in the medium and long viewpoints.
9. Yuan Longping, a former teacher at an agricultural college in Hunan Province, succeeded in breeding a large number of hybrid Indica rice varieties in the 1970s. It contributed to the development of selection and crossbreeding for three varieties of hybrid rice through large-scale mobilization of human labor. As a result of these efforts, the cultivation of hybrid rice spread rapidly since the mid-1970s (Tajima 1989).
10. The Four Clean Campaign was a socialist educational movement launched by the CCP in rural areas from 1963 to the spring of 1966. The movement promoted the purification of politics, economy, organization, and ideology. More specifically, dispatched project teams conducted the inspection of accounting, warehouses, finances, and labor scores of production teams and brigades to check the errors and cheating (Amako et al. (eds.) (1999)); Hamaguchi 2019).
11. We calculated factor decomposition for each grain (rice, wheat, and corn). The results are generally consistent with those of major grains, suggesting that the contributions of yields were larger for Case (1), while the contributions of margins were more apparent for Case (2).

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Chapter 5
People's Communes: A Microanalysis Based on Accounting Data of Production Team X in Jiangsu Province (1965–81)

Shanping Yan

Abstract Through microanalysis of an accounting data of Production Team X in Jiangsu Province, this chapter reproduces the specific economic activities of Team X during the people's commune period and the economic relationship between Team X and the peasants, to reveal the basic characteristics of the commune system. The results show that this system is not only one institutional device to realize the national industrialization strategy, but also the community to maintain the basic life of rural residents, which is a special product of the Mao era.

Introduction

As described in Chap. 4, rural communes are not only a pyramid organization composed of the commune, production brigades, and production teams, but also a mixture of political, administrative, and economic functions. Commune members live in production teams that are often natural villages formed by geography and kinship. Although the production team must cooperate with the national industrialization strategy, it also ensures the employment and life of villagers and plays the basic functions of their living community. The commune system has existed in Chinese mainland for more than 20 years, but it collapsed quietly after Mao Zedong's death because it failed to overcome the inefficiency of management, increase the production of agricultural products, and raise the income of peasants.

In the past, there were many research on the commune system in Japan (Doi, 1961; Sato 1964; Shimakura & Nakagane, 1980; Nakagane, 1975, 1977, 1982, 1984), but very few in recent years (Sato, 1997; Yan, 1996, 1998). In China, the academic research on communes has increased dramatically since the end of 1990s, and many research results have been accumulated. Wang et al. (1989) described the social and economic changes from 1949 to 1983 in *Fengyang* County, Anhui Province

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(the birthplace of rural reform) using the archival materials of the Chinese Communist Party (CCP) and government organs, detailing the agricultural collectivization, economic activities, and peasants' lives during the commune period, as well as the process of returning from communes to families and the conflicts between peasants and local cadres. Furthermore, Chen et al. (1993) explained the changes of rural social economy since the founding of the People's Republic of China (PRC) from a macro level, and systematically analyzed the formation process, structural characteristics, and internal mechanism of the changes of the commune system. Cao et al. (1995) described the basic structure of rural society and economy in the period of agricultural collectivization and people's commune based on the accounting data of production teams, from the perspective of sociology and social anthropology.

In addition, Zhang (1998) researched Commune Y in Zhejiang province and analyzed its commune system, rural social structure, peasants' consciousness, and behavior. The study revealed the interaction between external pressure and internal mechanism of traditional village society. Luo (2006) carefully combed all levels of the archives and personal memoirs, by analyzing how the central leaders, including Mao Zedong, participated in the establishment and operation of communes.

Hou (2006) wrote a diary compilation of his daily life and feelings as a peasant in Shanxi Province during his 60-year career. Hou graduated from a normal school and is a scholar in his village. He participated in the local agricultural collectivization and people's commune movement, served as an accountant of the production team and production brigades, and familiarized himself with agricultural production, food and cash distribution, and other related affairs. This book is said to be a valuable historical material in understanding rural economy and a peasant's life under the people's commune system.

In recent years, using the original data of the commune period, specific research such as empirical analysis of labor participation, distribution in kind, household sideline, contradiction between cadres and peasants, and technological progress of production teams have also emerged (Yan, 1998; Li, 2013; Xu and Huang 2014; Zhang, 2019). However, it is extremely difficult to analyze the economic activities at the level of production teams and the economic relationship between production team and peasants using the extant literature. During the period of communes, when the relationship between population and land was extremely tense, two questions were raised: (1) How did the production team adjust the production structure and realize the basic employment and daily life of villagers? (2) What is the economic gap between agricultural production and peasants' income as well as rural poverty and peasants?

Through microanalysis of the accounting data of Production Team X in Jiangsu Province (hereinafter referred to as Team X), this chapter reproduces the specific economic activities of Team X during the people's commune period and the economic relationship between Team X and the peasants, to reveal the basic characteristics of the commune system. The results show that this system is not only the institutional device to realize the national industrialization strategy, but also the community to maintain the basic life of rural residents, which is a special product of the Mao era.

5.1 State of Affairs at Jingjiang County and Xinqiao People's Commune in Jiangsu Province

A rural commune is an organization with both agricultural management and administrative functions, and it is also an institutional device for implementing planned economy. In 1960s and 1970s, more than 50,000 communes were established in China, each consisting of approximately 3,000 households. During this period, such communes were also established in cities, but all of them were abolished in 1966 (Luo, 2006).

After the establishment of PRC, the CCP implemented land reform throughout the country and realized family agriculture based on private ownership of land. Subsequently, to overcome the fragmentation of family management and the possible new polarization among peasants, the government led peasants to implement mutual assistance and cooperation among their neighbors and relatives. This was done to realize the organized management of agriculture. At first, the mutual aid group was primarily based on joint labor, which was unstructured and small in scale. However, with the active promotion of the government, the mutual aid groups were quickly merged into cooperatives, and the scale of the organizations became larger. The concept of cooperation was not limited to labor, and the common use of large-scale agricultural machinery and collective ownership of land was performed comprehensively. The transition from mutual aid groups to elementary cooperatives (natural villages) and advanced cooperatives (multiple natural villages) took three to four years. In 1958, under the call of Mao Zedong, the rural people's commune system characterized by "large in size and collective in nature" was quickly spread throughout the country (Yan, 2002).

Because the people's commune system has been discussed in Chaps. 4, 5 focuses on the general situation of Xinqiao People's Commune and Jingjiang County of Jiangsu Province, to which Team X[1] belongs.

After the founding of PRC, Jingjiang County, similar to the rural areas in China, has undergone the procedures of agricultural collectivization, such as land reform, mutual aid groups, elementary cooperatives, advanced collectives, and communes. According to the first population census, the total population of the county reached 403,000 in 1953, of which 95.4% were agricultural-registered permanent residents. In September 1958, under the influence of the national people's commune movement, cooperatives began to transition to the people's commune of "integration of government administration and commune management." Communes grew and introduced communist lifestyles, such as communal mess halls, but eventually failed. During the four years of 1958 to 1961, the birth rate of Jingjiang County dropped sharply, whereas the death rate increased aggressively, resulting in a small population increase. After the setback of the Great Leap Forward, the people's commune movement in this transitional period was adjusted. By 1962, according to the provisions of "Sixty Article of Agriculture", the three levels of ownership and production teams of the rural people's commune system[2] was formed. This chapter focuses on the period after the finalization of the people's commune.

Xinqiao People's Commune lasted more than 20 years, from May 1959 to autumn 1982. During this period, Xinqiao People's Commune consisted of 18 production brigades and 1,988 production teams. To overcome the resource restriction of scarce land and numerous people, in the late 1970s, communes began to build industrial enterprises under collective ownership to make effective use of surplus labor. In 1983, when the commune was abolished, there were 24 township-run and 33 village-run enterprises (*shedui* enterprises) in Xinqiao. This is not only because it is close to the Yangtze River and has convenient transportation, but also because it has unique location conditions, with the implementation of a famous *Sunan* Model[3] on the other side of the Yangtze River.

5.2 Accounting Documents of Team X

The following empirical analysis is based on the original accounting data of Team X. In 1991, the author met the old accountant of Team X during rural field work and obtained 18 years' worth of recorded materials from them. The data were original and readable handwritten materials, specifically year-end statements that started in 1965 after the formation of the commune system, until the implementation of the agricultural production responsibility system in 1982. However, there were no recorded materials in 1965, 1968, 1969, and 1973 in the year-end final accounts of the production team, and materials from 1968, 1969, and 1976 were missing in the final accounts of household income and payments, due to the influence of the Cultural Revolution (1966–1976) and other reasons. By 1982, the production team disintegrated halfway, so there were no year-end final accounts.

For the same reason, during this period, the accounting format of statistical tables was not consistent yearly, and it is common for the tables to have items but no records. Whether the relevant data should be filled in is seemingly determined by the accountat's subjective judgment. Consequently, some data are often lacking, making it difficult to obtain time series data.

The year-end final accounts distribution table of the production team summarizes the results of economic activities throughout the year, while the final accounts of household income and payments record the relationship between households and the production team, such that labor participation and the distribution of agricultural products and cash transactions must be disclosed to the members of the production team. Simultaneously, the year-end final accounts distribution table is not only considered the business statistics that deal with the internal economic relations of the production team, but also the statistical report presented to the superior. Therefore, relevant basic data must fill in the distribution table, including accurate figures among items and sectors, to maintain a high degree of consistency. In this case, the credibility of the accounting data of Team X is considered high, since it is difficult to intentionally fill in wrong or false figures in the distribution table, particularly for peasants.

All the accounting data in this chapter were compiled by an accountant; therefore, all the indicators have relatively high consistency. In a period of drastic social changes, if the accountant is frequently changed, the consistency and accuracy of statistical indicators will inevitably be affected. Therefore, the accounting data of Team X is extremely valuable first-hand data, which empirically provides pivotal academic value in expounding the production team's internal structure and its changes.

5.3 Composition and Nature of Team X

The following, in addition to the interview materials during a field study, give an overview of Team X. First, Team X is located in the Yangtze River Delta, several kilometers away from the north side of the Yangtze River, with abundant rainfall and four distinct seasons. There were no modern cities in the region, unlike in southern Jiangsu. Although both locations experience the similar natural conditions, the economic development in northern Jiangsu falls behind. Southern Jiangsu, Shanghai, and other places, often derogatorily call the people from northern Jiangsu, *Subei people*, which means *poor* people. Moreover, during the commune period, *Jiangbei people* is a disparaging term used to call people from the northern part of the Yangtze River. Peasants from this area, including Team X, are also extremely sensitive to this term.

Second, looking at the economic conditions of Team X from a population to land ratio, Team X had 180.63 mu of cultivated land (including collectively managed land, peasants' private plots and feed fields), with an average per capita of 0.91 mu/ capita in 1970, but was reduced in 1981 to 171.43 mu and 0.78 mu/capita, respectively (1 ha = 15 mu). Since distant past, the area has been a granary, with superior planting conditions for rice (grains), wheat, rapeseed, and cotton. It has a planting system of "cotton and wheat", and "early rice and late rice and green manure or wheat". However, with time, resource constraints have become more concerning. In terms of transportation systems, throughout the commune period, there were neither railways nor roads near Team X. However, since the area is in the Yangtze River basin, the rivers form a network and play a crucial role as means of transportation.

Third, the production organization of Team X was formed when the elementary cooperative was established in 1955. The village was liberated in 1948, but before 1955, there was no mutual aid group. When the village formed the elementary cooperative, they simultaneously built three groups, and these continued with the advanced cooperatives after 1957, and the people's commune after 1958. The groups were geographically oriented, rather than through consanguinity, covering east, middle, and west of the village. The three groups were eventually considered permanent by the production team as production groups, and the contract system was implemented group-by-group. During busy farming season, to earn more work points (credit), competitions were often held among groups. However, the activities of the group

were limited to the production process, and the distribution of grains and cash was carried out uniformly at the production team level.

Fourth, the social nature of Team X's village, from the perspective of kinship, is complex. Based on the surname of the household head, there were seven clans: Huang, Yu, Tang, Zhong, Zhang, Xu, and Pu. Huang accounts for 50.9% of 55 households and 52.6% of 230 villagers. Yu has 15 households, Zhong 5, and Tang 3, accounting for 41.9% of all households surveyed in 1991. The village of Team X is commonly known as "primary surname village," in southern China. However, there are three unrelated Huang in Huang's surname, which shows that there is no strong clan in the village. In 1965, the number of households and population of Team X increased to 50 households and 173 people, respectively. By 1981, it increased to 58 households and 219 people, respectively (Table 5.3). This shows that, on average, the household population slightly increased from 3.46 people to 3.78 people in the same period.

Another aspect that reflects the social relations in the village is class. During the land reform in the early 1950s, the number of families classified as landlords, rich peasants, middle peasants, and poor peasants was 0, 4, 18, and 33, respectively. In 1991, they accounted for 0%, 7%, 33%, and 60% of the total village, respectively. After the agricultural collectivization, land and large equipment were collectively owned, and peasants tended to be homogeneous in wealth ownership. However, due to the definition of political identity, the political rights among peasants were evidently unequal. In many political movements including the Cultural Revolution, this political inequality was gradually solidified (Zhang, 1998).

5.4 Agriculture and Its Structural Changes in Team X

5.4.1 Agricultural Equipment, Cultivated Land, and Labor

Although the production team kept large agricultural equipment, the agricultural tools required for daily operations were prepared by peasants themselves. In the relevant statistics of the production team, the waterwheels, threshers, farm animals, and warehouses owned by the production team are clearly recorded, whereas the farm tools owned by peasants are generally not recorded. In the accounting documents of Team X, only the fixed assets records from 1970 were found; only these—except warehouses and livestock houses—were built by production teams. Farm tools are traditionally cheap equipment, such as waterwheels, except for electric threshers and pumps, which are the only modern farm tools.

Records of cultivated land area are also extremely limited. In 1970, the cultivated land area was 180.63 mu, of which collective management accounted for 89.9%, while bamboo forests around residential buildings as private plots accounted for 6.6%, and feed land for peasants to raise pigs accounted for 3.5%. In 1980, the

cultivated land area decreased to 175.82 mu, but the proportion of private plots increased by 2.5 percent points.

There is also scarce data on the labor force. In 1965, the working population was 100, accounting for 57.8% of the total population, whereas in 1974, it was 110 and 53.9%, respectively. During this period, the labor force population and the total population increased by 10% and 18%, respectively. In 1978, the total population rose to 224, but has since declined, while the labor force declined from 45.1% of the total population in 1979 to 40.6% in 1981. After the restoration of the university entrance examination system, some peasant children left the village to take it, which was the main reason for the decline in the proportion of the labor force.

This labor force population refers to the nominal labor force regardless of men, women, and children, whereas the actual labor ability varies from person-to-person. Statistically, the labor force population is divided into "whole labor force," "semi-labor force," and "auxiliary labor force," whereas the individual's labor ability is calculated by the "bottom score (底分)" decided by the members' meeting. In Team X, the daily standard work points of young and middle-aged men and women were 10 and 8 points, respectively. In the final accounts at the end of the year, only the relevant data from 1965 can be found. Among the 100 laborers in that year, there were 62 whole laborers, 29 semi-laborers, and 9 auxiliary laborers.

Although some villagers are members of the production team, they are also engaged in sewing, carpentry, construction, and other daily handicrafts[4] and worked in enterprises run by communes and brigades (*shedui* enterprises).[5] Handicraftsmen have existed in village societies since long past, and they play a crucial role in a traditional self-sufficient society, while working in township and village enterprises (TVEs) that began after 1970s. According to the accounting data, in 1974, there were 10 craftsmen in Team X, and after 1979, this number increased to 15. Simultaneously, the number of employees in *shedui* enterprises increased from 8 in 1974 to 26 in 1981, and the proportion of employees in the labor force increased from 7.3% to 29.2%. In 1981, before the implementation of the agricultural production responsibility system, the proportion of agricultural employees had dropped to 53.9%. This is also a pivotal reason for the rapid increase in the income of production teams and peasants toward the end of 1970s.

5.4.2 Structural Changes in Agricultural Production

Although the cultivated land gradually decreased, the total sown area expanded by 14% from 1966 to 1975. During the same period, the planting index (sown area per cultivated land) increased from 1.7 to 2.0, despite interesting changes in the composition of sown area. Since Team X is in a cotton-producing area, it was obligated to sell cotton to the country. However, the sowing of cotton has shown a downward trend. In contrast, self-sufficient grains increased the proportion of planted area. This may indicate that cotton planting was discouraged to meet the increasing need for rations. After 1970s, in the composition of grain planting area, in terms of proportion of

sown area, winter wheat decreased, late rice expanded rapidly, and single-cropping rice was gradually replaced by double-cropping rice; that is, the grain production structure underwent a paradigm shift.

In terms of output, the proportion of summer grain output such as wheat and autumn grain (rice) did not change much except for a few years. Up to 1960s, the summer grain planting system was mainly composed of "wheat-rice cultivation" and "wheat-cotton," but after 1970s, the planting system of "early rice-late rice-green manure" was rapidly popularized. The adjustment in the planting system was closely related to the employment problem that resulted from the constraint of resources, because the production team had to provide jobs for the increasing population. Although there were strict mandatory plans under the commune system, there were lenient adjustments in specific activities of the production team. Conversely, the production team should accept the administrative guidance of the government, and simultaneously, it should be granted certain decision-making authority. Thus, the centralized system of people's communes is relatively loose.

5.4.3 Revenue and Expenditure Structure

The year-end final accounts are divided into five departments: agriculture, forestry, animal husbandry, sideline, and fishery. These accounts record the output value and composition of each department. Agriculture consists of food crops and commodity crops, while animal husbandry is dominated by pig farms of production team. A sideline business is not an industry operated by the production team. Instead, it is a general term for craftsmen, veterinarians, and employees of *shedui* enterprises who work outside the production team.

Sectoral output value is the nominal value calculated by multiplying the respective output by the state price. The total revenue based on this is also the figure evaluated at the current price. Table 5.1 shows that in the 11 years from 1966 to 1977, the average annual growth rate of total revenue was 4.4%, which is a quarter of the annual growth rate from 1977 to 1981. Looking at the agricultural sector, the average annual growth rate in the two periods is 1.4% and 13.5%, respectively, indicating that agricultural growth was extremely slow during the Cultural Revolution.

In terms of production structure, during the 15 years from 1966 to 1981, the proportion of agricultural sector decreased by 30 percent points, while the proportion of animal husbandry and sideline business increased sharply during the second half of 1970s. After the Cultural Revolution, because of the rapid growth of non-agricultural sectors, the sideline revenue of craftsmen, employees of *shedui* enterprises, and veterinarians that was remitted to production teams, also increased rapidly. In contrast, forestry and fishing had almost no revenue, which was related to the plain. Even in the period of the people's commune with grain as the key commodity, the production structure of the production team showed diversified characteristics. Besides agriculture and animal husbandry, peasants' labor force was also widely used in handicrafts and *shedui* enterprises.

Table 5.1 The revenue, expenditure and their structural changes in production team X (%)

Year	Index of revenue	Percent of total						Index of expenditure	Percent of total		
		Agriculture	Grain	Cotton	Livestock	Sideline	Others		Agriculture	Livestock	Others
1966	100	91.9	45.4	46.5	0.0	5.6	2.5	100	95.3	3.2	1.4
1967	97	93.6	59.9	33.6	0.0	5.7	0.8	97	96.6	1.6	1.7
1970	124	82.5	55.5	26.9	6.9	8.1	2.5	82	78.6	20.5	1.0
1971	130	88.3	62.0	26.3	5.4	5.9	0.4	101	71.9	25.1	3.0
1972	106	77.4	50.1	27.3	7.9	8.6	6.1	146	89.1	10.8	0.1
1974	166	81.6	52.2	28.4	7.0	9.2	2.2	174	81.9	14.7	3.4
1975	148	78.6	58.3	19.8	15.0	5.0	1.4	164	87.0	10.7	2.3
1977	160	66.8	49.3	16.0	9.6	15.1	8.5	188	82.2	16.3	1.5
1978	206	74.4	52.0	21.8	4.7	18.4	2.5	201	80.2	17.2	2.6
1979	237	70.6	46.8	23.0	16.9	12.2	0.3	230	76.4	21.7	1.9
1980	269	62.8	40.0	21.9	11.2	16.0	10.0	262	80.4	18.9	0.7
1981	297	59.7	37.7	21.5	11.6	15.6	13.2	250	80.8	18.2	1.1
1966–77	4.4	1.4				14.2		5.9	4.5		
1977–81	16.7	13.5				17.5		7.4	7.0		

In the 15 years from 1966 to 1981, agricultural expenditure accounted for roughly 80% of total expenditure, but the amount almost doubled in the same period. Among them, the proportion of self-retained seeds and manure decreased from 67.6% in 1966 to 40.9% in 1981, while the proportion of cash payments for purchasing commercial fertilizer and pesticides increased from 32.4% to 57.5% in the same period (Yan, 1996). Seemingly, agricultural investment gradually shifted from self-sufficiency to external dependence.

5.5 Distribution Structure Among the State, Communes, and Peasants

5.5.1 Relationship Among the State, Communes, and Peasants

The revenue of the production team is distributed to the state, commune, and peasants, with its basic principle: "first the state, then the collective and then the individual." The relationship among the three can be summarized as follows. Peasants have no direct economic relationship with the state, and agricultural taxes and grain requisition are all presented by the production team. If there is no unexpected reduction in production caused by natural disasters, the production team must pay sufficient agricultural tax to the state and complete the task of sale. Agricultural tax can be paid in cash, but primarily in kind. Different regions sell different agricultural products to the country, but they are typically bulk agricultural products such as grain, cotton, and rapeseed (Luo, 2006).

Table 5.2 shows the changes in distributable net income and composition in Team X. Here, distributable net income refers to the total revenue of agriculture, animal husbandry, and sideline business, from which the total expenditure, including manure and retained seeds, is subtracted. During the Cultural Revolution, the net income of production teams and peasants only slightly increased, with several instances of negative growth. Not until the end of Mao's era did the economic situation of production teams and peasants improve. Next, the changing characteristics of net income composition are examined in detail.

First, the total net income of Team X consistently increased, especially after 1978, because the sideline income remitted by *shedui* enterprises to the production team has increased rapidly since the mid-1970s (Table 5.1). In the 15 years from 1966 to 1981, the total net income of the production team increased by 2.75 times, with an average annual growth rate of 7.0%. However, the average annual growth rate from 1966 to 1977 was only 2.2%, and from 1977 to 1981, it was as high as 21.1%. The performance of the two periods is quite different.

Second, before 1978, the total tax paid by the production team to the state was fixed at 1,032 yuan per year, accounting for only a few percent of the net income. After the rapid growth of net income in 1979, the total tax payment increased slightly,

Table 5.2 The net income, income of households and their structural changes in production X (yuan, %)

Year	Total net income		Percent of total			Net income of households	Source composition		Type composition	
	Index	Growth rate	State	Production team	Households		Labor	Manure	Kind	Cash
1966	100		7.1	12.6	80.2	11,640	67.1	32.9	76.1	23.9
1967	98	−2.1	7.3	6.0	86.7	12,312	68.3	31.7	87.1	13.3
1970	119		6.0	15.5	78.5	13,522	93.6	6.4	84.1	15.9
1971	124	4.0	5.8	13.6	80.6	14,444	91.8	8.2	84.4	15.6
1972	99	−19.8	7.2	6.3	86.5	12,440	59.8	40.2	68.8	31.2
1974	151		4.7	8.0	87.3	19,079	75.6	24.4	63.4	36.6
1975	135	−10.2	5.3	9.0	85.8	16,832	70.6	29.4	70.8	29.2
1977	128		5.9	7.7	86.5	15,996	78.4	21.6	71.8	28.0
1978	179	40.2	4.0	13.5	82.6	21,405	82.5	17.5	67.1	32.8
1979	211	17.9	4.1	18.3	77.7	23,759	81.4	18.6	63.9	36.2
1980	237	12.2	3.6	16.7	79.7	27,330	81.2	18.8	53.6	46.4
1981	275	16.2	3.1	16.3	80.5	32,116	85.0	15.0	47.0	53.0
1966–77	2.2		0.4	−2.3	2.9	2.9	4.4	−1.0	2.4	4.5
1977–81	21.1		3.4	46.4	19.0	19.0	21.4	8.7	7.1	39.4

and its ratio to net income showed a downward trend. This does not show the value transfer of peasants selling cotton at the state price.

Third, in the commune, except for the transfer of profits from *shedui* enterprises to production teams after 1978, the economic relationship among production teams, brigades, and communes is extremely weak, and the management fees paid by production teams to the brigades are also extremely low. The production team had provident fund, public welfare fund, production cost funds, etc., but their proportion varies, and had been roughly maintained at the level of nearly 20% since 1979 (Yan, 1996).

Fourth, the proportion of peasants' income was extremely high during the entire period, reaching 87.3% in 1974, with the lowest being 77.7% in 1979. In Team X, the net income was mainly distributed between peasants and production teams, with only a small portion of it being remitted to the state, brigade, and commune. The net income of peasants from the production team could be divided into two parts: in kind and in cash. The distribution of food and other physical objects is carried out several times during the year, while cash is primarily paid in one lump sum at the end of the year. Some peasants can overdraw cash and food from the production team when they need, and then settle them all together at the end of the year.

As shown in the Table 5.2, the total net income of households increased by 2.76 times in the 15 years from 1966 to 1981, with an average annual growth rate of 6.4%. In terms of income sources, the proportion of labor income exceeded 80% in most years, and the proportion of manure was generally between 20–30% annually, but could reach 40% in many cases. In terms of forms of net income, the proportion of kind exceeded 70% before 1971, while that of cash was only 10–20%. After 1972, the proportion of physical goods decreased, while the cash ratio increased, exceeding 50% in 1981. It is noteworthy that the per capita cash income soared from 20.5 yuan in 1977 to 77.7 yuan in 1981.

5.5.2 Grain Distribution

During the people's commune period, Team X was designated the cotton producing area by the country, and all the cotton produced was to be sold to the country. In contrast, rice and wheat were considered the rations required for self-sufficiency. The institutional framework of grain distribution could be roughly deduced from the accounting documents: The disposable grain of the production team consisted of the following four parts: ① self-produced grain, ② grain transfer with population migration (marriage, etc.), ③ government resale grain (返销粮), and ④ incentive grain for selling cotton(奖售粮). Furthermore, the payment items of grain include ① selling to the country, ② keeping seeds, ③ keeping feed grain, ④ reserving done by production teams, ⑤ transferring grain with the migration of population, and ⑥ distributing to peasants based on the number of families, work points, and manure.

During the 15 years from 1966 to 1981, disposable grain was primarily produced by the production team itself, but there was no record of the government's grain

resale in the accounting documents. The incentive grain from the government greatly varied yearly, reaching 3,000 kg in many years and zero in some years. Therefore, the proportion of incentive grain is always low, at only a few percent.

In terms of food distribution, the ratio of selling to the country was only 0.2% in 1966, and then it increased, reaching the highest level of 9.5% in 1977. Subtracting incentive food from disposable food, the proportion of selling to countries further declined, and even became negative in 1972 and 1977. The proportion of self-retained seeds, self-retained feed grain, and grain reserves of the production team is approximately 20%. In the 1960s, feed grain accounted for less than 10% of disposable grain because the production team raised fewer pigs. After 1970s, with the increase in the number of pigs raised, the retained feed grain increased rapidly. As a result, the proportion of grain retained by the production team often reached approximately 20%.

Like the distribution pattern of net income, peasants had an absolute advantage in grain distribution. From 1966 to 1981, the proportion of rations and feed grain shared by peasants in total was roughly stable at a high level of 70–80%.

5.6 Economic Disparities Among Peasants and Mechanism of Rural Poverty

5.6.1 Changes in Management Performance

The economic relationship between peasants and the production team is relatively simple: Peasants get work points by participating in the collective labor of the production team, simultaneously receiving rations, fuel straw, and other such necessities from the production team. In the planned economy period, peasants can only get necessities from production teams to maintain their daily lives, and the distribution of such materials must be carried out according to the number of families and work points. Although the number of families is large, if the number of people who can participate in the economic activities of the production team is small, then the income is small; failing to cover the monthly requirements.

As shown in Table 5.3, the per capita income of peasants did not increase significantly until 1977. The distribution in kind of production teams is primarily based on the number of families. For peasants with low labor and work input, the real valuation obtained from the production team often exceeds the income from work points and manure. Peasants must pay the production team cash to make ends meet. Such peasants are generally called overspending households (*jinqianhu*). On the contrary, peasants whose labor income is higher than the real value of the products distributed from the collective are called revenue surplus households. In Team X, the total value of overspending households (*chaozhihu*) is relatively small and stable, whereas that of the revenue surplus households constitutes the vast majority. In this case, the total amount also presents a rapid increase in trend.

Table 5.3 Population, labor input and management results in production team X

Year	Households	Population (person)	Standard working days (day)	Price of SWD (yuan/day)	Income per household (yuan)	Income per person (yuan)	Grains per person (kg)	Revenue surplus households (household)	Total value of surplus (yuan)	Overspending households (household)	Total value of overspending (yuan)
1965	50	173	13,115	0.67	237	68	227	32	1639	18	721
1966	48	180	15,620	0.50	243	65	198	39	3116	9	330
1967	46	186	16,173	0.52	268	66	216	32	2098	14	458
1970	48	198	22,598	0.56	282	68	209	33	2951	15	796
1971	48	195	24,364	0.54	301	74	251	36	3194	13	940
1972	48	197	23,983	0.31	259	63	195	40	4294	9	408
1973	49	197	22,637	0.48	305	76	232	36	4095	13	598
1974	50	204	28,856	0.50	382	94	236	42	7479	8	496
1975	51	208	29,707	0.40	330	81	241	41	5469	10	552
1977	52	219	33,913	0.37	308	73	235	44	5011	8	526
1978	56	224	35,329	0.50	382	96	270	45	7706	11	690
1979	58	224	37,901	0.51	410	106	290	48	9221	10	626
1980	59	221	35,244	0.63	463	124	280	52	13,138	7	460
1981	58	219	37,570	0.73	554	147	297	52	17,579	6	566
1965–77	0.3	2.0	8.2	−4.8	2.2	0.6	0.3	2.7	9.8	−6.5	−2.6
1977–81	2.8	0.0	2.6	18.4	15.8	19.0	6.0	4.3	36.9	−6.9	1.8

However, with the increasing income of peasants and the increasing proportion of cash, why do overspending households continue to maintain a certain proportion? What are the characteristics of overspending households? Is there a certain liquidity between overspending households and revenue surplus households? We create a more comprehensive analysis—at the level of peasants—to address these queries.

5.6.2 Economic Disparity Among Peasants

Is there a big gap among peasants and individuals in terms of work points, rations, net income, and cash income? What about the relative level of such a gap? How do these gaps change over time? In this study, the Gini coefficient is used to discuss these problems concretely.

Table 5.4 shows the calculated Gini coefficient based on accounting data. From the figures in this table, the following four basic facts can be found. First, among peasants, the Gini coefficient of work points, labor remuneration, and manure evaluation are mostly stable at the level of 0.30–0.35 during the entire period. Thus, under the principle of distribution according to work, the gap in labor remuneration was relatively limited.[6] The gap in the distribution of grains and fuel straw was extremely small, which shows that the physical goods required by peasants for surviving have adopted a strict equal distribution system. Third, the gap pattern among peasants in labor participation (work points), labor remuneration, evaluation of manure, and distribution in kind was extremely stable during the people's commune period. Fourth, the Gini coefficient of the cash balance, which was the price of grains and other in-kind goods subtracted from the income from labor and manure, was large. However, in some years, it was considerably higher than 1. This is because the annual income and payments of some peasants were in deficit, that is, the income was less than the physical valuation.[7] Compared with the Cultural Revolution period, the cash income gap narrowed rapidly since 1977. It is noteworthy that the economic growth here was accompanied by the equality of income distribution.

5.6.3 Life Stages of a Household: The Case of Household H

The economic situation of peasants is not static. With the change of age structure of family members, the economic exchanges between peasants and the production team also change accordingly. As more people take part in the collective labor of the production team, the work points also increase. If there are auxiliary laborers such as children at home, they may not be able to participate in collective labor. However, they can earn sideline income by raising livestock; they can also increase work points by providing manure for their production team. In each environment, peasants use their own labor resources effectively.

Table 5.4 Economic disparities among households in production team X (Gini coefficient)

	Work points	Labor income	Manure	Grains	Fuel straw	Cash
1965	0.355	0.358	0.339	0.065	0.119	2.711
1966	0.332	0.332	0.322	0.058	0.098	0.983
1967	0.257	0.257	0.328	0.060	0.093	1.545
1970	0.286	0.286	0.180	0.066	0.101	1.607
1971	0.312	0.312	0.220	0.066	0.102	1.301
1972	0.305	0.305	0.367	0.046	0.086	0.664
1973	0.318	0.318	0.390	0.047	0.067	1.086
1974	0.288	0.288	0.355	0.046	0.083	0.571
1975	0.312	0.312	0.351	0.055	0.117	0.741
1977	0.314	0.314	0.343	0.067	0.096	0.761
1978	0.320	0.320	0.382	0.076	0.090	0.687
1979	0.333	0.333	0.378	0.081	0.110	0.645
1980	0.302	0.302	0.389	0.084	0.097	0.473
1981	0.337	0.337	0.379	0.090	0.147	0.484

Table 5.5 records the economic activities of Household H and the relationship between this household and the production team for a period of 17 years. In 1965, Household H comprised six individuals, with the household head being a doctor that had a non-agricultural registered permanent residence. Because the head receives his salary from the state in cash, they do not participate in the economic activities of the production team and are not statistically counted as a member of the production team. The doctor's family had a wife and four children. This family structure was extremely common at that time. The eldest son was born in 1956 and began participating in the collective work in 1970. Hitherto, only their wife worked in the production team to get work points. The eldest son's children who could not participate in collective labor helped (1) raise livestock, (2) increase sideline income, and (3) provide manure to the production team to get work points. From 1965 to 1967, the evaluation of manure greatly exceeded the labor income. However, because the valuation of food, fuel straw, and other materials was still more than their earnings, the settlement of their income and payments at the end of the year was negative. During this period, Household H paid cash to the production team. This overspend was primarily filled by sideline income, such as pig raising.

Household H's economic circumstances have evidently improved since 1973. The second son, who was born in 1958, also started working in that year. In 1978, the eldest son got married and added grandchildren to the family, increasing their number to seven. In 1980, the third son and the only daughter passed the university entrance examination and moved out; the number of family members returned to five. During this period, the second son also worked in *shedui* enterprises; because of their increasing work points, their labor remuneration also surged. It is noteworthy that since 1972, the settlement of income and payments was growing rapidly (the average

Table 5.5 The relationship between household H and production team X

Year	Population	Sow	Pig	Standard working day	Manure	Labor income	Weight of labor income	Rations(grains)	Feed grain	Per capita rations	Real Value of grains	Total fuel straw	Value of fuel straw	Balance of payments
	(person)	(head)	(head)	(day)	(yuan)	(yuan)	(%)	(kg)	(kg)	(kg/person)	(yuan)	(kg)	(yuan)	(yuan)
1965	5	0	1	161	138	106	43.5	1066	345	282	282	2842	57	−94
1966	5	0	4	154	190	77	28.9	850	160	202	202	2144	51	13
1967	5	0	4	172	192	89	31.8	1014	250	253	253	2324	56	−27
1970	5	1	2	527	22	295	93.2	967	258	245	245	2636	63	8
1971	5	0	0	529	43	288	87.1	1266	135	280	280	2477	59	−9
1972	5	1	2	533	219	165	43.0	840	114	191	191	2063	50	144
1973	5	0	3	609	163	292	64.1	1188	60	250	250	2827	68	138
1974	5	0	3	674	193	337	63.6	1294	45	268	268	2248	54	208
1975	5	0	3	756	184	303	62.2	1302	45	269	269	1934	46	171
1977	5	0	2	1105	142	409	74.2	1276	15	258	258	1896	45	248
1978	7	0	2	1268	151	634	80.8	1865	20	269	377	2370	57	351
1979	7	0	3	1214	171	619	78.3	2115	65	311	436	2590	62	292
1980	5	1	2	925	196	583	74.8	1632	180	362	362	2539	61	356
1981	5	0	2	910	190	661	77.7	1596	40	327	327	1970	47	479
1965–77				17.4	0.3	11.9		1.5	−23.0	−0.7	−0.7	−3.3	−1.8	
1977–81				−4.7	7.5	12.8		5.8	27.8	6.1	6.1	1.0	1.0	18.0

annual growth rate in 1972–1977 was 11.4%, and that in 1977–1982 was 18.0%). Since 1979, the per capita grains also increased greatly, and the food shortage of many years finally alleviated. The rapid increase of grain from the production team is not only due to the increase of grain production, but also due to not selling to the state.

5.6.4 Mechanism of Rural Poverty

Through the above analysis, the following three understandings were formed: First, under the people's commune system, members and their families are ensured necessities such as food and fuel straws. Second, since the mid-1970s, the per capita net income of peasants has increased rapidly, but its absolute level is extremely low. Third, the proportion of cash in net income is extremely low, indicating a state of self-sufficiency. In other words, the production team was in a state of poverty, and this poverty was shared by all peasants in the production team.

To understand rural poverty under the people's commune system, it is necessary to further clarify the income distribution mechanism. Therefore, the per capita net income is decomposed into the following factors, as shown in Eq. 5.1:

$$\begin{aligned}&\text{per capita net income of peasants}\\&= \frac{\text{work points [L]} \times \text{price of work points [P]} + \text{evaluation of manure [F]}}{\text{population}}\\&= \frac{\text{L} \times \left[\left(\begin{array}{l}\text{total net income} - \text{agricultural tax}\\ - \text{retention of production team} - \text{F}\end{array}\right)/\text{L}\right] + \text{F}}{\text{population}}\end{aligned} \tag{5.1}$$

In Eq. 5.2,

$$\begin{aligned}&\text{total net income} =\\&\quad = \text{output of agricultural products such as grain} \times \text{price}\\&\quad + \text{other output value} - \text{total expenditure}\end{aligned} \tag{5.2}$$

That is, the per capita annual net income is positively correlated with work points and the price of work points, negatively correlated with the population of the production team, and positively correlated with the output and price of agricultural products.

Next, we focus on work points and their prices, agricultural product, and their internal relationships with per capita net income. In terms of the change of work points, the labor input of Team X was 13,115 standard working days (SWD) in 1965, where 1 standard working day equals 10 points; however, in 1981, it increased to 307,570 SWD, with an average annual growth rate of 6.8% (Table 5.3).

The change of labor input should be considered from two aspects: demand and supply. With the expansion of sideline industries such as animal husbandry, the transition of planting system from two to three seasons, and the strengthening of agricultural infrastructure such as water conservancy facilities, the labor demand expanded. As mentioned earlier, although animal husbandry developed to a certain extent, it is impossible to confirm the growth of forestry and fishery from the data. The planting system gradually changed after 1970s, and no continuous increase in labor demand was recorded.

From the accounting data of the production team, it is impossible to discern how much labor was invested in agricultural infrastructure construction, but according to the field investigation, peasants were often mobilized to build water conservancy projects during slack season, especially in winter. Although the operation was not directly related to the agricultural production of the production team, the participants received work points from the production team, and these work points participated in various distributions of the production team, similar to the usual agricultural labor.

It should be considered that in Team X, during the same period, the internal pressure of continuous expansion of labor demand is not strong, and the increase of labor input primarily originates from the supply side. In the case of urban–rural division caused by the household registration system, an increasing population of peasants could stay only in the village. Under severe land constraints, they became a part of a substantial surplus population. Conversely, all individuals from every household were a member of the people's commune and had the right to participate in the collective labor of the production team. Surplus labor was heavily invested in agricultural infrastructure, and the production team became a living community in realizing equal distribution.

Furthermore, the existence of surplus labor can be observed from the change of labor score. As shown in Table 5.3, in 1965, the price of an SWD was 0.67 yuan. Since then, although the net income of the production team increased, the price of an SWD has been stagnant or in a state of decline; the lowest was in 1972, which is less than half of what it was in 1965. Work scores began to rise in 1978, and only recovered to the level of 1965 in 1981. If the price increase in the same period is considered, the price of an SWD in 1981 still falls short of the level in 1965.

There are two reasons for the rapid increase in work scores since 1978. First, the rapid growth of *shedui* enterprises not only absorbed the surplus labor of the production team, but also remitted part of the profits to them. Second, the employment restrictions on handicrafts, such as sewing and carpentry, were relaxed, which led the production team to leave agriculture and turn to non-agricultural employment, greatly reducing the surplus employment in the agricultural sector.

During the people's commune period, craftsmen, and employees of *shedui* enterprises were all members of the production team. However, they did not work in the production team, but the cash they received had to be remitted to the team. The production team gave them work points according to the cash remitted, and then unified the accounting when the year-end settlement was made, which was not remarkably different from the peasants of the production team.

Non-agricultural employees showed little resistance to this distribution system. In the absence of freedom of career choice, whether one can work in *shedui* enterprises was practically decided by the production team. Since factory labor was relatively easier than farm work, members often want to work for *shedui* enterprises; the case for craftsmen is similar.

Another reason for the long-term downturn in per capita net income is the low pricing of agricultural products in China. From 1965 to 1981, the national pricing standard of grain was 0.18–0.22 yuan/kg, and the valuation of fuel straw was even lower at 0.02–0.024 yuan/kg. To achieve the strategic goal of industrialization, the country adopted the policy of low-priced agricultural products for many years.

Almost all agricultural products of Team X are distributed among peasants, except cotton, which must be handed over to the state. Therefore, even if estimating agricultural output at market prices can increase the per capita net income, cash receipts and payments will not change considerably. This is because the increase in net income and in real value of the products from the collective will offset each other.

Conclusion

Because of the strict restrictions of the household registration system on population mobility, the production team from natural villages is a relatively closed organization. Despite the structural adjustments of agriculture and the increasing surplus labor being absorbed, it has been extremely difficult for peasants to eliminate poverty, considering the difficulty in improving labor productivity (Zhou, 1992). Conversely, under the collective ownership of land, the peasants' participation in collective labor is guaranteed by the system, and the evaluation of labor ability is relatively reasonable. The principle of distribution according to needs is adopted for daily necessities such as rations and fuel straw, thus realizing the relative stability of basic life. Because of the different members of each household, there are differences in cash income among peasants. However, it is noteworthy that the production team plays a crucial role as a living community sharing poverty.

To promote national industrialization, the Chinese government concentrated the surplus rural population in the agricultural sector and obtained primitive accumulation of agriculture and peasants through price policy. Simultaneously, it actively utilized the community function of production teams, maintained the inherent order of village society, and realized the initial development of agriculture.

Rural communes are not only institutional devices for the state to exploit agriculture, but also a community for peasants to maintain their basic life. Why then did the commune organization with such characteristics collapse quietly in the late 1970s? Mao Zedong's death and Deng Xiaoping's reinstatement have undoubtedly been a pivotal turning point, but the following three explanations can be considered more influential.

First, the commune system failed to overcome the evil cycle of poverty caused by resource constraints. During the planned economy period, the prices of agricultural products purchased by the state were extremely low, which led to the slow growth of

agricultural income. The flow of surplus labor from rural areas to cities was restricted, and the cultivated land area continued to decrease, creating a critical employment problem. To alleviate problems such as surplus employment, the government actively promoted the reform of farming system and vigorously developed animal husbandry. Thus, labor inputs into agriculture increased, and the growing rural population also gained jobs. However, because the purchase price of agricultural products was too low, the development of rural industry was slow, and the labor score dropped sharply instead of increasing. Additionally, the net income of peasants was low, as was the proportion of cash income; a certain proportion of overspending households existed for a long time.

Second, the egalitarian distribution system is said to guarantee the basic livelihood of poor villagers, but it also affects people's work enthusiasm. The system does not pay adequate attention to personal ability and effort. So long as individuals go out to work, they can get work points. Once it becomes a normal state that individuals' abilities and efforts are not rewarded accordingly, the decline of production efficiency is inevitable. Therefore, regardless of whether it aims for equality, it is inevitable for the commune organization to collapse.

Third, the inherent defects such as rigidity and inaccuracy of mandatory plans lead to the relatively low operating efficiency of agriculture, leading to the collapse of the people's commune system.[8]

Notes

1. The following description relies primarily on Jingjiang County Records Compilation Office (1992) and Baidu Encyclopedia, "Xinqiao Town" (https://baike.baidu.com/item/, accessed on November 8, 2020).
2. Sixty Articles on Agriculture (1961) is equivalent to the basic law of rural people's communes, which clearly stipulates those communes, brigades, and production teams have independent ownership, and production teams are the basic units of agricultural production and income distribution (Yan, 2021). Until the agricultural reform in the late 1970s, the people's commune was the primary economic organization in rural China as well as the grassroots administrative unit (*zhengshe heyi*).
3. In the 20 years since the end of 1970, in the coastal rural areas and surrounding areas of big cities, various TVEs have developed rapidly, which not only absorbed many rural surplus labors, but also made great contributions to improving peasants' income, becoming a crucial support for the rapid development of the national economy; the growth model of southern Jiangsu (*Sunan* model) being one of the examples. The *Sunan* model is characterized by the close combination of public ownership, rural government, and enterprises. This model has attracted wide attention worldwide, together with the *Wenzhou* model based on private ownership, family factories, and merchant networks, and the *Pearl River* model based on foreign capital and overseas market development (Yan, 2004).
4. In daily life, they are called "artisans," or craftsmen. During the people's commune period, although the craftsmen were strictly controlled, they were allowed to engage in non-agricultural work.
5. TVEs refer to enterprises whose main business is to produce and repair agricultural machinery, which are directly owned and operated by communes and brigades. Some of them were formed in the late 1950s. With the reform and opening-up policy, the rural and national economies grew

rapidly, which is similar to TVEs that grew and expanded based on commune and brigade-run enterprises (*shedui qiye*).
6. Please refer to Yan (1996) for a detailed explanation of the distribution of rations, feed grains, and fuel straw.
7. Normally, the Gini coefficient takes a value between 0 and 1, but because the cash income in this paper contains a negative value, a result greater than 1 can be obtained from this calculation.
8. Nakagane (1992) showed that ignoring peasants' wishes and interests and forcing organization extensively during the agricultural collectivization in the 1950s was a vital reason for the collapse of the people's commune system.

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Chapter 6
Water Use Construction: Flood Control and Irrigation Projects and Labor Accumulation

Huanzhen Luo

Abstract This paper investigates the process and economic performance of water conservancy construction from the perspective of labor accumulation. In the Mao era, in which there were insufficient capital and surplus labor, the labor-intensive water construction played a particular role in improving agricultural infrastructure and increasing agricultural production. On the other hand, the socialist authoritarian regime could over-mobilized the agricultural labor force and resulted in tragic consequences.

Introduction

Water utilization is generally divided into two areas: flood control and irrigation. Flood control aims to protect human life, properties, and livelihoods from the risk of floods caused by incidences such as river overflow. This is achieved by alternating the actual river channels, constructing new rivers, depositing levees, or building hydraulic works to control or adjust the water flow and volume flowing through rivers. Irrigation, which is called as "basic construction of water utilization in agricultural fields" in China, has led to the construction of reservoirs, weirs, and dams to secure these water sources and the development of irrigation channels to supply and drain water in order to maintain efficient agricultural production. The construction and maintenance of dams and rivers generally cover both flood control and irrigation because there are no clear boundaries between the two.

Due to the size and network of the flood controls and irrigation to maintain and manage water supply, resources and labor must be heavily invested and carefully managed to meet these needs. In order to effectively implement the mobilization of such resources, including labor, a centralized management of water governance was thought to be the solution.[1] The establishment of a centralized government would

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enable large-scale resources to be managed appropriately and allow the extensive use of water for farming activities.

The Mao era (1949–76) was a time of large-scale water conservancy construction in China. Soon after the establishment of "New China", the Huaihe River and Yellow River overflowed due to heavy rain and prolonged high precipitation, causing the dikes to break and seriously flooding the surrounding area. As a result, part of the first five-year plan (1953–57) included the government embarking on the construction of large man-made rivers to control the Huaihe River and Yellow River. This marked the beginning of water conservancy construction in this new era of China. Meanwhile, in order to restore and further develop agricultural production, China also carried out a series of irrigation projects as part of its agricultural cooperativization. This large-scale construction of flood control and irrigation continued throughout the Mao era but to varying degrees as such large-scale operations were affected by economic and social planning during the Great Leap Forward (hereinafter, GLF) era (1958–60), the national economic adjustment and recovery period (1961–65), and the Cultural Revolution (hereinafter, CR) decade (1966–76). The rural water conservancy also sought a new water conservancy system but faced many challenges, especially as the old, traditional system became unsustainable with the introduction of the agricultural responsibility system and the collapse of the People's Commune system in the late 1970s. China's rural water conservancy had to undergo many trials and tribulations.

This chapter examines water conservancy construction in the Mao era from the perspective of labor accumulation. Section 6.1 examines water conservancy construction throughout the country from 1950 to the end of the 1970s. Section 6.2 uses data from across the country and especially from the provinces of Jiangsu, Hebei and Zhejiang in order to provide a quantitative analysis of the effects of water conservancy construction. Section 6.3 focuses on Nurkse's (1955) capital-labor accumulation model[2] to examine how surplus labor was mobilized for these huge water conservancy projects. This chapter will finally conclude problems still faced in regards to the water use that occurred after the rural reform and identify the challenges ahead.

6.1 Historical Development of Water Conservancy Construction

China has two imbalances that affect their level of rainfall precipitation: namely regional differences between the north–south and east–west parts of the country, and seasonal disparity across its 9.6 million square kilometers of land. The south has the highest amount of rainfall, ranging from 750 to 2,000 mm of rainfall annually, while the north receives 350 to 750 mm. In contrast, the east gets around 350 mm of rainfall, and the west receives even less at an annual average of under 100 mm. In addition, the rainfall also varies significantly with the seasons. In China, summer rainfall accounts for 50% of the annual rainfall, while winter rainfall is only 10%.

Such geographical and seasonal imbalances in rainfall have caused floods, droughts and other water-related disasters in China. In fact, according to the national archives,[3] China had endured 1,031 floods of great magnitude and 1,060 droughts during the 2,142 years from 206 B.C. to A.D. 1936. On average, there was one flood or drought every year. How to construct a water conservancy and maintain stable agricultural production had been a major issue for successive rulers in China.

However, by the time of the establishment of New China in 1949, the country had reached melting point. Ravaged by warfare and facing an ever-growing population to feed, there was a lack of resources to manage water conservancy which consequently led to frequent floods and droughts. 8 million hectares of arable land had been submerged that year due to a massive flood, reducing food production by 11 billion kilograms, and affecting 40 million people. In addition, many houses, farm machinery and livestock were also damaged in this flood. Due to such catastrophic events, the newly-established Chinese government needed to respond swiftly and initiated a policy that prioritized water conservancy and agriculture, along with transportation (especially railways) to bring recovery. On October 19 of the same year, the Ministry of Water Conservancy was established, with Fu Zuoyi as its minister, to oversee water conservancy construction nationwide.

There was a need to mobilize many resources in order to get the water construction projects off the ground. In the 1950s, China was one of the poorest agricultural countries in the world, and although there was an enormous surplus labor in rural areas, the machinery needed for water conservancy construction was extremely scarce. The Chinese government compensated for the lack of machinery by immobilizing its labor force on a large scale to carry out their ambitious flood control and irrigation projects. Floods, droughts, and irrigation projects varied greatly from region to region to match the conditions of the rivers, lakes, and rainfall conditions. Local governments, therefore, located around the river basins and along the rivers, took the lead and played a major role in mobilizing resources, especially labors, to handle these ambitious construction projects.

The water conservancy construction during the Mao era from 1949 to 78 can be divided into three main periods. The first period was from 1949 to 57, when large-scale emergency flood control and irrigation construction was undertaken, mainly in the Huaihe River and the Jingjiang River. The second period was from 1958 to 65 in which large-scale irrigation projects were initially constructed under the GLF movement, but due to concerns about the effectiveness of the projects, such plans had to be reviewed and adjusted accordingly. The third period followed a policy of water conservancy construction under the "Learn from Dazhai in Agriculture" movement. However, by the end of 1978, the water utilization system became difficult to maintain. This was partly because of the implementation of the agricultural production responsibility system and partly due to the collapse of the People's Commune system which had been adversely affected by the reform and opening-up policy. Consequently, the government had to seek a new water utilization system after 1978.

6.1.1 *Emergency Flood Control and Large-Scale Irrigation Projects (1949–57)*

Due to hazardous flooding experienced all over China in 1949, the Ministry of Water Conservancy held in November a meeting in each liberated area of the country in an effort to set up policies to "prevent floods and promote water conservancy" to improve conditions for agricultural production. Under the policy, each area developed its water conservancy construction projects to determine which aspects of flood control and irrigation needed attention in its area. Table 6.1 shows the distribution of funds for each administrative region in 1950. East China, South Central China and North China focused on flood control, while the Northwest region concentrated on irrigation and the Northeast region evenly invested their funds between the two.

From the table, it can be noted that East China and South-Central China focused predominantly on flood control because of heavy flooding along the Huaihe River. In fact, nationally, flood control was the main area of investment, accounting for 73% of expenditure compared to irrigation at 19%, and field research at 4.7%. Yongding River in North China, Huaihe River basin, Yishu River in North Jiangsu Province, and Jingjiang River in Hubei Province especially benefited from such investments as they were areas most prone to dangerous flooding. Once these urgent flood control projects had been completed, irrigation projects began to be implemented on a large scale.

6.1.1.1 Urgent Large-Scale Flood Control Projects

These urgent large-scale flood control projects were a direct result of the notorious flooding since 1949 that occurred along rivers such as the Huaihe River, the Yangtze River, and the Haihe River. In this section, we will discuss two crucial flood control projects: one located in Huaihe River and the other situated along the Jingjiang River, in the middle reaches of the Yangtze River.

Table 6.1 Water fund: the proportion of government funds allocated to water maintenance for each administrative district

Administrative district	Flood control (%)	Irrigation (%)	Others (%)
East China	94.6	1.3	4.1
South Central China	90.2	4.3	5.5
Northeast China	31.8	37	31.2
Northwest China	6.1	79.4	14.5
North China	61.7	28.2	10.1

Source Zhongguo Shehui Kexueyuan, Zhongyang Dang'anguan (ed.) 1991:447

The Huaihe River is the third longest river in China, stretching 1,158 km. It originates in Tongbai Mountain in Henan Province, and flows through Henan, Anhui and Jiangsu Provinces, and enters the East China Sea from Xiangshui County in Jiangsu Province. With many tributaries, the Huaihe River basin area covers 280,000 km^2. Since ancient times, the Yellow River has changed its course many times and has been known to clash with the Huaihe River basin, causing destruction and leaving the Huaihe River system volatile. As a result, the mouth of the Huaihe River itself is not stable due to the downstream area of the Huaihe River having seriously affected the water system. Unsurprisingly, the Huaihe River has been historically known as the most flood-prone river in China. The Yellow River Flood of 1938 is one example that caused massive ecological damage to the environment. This incident led to breached embankments in the town of Huayuankou Zhengzhou in 1938,[4] causing flooding in 66 counties in Anhui and Henan provinces, leading to further destruction to the Huaihe River system and disrupting the lives of tens of millions of people.

Between June and July 1950, the Huaihe River basin received continuous torrential rainfall, causing the mainstream and tributaries of the Huaihe River to swell rapidly, leading to water levels exceeding the levels of the Great Floods of 1921 and 31, and resulting in serious flooding in the basin. More than 13 million people suffered from this flood. In response to this tragedy, the government in the following months began operations to rescue victims and to study comprehensively the problem of flood control in the Huaihe River and in all other nearby provinces. This resulted in the establishment of the Huaihe River Flood Control Committee (Zhihuai Committee) in November to oversee the governance of flood control along this river. This committee put into effect two phases to combat the destructive nature of the floods. The first phase of the project included: (1) building the Shimantan and Banqiao Dams, and flood storage areas in the upper reaches of the Huaihe River, and dredging more than 20 tributaries such as the Honghe and Ruhe Rivers; (2) building flood control gates in the middle reaches of the Huaihe River at Runheji and strengthening the embankments of mainstream and tributaries; and (3) repairing and strengthening canal embankments in the downstream of the Huaihe River in northern Jiangsu Province. The government mobilized more than 3 million laborers and provided the equivalent of more than 500 million kilograms of food to feed the workforce so that they could complete the first phase of the project in July 1951.

The second phase of Huaihe River flood control construction began in November 1951. This phase included: (1) building the Boshan and Nanwan Dams in the upper reaches of the Huaihe River, and continued dredging of the Honghe River and other tributaries in that area; (2) constructing the Foziling Dam in the middle reaches of the Huaihe River and flood storage works around the Shouxi Lake; and (3) digging the new canal, the Subei Irrigation Culvert, in the lower reaches of the Huaihe River, which diverted the Huaihe River from the Hongze Lake to the East China Sea. This two-year project alone mobilized more than 4.6 million laborers.

The flood control projects along the Huaihe River from late 1950 to 53 involved the transportation of over 2.68 billion cubic meters of soil and stones[5] and led to the construction of three new dams, repairs to three old dams, the building of 16 reservoirs, 104 control gates and tunnels, and the dredging of 77 rivers (totaling

2,969 km) (Fu, 1954). Due to the successful completion of these large-scale water system projects, the Huaihe River basin floods of 1954, which were conceivably more severe than the previous flood in 1950, were less destructive. With such promising results, the Chinese government has persistently continued to pursue greater control along the Huaihe River since 1954 with the completion of a series of dams (e.g., Baisha Dam, Boshan Dam, Nanwan Dam, Foziling Dam, Meishan Dam, Xianghongdian Dam), repairing and strengthening embankments, and the completion of new channels (Subei Irrigation Culvert) with water gates. The old flood damage in the Huaihe River has been largely eliminated as a result of these constructions.

The second major flood control project concentrated along the Jingjiang Reach, a stretch of water located in the Middle Yangtze River. The Yangtze River is the longest river in China, totaling a length of 6,300 km and covering a basin area of about 190,000 km^2. The S-shaped Jingjiang River is one part of this river and extends from the Jinsha River in the upper stretches of the Yangtze River through the Three Gorges and out of Yichang. The north bank of the Jingjiang River from Jiangling County to Jianli County is in direct contact with the water from the upper stream and is the most dangerous place during heavy storms and floods. In fact, between 1912 and 49, the Jingjiang River embankment was recorded to have broken 20 times. In the Great Yangtze River Flood of 1931, the Jingjiang River embankment broke, submerging more than 330,000 hectares of arable land and affecting more than 3 million people (Wang, 2020: p. 48). However, the Yangtze River Water Conservancy Committee was not established until February 1950, after being hit by another great flood in 1949. This committee proposed a flood diversion plan along the Jingjiang River, which the central government approved in early 1952. This plan consisted of several projects: (1) strengthening the embankment on the north bank of the Jingjiang River, (2) building an embankment around the flood diversion area on the south bank, and (3) constructing three kinds of sluices (sliding gates for flood inlets, flood regulators and flood outlets) in order to divert flooded areas.

The State Council publicly announced the need for "Provisions of the Jingjiang River Diversion Project" and officially put forward the Jingjiang River Diversion Project on March 31, 1952. On April 5, 300,000 people were mobilized to start the first phase of this project, which included strengthening the embankment on the north bank and constructing a flood diversion zone covering hundreds of kilometers on the south bank. These works were completed in two months and "amounted to the movement of about 10 million cubic meters of soil, stone, sand, and concrete" to strengthen the embankments (Liu 1991:489). The second phase of construction started on November 14, 1952. Projects involved strengthening the right embankment of the Jingjiang River, the embankment of the diversion area, and the construction of several safety zones. The construction was completed on April 25, 1953, after deploying a workforce of more than 170,000 people. The following year, the Jingjiang River Diversion Project was put to the test with the Yangtze River Special Flood in 1954[6] and was approved the effectiveness of the projects.

While the Huaihe River flood control and Jingjiang River diversion projects were underway, other constructions were also being carried out in other areas of China. For example, the construction of the Haihe River around Beijing, which included

improvements to the Yongding River and the construction of the Guanting Dam, resulted in the mobilization of more than 40,000 workers and technicians from 1951 to 54. The reservoir capacity of the Guanting Dam was 2.27 billion cubic meters, making it the largest dam in China at that time. Meanwhile, the Hunhe Dahuofang Dam, which has a storage capacity of 2 billion cubic meters, was also built on the Liaohe River from November 1953 to 58.

6.1.1.2 Large-Scale Constructions of Water Conservancy for Agricultural Fields (Irrigation Projects)

Mao Zedong's slogan, "water conservancy is vital to agriculture", led to extensive irrigation projects in many areas of China. The Central People's Government issued the "Declaration on the 1950 Water Conservancy Spring Reform Project", in which local farmers were to be mobilized in various regions to expand and improve irrigation projects in 1950. From this period onwards, the central government issued further instructions on agricultural and farmland water conservancy construction almost every year, and for regular large-scale irrigation improvement projects during the winter and spring months that followed.

According to the "Report on Agricultural and Rural Water Conservancy Construction" issued by the Water Conservancy Ministry in 1953, 3.1 million small dams and sluices were constructed, 730,000 new wells were built, and 214 large-scale irrigation works were restored and constructed between 1950 and 53. As a result, the irrigated area increased by about 3.07 million hectares, and improvements were made in the irrigation of another 14 million hectares of farmland.

In 1953, China began implementing its First Five-Year Plan. In December 1952, the State Council issued a directive to improve agricultural conditions. This included a drive to promote drought prevention and improve water and soil conservation. It also aimed at continuing large-scale irrigation construction in the countryside, shifting the focuses from repairing irrigation facilities to building new ones. In addition, the scale of agricultural irrigation construction was expanding concurrently with the agricultural collectivization (ranging from basic to high-leveled cooperatives). In particular, the construction of agricultural fields and water conservancy reached an intense level of agrarian development after October 1955, following Mao Zedong's announcement of there being a "high tide of socialism in China's rural areas". For example, in the spring of 1955, Anhui Province alone had transported 67 million cubic meters of soil and stones, and had completed 25,689 projects related to reservoirs, drainage channels, small dikes, and wells. For such expansion in these agricultural activities to remain successful, an even larger number of laborers were continuously mobilized to construct further irrigation projects in 1956.

According to the statistics from the Ministry of Agriculture, during the First Five-Year Plan period from 1953 to 57, the irrigated area supervised by central government grew by about 2.73 million hectares, while the irrigated area coordinated by peasant and local control increased even more. The national irrigated area in July 1957 covered 34.67 million hectares compared to 20.67 hectares in 1952 (Table 6.2).

Table 6.2 Changes in the irrigated area (1952–57)

	Actual area	Increased area
1952	2115.8	
1953	2225.1	120.1
1954	2322.3	106.8
1955	2462.7	148.4
1956	3223.9	791.3
1957	3436.1	287.3

Source Wang 2020:120
Note Although unknown, discrepancies between the increased area and the actual area may be due to a reduction in the actual area (Wang 2020:120)

Furthermore, the area of paddy fields also increased considerably. Represented as a percentage of total cultivated land, this area of land increased from 23.9% in 1953 to 24.6% in 1957. Accordingly, food production also made significant progress, and the national food production increased from 164 billion kg in 1952 to 195 billion kg by 1957.

6.1.2 Irrigation Projects and Their Adjustments Under and After the GLF Movement (1958–65)

The Eighth Central Committee of the Communist Party of China (CPC) held its Third Plenum in September 1957 and passed the revised draft of the National Program for the Development of Agriculture for the period from 1956 to 67. This outlined the policy of "promoting water utilization, developing irrigation, and preventing floods and droughts". Accordingly, the State Council decided to develop large-scale irrigation of agricultural fields and compost production, which marked the beginning of large-scale irrigation of agricultural fields during the GLF era. Water conservancy construction was a part of this GLF, and the establishment of the People's Commune enabled a more efficient mobilization of rural labor, which led to a surge in water conservancy construction. During this period, the traditional economic plan was abandoned and various economic targets, such as iron, steel and food supply, were arbitrarily revised by the higher levels of government, resulting in great confusion in the national economy and tragic consequences. Similarly, in the water conservancy construction, unrealistic construction targets were constantly revised upwards by decisions made by the upper levels of government, leading to labor being forced to work. During the period of national economic adjustment from 1961, the policy of water conservancy construction was reviewed, and the water conservancy projects initiated during the GLF era were revised.

6.1.2.1 Establishment of Policy that Prioritized Water Storage, Small Sizing and Cooperatives

Based on the results of the agricultural and farmland water conservancy construction up to 1957, the central government decided to launch "three main" irrigation development policies to focus on: "prioritizing the small, prioritizing the cooperatives, and prioritizing water storage". The policy of "prioritizing the small referred to focusing on the construction of small irrigation facilities other than emergency flood control works. The policy of "prioritizing the cooperatives" encouraged cooperatives and enabled their members to contribute their labor and funds directly to the construction of irrigation facilities, rather than rely on work initiated by government's construction budgets. These two policies were maintained during the period of national economic adjustment that followed the GLF. The policy of "prioritizing water", however, required further explanation. Traditionally, China's flood control methods focused mainly on how to drain water. However, Soviet flood control experts advised the Chinese government on the importance of water storage as this was an important economic resource. Storing water would enable the country to cope better with seasonal droughts. In response, the Henan Provincial Conference on Water Conservancy Activities was held in October 1957. At this conference, the policy was decided that "prioritized water storage over drainage and combined both water storage and drainage," which eventually became the national flood control policy. The People's Daily published an editorial on March 21, 1958, entitled "Prioritizing Water Storage, Prioritizing the Small, and Prioritizing the Cooperatives". Overall, the irrigation development during the GLF era led to large-scale projects under this three-tiered policy. However, irrigation development that focused on water storage soon led to a major problem of soil alkalinization of farmland.

6.1.2.2 Rapid Development of Agricultural Field Water Conservancy Construction

Greater emphasis was placed on the construction of irrigation in agricultural fields, following the decisions of the State Council and the adoption of the National Program for Agricultural Development in October 1957. Henan and Anhui provinces will be taken as examples to demonstrate how irrigation construction was carried out during the GLF era.

Held in October 1957, the Henan Provincial Water Conservancy Conference decided to add a new irrigated area of 1.33 million hectares to the existing irrigated area of 2.87 million hectares in 1958. According to a report in the People's Daily (February 15, 1958), Henan Province mobilized a workforce of more than 15 million laborers to meet these plans. This far exceeded the initial plans of organizing 5 million people to work in these newly irrigated areas. The implementation of this Irrigation Area Expansion Plan resulted in rapid growth in the new irrigated area in 1958 from 466,000 hectares to 667,000 hectares, then to 1,333,000 hectares, and finally reaching a total of 2,667,000 hectares. In addition to this irrigated expansion,

plans were also gradually introduced to improve water and soil runoff in particular areas. To achieve these plans, Henan Province mobilized men and women of all ages to work in harsh conditions to construct these water conservancy projects. Henan Province also proposed to expand the irrigated area to 7,333,000 hectares by the following year.

Anhui Province also held their water conservancy conference in October 1957 and decided to create large-scale projects from the winter of 1957 until 58. Anhui decided to increase irrigated areas by 286,000 hectares and improve irrigation in 595,000 hectares of farmland in 1958. This resulted in more than 300,000 workers per county being sent to complete these major works. According to the statistics from the government archives, in December 1957, more than 10 million agricultural laborers worked on such massive undertakings, leading to more than 800 million cubic meters of soil and stones being shifted to complete water conservancy targets in 1957. Such accomplishments led to further expansions of these projects in 1958 with another 800 million cubic meters being shifted. As a result of such efforts, a total of 2.4 billion cubic meters of earth and stone had been moved—six times the original targets and 1.5 times more than the total between 1950 to 57.

Other provinces also made similar progress in large-scale water conservancy during this period. For example, Hubei Province mobilized 7 million people, which is about half of the total agricultural workforce, and Zhejiang Province allocated over 100,000 person-days to work on construction. Overall, according to the Agricultural and Farmland Water Conservancy Construction Bulletin published by the Ministry of Agriculture in October 1958, the area of irrigated land had expanded nationally by 32 million hectares and a further 14 million hectares of water-prone farmland (depressions) had been converted nationwide in 1958.

Large-scale water conservancy construction continued in 1959 and 60. According to a report by the National Bureau of Statistics, during a three-year period, the GLF projects led to the constructions of 99 large dams (five times as many as in 1949–57), 1,100 medium dams (eight times as many), and 108,000 small water conservancy facilities (1.4 times as many). Furthermore, by 1960, the area under irrigation control grew to 63 million hectares, accounting for 59% of the total area under cultivation.[7]

How should we evaluate the large-scale water conservancy construction during the GLF era? "The History of Water Conservancy in New Rural China", edited by the Rural Water Conservancy Department of the Ministry of Water Conservancy, gave a high appraisal for such efforts. According to this book, during the GLF era, more than 100 million laborers were mobilized every year to build numerous large-scale dams and to irrigate large rural areas, as well as the countless small and medium-sized dams and smaller irrigated areas. Most of these facilities had to be renovated later but remain operational even up to this day. This book also commented on the poor quality of some works and the lack of maintenance.

There was strong criticism, however, by Li Rui, the former director of the General Bureau of Water and Electric Power of the Ministry of Electric Power Industry. He severely criticized the large-scale projects as a "disaster" with the Huaihe River basin and the Yellow River water supply construction as clear examples in his book "The History of the Great Leap Forward". In his memoirs of historical incidents, Bo Yibo,

who was one of the senior members of the central government, also criticized the water conservancy construction during the GLF, saying that although it had achieved a certain level of success, the price paid was too great and the loss outweighed the gains (Bo 1993:710).

6.1.2.3 Modifications to Irrigation Projects During the Period of National Economic Adjustment

The GLF era failed miserably and resulted in starvation with deaths estimated at more than 30 million people. In response to such failure, the Chinese economy entered a period of "adjustment". At the same time, the water conservancy construction during the GLF was also reviewed, and several problems were exposed. There was a serious alkaline soil problems in the plains, which were a direct result of projects that focused on creating water storage. Water accumulated in these farmland areas, leading to groundwater levels to rise, and resulting in an increase in the salt content underground. This change in soil alkaline levels caused severe damage to crops. At the Fan County Conference in 1962, it was confirmed that more than 1.33 million hectares of arable land in Hebei, Shandong, and Henan provinces had been seriously affected. As a result, the policy of "focusing on water storage" was put to a halt in order to resolve this problem and advert any further agricultural disasters. The National Agricultural Conference in 1962 proposed a new three-tier policy which focused on "small-size", "complementation", and "the masses". "The masses to carry out the work" and attention to "small-size" were not so different from the previous government policy of "prioritizing the small" and "prioritizing the cooperatives" during the GLF period. The new policy still organized work through production teams and production brigades as it was under the People's Commune. However, the policy of "complementation" demanded that when the governments planed a large-scale water projects they should provide a systematic irrigation system which included additional supplementary works to ensure their smooth operation.

Another problem in the construction of water conservancy during the GLF era was the frequent water conflicts between different regions. In order to store water, each region built arbitrarily weirs which stopped the flow of water to other regions. As a result, not only had the irrigation system failed, but many rivers had also been blocked. The problem was particularly serious in the Huaibei region of northern Jiangsu Province, and in Hebei, Shandong, and Henan Provinces.

Irrigation facilities can only fulfill their role if they are integrated as a whole system. In general, an irrigation system consists of a water source (dam, river, well), the main canal (trunk canal), a tributary canal (branch canal), a terminal canal (farm canal), and ditches that flow to each field. If one irrigation channel were not adequately maintained, other constructed dams and main culverts would also be affected. In fact, according to a 1963 survey by the National Bureau of Statistics, 3,989 large and medium-sized irrigated farmland districts with an irrigation area of 667 hectares or more actually irrigated only 11.05 million hectares consequently to such faults in managing these integrated irrigation systems. This irrigated area was

significantly smaller than expected with their initial plan of 19.43 million hectares. In fact, only about 60% of the design capacity was achieved due to the lack of coordination in these "complementary" works.

In the 1960s, water conservancy construction was also overhauled under the new three-tier policy of "small size", "complementation", and "the masses" to resolve the above problems. Firstly, many of the large water conservancy projects that had been planned or were in the process of being started were halted. Secondly, it was decided that any additional new large projects would be stopped. The "Instructions of the Committee of CPC on Water Conservancy Construction Issues" from June 1960 made it clear that the construction of large-scale projects must be first approved by the central government. Furthermore, each region that undertook the construction and maintenance of any large had to also consider their small irrigation canals as part of the supplementary works. Thirdly, Henan, Shandong, Hebei, and other provinces had to resolve the problem of soil alkalization. Other developments included stopping irrigation with water from the Yellow River and removing weirs that had been built without permission in each region. For example, from 1962 to 65, Henan Province removed more than 40,000 weirs that obstructed the flow of water in various parts of the province. In addition, further developments were made at the irrigation facilities mainly in Jiangsu, Zhejiang, and Shanghai, with the introduction of electric power pumps along the Yangtze River.

6.1.3 Water Conservancy Construction Under the "Learn from Dazhai" Movement

Dazhai is a small mountain village in Xiyang County, Shanxi Province. It was a poor village with natural conditions so unfarmable that the area was described as "mountainously high, rich in stones, with not even 0.2 hectares of flat land. "Under the leadership of Chen Yonggui, the local Communist Party secretary, the villagers began to work together using simple tools such as sickles and plows in 1953 to construct water channels, improve the soil and create terraced farmlands. This resulted in an increase in food production and improvement in the lives of the peasants there. Mao Zedong thought that the whole country should follow the footsteps of Dazhai's achievements, and in 1964, Premier Zhou Enlai introduced the motion that "Learn from Dazhai in Agriculture," and this became a nationwide campaign. From 1964 until the end of the 1970s, Dazhai became the model village for agricultural farming nationwide.

However, 1966 marked the beginning of the CR, causing great harm to agricultural production. From 1967 to 69, agricultural production shrank. The total amount of farmland allocated to crops fell from 144.94 million hectares in 1967 to 140.94 million hectares in 1969, and resulted in a drop in food production from 217.82 million tons to 210.97 million tons (General Rural Socio-Economic Survey Team, National Bureau of Statistics 2000:34 & 37). The Northern Agricultural Conference

was held in August 1970 in Xiyang County to respond to this serious problem. At the conference, the order was given to carry out basic agricultural and farmland construction that centered on soil improvement and irrigation maintenance. Such developments occurred on a large scale as part of the "Learn from Dazhai" movement.

One million cadres (small groups of trained members) and more than 100 million farmers were mobilized across the country to work on water conservancy construction in various parts of the country from 1970 to 71. To prevent floods and droughts and to expand the level of irrigation, the government resumed large-scale irrigation projects such as the Jiangdu Drainage Irrigation Station in Jiangsu Province, the Baoji Weihe Irrigation Project in Shaanxi Province, the Dujiangyan Expansion Project in Sichuan Province, the Danjiangkou Irrigation Project in Hubei Province, the Taichuan Water Supply Project in Gansu Province, and the Bishihang Irrigation Area in Anhui Province. The following year, further large-scale construction, irrigation mechanization and drilling of irrigation wells were carried out. Since the 1970s, there was a drive to expand the supply of electricity using small hydropower plants, and this led to the construction of many pumped drainage irrigation stations. 2.4 million irrigation wells and 54 million kilowatts of electricity capacity for irrigation and drainage were built nationwide by 1976 due to such mammoth undertakings (Ministry of Water Resources, Ministry of Water Conservancy and Water Conservancy Development Research Center 2010:57).

6.2 Quantitative Evaluation of Water Use Construction

As mentioned previously, an enormous amount of labor had been mobilized to build water conservancy in the Mao era. What had been achieved from such efforts to develop water conservancy over the past 40 years (1949–89)? In this section, we will try to evaluate the results by concentrating on data that provide insight into the changes in irrigated areas, flooded areas, and food production. We will also examine the relationship between water use construction and agricultural collectivization.

6.2.1 Changes in Irrigated Area

Expansion of irrigated areas was the main goal and the most obvious achievement of water conservancy construction. Table 6.3 shows how the irrigated area changed from 1949 to 89:

Leaving out the minor variations within each period, the above table shows a rapid expansion of irrigated areas from 1949 to 58 (average annual growth rate in China of between 8.63 and 10.18% depending on sources). In the period of national economic readjustment (1961–65), the amount of irrigation declined slightly but expanded once more during the "Learn from Dazhai" period (1964–76) (average annual growth rate of 2.4%). After this period, growth in such farmland stagnated and later fell into

Table 6.3 Changes in national irrigated area (1949–89) expressed in units of 1000 hectares

	China[1]	China[2]	Jiangsu province	Hebei province
1949			1822	769
1952	19,959	21,158	1854	963
1958	32,791	34,361*[1]	2586	2071
1960	35,083		2883	1952
1965	33,055		2588	1754
1966			2801	2294
1978	44,965		3270	3660
1989	44,917		3531	3683

Source For China[1], Jiangsu and Hebei Provinces, Guojia Tongjiju, Nongcun Shehui Jingji Diaocha Zongdui (ed.) 2000:44–47. For China[2], Wang 2020:120
Note *[1] data for 1957

decline from 1979. Overall, however, in terms of national productivity, the area of irrigated farmland had more than doubled in size from 19,959,000 hectares in 1952 to 44,965,000 hectares by 1978.

6.2.2 Flooded Area

The purpose of flood control is to prevent floods and flood damage. Figure 6.1 is a graph of the area damaged by flooding from 1950 to 78. The occurrence of floods often depends on natural conditions such as the amount of precipitation, but the likelihood of flooding can be reduced by improving the condition of rivers. Although the levels fluctuated over the period, it is possible to observe a general fall in the number of areas affected by flooding during the Mao era. This is in contrast to the trend that followed from 1979.

6.2.3 Crop Yields

Expansion of irrigated area and reduction of the flooded area led to an increase in food supply of staple crops. The crop yields showed gradual signs of improvement at the end of the 1970s but rapidly increased after the introduction of further rural reform. The increase in food yield and total production was due to the expansion of irrigated areas and will be discussed in detail in the regression analysis in Sect. 3. Also, refer to Chap. 3 (Fig. 3-4) for more information on the total production of food (rice) yield.

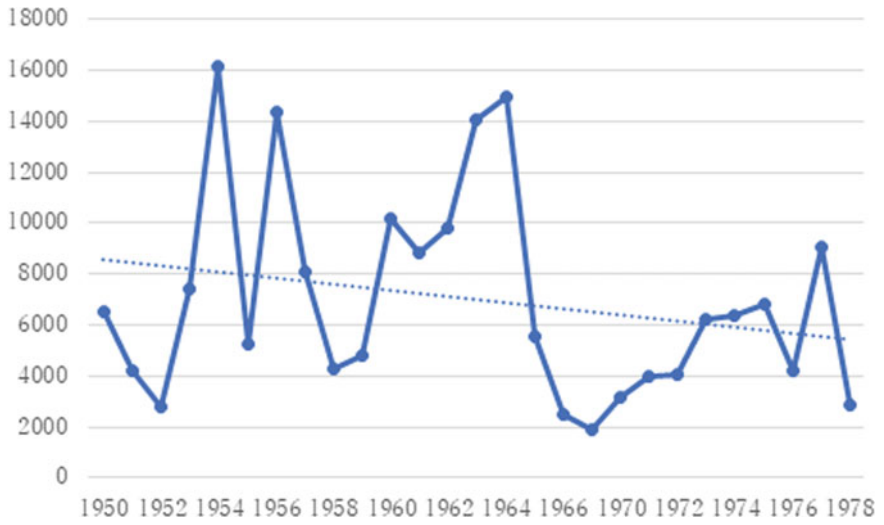

Fig. 6.1 Flooded area in the Mao era expressed in units of 1000 hectares. *Source* Guojia Tongjiju, Guomin Jingji Zonghe Tongjisi (ed.) 2005:29

6.2.4 Water Conservancy Heritage

It is believed that the water conservancy facilities constructed during the Mao era continued to play a vital role in the reform and opening-up era (1978–93). Table 6.4 shows the number of sluice gates constructed on average each year from pre-liberation to 1993 in Jiangsu Province. Sluices played a major role in controlling floods and storm surges, and the number of gates (holes) needed for each one depended on the size of the sluice. For example, Wangzhuang Sluice Gate in Xinyi Wangzhuang Town, completed in 1967, had 45 gates, while the Wulong River Sluice Gate in Donghaipo South Township, completed in 1978, had only one gate.

Table 6.4 Number of individual gates for the sluices in Jiangsu Province (pre-liberation to 1993)

Period	Number competed for the period	Annual average of completed
Pre-1949	17	
52–57	325	54.2
58–60	641	213.7
61–65	231	46.2
66–76	783	71.2
77–78	146	73.0
79–93	284	18.9

Source Jiangsu Sheng Difangzhi Bianzuan Wiyuanhui (ed.) 2001:841–867

As mentioned previously, Jiangsu Province had built a considerable number of sluices, canals, and reservoirs in coastal areas as part of their flood control management in North Jiangsu. As of 1995, there were 284 sluices and 2,427 gates in use, of which only 17 of these sluices were completed before the liberation. The rest were built after 1952. Of these, 325 gates were built between 1952 and 57 (an average of 54.2 gates per year), and this rose to a maximum of 641 gates (an average of 213.7 gates per year) during the three years of GLF era. After this period, the average number of gates built fell to around 70 gates per year in the 1960s and dropped even further from after 1979 to just 18.9 gates per year. Overall, the number of sluices built during the Mao era accounted for 81.6 percent of the total sluices in use (87.6 percent of 146 sluices built between 1977 and 78 are also included in the data).

Many of the dams and irrigation facilities in Jiangsu, as well as in other regions, were built during the Mao era. In Zhejiang Province, 9 of the 11 large dams were designed, implemented and completed during this period. Of the 85 medium-sized dams, 49 had been completed by 1976, and another 8 had been built by 1978 (Zhejiang Provincial Water Conservancy Chronicle Compilation Committee 1998:475–494). Also, there were nine large sluices constructed between 1952 and 71. In Hubei Province, 46 medium-sized sluices were built in all, and 42 were constructed between the 1950s and 1970s, with only two being built before 1949, one being completed with an unknown date, and a final one constructed in 1979 (Hubei Provincial Chronicle Compilation Committee 1995:391–394).

Large-scale water conservancy construction helped to control frequent floods and droughts to a certain extent, protecting the people's property, their livelihoods, and economic activities. Except during the GLF era, the expansion of irrigated areas improved the crop yields and other agricultural products and made it possible to adequately feed the growing population.

6.2.5 Water Conservancy Construction and Agricultural Collectivization System from Mid-1950s to 1978

How did the large-scale construction of water conservancy during the Mao era relate to collectivization (People's Commune) since the mid-1950s? It is necessary to separate flood control from irrigation when considering this problem. As mentioned previously, the large-scale flood control projects were undertaken immediately after the founding of New China were not based on the premise of agricultural collectivization. With the strong rise of the Communist Party and their various administrative organizations, large numbers of laborers could be easily mobilized to work on these huge agricultural developments. The construction of dams, sluices, and other water control projects after agricultural collectivization were effectively organized through the People's Commune system. However, it could be conceived that this period of production might have occurred even without the People's Commune system due to other particular pre-existing circumstances.

Mutual understanding, cooperation, and monitoring of farmers were essential for irrigation to be successfully managed in agriculture and allow this valuable resource to reach its destination from the water source to each field via the various intricate canal networks. In Japan and many other Asian countries, irrigation projects, including the maintenance and management of water facilities and the distribution of irrigation water, had been carried out through rural and village communities (Kajisa, 2020). In some traditional rural areas in China, irrigation projects were maintained at a certain level under the management of local country gentlemen. In this sense, the development of irrigation projects in New China may not have been necessary as part of the need for agricultural collectivization or through this People's Commune system. However, as Zhang (1994) points out, in traditional Chinese society at that time, both the construction of new irrigation facilities and the restoration and maintenance of old ones became too difficult to be entrusted to the traditional private organizations (country gentlemen) due to technical and financial problems. In addition, China's traditional rural society was not effectively organized to deal with the scale of more modern, large-scale projects. Referred to as "scattered sand", this society had problems regarding trust and cooperation among peasant classes and was, therefore, insufficiently prepared to undertake the scale of these enormous developments. Agricultural collectivization under socialist ideals was more favorable in driving large-scale irrigation projects.[8]

However, the relationship between the agricultural collectivization and irrigation projects can be observed by how the rural water conservancy projects fell into disarray as a result of the downfall of the People's Commune system. Using Shayang County in Hubei Province as an example, problems associated with irrigation since the implementation of the agricultural production responsibility system became apparent. Wu (2017) points out the severity of the problems with issues related to the reduction of irrigation area, the shift of farmers using water from traditional large-scale water sources to digging their own wells, the rising costs associated with the use of small-scale water utilization facilities, the devastation of terminal irrigation canals, water theft by farmers in irrigation canal transitional areas, and farmers' water supply difficulties. In general, it can be said that irrigation projects and agricultural collectivization were incompatible with each other. Wu claimed the necessity to consider the reconstruction of a new irrigation system.

6.3 Water Conservancy Construction Through Labor Accumulation

6.3.1 Number and Percentage of Labor Force Mobilized for Water Conservancy Construction

An enormous number of laborers were mobilized for the various water conservancy construction during the Mao era. Although there seems to be no time-series data on

labor input nationwide, Fig. 6.2 shows the size and, therefore, the movement of labor and their productivity in Jiangsu Province.

As the graph indicates, two million people were initially mobilized at the beginning of the 1950s, but the number increased rapidly from 1955 to reach seven million people by 1958. The workforce shrank in size after entering the period of national economic adjustment but then grew gradually again during the period of "Learn from Dazhai" and gained further momentum by 1976, reaching a peak of 7.2 million workers. Since there was not much machinery introduced into water construction until the 1980s, the amount of completed work (the amount of soil and stones transported) also fluctuated in accordance with the number of labor mobilized. Also, it is noted that the data on the "mobilized labor force" includes information on those who worked on water construction for even one day, so it may not provide a clear indication of how long the workforce stayed on each project throughout the year.

Furthermore, how much did the mobilized labor force account for the rural labor force? As Fig. 6.3 shows, the proportion of the labor force mobilized fluctuated greatly from year to year. The figure jumped significantly from around 20% in 1952–57 to 30–50% in the GLF period. The mobilized labor force then declined sharply upon entering the period of national economic adjustment of 0–10% but recovered to around 30% during the "Learn from Dazhai" era. However, the mobilized labor force dropped once more to a level of 20% after entering the period of the reform and opening-up policy.

The Zhejiang Provincial Water Conservancy Compilation Committee (1998) provides data on labor person-days[9] mobilized for water conservancy construction up to 1989. According to Fig. 6.4, the labor force mobilized was comparatively low initially. There were about 10 million person-days to be mobilized until 1957. The number jumped to 248 million person-days in 1958 and 202 million person-days in 1960. The number of mobilized workers sharply declined from 1961, but gradually increased again in the 1970s, and by 1978, the number of workers reached a total

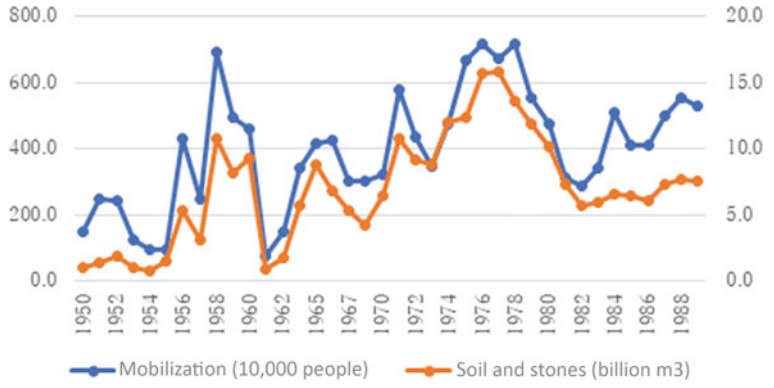

Fig. 6.2 Number of mobilized workers and quantity of soil and stones transported in hydraulic construction in Jiangsu Province. *Source* Jiangsu Sheng Difangzhi Bianzuan Wiyuanhui (ed.) 2001:874

Fig. 6.3 Percentage of mobilized labor force in Jiangsu Province. *Sources* Jiangsu Sheng Difangzhi Bianzuan Wiyuanhui (ed.) 2001:874 and Jiangsu Nongcun Jingji 50 Nian Bianji Weiyuanhui 2000:91–92. *Notes* 1952, 1957, 1965 and 1974 onwards refer to the "rural labor force"; other years refer to the "agricultural, forestry, pastoral and fishing labor force"

of 567 million person-days. Assuming that agricultural laborers worked 300 days a year, the mobilization rate during the GLF era was about 10%, and in 1978, this rate exceeded 12%.

6.3.2 Mobilization System

The effective mobilizations of millions of laborers is closely related to the social organization of that time. The methods of mobilizing the workforce differed between the fragmented and mainly self-employed rural society after the land reform of the early 1950s and the later period of People's Commune system.

6.3.2.1 Mobilization System Before the People's Commune

With a self-employed rural society, the organization of labor began once a flood control project had been decided. The mobilization of labor was divided into two main stages. The first stage was the recruitment of laborers by calling on them to become involved with one of the water conservancy projects, and then provided the means for these people to reach the water conservancy construction site. The second stage was to ask the labor force to complete the water conservancy construction according to the plan.

We will use the Xinyi River Construction in Jiangsu Province as an example to explain the steps in detail. The first phase of the Xinyi River construction needed labor force of 300,000. To do so, the Subei (North Jiangsu Province) District Committee of

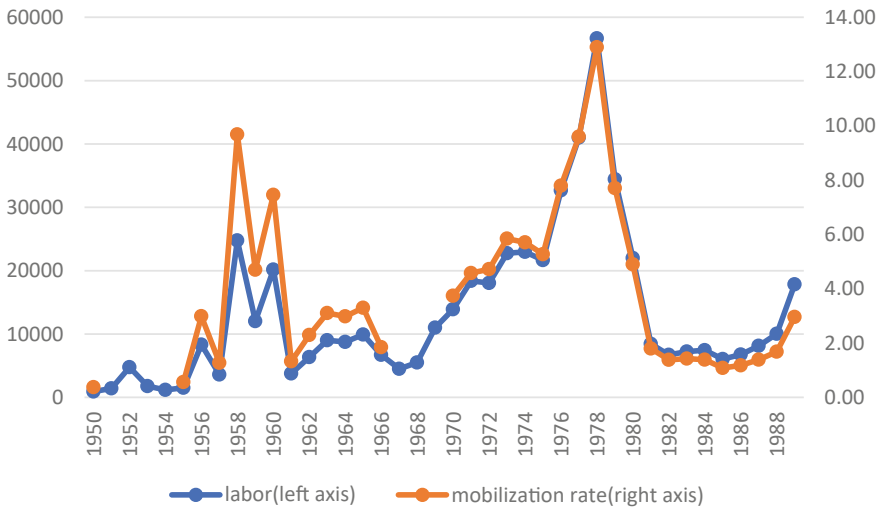

Fig. 6.4 Labor force mobilized for water conservancy construction in Zhejiang Province expressed in units per 10,000 days (left) and as a percentage (right). *Sources* For the number of laborers mobilized for water conservancy construction, see Zhejiang Sheng Shuilizhi Bianzuan Weiyuanhui (1998:780); for the number of agricultural (rural) laborers, see Zhejiang Sheng Nongyezhi Bianzuan Weiyuanhui 2004:347). *Notes* Labor is referred to as the "Agricultural workforce" until 1965, and the "Rural workforce" after 1966. The mobilization rate is calculated on the assumption that the mobilized labor force worked 300 days per year

the Communist Party of China, the Subei Branch and the Subei Military Region of the People's Liberation Army of China jointly issued the "Subei Great Flood Control Movement General Mobilization Order". This mobilization order emphasized the importance of flood control and stressed that 600,000 workers needed to be mobilized to work on construction for 80 days. To oversee this project, Subei Yimu Construction Command was established to ensure that all sectors in the province were involved. The command first allocated the number of laborers to be deployed, which meant enlisting 5% of the agricultural laborers from each relevant area (including Xin'an County, Muyang County, Suqian County, Siyang County, Suining County, Lianshui County, Huaiyin County, Quanyun County, and Pishui County). Each county would then consider how to reach this target by deciding the number of laborers to be allocated from each village. Each village would then hold meetings to encourage a sufficient number of farmers to apply. To entice the farmers, these meetings not only emphasized the importance of water conservancy work but also focused on their wage policy. The labor force could generally be recruited without too much trouble since there was a surplus of poor peasants in the countryside then. As a result, all the nine counties mentioned above managed to secure 250,000 laborers within ten days. These peasants were organized like an army, with each county and village having its general unit (county), battalion (township and village), team (township and village),

and platoon. Each organization had its leader who was responsible for managing the unit.

Mobilized peasants would bring their work clothes, shovels, hoes, balance sticks, wheelbarrows and other tools with them and walk to the water conservancy construction sites. As for their accommodation,[10] these workers lived in basic facilities (camp sheds) around the construction site.

How were the peasant workers mobilized from each region to work on the construction? First, teams were organized into groups of around 15 people and were sent as groups to work on the construction sites. Workers were responsible for hard manual labor such as digging up and transporting the soil, and their performance depended on the physical strength and endurance of the team they were placed in. To improve the incentive to work hard, laborers were evaluated individually, and their performance was based on the amount of soil carried by each person. Generally speaking, wages were paid according to the amount of soil carried per cubic meter. For example, in the winter of 1950, the central government set the daily wage at 3,800 yuan (0.38 yuan in today's money), but in Subei, each cubic meter was converted into 1.2 kg of food.[11] These wages were very attractive to poor peasants who had no other work during the off-season. For example, 65,516 peasant workers in Lishui County received wages which amounted to 2.69 million kilograms of food in 1950. In addition to receiving a food provision for daily consumption lasting 68 days, each worker earned an additional 10–13 kg in food wages (Zhao 2016:339).

Also, there was a lot of competition among laborers (work contests) at the construction site, and the best workers were given other incentives to motivate them (for example, a certificate of commendation, called them the "Great Labor Hero") in an effort to improve their work efficiency. However, this food wage system was abolished after 1953, and replaced by a cash-based income which was a basic wage and other subsidies.

6.3.2.2 Mobilization During the People's Commune Era

Under the People's Commune system, most of the peasants were incorporated into a People's Commune and organized into their production groups or units. With this system of central government–province–county–commune–production units, it became easier to mobilize the labor force. Unlike the previous system which had an application procedure to attract laborers, the People's Commune system enforced the mobilization of workers by a simple top-down instruction which often interfered with traditional agricultural production and peasants lifes. For example, in the rural areas of northern Zhejiang Province, a lot of peasants were quickly mobilized to dredge rivers, level land, build roads for agricultural machinery, or irrigate canals for drainage through this system. According to Zhang's research, the Y Commune L production brigade in Haining County, Zhejiang Province, invested more than 200,000 working days in water conservancy construction from 1973 to 78, which accounted for 10% of all working days (Zhang,1998:298).

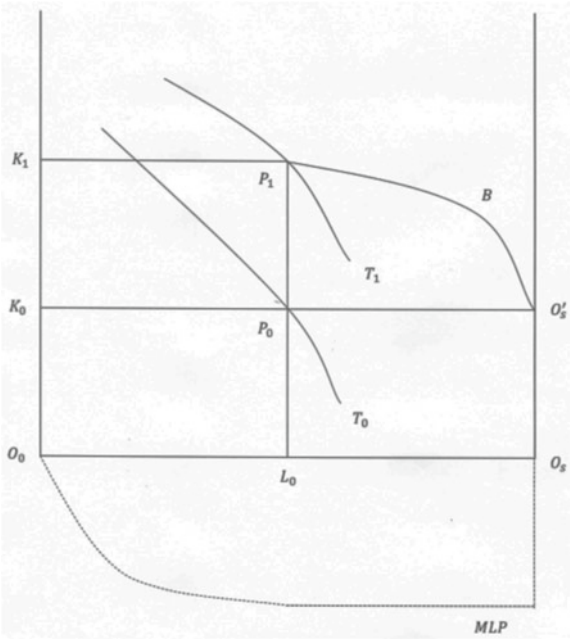

Fig. 6.5 Labor accumulation model under surplus labor. *Note* Based on and modified of a model presented in Nakagane (1999, Chap. 2)

6.3.3 Forced Labor Accumulation

Nurkse (1955) focused on the huge excess labor force, i.e., unemployment that existed in rural areas of developing countries. His model explained how economic development could be promoted by mobilizing this untapped workforce to improve capital accumulation for the Chinese economy. Figure 6.5 shows a model based on Nurkse's idea.

Assuming that the amount of farmland remains constant, this model looks at agricultural production in terms of capital and labor. If there be a limit in capital, the capital can be compensated by using the extra labor until the marginal labor productivity (MLP) becomes zero.[12] Referring to Fig. 6.5, the rural area has a labor force, represented along the horizontal axis from 0_0 to 0_s. Importantly, the area L_0 to 0_s represents the surplus labor force in which there is zero marginal labor productivity. Looking at the MLP curve below the horizontal axis, one can notice how this line flattens from L_0 onwards to indicate no changes in MLP. This surplus workforce, however, can still be used as part of unskilled labor in agricultural projects such as waterways or dams with no additional capital except the equipment of simple tools. This additional labor force can, therefore, be included as part of agricultural capital accumulation which is represented by B curve in the graph. In the early years, capital invested in agricultural production was low at K_0, and consequently resulted in low agricultural production at P_0. The formation of additional capital created solely by the inclusion of this poorly equipped surplus labor (labor accumulation) resulted in

a shift in overall capital from K_0 to K_1, and an increase in agricultural production from T_0 to T_1. However, when applying this model to China's water conservation construction case during the GLF era, one can observe that this mobilization of surplus labor may have gone too far as a result of this overemphasis on "subjective activism" in the large-scale mobilization for water conservancy construction. This extreme level of labor mobilization reduced capital accumulation, distructed agricultural production, and contributed to the outbreak of famine.

Using Nurke's model, let us explain the water conservancy projects undertaken during the Mao era. First, China had to rely on domestic food supply to feed its people as they were affected by international blockades. The Chinese government focused on developing heavy chemical industries so there was an urgent need to increase land productivity because expansion of arable land seemed to be impossble. The country could not expect much improvement in land productivity through technological innovation (the so-called Biology and Chemical Technologies) through the use of chemical fertilizer and seed improvement in the 1960s.[13] Instead, the most effective way to increase production at that time was to improve irrigation facilities and expand the irrigated area by mobilizing a huge workforce. Such mobilization of labor could be regarded as the most effective method in capital accumulation. However, to organize such a big workforce, it was necessary to create an effective system to mobilize the fragmented labor force of small farmers. This was achieved by integrating both local government and the military organisations which remained from the civil war, and thereby enabling the government to gradually develop a peasant mobilization system which included elementary cooperatives, high-level cooperatives, and the People's Commune. The government was able to save transaction cost by efficiently mobilizing the labor force through such cooperatives—especially through the People's Commune system. As a result, water projects which required a massive manual labor force to complete, such as flood control and irrigation, could now be organized efficiently and effectively as the old, fragmented system of peasant mobilization from a mainly self-employed rural society became overhauled. This new system put a stop to the self-interests of fragmented small peasants and led to improvement in the efficiency of the overall irrigation system.

On the other hand, the government also ran into a risk of over-mobilizing labor force by using such a system as the People's Commune. This was due to the fact that mobilization of such labor through the People's Commune was almost free of charge for the government. Under the People's Commune system, the peasants were not only tied to the land and forced to engage in collective agricultural production, but they were also totally dependent on the People's Commune for their livelihood. Unless there were special circumstances, the government would not guarantee or provide relief for the peasants' livelihood. Laborers mobilized for water conservancy construction could earn "labor points," but the subsidies from the government were minimal. Overall, the ability to mobilize rural labor almost freely induced the government to over-mobilize, resulting in the tragedy of mass starvation during the GLF era.

The effect of the government's coercive water labor mobilization can be represented in the following regression analysis below:

$$\ln(Y) = \alpha_0 + \alpha_1 lnir + \alpha_2 lnfer + \alpha_3 lnsown + \alpha_4 lndis + \alpha_5 great + \alpha_6 reform + \varepsilon$$

Y refers to the unit yield or total production of food, which includes, although not written, variables *i* (region) and *t* (year) of Y. The following is an explanation of other notation: "*ir*" (irrigated area), "*fer*" (chemical fertilizer used), "*sown*" (food sown area), and "*dis*" (disaster area due to flood or drought),[14] "*great*" (the GLF dummy variable, which is set to 1 for the years 1958 to 60, and 0 for other years), and "*reform*" (the reform dummy variable, which is set to 1 for years after 1979 and 0 for all other years).

Table 6.5 provides information on the determinants of food production. Such information was compiled from data aggregated from national sources and from Zhejiang, Jiangsu, Shandong, Sichuan, and Shaanxi provinces. The national data was obtained from the National Bureau of Statistics' General Statistics of the National Economy (2005) (General Statistics Bureau of the National Economy, National Bureau of Statistics) and data from provinces were taken from each province's "Agricultural Chronicle" and "Water Conservancy Chronicle".

There are some interesting findings from Table 6.5. First, for food unit yield and total food production, irrigated area is significant at 1%. The construction of water conservancy and the expansion of irrigated areas not only made a great contribution to the development of agricultural production but also had a greater effect than chemical fertilizers. The reform dummy variable is positive, and its value is large, probably due to factors such as improved incentives for agricultural production through the agricultural production responsibility system and the spread of high-yielding hybrid varieties. While the *t*-value for the GLF dummy variable is low, the actual figures are negative, which means that the GLF era had a negative impact on the unit yield of food and its total production.

Table 6.5 Determinants of food production

Explained variable	Unit yield	*t*-Value	Total production	*t*-Value
Irrigated area	0.2101	7.98[a]	0.4133	10.15[a]
Chemical fertilizer	0.0858	4.99[a]	0.0369	2.12[b]
Seeding area			0.7301	16.62[a]
Disaster area	−0.2661	11.84[a]	−0.2084	9.33[a]
GLF dummy	−0.0649	0.92	−0.09955	1.56
Reform dummy	0.5127	9.94[a]	0.4365	9.07[a]
Constant	0.5723	3.74[a]	−1.1056	6.68[a]
Size of samples	166		166	
Adjusted R^2	0.7447		0.9650	

Source Author's calculation
Note [a] indicates statistically significant at 1% and [b] indicates statistically significant at 5%.

Conclusion

In this chapter, from the perspective of labor accumulation, we examined the effect of the water conservancy construction in the Mao era. First, we explored the historical transition of flood control projects and irrigation projects in three periods: The first period of Mao Zedong rule (1949–57), the GLF era and economic adjustment and recovery period (1958–65), and the CR decade (1966–76). Secondly, we examined quantitatively the results of water conservancy construction by using the data of the irrigated area, flooded area, and unit yield. Finally, the effect of "forced labor accumulation" on water conservancy construction in the Mao era was examined using Nurkse's labor accumulation model.

As previously mentioned, by the end of 1978, it became impossible to maintain the traditional water conservancy system based on the system of collectivization. The collapse of the People's Commune system had been adversely affected by the reform and opening-up policy. As a result, the maintenance of dams and other facilities were not adequately sustained due to the decline in investment in water conservancy construction. Some dams and embankments deteriorated to the point that they could no longer fulfill their designed roles. Furthermore, farmers who had returned to a small peasant economy were no longer able to benefit from the integrated irrigation system as it had fallen into disrepair and consequently led to a decline in the irrigated areas since 1979.

In recent years, industrialization and urbanization have brought about new water problems such as water shortage and water pollution. The government not only continues the management of conventional flood control and irrigation but also faces new water problems. As a consequence, the Central Committee of the Communist Party of China (CPC) and the State Council of the People's Republic of China (PRC) issued the Central No. 1 Decision on Accelerating the Development of Water Conservancy Reform, which focuses on water conservancy reform and construction in January 2011. For the first time since the founding of the PRC, this decision proposes to form four comprehensive systems by 2020: (1) a flood, drought, and disaster prevention system; (2) a system to rationally allocate and efficiently use water resources; (3) a system to protect water resources and guarantee the conservation of rivers and lakes; and (4) an institutional system to promote the development of water conservancy science.

Notes

1. Wittfogel (1991) is the best known for his classical studies on irrigation and society under a Chinese state regime. For more recent studies on the relationship between water-irrigated agriculture and despotic states in Japan, see, for example, Morita et al. (2012).
2. Nakagane (1999, Chap. 2), after modifying the Nurkse model, explains the development policies during the GLF and the People's Commune period.

3. Zhongguo Shehui Kexueyuan, Zhongyang Dang'anguan (ed.) (1998), p. 643. In the following, to avoid complications, the sources are omitted when using the archival (historical) materials by the same editors.
4. In order to hinder the Japanese invasion, the National Government of the Republic of China deliberately blew up and destroyed the embankment. This led to the formation of the Yellow River Flood Zone.
5. The scale of flood control, which is carried out by human and manual labor, is generally measured in terms of the amount of soil and stones transported.
6. The Jingjiang embankment was tested by the great floods in 1998 and 2020. Especially in the 1998 flood, it was feared that the levee would collapse.
7. The irrigation control area is the area of arable land that can theoretically be irrigated after the completion of water conservancy construction.
8. Bo (1993:681, 728) argues that the logic of large-scale irrigation projects → Great Leap Forward → People's Commune is that water conservancy construction led to People's Commune.
9. One person-day is defined as one worker working for one day.
10. According to the author's interviews with relevant people, to complete the construction of the Yaojiang River sluice gate in Ningbo, Zhejiang Province in 1959, many peasants from the surrounding areas were mobilized. These peasants did not stay in simple facilities (camp shed), but in farmhouses in the villages around the construction site.
11. In the case of the Ningbo Yaojiang Sluice Gate construction, workers would get 12 labor points per day and an allowance of 0.25 yuan.
12. There are different opinions in academics regarding whether surplus labor with zero marginal labor productivity (disguised unemployment) existed in the Mao era. Kato (1997, Chap. 2) pointed out that surplus labor existed in rural China until the reform and opening-up policy Hondai and Luo (1999) estimated that there were about 170 to 190 million people (surplus labor rate: 54.6% to 60.5%) in 1987, although not during the Mao era. On the other hand, citing several previous studies, Marukawa (2002, Chap. 2) measured the agricultural production function and emphasized that there was no surplus labor with zero marginal labor productivity. Marukawa argued that under the average-based distribution system in the People's Commune, there was an extremely weak incentive for the remaining members to cover work for the left members led to a decrease in the rural labor force, which in turn led to a decrease in agricultural production, and that the marginal labor productivity was not zero. The institutions denied its existence.
13. It was argued that the development of indica hybrids and the use of chemical fertilizers had improved food yields during the Mao era. But that was not true. Yuan Longping and other researchers were fully engaged in hybrid seed development in the early 1970s, but hybrid seeds did not diffuse widely until the end of the 1970s. For example, in Fujian Province, where hybrid paddy rice production was most advanced, the hybrid sowing area was only 4.7 hectares in 1975 and only 3,173 hectares in 1976 (Fujian Sheng Difangzhi Bianzuan Weiyuanhui (ed.) (1999:129). The hybrid area in Chongqing was also negligible (127 ha in 1976 and 3,080 ha in 1977) (Chongqing Shi Difangzhi Bianzuan Weiyuanhui (ed.) 1999:45. On the other hand, the use of chemical fertilizers indeed increased since the 1970s, but the amount of chemical fertilizers used per unit area of arable land was so small that the effect of increased production of chemical fertilizers during the Mao era was limited.
14. In China, the disaster area of floods and droughts is sometimes published separately for the "area that has suffered a disaster" and the "area that has become a disaster". Here, we use the "area that became a disaster" because only some provinces published the "area that became a disaster". Incidentally, Guo (2013:111) used the "area of suffered and became disaster " to create a national climate index.

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Chapter 7
Rural Finance: State Banks and Rural Credit Cooperatives in the Context of Fund Transfers

Cheng Tang

Abstract During the period of planned economy when China's strategic priority was to develop the heavy industry, did rural financial institutions function as "pumps" to provide funds for the development of urban industrialization? Or did they function as "blood transfusion" mechanism by injecting funds into programs designed to improve agricultural productivity? Based on the data from 1949 to 1978, this paper examines rural capital flow and the impact of Rural Finance on agricultural development under the planned economy system. The results indicate that: first, from 1952 to 1978, the total net outflow of funds in rural areas through financial institutions was 14.771 billion yuan. Second, the way in which the flow of rural funds through financial channels varied during the different time periods. For instance, during the early stage of the planned economy (1953–1957), funds continuously flowed into rural areas through financial channels, with a small and stable inflow scale; during the later period of economic development (1971–1978), rural funds continued to flow out through financial institutions, and the scale of capital outflow showed a "U" shape. Third, agricultural loans significantly improved the level of agricultural development during the period of planned economy. The above findings shed light on our understanding of the positive role played by rural finance during the period of the planned economy.

Introduction

Having completed its socialist transformation between 1949 and 1952, China began large-scale economic development in 1953 under its heavy-industry-oriented development strategy.[1] However, how to secure financing for the industrial sector was a major issue during the development of its heavy industry. Generally, three sources of funds exist for development available to developing countries during the early stages of industrialization: agriculture, commerce and industry, and foreign capital. However, during the early years following its founding, China could not rely on

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foreign capital or foreign aid because of the international environment and the U.S.'s policy of "containment" toward China. Therefore, sources of funds had to be domestic and, indeed, not from the weaker commercial and industrial sectors but from the agricultural sector.

This relationship has attracted the attention of many academics under the theory of intersectoral resource flow, and two opposing hypotheses have been developed. The first hypothesis is that agriculture provides funds for industrialization in the early development stages. Capital for industrialization is accumulated mainly through taxes or savings or by manipulating prices (Price Scissors) (Lin et al., 1994, Knight & Song, 1999, Kong & He, 2009, Yuan, 2010, Liu et al., 2017). Among other points, academics argued that price scissors (scissor pricing) were the main method used to accumulate capital for industrialization (Feng & Li, 1998).[2] The second hypothesis is that the industrial sector provides funds (transfer) for the agricultural sector, mainly from the financial subsidies for agricultural production. Ishikawa (1967) proposed the hypothesis that the industrial sector in Asian countries in the early stage of economic development must invest (transfer) more funds in (to) the agricultural sector, which was subsequently followed by studies including Nakagane (1989), Ishikawa (1990), Nakagane (1992), and others. Thus, the question of whether the agricultural sector was a provider of funds for industrialization (intersectoral resource transfer) has yet to be settled (Nakagane, 2015a, 2015b).

However, the main purpose of this chapter is not to reexamine the intersectoral resource flow hypothesis but, rather, to clarify how rural finance was developed through state banks cooperatives and state banks—and the true state of rural financial capital flows—which is essential to considering the important theme of intersectoral resource flow because, in both intersectoral resource flow hypotheses, agriculture is directly or indirectly related to the expansion of funds for the industrialization of the agriculture-based Chinese economy. Therefore, the expansion of agricultural production was extremely important for its industrialization. In other words, similar to the industrial sector, agriculture—as the foundation of China's economy and industrialization—required financial input to expand its production, and the role of finance in this process should be clarified.

Sufficient discussion on the sources of financial inputs to the rural sector and how financial functions were performed has not always been available. For example, as a representative argument, the hypothesis that agriculture is the provider of industrial financing (Zhou & Zhou, 2009) highlights that the state completely monopolized the financial sector, controlled all financial institutions from rural to urban, and mobilized all resources, including capital, to promote industrial development and obtain capital—the most scarce element in industrialization. Zhou et al. (2016) also noted that the financial system under a state monopoly withdrew surplus rural savings in the form of deposits and channeled them to the urban and industrial sectors. However, sufficient evidence has not always been used to substantiate such arguments.

Despite the fact that state banks and rural credit cooperatives were important constituent organizations of rural finance, how they actually developed their financial operations has not been made sufficiently clear. For example, Zhou (2006) systematically captured the institutional evolution of rural credit cooperatives but failed to

explain the mechanism for why rural surplus funds could be provided for industrialization by rural credit cooperatives. Feng and Li (1998) are unique in their estimating the outflow of rural funds through the rural credit cooperative channel. However, their estimates did not take into account measurement of the flow of funds through state banks and do not capture the overall flow and size of rural funds. Thus, when building on the work of Feng and Li (1998), this chapter aims to further develop research in this area by capturing the overall picture of financial flows of funds in rural areas, including not only rural credit cooperatives but also state banks.

Specifically, using a variety of historical materials on rural finance that have been made public, this chapter clarifies the overall picture of the mechanisms of rural finance and the flows of rural funds in the Mao era, and illuminates the role of rural finance. In comparison to previous studies, this chapter has the following two distinctive features. The first is that it seeks to clarify the respective positions of state banks and rural credit cooperatives in rural finance during the Mao Zedong era and to obtain a true picture of their financial operations by compiling financial documents and data. The second is that it provides an overall picture of the flow of financial funds through rural finance and then objectively captures the different characteristics of each period.

This chapter is organized as follows. Section 7.1 focuses on state banks and rural credit cooperatives to identify how the financial system has been shaped in rural areas. Section 7.2 captures the size- and time-specific characteristics of rural capital flows through financial channels to explain how rural finance—not originally an important channel for industrial finance—became an important channel for industrial finance from the 1970s. Lastly, we present this chapter's conclusions.

7.1 Formation of Financial Systems in Rural Areas

7.1.1 Development of Rural Finance Through State Banks

Finance functions as a lubricant for the real economy and is an important part of a country's economic development. On the topic of how financial development can promote economic growth, Levine (1997) identified five functions by which it plays this role, including mobilizing savings and resource allocation. From a historical perspective, banks have been central to the financial system since the founding of the first modern bank—Imperial Bank of China—through the present day. However, the functions and characteristics of the banking system have changed under different economic regimes. For example, during the Beiyang government period, the economy was dominated by private banks; however, the economy gradually shifted to an "oligopoly" of government-affiliated financial institutions as the Nanjing government took over.

The financial system was united under a pluralistic system of bank ownership through the formation of the People's Republic of China in 1949 and a heavy-industry-oriented development strategy. The system's most important feature was that the People's Bank of China, effectively the only bank in the country, performed the dual function of central bank and commercial bank, concentrating credit in the hands of state banks (Zhongguo renmin yinhang (ed.) (2008), p. 50). It goes without saying that rural finance was extremely important for agriculture-based China. State banks and rural credit cooperatives came to be promoted through policy as the organizations comprising the entirety of rural finance.

For example, at the Second National Financial Conference held by the People's Bank of China in early 1951, clearly stipulated as part of its review of rural financial services were that (1) 80% of provincial branch operations should be allocated to rural financial services, bank branch organizations should be expanded from counties to districts, and bank offices should be established, and (2) credit cooperatives should be developed. In fact, by 1953, almost every province had a bank office.[3]

Moreover, the State Council issued directives on rural finance each year between 1953 and 1957. For example, on August 31, 1953, in its "Directions on Rural Financing," the State Council stipulated that "the main function of the People's Bank of China in rural areas is to support impoverished peasants, develop production, and wage an economic struggle against loan sharks through rural financing such as agricultural loans and the organization of credit cooperatives" (Lu (ed.) (1986), p. 313).

Furthermore, at the First National Credit Cooperative Conference held by the People's Bank of China in 1954, Deng Zhihui, Vice President of the State Council, made the following remarks concerning rural financial operations: "the basic task of rural finance was to provide rural credit loans and develop credit cooperatives," and the role of state banks is to lead the development of agricultural lending and credit cooperatives.

Next, we discuss the type of lending operations of state banks in rural areas. At the First National Conference on Rural Finance Industry in May 1951, the following loan types were stipulated (Lu (ed.) (1986):83–95). The first is lending for agricultural production, mainly providing loans for agricultural land, water use, seeds, fertilizer, agricultural tools, cattle, fishery, agriculture, and various specialty agricultural products. Such loans also set three important lending targets: (1) to provide systematic support to farmers engaged in agricultural production, simplifying procedures and offering preferential lending conditions such as interest rates; (2) to use lending to increase production through the improvement of production technology and the introduction of new agricultural tools; and (3) to use exclusive funds to lend for the production of specific agricultural products such as cotton, tobacco, and hemp.

The second loan type was liquidity funding. The main purpose of liquidity funding was to solve temporary difficulties faced in peasants' production activities and to lend to relieve problems in peasants' lives (e.g., marriage, funerals, illness, education, home repair) to the extent available funds allowed. However, the liquidity funds to be lent were to be generated from deposits collected by branches or offices in the area. Between 1950 and 1952, state banks' lending to rural areas amounted to 1.66

billion yuan; however, lending to impoverished peasants accounted for 77.4% of this total, indicating that impoverished peasants were the main lending target. Thus, until state banks began offering low-interest loans, the only source of borrowing for poor peasants was through loan sharks. The ability to borrow from state banks at low interest rates protected their livelihoods to some extent and might have curbed the widening gap between the rich and the poor.

Although the scope of lending by state banks covered a wide range of industries, including state farms, forestry, cattle breeding, fisheries, and handicrafts, lending appeared to be concentrated around expanding production on state farms. For example, the People's Bank of China's 1954 "Directions on Lending to State-Owned Agricultural (Livestock) Farms" provided specifics for the subject, use, size, term, interest rate, and guarantee of loans. Moreover, the Agricultural Bank of China held a discussion on "Lending Operations for State Farms in H1" in May 1955 and a special conference on "State Agricultural Lending Operations" in October 1956 to provide financial support to increase food production by state farms. At the end of September 1956, its outstanding loans totaled 111.18 million yuan, more than twice that of the same period of the previous year, to meet the financing needs of agricultural production. According to statistics for the first half of 1956, production costs and parts stockpiling accounted for 83% and 13.5%, respectively, of the mechanized agricultural lending in 24 provinces (cities).

State banks were also active in lending to the forestry and cattle breeding industries. For example, they specifically provided lending operations to the forestry industry in January 1951 and January 1952, respectively. In other words, they defined the uses, targets, deadlines, and interest rates for lending to the forestry industry, lending and repayment plan for the funds, methods of guarantee, and implementing departments. In February 1956, the Agricultural Bank also made specific provisions for lending to livestock farmers as part of its efforts to encourage the agricultural collectivization movement that was developing at the time. Particularly in Inner Mongolia, Xinjiang, Qinghai, and other regions, the following three types of loans were provided for livestock production cooperatives: (1)capital construction finance (e.g., production equipment, water conservancy construction), (2) production cost finance (e.g., liquidity funds for feed stockpiles, fertilizer, small farm tools), and (3) impoverished livestock farmers' cooperative finance (e.g., capital costs for cooperatives). Thus, state banks might have played a financial role in expanding agricultural production through their rural lending operations.

7.1.2 Spread of Rural Credit Cooperatives and Financial Services

In contrast, the history of rural credit cooperatives dates back to the 1920s. By the founding of the new Chinese state, more than 800 credit cooperatives operated throughout the country. Rural credit cooperatives expanded in size as a result of the

increasing unification of the financial system after 1949 and as the sole rural financial end-organization. This fact shows that rural credit cooperatives were important players in Chinese finance. The role of rural credit cooperatives and their financing can also be gleaned from the contents of several key meetings, as follows.

For example, in 1949, the People's Bank of China promulgated the "Future Measures to Promote the Credit Functions of Cooperatives," which indicated that the missions of state banks cooperatives were the accumulation of microfinancing, the supply of funds for production and distribution, socioeconomic prosperity, and the accumulation of public assets (Lu (ed.) (1986):4). Moreover, the First National Finance Conference, held from February 21 to March 12, 1950, established five basic functions for state banks cooperatives, including expanding into the credit business and conducting deposit and lending operations (Lu (ed.) 1986, p. 40).

In this way, rural credit cooperatives aimed to develop the rural economy through the mobilization of savings and unsecured lending. In addition, the First National Conference on Rural Finance Industry held by the People's Bank of China in May 1951, stipulated that (1) the development of rural credit cooperatives should be organized from the grassroots up, and (2) under the counsel of state banks (e.g., guidance and leadership, carrying a strong nuance of "order" more than "guidance"), cooperatives should complement state banks and work together to carry out rural financing.

In 1954, the People's Bank of China made more explicit provisions concerning the financial relationships between rural credit cooperatives and state banks. In other words, (1) rural credit cooperatives were to engage in the rural savings business, whereas banks would not; and (2) rural credit cooperatives' main lending was to solve short-term and microfinancing liquidity needs of employees, mainly short-term loans of one year or shorter, whereas loans of more than one year were to be provided by state banks. Following the completion of agricultural collectivization in 1956, it was stipulated that (1) the purpose of rural credit cooperatives was to lend money to individual employees for sideline production and to resolve temporary difficulties in their lives, (2) rural credit cooperatives' business should be conducted as their responsibility and with independent accounting, and (3) deposit surpluses should be deposited with banks, and banks should provide funds at preferential interest rates to cover fund shortages.

Thus, rural credit cooperatives were to play a role in rural financing by providing both saving and lending functions together with state banks because agriculture was the very foundation of the economy in the new China, indicating that the development of rural areas and agriculture was crucial to advancing the heavy-industry-oriented development strategy. Moreover, under the unified financial system in which state banks had a monopoly on funds, the common people's petty funds were the only source of funds not controlled by state banks. Therefore, expanding the base of rural credit cooperatives was essential to accumulate microfinance in rural areas.

The following report provides a glimpse as to how rural credit cooperatives expanded at the grassroots level to fulfill this role. A 1953 report by the People's Bank of Shandong Province to the Shandong Bureau of the Chinese Communist Party described the development of rural credit cooperatives as follows (Zhongguo Nongye

Yinhang Shandong Fenhang, 1991, p. 201): (1) one credit cooperative and two or three mutual aid associations will be provisionally established in each province, and the state bank's provincial office and local offices will monitor their establishment; (2) experiences from the establishment of this cooperative and associations will be summarized and then actively and systematically expanded to other regions, (3) banks in each region will be responsible for guiding the development of systems for the development of rural credit cooperatives; in terms of fund management for which a surplus of deposits exist, these will be deposited with the bank and the bank will provide support in the reverse situation, (4) rural credit cooperatives' business objectives will be to provide financial services for agricultural production to its members at different interest rates for deposits and loans, at interest rates lower than the local private free lending rate, and close to the bank interest rate, and (5) regarding the remuneration of credit cooperative managers, approximately half will come from production sites, and their income will be supplemented according to the circumstances.

Next, we examine using the following documents how the financial operations of rural credit cooperatives developed. According to Shandong Province's "Report on the Credit Cooperative Work of Haiyang County (June 1951)," Haiyang County established a credit function with 13 credit cooperatives in 1949, which were reorganized into 10 credit cooperatives in 1951 with 15,500 employees and expanded capital of 350 million yuan. These 10 cooperatives with 36 specialist managers covered 221 villages in 52 townships, one-third of the total provinces, and—together with state banks—are responsible for 66.7% of the county's deposits and 76% of the county's loans. In 1950, 8.154570 billion yuan in idle funds in rural areas were collected, of which 6.89481 billion yuan was lent (Zhongguo Nongye Yinhang Shandong Sheng Fenhang, 1991, p. 201).[4] Loans were made primarily to members and nonmembers, which provided financial support for agricultural production and its subproducts, including the purchase of 160 wells and 15 water wheels, more than 150 new agricultural implements, 2,565 livestock heads, 1.46 million pounds of fertilizer, and the production and repair of 52 fishing boats, 1,360 fishing nets, and 2,101 craftsmen. Of these, the largest—the Daxinjia Liancun Credit Cooperative—had 2,322 employees and held 65.2 million yuan in capital. The Daxinjialian Liancun Credit Cooperative covers five townships and 24 villages, with employees accounting for 64.3% of the total township population. The farmers call the credit cooperative "their own small bank" (ibid.).

These two reports show how state banks cooperatives, under the guidance of state banks, expanded their organizations, accumulated micro funds, provided financial services to farmers and agriculture, and were supported by farmers. The number of rural credit cooperatives (credit functions) increased from just 542 in 1950 to 9,831 by 1953 (Zhongguo Renmin Yinhang Nongye Jinrongju Xinyong Hezuo ke (ed.) 1955, p. 7). Then, the agricultural collectivization movement started in 1953, and the number of rural credit cooperatives rapidly increased to 159,000 by the end of 1955, with capital reaching 200 million yuan. By 1956, rural credit cooperatives had been established in 97.5% of the country's townships, and credit cooperativization under

"one village, one cooperative" was achieved on a national scale (Lu (ed.) (1986), pp. 451–452).

Table 7.1 provides a time series of changes in the capital, number of institutions, and number of employees of rural credit cooperatives during the Mao era. This table indicates that the size and number of investments in agricultural credit cooperatives increased from 12.01 million yuan and 4,349 locations in 1953 to 310.18 million yuan and 88,368 locations in 1957, whereas capital per location increased from 2,760 to 3,510 yuan. However, from 1958, rural credit cooperatives experienced the Great Leap Forward and the Cultural Revolution, and their management systems and finances were put in turmoil. Nonetheless, these more than 420,000 credit cooperatives made great progress, with capital of 1,491.95 million yuan in 1977.

As previously set out, throughout the Mao era, rural credit cooperatives demonstrated systematic expansion as a functioning financial organization as the endpoint of state banks. In contrast, however, after the implementation of the First Five-Year

Table 7.1 Development trends among rural credit cooperatives in rural areas during the Mao era

Year	Capital (yuan, millions)	Number of institutions (locations)	Per location capital (Yuan, 10,000 s/location)	Number of employees (persons)
1953	1,201	4,349	0.276	–
1954	12,877	126,452	0.102	–
1955	20,452	159,393	0.128	–
1956	27,000	102,558	0.263	213,494
1957	31,018	88,368	0.351	–
1958	41,554	133,642	0.311	–
1959	49,274	198,610	0.248	81,747
1960	50,656	207,145	0.245	163,356
1961	50,656	188,749	0.268	138,655
1962	50,656	127,864	0.396	156,436
1963	61,231	294,953	0.208	160,459
1964	68,392	306,000	0.224	168,000
1971	104,417	342,006	0.305	165,134
1972	120,648	327,565	0.368	170,475
1973	123,430	318,855	0.387	175,369
1974	120,995	327,228	0.370	182,953
1975	138,036	324,971	0.425	190,005
1976	146,716	366,375	0.400	208,817
1977	149,195	420,284	0.355	221,202
1978	171,721	418,120	0.411	237,810

Source Author's calculations based on Lu (ed.) (1986)

Plan in 1953 and the financial system gradually became more monopolistic, the character of rural finance also changed. Sun and Pan (2019) pointed out that rural credit cooperatives were organized through peasants' own financial cooperation until 1952. However, after 1953, these cooperatives became endpoint organizations of state banks, and a unified system of rural finance was formed. In other words, the rural credit cooperative development model during the Mao era also inevitably belonged to the state-led financial system.

7.2 Flow of Financial Resources in Rural Areas

7.2.1 Capital Flows in Rural Finance

As previously described, two functions were assigned to rural finance: the mobilization of savings and the allocation of financial resources—the main sources of which were state banks and rural credit cooperatives. Thus, the flow of funds through the formal sector, which can be observed in Fig. 7.1, can be divided into two channels: state banks and rural credit cooperatives. In other words, the People's Bank of China (Agricultural Bank), as a state bank, was primarily responsible for deposits and lending to agricultural production. Rural credit cooperatives, as grassroots organizations of state banks, were primarily responsible for collecting rural deposits and providing small loans to agricultural production and farmers.

Specifically, rural credit cooperatives absorbed rural deposits (mainly agricultural deposits, farmers' deposits, and rural enterprise deposits) and provided loans for collective agriculture, rural enterprises, and farmers. Rural credit cooperatives lent out a portion of the deposits they collected and deposited the majority with state banks, the size of which increased year by year.[5] In contrast, state banks used the money deposited by rural credit cooperatives as their main source of funds to lend directly to agriculture. This composition suggests that surplus funds from rural areas

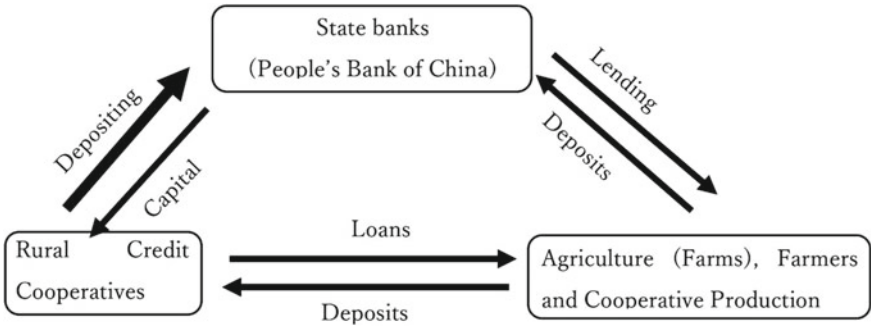

Fig. 7.1 Capital flows in rural areas. *Source* Author's illustration

were also eventually transferred to urban areas (i.e., the industrial sector) via state banks. However, the scale and characteristics of these fund flows have never been clarified. In the following, we use financial documents to speculate on these financial flows. First, Fig. 7.2 shows the inflows and outflows of funds from rural credit cooperatives.

This figure shows that, from 1953 to 1978, rural credit cooperatives' deposit size fluctuated as it increased from 0.1 to 16.6 billion yuan.[6] The scale of lending also increased from 0.2 billion yuan in 1953 to 4.51 billion yuan in 1978, although the range of fluctuation can be large depending on the period. However, between 1958 and 1975, loan size remained virtually unchanged, whereas deposit size increased. Of the loans, loans to rural enterprises increased from 0.8 billion yuan in 1971 to 1.21 billion yuan in 1978, and these were loans since the 1970s to the five small industries (township and village enterprises). Rural enterprises were subsequently transformed into township and village enterprises through the implementation of the reform and opening-up policy starting in 1978, and achieved remarkable development (see Chap. 10).

Thus, the outflow of rural funds through rural credit cooperatives amounted to 127.44 billion yuan during the entire period, with an average annual net outflow of 5.09 billion yuan in all years except for 1953—the first year during which statistics were available. These outflows were deposited with state banks and gradually increased in size from 1.12 billion yuan in 1957 to 12.09 billion yuan in 1978. Thus,

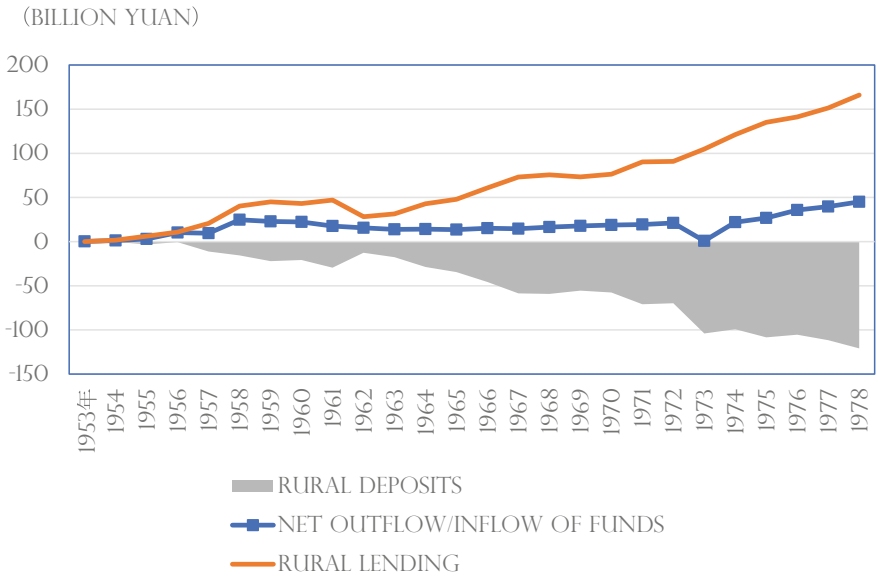

Fig. 7.2 Flows of funds through rural credit cooperatives. *Source* Author's estimation based on Lu (ed.) (1986) and Su (ed.) (2007)

rural credit cooperatives likely specialized more in mobilizing savings than in lending in rural areas, and they played a role in siphoning off rural funds.

7.2.2 *Flow of Funds in State Banks*

Next, let us examine the state of the flow of rural funds through state banks. State-owned bank lending to rural areas is believed to have been funded mainly by rural deposits, that is: (1) deposits with rural credit cooperatives, and (2) rural deposits with state banks. In theory, however, the difference in lending in excess of deposits needs to be funded by the urban sector. Figure 7.3 shows the trends in the flows of funds in and out of state banks.

The figure shows that outstanding agricultural loans made by state banks increased from 420 million yuan in 1952 to 11.56 billion yuan in 1978. Moreover, regarding the source of funds, the share of rural credit cooperative deposits increased from 34.3% in 1954 to 94.2% in 1978. The following characteristics can be observed in the inflows and outflows of funds through state banks. In other words, during the 1950s and 1960s, a net inflow of rural funds occurred through state banks. The size of the inflow gradually increased because, as shown in Fig. 7.2, rural credit cooperatives' capacity to accumulate deposits remained weak in the 1950s, and the deposit size was small.

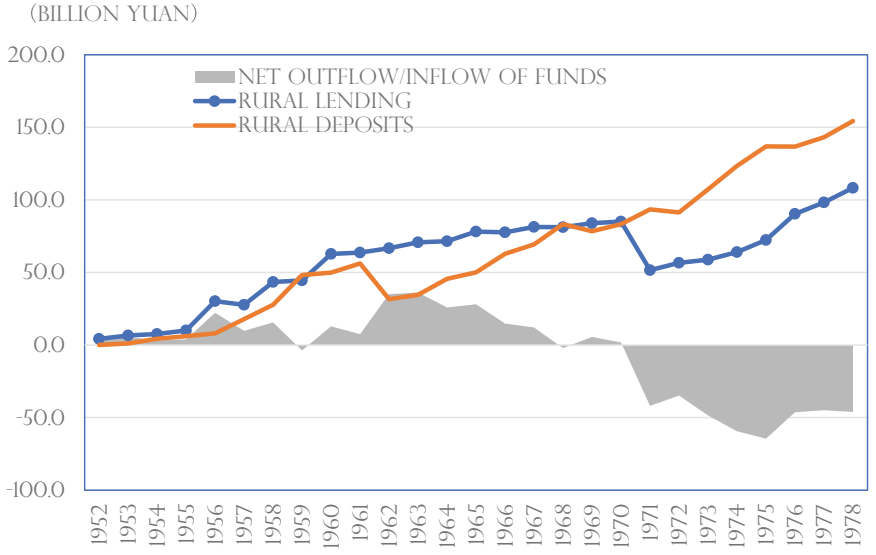

Fig. 7.3 Flows of funds through State Banks. *Source* Author's estimation based on Lu (ed.) (1986), Su ed. (2007), Gao (1958), etc. *Note* Because of incomplete deposit data for rural credit cooperatives between 1957 and 1965, the data are measured using average values from the Shandong Province's financial data

However, by the 1970s, the flow of funds through state banks began to reverse, flowing out of rural areas and gradually increasing in size. The scale of rural capital outflows through state-owned banks amounted to 14.77 billion yuan during the entire period, with an average annual outflow of 550 million yuan. In other words, the flow of rural funds through state banks can be said to have had different characteristics at different points in time, with a clear pattern of inflow into rural areas until the 1960s and outflow from rural areas from the 1970s.

Next, let us look at trends in inbound and outbound flows of rural funds through rural credit cooperatives and state banks, which are illustrated in Fig. 7.4. Overall, the trend in the movement of rural funds through financial instruments changed from an initial net inflow to rural areas to a subsequent net outflow, and the amount of these funds increased. This characteristic can be shown to be split into periods as follows. In the first period (1953–70), with the exception of particular years (1959 and 1968), financial investment funds flowed in from the urban sector, totaling 23.45 billion yuan, with an average annual net inflow of 1.30 billion yuan. In particular, the inflows in 1962 and 1963 were the largest, at 3.51 and 3.62 billion yuan, respectively.

These inflows resulted from the failure of the Great Leap Forward policy, which began in 1958, and the effects of the natural disasters of 1959–61, which led to a sharp decline in agricultural production. According to Matsumura (2011), in January 1961, Li Fuchun, the head of the State Planning Commission, proposed an "agriculture, light and heavy industry" policy, which meant that when organizing economic plans, policy decisions were to be made in the priority order of agriculture > light industry > heavy industry. Put another way, budgets would be allocated in that order. Strengthening agricultural development, increasing farmers' income, and reducing

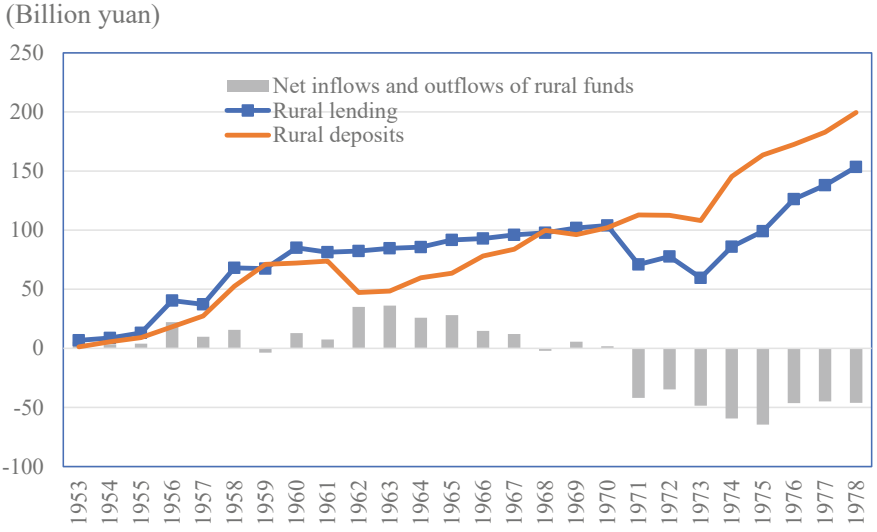

Fig. 7.4 Net transfer of rural funds in the Mao era. *Source* Figs. 7.2 and 7.3

the burden on farmers, which had been overlooked under the Great Leap Forward policy, emerged as top priorities. Thus, rural areas would have needed more money to facilitate the recovery of production, and there would have been a significant expansion of financing to rural areas in 1962.

Moreover, the trend in rural funds since 1972 shifted from the previous trend of small-scale inflows to outflows. Moreover, the scale of those outflows was increasing because the Third Front construction re-intensified from 1970, with basic capital construction accounting for 67.1% of gross national investment and Third Front construction infrastructure investment accounting for 55.3% (Hu, 2007: 675). Furthermore, in 1972, Mao Zedong issued instructions to prepare for a Soviet invasion, which led China to prioritize military industry even more under its heavy-industry-oriented development strategy (Hu, 2007: 671). The destructive effects of the Cultural Revolution on the national economy gradually began to manifest, leading to a decline in enterprise production, an increasing deficit, a decline in fiscal revenues, and an expansion in expenditures (Lu (ed.) 1986, p. 474).

Thus, financial inputs to rural areas, through rural finance, were viewed as a net inflow from the urban sector during the 1950s and 1960s, but turned into a net outflow in the 1970s. The role of rural finance was essentially to mobilize savings in rural areas that would then be used to finance rural lending to expand agricultural production. However, in the 1950s and 1960s, funds flowed from the urban sector as lending exceeded savings in most years. Conversely, in the 1970s, rural funds began to flow instead to the urban sector, and the scale of this flow increased. In other words, the savings mobilized in rural areas flowed out to urban areas (industrial sector)—rather than back to rural areas through lending—and were used for heavy-industry-oriented development.

7.2.3 Quantitative Analysis of the Effects of Rural Finance on Agricultural Development

We have seen that the main functions of rural finance during the Mao era were the mobilization of savings and the allocation of financial resources. However, what impact did rural finance have on agricultural development? Although few such quantitative analyses have been conducted, this section presents an overview of the empirical panel data analysis by Tang and Zhang (2020).[7] First, the estimated model used is as follows:

$$LnY_{it} = \alpha LnCredit_{it} + \beta X_{it} + \theta_i + \gamma_t + u_{it}$$

Here, agricultural output per capita is considered to be the level of agricultural development and the value of agriculture-related loans as the role of rural finance. The dependent variable Y_{it} is the gross agricultural output of province i in period t, denoted by gross agricultural output and the agricultural output index, which is measured in

this analysis by the per capita agricultural output and the per capita agricultural output index. $Credit_{it}$ represents the agricultural loans obtained by province i at time t, calculated in terms of the value of loans per worker. X_{it} is a control variable, θ_i is the fixed effects of province i, γ_t is the fixed effect of time, and u_{it} denotes the random error term for province i at time t. Note that because of the limited economic data from the Mao era, the control variables include the number of people engaged in agricultural labor, the crop sowing area, per capita GDP, the number of students in middle school, and the total financial expenditures of the province. The main sources of data are the China Compendium of Statistics 1949–2004 and the China Financial Statistics 1949–2005.

Table 7.2 shows the estimated results, where (1) and (2) are the results estimated from the fixed and variable effects of the panel data, respectively. These results indicate that the estimated coefficient of agricultural loans per capita is 0.0104, a significant positive correlation at the 1% statistical level, suggesting that agricultural loans had a strong, positive impact on agricultural output. Similarly, the results of estimating agricultural production indices in (3) and (4) show estimated coefficients

Table 7.2 Estimates of the effect of rural finance on agricultural development

	Ln agricultural output per capita		Ln per-capita agricultural production index	
	(1)	(2)	(3)	(4)
	Fixed effect	Variable effect	Fixed effect	Variable effect
Ln Agricultural loans per capita	0.0104*** (0.0019)	0.0104*** (0.0018)	0.1036*** (0.0199)	0.0488*** (0.0103)
Fiscal expenditure	0.0077* (0.0044)	0.0095** (0.0044)	−0.0090 (0.0435)	0.0048 (0.0299)
Area sown for crops	0.0183*** (0.0069)	0.0005 (0.0038)	−0.0591 (0.0726)	−0.2536*** (0.0160)
Birth rate	0.0163*** (0.0040)	0.0163*** (0.0037)	0.2810*** (0.0397)	0.1150*** (0.0420)
GDP per capita (1952)	0.0531*** (0.0094)	0.0227*** (0.0056)	0.5291*** (0.1029)	0.1114*** (0.0220)
Number of students in secondary school (tens of thousands)	0.0101*** (0.0024)	0.0039* (0.0020)	0.1241*** (0.0236)	0.0076 (0.0202)
Agricultural labor force (people, tens of thousands)	−0.0023*** (0.0006)	−0.0007*** (0.0003)	−0.0393*** (0.0058)	0.0037*** (0.0012)
Provincial control	Yes	Yes	Yes	Yes
Time control	Yes	Yes	Yes	Yes
N	317	317	288	288
R-square	0.499	0.247	0.535	0.746

Source Tang and Zhang (2020)

Notes *, ** and *** are significant at the levels of 10%, 5% and 1%, respectively; heteroscedasticity robust standard error is in parentheses ()

of 0.1036 and 0.0488, respectively, both positive at the 1% significance level. The control variables were also almost as expected and showed significance. These estimates indicate that agricultural finance had a strong, positive effect on agricultural development.

Conclusion

This chapter focuses on two financial organizations—rural credit cooperatives and state banks—to clarify their respective financial roles during the Mao era. The main findings of this chapter are as follows. First, rural finance had an important place in the Mao era, and state banks and rural credit cooperatives were important organizations that made up the entirety of rural finance. Second, although the main functions of rural finance were the mobilization of rural savings and lending, state banks and rural credit cooperatives had different characteristics. In other words, the main financial function of rural credit cooperatives can be said to have been the mobilization of savings, whereas the main financial function of state banks was lending. Third, the flow of financial resources through rural finance had different characteristics in different periods. In other words, during the 1950s and 1960s, an inflow of funds occurred from the nonagricultural sector. In the 1970s, an outflow of funds occurred from the rural sector.

The results of the analysis in this chapter support a different argument over the role of rural finance than that of prior studies. That is, rural finance cannot necessarily be called the main channel of financing for industrialization. Rather, it is apparent that two financial organizations—state banks and rural credit cooperatives—were originally expanded to strengthen the agricultural base, mobilize savings, and provide lending by rural communities for rural communities. Also clarified was that a shortfall of financial inputs in the 1950s and 1960s arose from the nonagricultural sector. The results of the empirical analysis using provincial-level panel data for the period 1949–78 show that agricultural lending strongly promoted agricultural output. Thus, during the Mao era, state banks and rural credit cooperatives achieved some success in expanding agricultural production and developing the rural sector through their financial functions in rural areas.

However, as a result of the special environment and institutions of the time, entering the 1970s, rural funds were directly transferred to urban areas through state banks to meet the demand for funds for industrialization. Put another way, in terms of rural finance, rural credit cooperatives and state banks were transformed into a financial mechanism for absorbing funds in rural areas. The original function of rural finance, namely, to develop rural areas using rural funds, was altered, resulting in a widening economic gap between urban and rural areas.

Notes

1. In September 1953, Zhou Enlai stated that the basic mission of the First Five-Year Plan was to prioritize the development of heavy industry and defined the order of development as heavy industry > agriculture (Hu, 2007:184–185). However, the first Five-Year Plan was not officially formulated until 1955.
2. For example, Feng and Li (1998) estimated that approximately 1 trillion yuan was raised from agriculture during China's industrialization between 1952 and 1990, providing an average annual 25 billion yuan to the industrial sector. Of these, the scale of funding provided by scissor pricing is regarded as having been the largest.
3. In fact, the number of district-level offices of the People's Bank of China had expanded from 457 at the end of 1950 to 13,290 by the end of 1953 (Shang (ed.), 1989, pp. 312–313).
4. According to Miki (1956), as of March 1, 1955, the People's Bank of China issued new yuan and collected old yuan. The exchange rate was 1 new yuan to 10,000 old yuan.
5. For example, according to Zhongguo Nongye Yinhang Shandong Sheng Fenhang (1991), the average redeposit rate of rural credit unions (cooperatives) accounted for 86.5% of rural deposits held by state-run banks in Shandong Province (1954–1978).
6. Within which, the scale of deposits from collective farming and farmers increased from 310 million yuan and 0.1 billion yuan in 1955 to 9.38 billion yuan and 4.51 billion yuan in 1978, respectively. The increase in the share of deposits from economic collectives from 53.3 to 71.1% between 1958 and 1971 can be attributed to the Great Leap Forward, implemented from 1958, which saw peasants' means of production belonging to a collective and that also acted to increase the share of economic collectives' deposits.
7. See Tang and Zhang (2020) for more details.

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Chapter 8
Heavy Industry: Heavy Industrialization and Its Evaluation

Nariaki Kai

Abstract This chapter inspects the heavy industrialization during the Mao era and examines its legacy to the Deng era. Heavy industrialization in the Mao era laid the foundations of heavy industry, providing favorable conditions for economic development in the reform and opening-up era. The presence of heavy industry was maintained during the Deng era. Moreover, during the Mao era, the embryonic forms of some of the reform and opening-up policies could be found in the policies related to heavy industrialization, such as the utilization of foreign plants, technology, and funds, and the exploration for a better SOE management system. On the other hand, heavy-industry-oriented development strategy during the Mao era aimed at strengthening national defense, and as a result, investment efficiency was not improved. However, the challenge of improving investment efficiency was also a difficult issue during the Deng era.

Introduction

Industrialization during the Mao era centered on heavy industry.[1]

The First Plenary Session of the Chinese People's Political Consultative Conference was held in Beijing in September 1949. The "Common Program of the Chinese People's Political Consultative Conference" was passed at this meeting as a provisional constitution, and the establishment of the People's Republic of China was declared. The Common Program stated that "systematically, and in order, we will create a foundation for China's industrialization by focusing on the recovery and development of heavy industry, such as mining, the iron and steel industry, power industry, machine-making industry, electrical industry and the main chemical industry." Thus, from its very inception, the People's Republic of China was keenly aware of the importance of heavy industry to its industrialization.

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However, in 1949 China, agriculture accounted for approximately 60% of its gross output value, whereas industry accounted for just 25%. Moreover, heavy industry only accounted for about one-quarter of the gross output value of industry (NBS, 1983). The production of electricity, crude steel, metal-cutting machine tools, and chemical fertilizers was far less than that of the United States, or even Japan which had just finished the war. For China, which at the time was an agricultural nation, it was a tremendous challenge to lay the foundations for heavy industry.

During the Mao era, China concentrated funds in heavy industry. The extreme cases are the "Great Leap Forward (*da yuejin*)" and the "Third Front Construction (*sanxian jianshe*)". Importing plants from abroad was an important means for strengthening the fragile heavy industry. Even under the "self-reliance (*zili gengsheng*)" policy (self-reliance in building the economy), as much technology was imported from overseas as possible in the form of plant imports, including the Soviet-assisted "156 Projects (*156 gongcheng*)", and the "4-3 Development Strategy (*sisan fang'an*)" that focused on the technology and equipment of advanced Western countries.

Why did China during the Mao era pursue the heavy-industry-oriented development strategy? How did China develop its heavy industry? What did the heavy industrialization leave behind for the Deng Xiaoping era of the reform and opening-up? This chapter looks back at the heavy industrialization policies of the Mao era. We also use statistical data to examine heavy industrialization during the Mao era and compare it with the Deng era.

8.1 Historical Background Behind Heavy Industrialization

Why did the Communist Party of China (CPC) regime promote heavy industrialization rapidly?

Behind China's heavy industrialization was the goal of strengthening national defense. Their relationship can be traced back to the Republic of China period. In the latter half of the 1930s, when military tensions with Japan were rising, the ROC government focused state capital on heavy industry. For instance, just before the outbreak of the Sino-Japanese War in 1937, Chiang Kai-shek announced the "China Economic Development Plan," which set national defense as the primary objective of economic development, and established the segregation of investment, with private sector investment for light industry and central government investment for heavy industry (Xu, 2010). Therefore, heavy industrialization had been a dream since the days of the Kuomintang.

In 1949, after having defeated the Kuomintang-led government in the Chinese Civil War, the CPC established the People's Republic of China. However, the Communist China was politically isolated from, economically blockaded by, and threatened with war by Western developed nations, even after the Korean War (June 1950–July 1953). Strengthening of national defense was a matter of life or death to the Mao government. For instance, in September 1953, at the enlarged 49th meeting of

the Standing Committee of the First National Committee of the Political Consultative Conference, Premier Zhou Enlai said, "The national defense industry will develop on the basis of heavy industry. We are still unable to manufacture tanks, planes, cars, tractors, or good artillery. We must further accelerate the development of heavy industry and strengthen our national defense." As this impatient statement shows, Chinese leaders recognized heavy industrialization as a prerequisite for strengthening national defense (Zhou, 1984).

For China, which was isolated from the West, the Soviet Union's experience as a socialist powerhouse capable of competing with the United States was attractive. In June 1949, in the "On the People's Democratic Dictatorship" paper commemorating the 28th anniversary of the founding of the CPC, Mao Zedong outlined his vision of the soon-to-be-established People's Republic of China and said, "We must lean to one side. The Communist Party of the Soviet Union is our best teacher and we must learn from it," and launched a policy of "leaning to the side of the Soviet Union" (Mao, 1951).

To China, the Soviet Union's socialist industrialization was to serve as a model for its economic development. The theoretical basis for socialist industrialization was the "Law of the Precedence of Production-means' Production" developed by Lenin. As discussed in Chap. 1, the "socialist industrialization debate" arose in the mid-1920s, which led Stalin to promote heavy-industry-oriented development. As can be seen from the "Common Program of the Chinese People's Political Consultative Conference" introduced at the beginning of this chapter, China also sought to achieve the development of heavy industry by concentrating investment into this industry.[2]

8.2 Development of Heavy Industry

However, China lacked the conditions for the development of heavy industry. To concentrate scarce resources such as capital into heavy industry, China—which lacked capital—planned the allocation of resources, nationalized the industrial sector, and collectivized agriculture (Lin et al., 1994).

The State Planning Commission—the headquarters of the planned economy—was established in November 1952. One of its key responsibilities was to develop Five Year Plans (FYPs) for economic development. Next, let us look at the FYPs to review the importance of heavy industry in economic planning.

8.2.1 The Five Year Plans

Four FYPs were drawn up and implemented during the leadership of Mao Zedong, who passed away in 1976.[3] These were the First FYP (1953–57), the Second FYP (1958–62), the Third FYP (1966–70), and the Fourth FYP (1971–75). The First FYP period was preceded by the economic recovery period immediately following

the Communist China's founding (1949–52), while an economic adjustment period (1963–65) was between the Second and Third FYP periods.

These four FYPs all emphasized the development of heavy industry. The First FYP stated, "The capital construction (*jiben jianshe*) for heavy industry shall be the main focus of this FYP. The objective behind adopting heavy-industry-oriented development policy is the creation of a strong national defense capability, the satisfaction of the needs of the people, and the achievement of a material foundation for the socialist transformation of the national economy," clearly indicating that national defense was an important objective for the development of heavy industry (State Planning Commission, "First Five Year Plan," passed at the Second Session of the First National People's Congress in July 1955).

The Second FYP also pursued "the building of a strong, independent, and a complete industrial system at the national level," instructed the appropriate dispersal of enterprises for "national security," and called for "bringing the production of steel and some other important industrial products close to that of the United States" (State Planning Commission, "Opinions on the Second Five Year Plan," passed by the Enlarged Meeting of the CPC Central Committee Political Bureau in August 1958).

In order to prepare for possible invasion by enemy nations, the Third FYP called for "Third Front Construction," which aimed at constructing an industrial production base centered on heavy industries, including military industry, within the Third Front area, located mainly in the southwest and northwest regions of China. It stated, "We must stand on a war footing, and actively prepare for war from the view of early and large-scale war. We must prioritize national defense construction, accelerate Third Front Construction and steadily improve the distribution of industry," "We must strengthen the development of basic industry and transportation," and "We must concentrate the nation's human, material and financial resources to steadily build the national defense industry and various industries including raw materials, processed materials, fuel, power, machinery and chemicals, as well as the transportation sector in the Third Front regions" (State Planning Commission, "Report Syllabus about the Arrangement of the Third Five Year Plan (Draft)," submitted to the Central Work Conference in September 1965).

The Fourth FYP also called for "resolutely strengthening preparations for war" and "continuing the construction of the Big Third Front (*da sanxian*) regions with an unwavering concentration of strength," to enable "the ten economic cooperation zones," which were similar to military zones, to "plan their own military strategies and undertake large-scale cooperation" and cited the goal of an "independent and fairly complete industrial system and economic system" (State Planning Commission, "Outline of the Fourth Five Year Plan (Draft)," submitted to the Second Plenary Session of the 9th CPC Central Committee in August 1970). The development of agriculture and light industry was also mentioned in connection with war preparedness and strategic rear construction, but emphasis was concentrated on the production of steel, coal, oil, natural gas, machinery, and equipment.

Figure 8.1 shows the industrial distribution of capital construction investment from 1953 to 1975. Capital construction investment, i.e. the investment for new construction, expansion, and replacement in fixed assets, is the most important form of capital investment. According to China's industrial sector classification, (1) the electric power industry, (2) coal industry, (3) petroleum industry, (4) metallurgy industry, and (5) building materials industry are all classified as heavy industry, whereas (6) the food industry, (7) textile, wearing apparel and leather industry, (8) paper, cultural and educational articles industry are classified as light industry. However, (9) the chemical industry, (10) machinery industry, (11) forestry-related industry, and (12) other industries contain both heavy and light industries. In terms of gross output value, the majority of chemical, machinery, and forestry-related industries belong to heavy industry, whereas most of other industries belong to light industry.

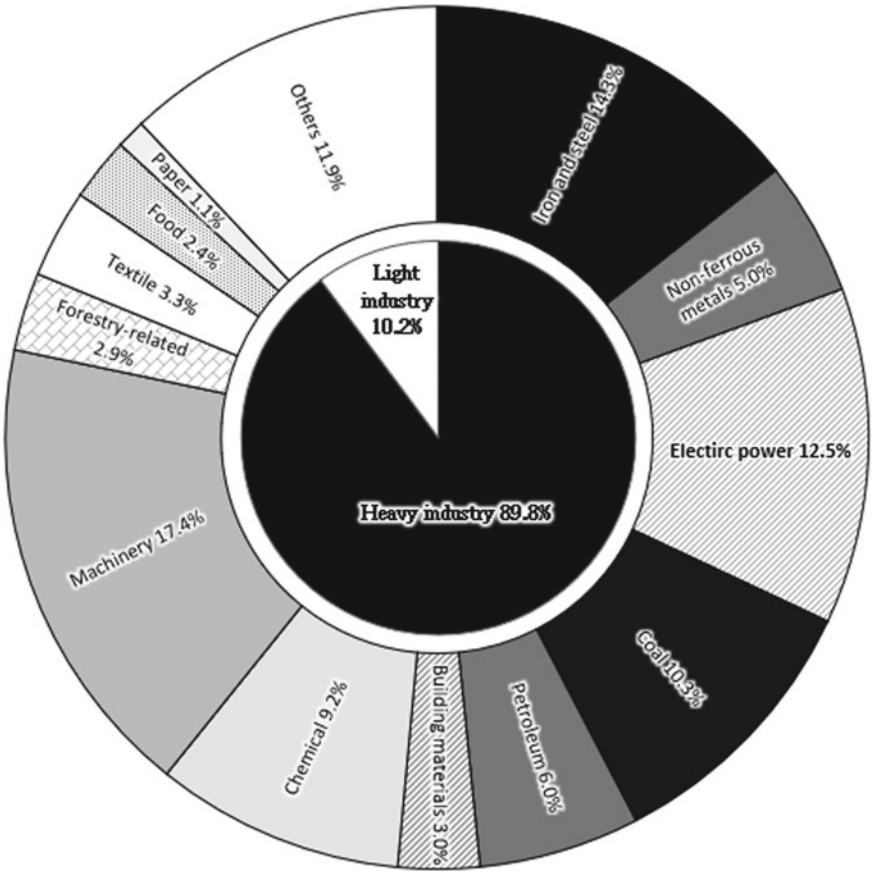

Fig. 8.1 Industrial capital construction investment share by industry (1953–75).
Sources Author's calculations based on DSIFA (1997)

This figure shows that approximately 90% of investment was allocated to heavy industry. Investments were especially concentrated in iron and steel, electric power, coal, petroleum, chemical, and machinery industries. Investment in typical light industries, such as textile, food, and paper, was extremely low.

During the Mao era, China invested extremely vigorously in heavy industries. What exerted decisive influences on the development of heavy industry were the Soviet-assisted "156 Projects," the Great Leap Forward, and the Third Front Construction.

8.2.2 The "156 Projects"

In the first two FYPs of 1953–1962, the most important construction projects were the so-called "156 Projects" assisted by the Soviet Union. The First FYP instructed clearly that "we will concentrate our efforts with the highest priority on the construction of industry, consisting of 694 'above designated size' large-scale construction units which centered on the 156 industrial projects designed and assisted by the Soviet Union." More than half the industrial capital construction investment within this FYP was assumed to be allocated to these projects. The Soviet-assisted "156 Projects" can be said to have served as a guide for China, which had little experience in heavy industrialization at the time.

Initially, 156 industrial projects were planned; however, because of the duplicate accounting and the cancellation of plans, only 150 projects were actually implemented. All were plant imports, of which civilian and military industries accounted for 106 and 44 projects, respectively.

In the 104 civilian projects that began construction during the First FYP period, the number of projects and investment value are distributed by industry as follows: coal (25 projects, 1.46 billion yuan), petroleum (2 projects, 369 million yuan), electric power (25 projects, 2.24 billion yuan), iron and steel (7 projects, 5.66 billion yuan), non-ferrous metals (11 projects, 1.76 billion yuan), machinery (24 projects, 2.84 billion yuan), chemical products (7 projects, 1.08 billion yuan), medicine (2 projects, 95 million yuan), and paper (1 project, 102 million yuan). Only three projects belonged to light industry, namely, medicine and paper manufacturing.

The two civilian projects that began construction during the Second FYP period were both related to non-ferrous metals.

Of the above 106 civilian projects, 30 were completed during the First FYP period, and 75 projects were completed in the Second FYP period, with the exception of the Sanmenxia Dam (DSIFA, 1987).

The value of investments in the 44 military industry projects was not announced, but the number of projects was distributed by industry as follows: weapons (16 projects), aviation (12 projects), electronic equipment (10 projects), shipbuilding (4 projects), and space (2 projects). The Shanxi 874 Works began construction in 1958 and came into operation in 1966, whereas the other 43 projects were all started during

the First FYP period, of which 19 were completed during the First FYP period, and the remaining 24 came into operation in the Second FYP period (Chen, 2004).

Through the "156 Projects," China built up the foundations of its heavy industries and gained the capability to produce many heavy industry goods, including motor vehicles, tractors, 10,000-ton class marine vessels, high-capacity power generation machinery, and new machine tools. Compared with newly increased production capacity (through capital construction) during 1950–75, the "156 Projects" accounted for approximately one-quarter of the crude steel production capacity at Anshan Iron & Steel, Wuhan Iron & Steel, and Baotou Iron & Steel, and approximately 30% of the motor vehicle production capacity at First Automobile Works (DSIFA, 1987). The "156 Projects" greatly promoted the construction of China's heavy industrial base.

8.2.3 The Great Leap Forward

The Great Leap Forward policy was formally put into effect at the Enlarged Meeting of the CPC Central Committee Political Bureau held at the summer resort of Beidaihe in August 1958. This meeting voted to establish the People's Commune, called for a doubling of crude steel production in 1958 over the previous year—as Mao had directly instructed—and approved the State Planning Commission's "Opinions on the Second Five Year Plan."

The FYP approved at that meeting first set a target for crude steel production of 80 million tons in 1962. Then basing on this production target, it set the production targets for other heavy industries, including electric power, coal, crude oil, copper, aluminum, chemical fertilizers, plastics, synthetic rubber, metal-cutting machine tools, motor vehicles, tractors, marine vessels, logs, and cement. Production target of grain crops was also set at 650 to 750 million tons, and the government planned to mechanize agriculture and use large amounts of chemical fertilizers and pesticides to achieve this goal.

In fact, the "Recommendations for the Second Five Year Plan" had already been approved at the 8th Party Congress in September 1956, approximately two years before the Great Leap Forward. This proposal set the production target in 1962 at approximately 10.5 to 12 million tons of crude steel and 250 million tons of grain crops. The FYP approved at 1958 was really a "great leap forward."

The Second FYP, modified by the Great Leap Forward, was obviously not a meticulously calculated and feasible plan. Unable to secure adequate supplies of materials, energy, transport, labor, grain crops, and equipment, the government attempted to rely too heavily on local government and people's enthusiasm. As a result, economic management was thrown into chaos. With additional disruption from massive natural disasters, China was plunged into a famine that killed tens of millions of people, causing the collapse of the Great Leap Forward plan (see Table 1.8). In 1962, crude steel and grain crops production achieved only 6.67 million tons and 160 million tons, respectively (Table 8.1).[4]

Table 8.1 Plan target and actual output of the FYPs (last year) in the Mao era

Items		1957	1962	1970	1975
Crude steel (million tons)	Plan target	4.12	80	16	35–40
	Actual output	5.35	6.67	17.79	23.9
Electricity generation (billion kwh)	Plan target	15.9	300	110	200–220
	Actual output	19.3	45.8	115.9	195.8
Coal (million tons)	Plan target	112.985	900	280–290	400–430
	Actual output	131	220	354	482
Crude oil (million tons)	Plan target	2.702	50	18.5	70–100
	Actual output	1.46	5.75	30.65	77.06
Metal-cutting machine tools (thousand units)	Plan target	12.72	500	65	150
	Actual output	28	22.5	138.9	174.9
Tractors (thousand sets)	Plan target	NA	300	73.6	215–225
	Actual output	NA	7.2	83.3	287.8
Chemical fertilizers (million tons)	Plan target	NA	60	18	32–35
	Actual output	0.151	0.464	2.435	5.247
Chemical fibers (thousand tons)	Plan target	NA	NA	105	350
	Actual output	0.2	13.6	100.9	154.8
Cotton yarn (million bales)	Plan target	5	26	9	13–14
	Actual output	4.65	2.912	9.742	10.309
Grain crops (million tons)	Plan target	192.81	650–750	220–240	300–325
	Actual output	195.05	160	239.96	284.52

Sources Author's calculations based on "First Five Year Plan," "Opinions on the Second Five Year Plan," "Report Syllabus about the Arrangement of the Third Five Year Plan (Draft)," "Outline of the Fourth Five Year Plan (Draft)," DIS (1995), DIS (2013) and NBS (1983)
Notes NA indicates that data were not available to the author in constructing this table

However, even during this difficult period, China continued to build a base of heavy industry. Most of the "156 Projects" were completed during this period, including Anshan Iron & Steel, Wuhan Iron & Steel, Baotou Iron & Steel, and Luoyang Tractor. Besides the "156 Projects," many other heavy industry projects, such as the Daqing Oil Field and Maanshan Iron & Steel, were also started or completed. The production of most heavy industrial products, although far from the planned targets, still grew significantly (Table 8.1).

Newly increased production capacity also expanded substantially. As evidenced by the share of newly increased production capacity within various sub-periods during 1950–75, this FYP period made the greatest contribution among the four FYP periods of the Mao era in many industries, such as crude steel (35%), iron smelting (32%), electrolytic copper (33%), metal-cutting machine tools (48%), smelting tools (60%), mining tools (72%), petroleum-chemical tools (46%), cotton spindles (25%), sewing machines (27%), coal mining (29%), machine-made paper and paperboard

(52%), refined sugar (42%), and raw salt (63%). This period also made significant contributions to the expansion of production capacity for tractor manufacturing (34%), synthetic rubber (28%), cement (27%), trucks (24%), and power generating capacity (22%) (DSIFA, 1997). Considerable production capacity was built up across a wide range of industries, including iron and steel, machinery, energy, building materials, paper, and food, which laid the foundation for subsequent economic development.

8.2.4 Third Front Construction

As previously described, in September 1965, the State Planning Commission submitted the Report Syllabus about the Arrangement of the Third Five Year Plan (Draft) to the Central Work Conference, placing Third Front Construction at the center of the FYP. Report Syllabus (Draft) placed top priority on national defense construction through the Third Front and called on other regions to provide people, technology, materials, and equipment.[5]

Of the 85 billion yuan budget in capital construction, this FYP called for concentrated investment in (1) the national defense industry (8.7 billion yuan); (2) heavy industries: iron and steel (5.7 billion yuan), non-ferrous metals (4 billion yuan), coal (5 billion yuan), petroleum (3.5 billion yuan), electric power (9 billion yuan), machinery (4.2 billion yuan), chemicals (4.2 billion yuan), forestry-related (2.9 billion yuan), and building materials (1.3 billion yuan); and (3) transportation (13.3 billion yuan). Of the capital construction budget, at least 33.3 billion yuan or 40% was assigned to the Third Front.

However, in May 1964, the State Planning Commission had already submitted the Preliminary Tentative Plan of the Third Five Year Plan (Report Syllabus) to the Central Work Conference. The Preliminary Tentative Plan proposed to use agricultural production as the base of the plan, and to plan heavy industry and basic industries after fully taking into account the agricultural demand for chemical fertilizers, chemical fibers, electric power, and drainage and irrigation machinery, as well as national defense demand.

Why did the sudden shift in planning policy observed in the Great Leap Forward Policy occur again? The most significant factor was the ever-increasing military tensions at the time, including the U.S. military intervention in Vietnam, the Soviet Union's presence in Mongolia, the Taiwanese regime's plan for a counterattack against the Mainland, and the border dispute with India, while the Gulf of Tonkin incident in August 1964 decisively shifted the FYPs back to an arms-centric focus.

Likewise, in 1970, when the State Planning Commission prepared the "Outline of the Fourth Five Year Plan (Draft)," and called for "continuing the construction of the Big Third Front with an unwavering concentration of strength," as the Sino-Soviet border dispute intensified, and the Vietnam War expanded.[6]

Although political turmoil continued for a long time from May 1966 when Mao launched the Cultural Revolution, manufacturing and R&D bases for conventional weapons, military electronic equipment, fighter aircraft, military ships, nuclear weapons, missiles and rockets continued to develop in the Third Front regions during the next 10 years, including satellite launch centers in Jiuquan and Xichang that remain active today. Moreover, 124 large-scale machinery industry projects were implemented, including the establishment of the Second Automobile Works (presently Dongfeng Motor) and Dongfang Electric Machinery (presently Dongfang Electric), which are still among the country's top companies. Large-scale energy and metallurgy projects, such as the Daqing Oil Field, Liupanshui Coal Base, the Gezhouba Water Conservancy Project, and Panzhihua Iron & Steel, were carried out. The construction of railways, which was extremely difficult in the Third Front regions, such as the Chengdu-Kunming Railway, also achieved success.

Capital construction investment in industry during this decade amounted to 151.9 billion yuan, accounting for 56% of investment between 1953 and 1975. These two FYP periods contributed more than 80% of newly increased production capacity during 1950–75 in petroleum extraction, more than 70% in synthetic ammonia, wristwatches, plastics, chemical fibers, internal-combustion engines, and chemical fertilizers, and more than 60% in synthetic rubber, power generating capacity, electrolytic aluminum, cement, and tractor manufacturing (DSIFA, 1997).

8.3 Legacy and Evaluation of Heavy Industrialization

During the Mao era, the heavy industry's share of industrial output value increased from 26% to approximately 50–60% (Fig. 8.2).

Although heavy-industry-oriented planning has often brought chaos to the Chinese economy, heavy industrialization also recorded significant achievements during the Mao era. Comparing the planned production targets and actual results, it is clear that the plans were reckless. Nonetheless, the expansion of production also stands out (see Table 8.1). What did the heavy industrialization leave behind for the reform and opening-up era, and how shall we evaluate it?

The radical heavy industrialization of the Mao era laid the foundations of heavy industry and built a primary complete industrial system in China. Many industrial products were newly developed, such as crude petroleum and natural gas extraction, petroleum processing, large-scale metal-cutting machine tools, motor vehicles, ships, locomotives, aircraft, synthetic fibers, plastics, and industrial equipment for mining, electric power, metallurgy, textile and other industries.[7] The coal mining, metallurgy, and chemical industries were also greatly strengthened. China's production of electricity, crude steel, metal-cutting machine tools, and chemical fertilizers, which were only a few hundredths to approximately one-hundredth of those of the United States by 1949, rapidly expanded to approximately one-tenth, one-quarter, three-quarters, and one-third of those of the United States by 1975, respectively (DITMS, 1985).

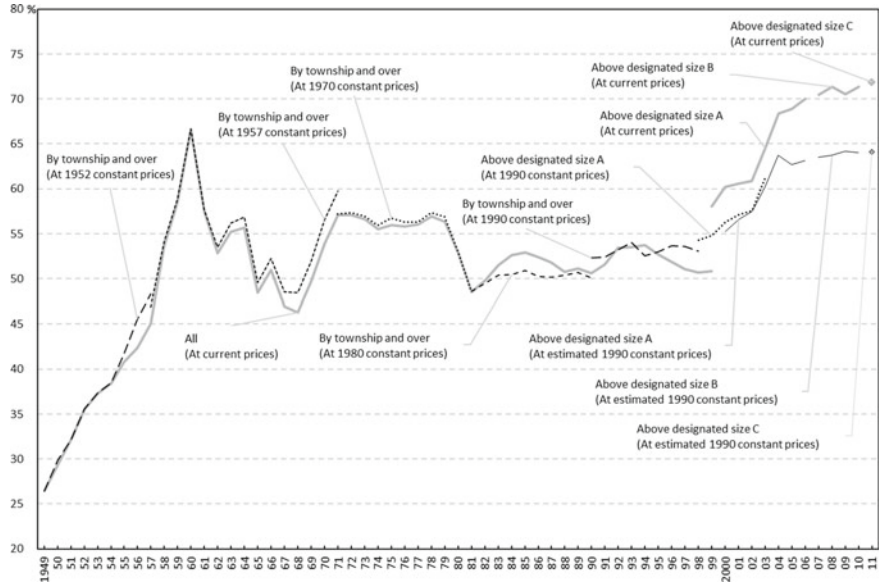

Fig. 8.2 Heavy industry's share of gross industrial output value.
Sources Author's calculations based on DITMS (1985), DIS (various issues), NBS (various issues) and NBS (1984).
Notes Enterprises above designated size A refer to all state-owned industrial enterprises and the non-state-owned industrial enterprises with revenue from principal business over 5 million yuan. Enterprises above designated size B refer to all industrial enterprises with revenue from principal business over 5 million yuan. Enterprises above designated size C refer to all industrial enterprises with revenue from principal business above 20 million yuan. Gross industrial output value at constant prices during 1988–93 was aggregated within the enterprises with independent accounting systems. The "at estimated 1990 constant prices" was calculated by the industrial products producer price indices

Engineer training and R&D organization establishment were also of great significance during the heavy industrialization of the Mao era. For instance, during the implementation of the "156 Projects," Chinese engineers, under the guidance of Soviet experts, actively acquired and imitated technologies, which moved China toward developing the capacity to produce and develop the equipment independently. The Soviet Union dispatched more than 10,000 experts to China to offer technical guidance, provided China with a large number of plant blueprints and technical data on product design and manufacturing, and assisted Chinese design departments in plant installation and design work. The Soviet Union also accepted more than 8,000 Chinese technical trainees. As a result, approximately 20–30% of the design of the "156 Projects" was completed by Chinese design departments, while approximately half of the equipment was manufactured by China, based on technical documents that obtained from the Soviet Union (Dong, 1999). The Soviet Union also helped China to establish research institutes for technologies including nuclear energy, electronics, automation, and semiconductors. Thus, even after the Soviet Union withdrew its

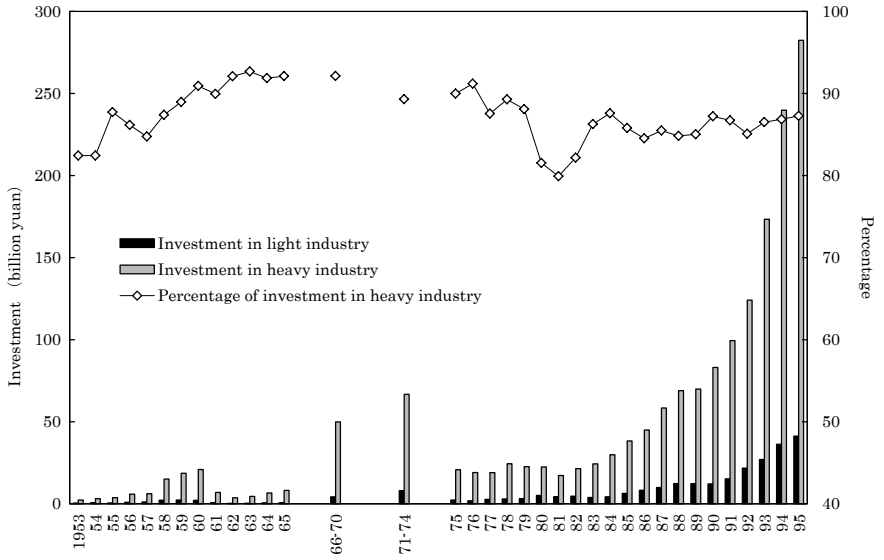

Fig. 8.3 Industrial capital construction investment (1953–95).
Sources Author's calculations based on DSIFA (1987, 1997)

experts from China, China was able to complete 66 projects under construction by emulating Soviet technology and plants.

Therefore, in both hard and soft aspects, the heavy industrialization during the Mao era laid the foundations for industrialization in the Deng era.

In the Deng era, China kept on concentrating the investment on heavy industry (Fig. 8.3). Heavy industry's share of capital construction investment declined only briefly in the early 1980s. Subsequently, its investment share swelled. Although the heavy industry's share of investment has not reached the Mao era's highest level of 92%, it has almost recovered to a level near 90%.

Looking to the heavy industry's share by gross output value (see Fig. 8.2), it is certainly true that heavy industry development advanced rapidly in the 1950s. However, during the later Mao era, heavy industry's share of gross output value mostly settled in the range of approximately 50–57%. On entering the Deng era, although the share dropped significantly in the 1980–81 period, it still mostly hovered at 50–54% until the end of the 1990s—only slightly lower than the Mao era. From 1999, the heavy industry's share began to increase rapidly to a level resembling that of the Great Leap Forward period.

Thus, the Mao era laid the foundations for industrialization in the reform and opening-up era; however, heavy industrialization not only accelerated during the Mao era, but continued into the reform and opening-up era.

Regarding changes in industrial structure, many key heavy industries actually overlapped between the Mao era and the reform and opening-up era. Table 8.2 shows the structure of industry in 1955, 1979, 1995, and 2012. These four years were

Table 8.2 Percentage of output value by industry

Industry		1955	1979	1995	2012
(1) Heavy industry		34.1–40.2	55.3–56.8	56.9	69.1
Electric power	Electricity production and supply	1.6	3.9	4.5	5.6
Coal	Coal mining	3.0	2.6	2.1	3.6
	Coking, manufacture of gas	0.2	0.2	0.3	1.0
Petroleum	Crude petroleum and natural gas production	0.3	2.1	2.6	1.3
	Petroleum processing	0.8	3.3	3.5	3.2
Metallurgy	Ferrous metal	6.7	6.3	6.9	7.3
	Of which: Primary iron and steel manufacturing	6.5	6.1	6.7	6.5
	Non-ferrous metal	3.1	2.7	3.1	4.8
	Of which: Primary non-ferrous metals manufacturing	NA	2.3	2.5	4.2
Chemical	Mining of chemical minerals	0.3	0.1	0.1	0.1
	Manufacture of basic chemicals	1.6	1.6	1.2	0.9
	Manufacture of organic and synthetic basic chemicals		1.8	2.1	3.7
	Manufacture of chemical fertilizers	0.3	1.9	1.6	0.9
	Manufacture of chemical pesticides	0.2	0.4	0.4	0.2
	Manufacture of rubber products for production use	1.2	1.5	0.8	0.8
	Manufacture of plastic products for production use	NA	0.9	1.0	1.1
Machinery	Manufacture of machinery for production use	7.1	12.7	13.2	16.4
	Of which: Manufacture of agricultural machinery	0.9	1.8	0.9	0.3
	Of which: Manufacture of boilers, engines and turbines	1.5	2.1	2.5	2.8
	Of which: Manufacture of metalworking machinery	0.3	0.8	0.4	0.5
	Of which: Manufacture of special industrial machinery and equipment	1.3	2.3	1.5	1.6

(continued)

Table 8.2 (continued)

Industry		1955	1979	1995	2012
	Of which: Manufacture of motor vehicles	0.3	1.6	4.0	5.7
	Of which: Ship building	0.7	0.6	0.4	0.9
	Manufacture of electronic equipment	0.1	3.3	3.5	6.6
	Of which: Manufacture of radio and television transmitters, telecommunication equipment and computers	NA	NA	2.1	3.9
	Of which: Manufacture of electronic components	NA	NA	1.4	2.5
	Manufacture of metal products for production use	1.5	4.6	3.0	4.4
	Maintenance and repair of machinery and equipment	<1.6	<1.4	0.6	0.6
Building materials	Manufacture of building materials	2.8	3.7	5.6	5.2
Forestry-related	Logging and transport of timber, sawmills and manufacture of fiberboard	3.3	1.0	0.8	0.9
	Manufacture of forest chemical product	NA	0.2	0.1	0.1
Others	Of which: Heavy industry	NA	0.4	0.2	0.2
(2) Light industry		59.8–65.9	43.2–44.7	43.1	30.9
Chemical	Manufacture of paints, dyestuffs and printing ink	0.5	0.7	0.6	0.5
	Manufacture of pharmaceutical chemicals	1.5	1.4	1.3	1.1
	Manufacture of chemical products for daily use	1.3	0.8	0.9	0.6
	Manufacture of rubber products for daily use	0.9	0.5	0.4	0.1
	Manufacture of plastic products for daily use	NA	0.7	1.0	1.0
Machinery	Manufacture of machinery and equipment for daily use	0.5	1.8	2.3	1.4
	Of which: Manufacture of electronic appliances	NA	0.4	1.2	0.7
	Manufacture of metal products for daily use	1.2	0.5	1.9	1.5

(continued)

Table 8.2 (continued)

Industry		1955	1979	1995	2012
	Of which: Manufacture of household electrical appliances	NA	0.3	1.9	1.4
	Manufacture of metal products n.e.c	1.8	2.4	2.2	2.1
	Treatment and coating of metals	NA	NA	0.2	0.2
Forestry-related	Manufacture of wood products	NA	0.7	0.5	0.8
Food	Manufacture of food products	23.9	11.4	10.2	8.2
Textile, wearing apparel, and Leather	Manufacture of textiles	21.4	11.6	7.9	4.0
	Manufacture of artificial fibres	NA	0.2	0.2	0.2
	Manufacture of synthetic fibres	NA	0.6	1.2	0.5
	Manufacture of wearing apparel	1.4	2.2	2.7	1.8
	Manufacture of leather, fur and their products	0.7	0.8	1.6	1.0
Paper, cultural and educational articles	Manufacture of paper	2.3	1.3	1.3	0.8
	Printing industries, manufacture of articles for cultural activities, education, sports, arts and crafts	2.4	2.1	2.3	1.9
Others	Of which: Light industry	NA	NA	4.2	3.2

Source Author's calculations based on NBS (1957, 1981), firm-level data set for the enterprises in the Third National Industrial Census of PRC in 1995, firm-level data set for the enterprises as China's basic statistical units in 2012

Notes The percentage of output of 1955, 1979, 1995 and 2012 was calculated from gross industrial output value at 1952 constant prices, gross industrial output value at 1970 constant prices, gross industrial output value at current prices, and sales revenue at current prices, respectively. NA indicates data were not available to the author in constructing this table. Several industries could not be split into heavy industry and light industry precisely, because the industries could not be split further or these industries' output data were not available. The classification of industrial sectors is based on the Industrial Sector Classification (1972); however, we modified it minorly in order to unify the classification systems utilized in different years. Printing ink and matches originally belongs to paper, cultural and educational articles, and others respectively, was placed into chemical industry. Carbon and graphite products originally belong to others was placed into building materials

chosen because of data limitations. However, 1955 was the third year of the First FYP period and almost the beginning of heavy industrialization in the Mao era. In 1979, China had just changed course toward the reform and opening-up. By 1995, the marketization policies of the Deng era were advancing at a rapid pace. The year 2012 is approximately 10 years after China made rapid progress toward heavy industrialization in the reform and opening-up era.[8]

The period 1955–79 generally represents the Mao era. Comparing the share of output by industries in 1955 and 1979, it shows that the importance of light industry, particularly the two representative industries, food and textiles declined sharply. In contrast, Table 8.2 confirms the progress of heavy industrialization. The shares of electric power, petroleum, basic chemicals, chemical fertilizers, agricultural machinery, boilers, engines and turbines, metalworking machinery, special industrial machinery and equipment, motor vehicles, electronic equipment, metal products for production use, and building materials all increased significantly. Additionally, iron and steel, and coal generally maintained the high shares recorded in 1955. A wide range of heavy industries expanded significantly, including energy, iron and steel, special industrial machinery and equipment, chemicals, and electronic equipment.

By observing the industrial structure in 1995, we find that even in the Deng era, the share of food and textiles continued to decline. However, many other light industries, such as synthetic fibers, wearing apparel, leather, electronic appliances (e.g. TVs and radio-cassette recorders), and electrical appliances (e.g. refrigerators and fans) increased their shares. Within heavy industry, the shares of agricultural machinery, metalworking machinery, and special industrial machinery and equipment declined, whereas the shares of electric power, petroleum, organic and synthetic basic chemicals, boilers, engines and turbines, motor vehicles, electronic equipment, and building materials continued the upward trend begin during the Mao era. The share of the metallurgy industry, which was high during the Mao era, increased further. The presence of heavy industry was maintained.

The industrial structure in 2012 shows that energy (e.g. electric power), metallurgy (e.g. iron and steel), organic and synthetic chemicals, and machinery industries have continued to play an important role in heavy industrialization after 2000. Thus, even in the reform and opening-up era, the presence of heavy industries continued to expand. Heavy industrialization in the Mao era formed favorable conditions for the development of these industries.

Within the machinery industry, we see significant share growth in the production of motor vehicles and electronic equipment during the reform and opening-up era. The majority of motor vehicles are passenger cars, and typical products of electronic equipment not only include electronic components for production use, but also personal computers and mobile phones, many of which are used in daily life. In other words, heavy industry development after the reform and opening-up was partly the result of the growth in the output of consumption goods, which was evidently different from the national defense-oriented heavy industrialization during the Mao era.[9] Nonetheless, as previously stated, the motor vehicles and electronic equipment industries significantly had increased their share of output value even during the Mao

era. The development of these industries during the reform and opening-up era is not independent from the Mao era.

Although as a result, the heavy industrialization in the Mao era played a role in constructing industrial foundations for the reform and opening-up era, how should this policy itself be evaluated?

Lin et al. (1994) argued that although heavy industries grew faster than other sectors as a result of the heavy-industry-oriented investment policy, disregard for factor endowments resulted in a distorted industrial structure. It slowed economic growth, hindered the movement of labor from agriculture to other industries, impeded the improvement of people's living standards, and isolated the economy from the outside world. They also argued that the planned resource allocation system, the management of state-owned enterprises (SOEs) and People's Communes, which were adopted to support the heavy-industry-oriented development strategy, led to low allocative efficiency and poor work incentives.

Let us review the industrial investment efficiency in China. In Table 8.3, the incremental capital output ratio (ICOR) is calculated using the sectoral statistical data. Output value and capital are both deflated; however, gross output value is used for output and fixed capital for capital.

Because the ICOR is the amount of additional capital required to increase output by one unit, the higher its value, the greater the amount of additional capital—such as plant and equipment—required to bring about an increase in output of one unit; therefore, the lower the investment efficiency. Because industries such as mining tend to have a high ICOR, we focus on the time-series tendency of each industry rather than on comparisons between industries.

Most industries showed the most striking deterioration in investment efficiency during the Second FYP period, namely the Great Leap Forward period. In many industries, gross industrial output even shrank despite an increase in fixed capital.[10] The investment efficiency of most industries improved during the subsequent economic adjustment period of 1963–65; however, investment efficiency began to deteriorate again by the Fourth FYP period at the latest.

The low investment efficiency of the Mao era can also be observed in the state of progress of construction. The "rate of fixed assets transferred and put into use in capital construction" shows that, particularly during the Third Front Construction period when location conditions were poor and construction periods were considerably extended, the operation of new fixed assets encountered substantial delays. Because only recorded fixed assets were used to calculate the ICOR, investment efficiency during the Third Front Construction period must be lower than what the ICOR indicated.

As with growth rate of other economic indicators in Table 8.3, such as the dramatically fluctuating gross domestic product (GDP) growth rate, the ICOR for the entire industry also fluctuated greatly. However, these two indicators demonstrated inverse movements, confirming that the decline in investment efficiency hampered economic growth in the Mao era.

Table 8.3 ICOR by industry

Period	1953–57	1958–62	1963–65	1966–70	1971–75	1976–80	1981–85	1986–90
ICOR								
Total	0.34	2.69	0.18	0.20	0.51	0.43	0.28	0.40
Metallurgy	0.61	2.78	0.03	0.41	1.19	0.71	0.43	0.88
Electric power	2.32	3.10	1.02	1.16	1.42	2.15	2.18	2.66
Coal	1.53	4.01	20.51	1.23	2.89	3.18	3.88	4.44
Petroleum	0.85	0.95	0.34	0.15	0.42	0.77	1.25	2.47
Building materials	0.42	−2.83	0.21	0.41	0.64	0.70	0.46	0.65
Chemical	0.17	0.57	0.16	0.10	0.21	0.21	0.11	0.14
Machinery	0.39	1.85	0.22	0.16	0.36	0.42	0.07	0.12
Forestry-related	0.28	−0.92	0.90	−2.68	1.23	0.84	1.06	1.11
Food	0.11	−1.40	0.05	0.21	0.19	0.31	0.42	0.66
Textile	0.27	−0.59	0.06	0.09	0.29	0.19	0.29	0.51
Others	0.01	1.23	−0.09	0.02	1.14	0.09	0.25	0.23
Yearly-averaged growth rate (%)								
Industrial gross output value	18.0	3.8	17.9	11.7	9.1	9.2	10.7	10.7
Value-added of industry	19.8	2.1	21.4	11.6	9.0	9.6	9.9	9.2
GDP	9.2	−2.0	15.1	6.9	5.9	6.5	10.7	7.9
Rate of fixed assets transferred and put into use in capital construction (%)								
All industries	80.2	70.9	88.5	58.5	60.4	74.2	68.9	73.6

Sources Author's calculations based on DIS (various issues), DITS (2000), NBS (1991), GPDMF (1992), DNA (2007), Zheng and Ji (1993), Chen et al. (1993), DSIFA (1997)

Notes The capital input was calculated by using original value of fixed assets, net value of fixed assets, fixed assets depreciation rate of industrial enterprises, and deflated. The rate of economic depreciation is 5%. Gross industrial output value at constant prices was used as output. The yearly-averaged growth rate is at constant prices

The ICOR also shows that, even on entering the Deng era, investment efficiency declined in industries such as electric power, coal, petroleum, and food. The investment efficiency of the whole industry improved only for a while before deteriorating again. Improving investment efficiency has always been an issue in the Chinese economy even after the reform and opening-up.

Although as previously mentioned, Lin et al. (1994) offered a general critique of the Mao-era heavy industrialization strategy, others disagreed. Yao and Zheng (2008) constructed a dynamic general equilibrium model composed of light and heavy industries, and compared the sum of the discounted utility of all residents realized under three cases: (1) a market-based strategy with no subsidy to heavy industry, (2) a strategy with an optimal term and subsidy rate for heavy industry development, and (3) actual Chinese practice with a high, long term subsidies. The results showed that, case (2), namely the optimal catch-up strategy, in which the

subsidy rate is somewhat reduced and the term of subsidy is substantially shortened as compared with case (3), offers the highest utility among these three cases. They affirmed that the "heavy-industry-oriented development strategy was correct" and argued that the problem was that the strategy's implementation period was overly long.

At the same time, Yao and Zheng (2008) noted the lack of analysis of military strategy in their study, and suggested that the mistakes of the Mao era were more about politics than economic policy.

Indeed, we have already seen that one of the major goals of heavy industrialization was to strengthen national defense. Moreover, Mao possessed great influence not only on the turmoil of the Great Leap Forward and the Cultural Revolution, but even on the preparation and decisions of the FYPs. These factors should also be taken into account as constraints when discussing the merits and demerits of heavy industrialization.

8.4 Another Legacy: Embryonic Reform and Opening-Up

Deng Xiaoping took over the reins of power at the end of the 1970s. On entering the Deng era, China gradually reformed state enterprises, expanded the scope of private capital activities, accepted foreign capital and technology, and adopted market mechanisms.

The reform and opening-up policy did not have a roadmap: the policy was formed through trial and error. However, prototypes of some of these policies had in fact already been explored during the Mao era. The rural household responsibility system, which was briefly implemented after the failure of the Great Leap Forward, is well known; however, we will review the policies more directly related to heavy industrialization.

8.4.1 Utilization of Foreign Equipment, Technology, and Funds

Even during the "self-reliant" Mao era, China had to aggressively adopt foreign plants to develop its extremely fragile heavy industry.

The most famous example is the already-mentioned introduction of plants from the Soviet Union under the "156 Projects." The implementation of the "156 Projects" strengthened China's extremely weak heavy industry in a fairly short period during the first two FYPs. In addition to the military industry, the "156 Projects" focused on the metallurgy (e.g. iron and steel), energy (e.g. coal and electricity), and machinery industry (e.g. metalworking machinery). The production capacity growth in machine

tools and special industrial machinery and equipment particularly boosted China's capacity to pursue an independent path of industrialization.

Mao did not reject imports even from the West. Even Mao Zedong's article, "On the People's Democratic Dictatorship," which called for China "to lean to the side of the Soviet Union," stated, "We are against no one except the domestic and foreign reactionaries who hinder us from doing business" (Mao, 1951). Nonetheless, amid the economic blockade imposed by the Western bloc immediately after its founding, China had no other choice but to "lean to the side of the Soviet Union."

However, in July 1960, in the midst of the Great Chinese Famine, the Soviet Union unilaterally notified China of plans to withdraw its experts and suspend its assistance. The deterioration of Sino-Soviet relations resulted in the halting of plant importation from the Soviet Union. Despite its commitment to "self-reliance", China had to turn to the introduction of plants from Western countries from then on.

Starting from a 1963 contract with Japan's Kurashiki Rayon (now Kuraray Co., Ltd.) for an integrated PVA/PVA fiber manufacturing plant, China planned to import 84 plant and technology items with a total value of approximately $270 million. These items included plant for synthetic ammonia, urea, ethylene, propylene, vinylon, acrylonitrile, polyethylene, polypropylene, and polyacrylonitrile, together with oil well-drilling machinery, underground mining equipment, top-blown rotary converter, and large electric steelmaking furnaces from Japan, the United Kingdom, France, West Germany, and other countries (Cheng, 2004; Niu, 2016). In addition to petrochemical equipment related to the production of agricultural and daily necessities (e.g. chemical fertilizers and synthetic fibers), China also enthusiastically imported advanced facilities and technologies across a wide range of industries, including organic and synthetic basic chemicals, metallurgy, machinery, and electronics.

The importation of these items from western countries was not easy. For instance, the above-stated Kurashiki Rayon's deferred payment export to China—was officially approved in August 1963; however, this approval provoked strong criticism from the United States and Taiwan. The United States declared that this plant export to China was "problematic in that it contributes to an increase in Communist China's industrial capacity." Taiwan also strongly opposed export by deferred payment to China through loans from the Export–Import Bank of Japan. As a result, the Japanese government stopped approving loans to China from this bank, and the second export contract, namely Nichibo (now Unitika Ltd.) vinylon plant export contract expired (Kimura, 2009).

Only in the 1970s, when the international environment had changed significantly, was China able to really import plants from advanced western countries. As the development of agriculture and the textile industry—closely connected to the lives of the people—lagged behind as a result of heavy-industry-oriented development strategy, in September 1972, by taking advantage of the development of the Daqing Oil Field, China decided to import plants from Japan to expand the production of synthetic fibers and chemical fertilizers. Subsequently, many other plants were also planned to be imported from Japan and other developed western countries, such as a 1700-mm rolling mill project, petrochemical plants, electric power plants, and alkylbenzene plants, totaling $4.3 billion in value during the three to five years from

1973 (State Planning Commission, "Consultation Paper on Increasing Equipment Imports and Expanding Economic Exchange," submitted in January 1973), which was the so-called "4-3 Development Strategy." The scale of the imports subsequently increased to $5.18 billion. These imported plants were used to construct 26 large-scale projects, including Wuhan Iron and Steel, Shanghai Petrochemical, Tianjin Petrochemical Fiber, Liaoyang Petrochemical Fiber, Jilin Chemical Industrial, Beijing Petrochemical, Guangzhou Petrochemical, and Nanjing Alkylbenzene, all of which came into operation in 1982.

The implementation of the "4-3 Development Strategy" contributed to a significant increase in the production of chemical fertilizers, synthetic fibers, and synthetic detergents. For instance, production volumes of synthetic ammonia and synthetic fibers in 1970 were 2.445 million tons and 36,200 tons, respectively, whereas the newly increased production capacity built under the "4-3 Development Strategy" was 3.57 million tons and 236,000 tons, respectively. The "4-3 Development Strategy" contributed to alleviating the problems of national life, such as food and clothing.[11]

The "4-3 Development Strategy" also sought to strengthen bottleneck industries, such as petrochemicals, iron and steel, coal, and electric power. For instance, in 1970, China's ethylene production was only 15,100 tons; however, the implementation of the "4-3 Development Strategy" created a production capacity of 415,000 tons (DIS, 2013; DSIFA, 1987).

The import of plants from Western countries must have been a blessing for China after the heavy industry equipment and technology that introduced from the Soviet Union more than ten years ago became obsolete.

Plant imports for the "156 Projects" were financed by state loans from the Soviet Union and important commodities such as tungsten ore, copper, and rubber. However, for the implementation of the "4-3 Development Strategy," deferred payment was used, and foreign currency funds were raised by the Bank of China. To increase plant imports from Western countries, in 1975, Vice Premier Deng Xiaoping proposed the so-called "compensation trade," a method of offsetting the cost of importing coal mining machinery with the export of the coal mined. This method utilizes foreign exporters' funds. Meanwhile, Premier Zhou Enlai was also refining a more advanced method for the use of foreign capital. In 1973, when he met banker David Rockefeller, the head of the Rockefeller family, Zhou referred to the Kaohsiung Export Processing Zone in Taiwan and praised the so-called processing trade, in which foreign capital is used to import, process and assemble raw materials and parts, and then re-export the finished products (Xing & Chen, 2006; Chen, 2004).

The realization of compensation trade, processing trade, and export processing zones actually had to wait until the dawn of the Deng era. In 1978, the "Three-plus-one (*sanlai yibu*)" trading mix (custom manufacturing with materials, designs, or samples supplied and compensation trade) appeared as a form of export in China. In 1979, "Special Export Zones", equivalent to export processing zones, were approved in Shenzhen and other cities, which were designated as the famous "Special Economic Zones" in the following year.

It appears that Mao era's experimentation with the use of foreign equipment, technology, and funds contributed to the open-door policy of the Deng era.

8.4.2 Exploration of SOE Management System

As part of the institutional preparations for the Great Leap Forward, the State Council transferred a number of central enterprises (SOEs under central government management) to local governments, while encouraging the expansion of SOEs' managerial autonomy and permitting them to retain a share of the profits (State Council, "Provision of the State Council on Improving Industrial Management System," issued in November 1957). The compulsory quotas under production planning (the planning indices prohibited to be changed without the approval of the State Council) were drastically reduced, from 12 (gross output value, output of major products, trial manufacture of new products, important technical economic quota, cost reduction rate, cost reduction value, total number of staff and workers, number of workers at year-end, total wages, average wage, labor productivity, and profit) to four (output of major products, total number of staff and workers, total wages, and profit). Authority over personnel and limited changes in fixed assets were transferred to enterprises, while profits were also permitted to be partially retained by enterprises. Part of the retained profits could also be used for the welfare of staff and workers.

However, because the purpose of this system change was to enable SOEs to actively achieve the production quotas of the Great Leap Forward policy, even the basic management authority concerning production and sales was not transferred to enterprises. Worker management rights were delegated; however, personnel adjustments were required to keep the condition that the total number of staff and workers could not be increased. The investment and disposal of fixed assets were also limited to the authority set by the senior managing body.

In June 1958, the CPC Central Committee ordered that the decentralization of approximately 80% of the central enterprises should be completed within two weeks (CPC Central Committee, "Provision of the CPC Central Committee on Delegating Enterprises, Institutions, and Technical Forces," issued in June 1958). As a result, cooperation between enterprises in production activities was disrupted, and economic plans for materials, labor recruiting, financing, and transportation were severely disordered. In the midst of the Great Leap Forward, the finances of many SOEs slid into deficit, and the trial of this SOE management system failed.

Subsequently, central government ministries and agencies recovered the control of the transferred SOEs from local governments; however, after the Great Leap Forward, China renewed the search for new SOE management system.[12] The next trial was the trust (*tuolasi*) system, under which unified entities were made up of enterprises in the same industry. In 1964, following the instructions from Chinese President Liu Shaoqi, nine state trusts were established for tobacco, salt, motor vehicle, tractor & internal-combustion engine parts, textile machinery, aluminum, rubber, pharmaceuticals, and geological machinery and instruments. Several regional trusts were also established (National Economic Council, "Report of the State Economic Commission CPC Party Group on the Recommendation of the Pilot Implementation of Industrial and Transport Trusts," submitted to the CPC Central Committee and the State Council in July 1964). These establishments were expected to integrate enterprises on the basis of

industry and carry out production activities according to the state's plan. However, after the Cultural Revolution began, Liu was permanently expelled from CPC in 1968, and the trusts became the subject of criticism.

Turning to the SOE reforms of the Deng era, in October 1978, trial of the "power delegation and profit sharing" (*fangquan rangli*: expanding the SOEs' managerial autonomy and permitting the SOEs to retain a share of profits) was first executed in Sichuan Province at six SOEs, and was expanded nationwide the following year. This reform evolved into the "contracted management responsibility system for industrial enterprises (*gongye qiye jingying chengbao zerenzhi*)" later (Xu, 2014). The SOE management system enforced in the Great Leap Forward was certainly a kind of prototype for this reform.

The trust system, although criticized during the Cultural Revolution, continued to be utilized by some local SOEs in a similar manner, for instance, by the Tianjin Paper Manufacturing. On entering the Deng era, many such enterprises were established as "enterprise companies (*qiyexing gongsi*)", rather than "administrative companies (*xingzhengxing gongsi*)" (Yu et al., 1981). In the 1990s, the proposal that the trust system should be used to reform SOEs was brought up (Ju, 1996). In 1991, China started a pilot project with 55 state-level large enterprise groups for the reform of the state-owned asset management system. Subsequently, a system known as authorized operation (*shouquan jingying*) of state-owned assets, under which the state-owned assets administration gives the core enterprise of an enterprise group, i.e. the "group company", the authority to manage and control the state-owned assets of its key related companies in the group, was adopted in reforming large SOEs (Xu, 2019). It appears that large-scale trusts have been revived under this system.

Conclusion

This chapter has inspected the heavy industrialization during the Mao era and examined its legacy to the Deng era. Heavy-industry-oriented development strategy during the Mao era aimed at strengthening national defense, and as a result, investment efficiency was viewed as secondary, and was not improved. In contrast, heavy industrialization in the Mao era laid the foundations of heavy industry, trained a large number of engineers, thus providing favorable conditions for economic development in the reform and opening-up era. The presence of heavy industry, particularly the electric power, metallurgy, organic and synthetic chemicals, and machinery industries, was maintained during the Deng era. The challenge of improving investment efficiency was also a difficult issue during the Deng era. Moreover, the embryonic forms of some of the reform and opening-up policies could be found in the policies related to heavy industrialization during the Mao era, such as the utilization of foreign plants, technology, and funds, and the exploration for a better SOE management system.

Heavy industrialization during the Mao era resulted in the institution of state ownership and the planned resource allocation system in China's economy. China's SOEs still dominate many heavy industries. These industries have become the "commanding heights" for state capital to control the Chinese economy, which has led to

criticism of China's economic system as a form of "state capitalism." Furthermore, in October 2020, China set forth a policy of strengthening the national security system and ensuring national economic security at the Fifth Plenary Session of the 19th CPC Central Committee. Will China strengthen the dominant power of state capital over key industries further on the grounds of national security? It has become more important to look back to the Mao era, and study the issue of today's China in historical perspective.

Notes

1. "Heavy industry" in China's industrial statistics is similar to that of the "heavy-chemical industry" in Japanese statistics, but there are some differences. For instance, in Japan, metals, machinery, and chemicals are classified as heavy-chemical industries. In China, some of these industries, such as bicycles and home appliances, are classified as light industries. Therefore, the term heavy industry as it is used in this chapter is quite close to the heavy-chemical industry in Japan, but there are some differences. In addition, in this chapter, the term industry means mining, manufacturing, and production and supply of electricity, gas and water.
2. The economic theory also influenced the radical implementation of heavy-industry-oriented development strategy. See Chap. 1.
3. The Fifth FYP does not exist, including in the form of an "opinion", "report syllabus" or "outline." Not until March 1978, after Mao's death, did the National People's Congress pass the "1976–1985 Ten-Year Plan Outline of Developing National Economy (Draft)".
4. Nakagane (2002) termed China's planning system as "slack centralization," judging from the weakness of the bureaucracy and the absence of law and order, setting the number of controlled products and directive planning indicators aside. In fact, the three FYPs, from the second to the fourth, were not formally "plans" but rather "opinions" and "outlines", and the policy often shifted significantly. The First FYP was finally decided in the middle of the five-year period. The plan and actual results always greatly deviated from one another.
5. The First FYP pointed out that "our country's industry has been unevenly concentrated in one location or along the coast, and this state of affairs is irrational for economy and national defense," whereas the Second FYP proposed that "in order to adapt to national defense and security requirements, the layout of enterprises should be dispersed accordingly"; therefore, the dispersal of industrial areas for national defense purposes has been paid heed since the country's founding.
6. The Fourth FYP also emphasized the construction of the Third Front in the southwest and northwest. The plan also positioned the development of agriculture as an important part of war preparedness and called for the strengthening of light industry construction at the strategic rear, in addition to heavy industries, such as iron and steel, petroleum, and machinery.
7. The manufacture of synthetic fiber polymers is classified under heavy industry as manufacture of organic and synthetic basic chemicals, while spinning and other processes are classified as a light industry under manufacture of synthetic fibers.
8. From the second half of 2013, the National Bureau of Statistics abolished the "light industry" and "heavy industry" classification in its statistical reports (Gu, 2013).
9. Nakagane (2012) argued that China's high rate of heavy industrialization was a "deliberately and consciously created industrial structure" in the Mao era, but manifested itself as a "result of the formation of a market economy" and "an inevitable effect of income growth" after the reform and opening-up.
10. Between 1963 and 1965, "Others", namely other industries n.e.c., also showed negative ICOR. However, in this case, gross output expanded despite the decrease in capital.
11. In 1982, all major projects of the "4-3 Development Strategy" were put into operation. Plant imports for heavy industries, such as chemical fertilizers and synthetic fibers, exerted a significant impact on the expansion of grain crops production in the 1980s and the abolition of the

"clothing coupons" (cotton clothing ration ticket) after 1984 (Xing and Chen, 2006). These efforts during the Mao era prepared for the expansion of supplies of agricultural products, clothing, and detergents on entering the reform and opening-up era.

12. In 1970, the majority of central enterprises were again transferred to local governments to build complete industrial systems in each region.

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(in Japanese)

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Chapter 9
Light Industry: Socialist Industrialization and the Textile Industry

Jun Kajima

Abstract This chapter examines the impact of socialist industrialization policies implemented during the Mao era on the long-term industrialization process of China, focusing on the light industrial sector, especially the textile industry. The textile industry was the core of the rise of China's modern industry after the latter half of the nineteenth century while the traditional handicraft sector coexisted. Significant changes in the textile industry by the introduction of a socialist system in the 1950s and the "heavy-industry-oriented strategy" were seen in four specific aspects: (i) governmental control of raw materials and product distribution, (ii) nationalization and semi-nationalization of modern industrial sectors, (iii) reorganization of the traditional handicraft sector, and (iv) restraint of investment in the textile industry. As a result, the development of the textile industry was relatively suppressed in both the modern industrial and traditional handicrafts sectors throughout the Mao era, while the textile industry contributed to the socialist industrialization policy by earning relatively high profits and foreign currency through export. The post-1978 rapid expansion of the textile industry mainly by small-and-medium-sized enterprises suggests that the textile industry, suppressed under the socialist system, revived in the market economy after the reform and opening-up policy.

Introduction

This chapter examines the impact of socialist industrialization policies implemented during the Mao era on the long-term industrialization process of China, focusing on the light industrial sector, especially the textile industry. The socialist industrialization policy referred to here is the industrialization policy under the socialist system formed in China in the 1950s based on a planned economy and public ownership of the means of production. The government of the People's Republic of China, as discussed in Chap. 8, intensively promoted investment in heavy industry, leading to

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a rapid increase in the ratio of secondary industries (mining and manufacturing) in China's industrial structure (Minami & Makino, 2014: 19–21).

Although the socialist industrialization policy strongly prompted China's industrialization, it is a mistake to think that China's industrialization began after 1949. As is well known, the rise of modern industry in China can be traced back to the latter half of the nineteenth century, after the opening of its ports. Following the rise of governmental and foreign companies, Chinese private industrial companies also took off, mainly in Shanghai and other coastal areas in the 1910s. As a result, a certain level of industrialization was achieved by 1937 when the Second Sino-Japanese War broke out (Feuerwerker, 1977; Rawski, 1989; Kubo et al., 2016). In this sense, China's industrialization is a continuous, long-term process that began before 1949, and socialist industrialization policies should be placed in this context. This long-term perspective helps connect China's industrial-oriented economic development after the reform and opening-up policy in 1978 in the context of industrialization since the latter half of the nineteenth century.

Therefore, this chapter investigates the influence of the socialist industrialization policy of the Mao era on China's long-term industrialization through three periods: pre-1949, the Mao era, and the post-the reform and opening-up policy focusing on the textile industry, which was the core of China's modern industry. The definition of the textile industry in this chapter is broad and includes the garment, spinning, and weaving industries. However, owing to the data limitation before 1949, only the spinning and weaving industry was included in the pre-1949 period analysis.

The reasons why this chapter focuses on the textile industry are as follows: (1) the textile industry was a core industry in many countries during the emergence of modern industry, and a certain level of development of the modern sector in the industry was observed in China before 1949; (2) while the modern sector developed, traditional handicrafts in the silk and cotton industries coexisted in China; therefore, the impact of the socialist industrialization policy can be examined from the perspective of both the modern and traditional sectors; (3) relatively long-term data of the Chinese textile industry are available since it has been a major industry in China for a long time.

Many scholars have already discussed the Chinese textile industry, reflecting its long tradition and its major position in China's modern industrialization (Yan, 1955; Chao, 1977; Zhao & Chen, 1977; DCB, 1984; SSJ, 1992; Soda, 1994; Nakai, 1996; ZJB, 1997; Tsuji, 2000; Mori, 2001; Kou, 2003; Benno, 2004; Okumura, 2004; Kubo, 2005; Setobayashi, 2008; Tomizawa et al., 2011; Tomizawa, 2019). However, a long-term perspective that includes the period from the rise of modern industry to the Mao era and the reform and opening-up period has only partially been adopted (Grove, 2004, 2006; Pomeranz, 2013). Therefore, this chapter covers the long-term development of the Chinese textile industry since the late nineteenth century and examines the impact of the socialist industrialization policies of the Mao era on the development process, which began before 1949.

9.1 The Textile Industry before 1949

In China, the textile industry was a traditional native industry, and the handicraft sector of the silk and cotton industry was highly developed until the mid-nineteenth century. After the opening of ports in 1842, the Shanghai Mechanical Textile Bureau was established in 1880 and started production in 1890 as a pioneer of modern factories in the Chinese cotton industry, which was supervised by Li Hongzhang, a senior government official of the Qing dynasty, for import substitution of foreign machine-made cotton products. On the other hand, due to the defeat in the First Sino-Japanese War, the Shimonoseki Treaty signed in 1885 allowed foreign companies to operate factories in open port cities, which triggered foreign companies to enter China in the form of direct investment (Kubo et al., 2016: 21–25).

It was not until the outbreak of World War I (1914–18) that modern textile enterprises with Chinese private capital rose. Owing to the decline in imports of European products, Chinese private capital entered the textile industry one after another. Simultaneously, direct investment by Japanese cotton companies in China, the so-called Zaikabo, became prominent (Takamura, 1982; Tomizawa et al., 2011).

Table 9.1 shows the overall picture of Chinese industry in 1933, before the outbreak of the Second Sino-Japanese War (1937–45). The first thing seen here is the high share of the light industry in total manufacturing output, reaching 74.5%, while its share in Manchuria, where Japan intensively invested in heavy industry, is slightly lower (71.6%). In particular, the textile industry accounted for 40% of the total manufacturing output, indicating that it was a core light industry. The second thing that should be emphasized is that the foreign-owned capital in the textile industry accounted for a relatively high percentage, reaching 24.8% in China proper. As mentioned above, this was due to the existence of Zaikabo, Japanese-capitalized cotton companies that had advanced into coastal cities such as Shanghai and Qingdao.

Let us now turn our attention to the cotton industry central to the Chinese textile industry. Figure 9.1 shows the self-sufficiency rates of the machine-made cotton yarn and cotton cloth in China. While it is necessary to note that the data in Figure 9.1 include production by Zaikabo, the Japanese factories in China, the self-sufficiency rate of both cotton yarn and cotton cloth rose rapidly from the 1910s to the 1930s. For cotton yarn, for which modern factory production in China developed earlier, the self-sufficiency rate reached 100% in 1930. The same tendency was observed for cotton cloth somewhat later. According to Table 9.1, while the ratio of foreign capital in the textile industry was higher than that in other industries in terms of the production value shares, Chinese capital accounted for 68.1%. It suggests that the development of Chinese private capital significantly contributed to the development of import-substitution industrialization in the cotton industry.

However, the development of the modern industrial sector has by no means eliminated the Chinese traditional handicraft textile industry, which has a long history. Figure 9.2 shows an estimate of the supply structure of cotton yarn and cloth between 1875 and 1931 by a supplier. In the case of cotton yarn, the ratio of the handicraft

Table 9.1 Output value of manufacturing in China, 1933

Unit: million yuan

Classification	Gross value of output				Percentage		
	China proper		Manchuria	Total	China proper		Manchuria
	Chinese-owned	Foreign-owned		(Percentage to all industries)	Chinese-owned	Foreign-owned	
Textile	721.0	262.4	74.8	1,058.2(*40.0*)	68.1	24.8	7.1
Foods	561.2	156.4	194.8	912.0(*34.5*)	61.5	17.1	21.4
Metal	83.0	2.8	19.7	105.5(*4.0*)	78.7	2.7	18.7
Machinery	68.8	17.9	27.3	113.8(*4.3*)	60.5	15.7	24.0
Chemicals	123.8	27.2	23.7	174.7(*6.6*)	70.9	15.6	13.6
Stone, clay & glass	45.8	1.8	10.5	58.1(*2.2*)	78.8	3.1	18.1
Lumber & wood	5.6	6.1	12.5	24.2(*0.9*)	23.1	25.2	51.7
Miscellaneous	161.9	23.0	14.1	199.0(*7.5*)	81.4	11.6	3.5
Light industry	1,282.2	418.8	269.6	1,970.1(*74.5*)	65.1	21.3	13.7
Heavy industry	275.6	47.9	70.7	394.0(*14.9*)	69.9	12.2	17.9
Total	1,771.4	497.4	376.7	2,645.5(*100.0*)	67.0	18.8	14.2

Source Kubo et al. (2016), p. 73; Liu & Yeh (1965), pp. 426–428
Notes "Light industry" includes "Textile" and "Foods"; "Heavy industry" does "Metal," "Machinery" and "Chemicals." Some figures of "Total" are not equal to total of all items, but they are from original sources
Percentages are calculated based on the figures of the original table

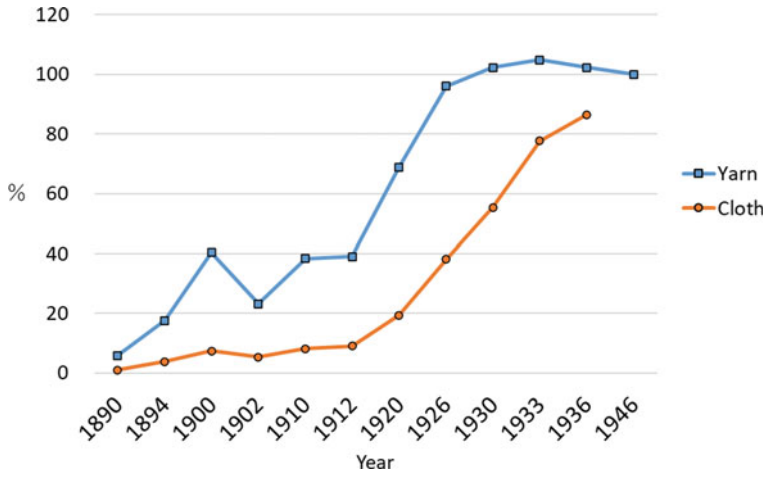

Fig. 9.1 China's self-sufficiency rate of machine-made cotton yarn and cloth, 1890–1946.
Source Kubo et al. (2016), pp. 23–24.
Notes "Self-sufficiency rate" is calculated as (amount of production)/(amount of production + import - export) × 100. The data of this table only covers cotton products made by modern factories. The figure of "Cloth" of 1947 is not available

industry consistently declined from 1875 to 1931, while the production of modern factories expanded and came to occupy a major position. In contrast, in cotton cloth, although imports and domestic modern factories expanded to a certain extent, handicrafts continued to occupy a major position until 1931, and the production portion of imports and modern factories remained under 40%.

The production of hand-woven cotton cloth developed in response to the advancement of modern industry, such as the emergence of rural hand-woven production using machine-made cotton yarn imported from India and Japan as raw material

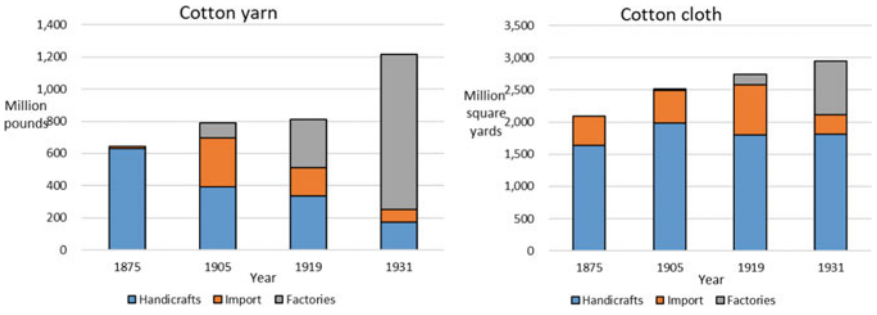

Fig. 9.2 Cotton yarn and cloth supply in China, 1875–1931.
Source Kubo et al. (2016), p. 24.
Note The original data is from Reynolds (1974), Table 2.4, p. 31; Feuerwerker (1977)

instead of traditional hand-spun yarn (Kubo et al., 2016: 22). In this way, the handicraft industry continued to change its form in China's cotton industry until the 1930s, while the modern industrial sector gradually expanded.

The Second Sino-Japanese War in 1937–45 and the civil war between the Chinese Nationalist Party and the Chinese Communist Party in 1946–49 had a complex influence on the textile industry. While they damaged the production of the textile industry, they also caused a significant change: the establishment of the state-owned China Textile Construction Company after World War II as a recipient of the requisition of former Japanese textile production facilities, which increased the presence of state-owned companies in the textile industry (Kawai, 1987; Jin, 2006). However, the private sector accounted for 63% of the textile industry's total output in 1949 (excluding handicrafts), and the private sector was still the main producer in the textile industry (ZGG, 1958: 157). In summary, China's textile industry developed in a way that Chinese private enterprises, foreign-invested enterprises, and traditional rural handicrafts coexisted until 1949.

9.2 Socialist Industrialization Policy and the Textile Industry

9.2.1 Introduction of the Socialist Industrialization Policy

With the establishment of the People's Republic of China in 1949, the socialist system was introduced in the 1950s and a socialist industrialization policy was implemented. The main features of the socialist system that distinguish it from other economic systems (e.g., the capitalist system) are (i) public ownership of the means of production (i.e., the denial of private ownership of the means of production), (ii) resource allocation by planning (i.e., the denial of resource allocation by the market), and (iii) centralized control of political power by a single party (Okumura, 1999; Shiokawa, 1999; Kajima, 2018).

In China, these three features formed throughout the 1950s. (i) The public ownership of the means of production was completed in 1956 in the form of socialist transformation, consisting of the collectivization of agriculture, socialization of private enterprises, and cooperativization of handicrafts. (ii) The distribution of resources according to the plan gradually tightened since 1949 and was fully implemented with the start of the First Five-Year Plan in 1953. (iii) Centralized control of political power was established by strengthening political control by the Chinese Communist Party after 1949.

The socialist industrialization policy was adopted under the socialist system, and the "heavy-industry-oriented strategy" at the heart of the policy led to major changes in the structure of the Chinese industry. Figure 9.3 shows the changes in China's capital construction investment, which was allocated to the formation of fixed assets, including the production activities of enterprises, in heavy and light industries over

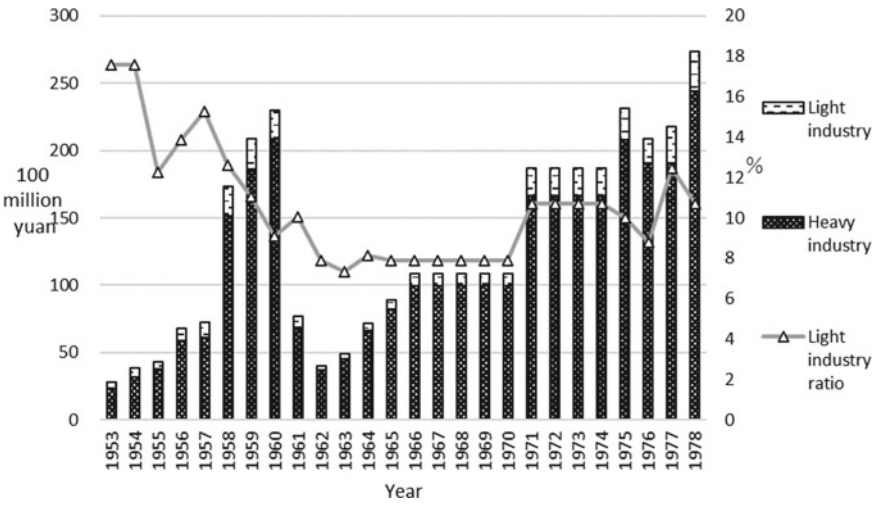

Fig. 9.3 Capital construction investments of heavy and light industries, 1953–78.
Source GTG (1987), p. 97.
Note The figure of 1966–75 is an estimation

the period 1953–78. It clearly shows that investment in the heavy industry accounted for the overwhelming share, while the ratio of light industry to total capital construction investment fell from 18 to 10% in the 1950s and has remained between 10 and 12% ever since. Although it is natural for heavy industry, requiring large-scale investment, to have a relatively large share of investment, this shows that the government's "heavy-industry-oriented strategy" was thorough.

The results of the "heavy-industry-oriented strategy" are clearly shown in Figure 9.4, which indicates changes in the composition of manufacturing output by industry from 1933 to 1980. As seen in Table 9.1 above, the ratio of the two main light industries, food and textiles, in 1933 accounted for about 30–40% of the total manufacturing industry; the ratios basically remained the same in 1953. However, a jump in the heavy industry ratio occurred between 1953 and 1970, reaching 57.9% in 1970. It shows that the above-mentioned "heavy-industry-oriented strategy" promoted China's heavy industrialization to a large extent.

9.2.2 Impact on the Textile Industry

Let us look closely at how the socialist industrialization policy and "heavy-industry-oriented strategy" have affected the textile industry. It can be summarized in the following four aspects:

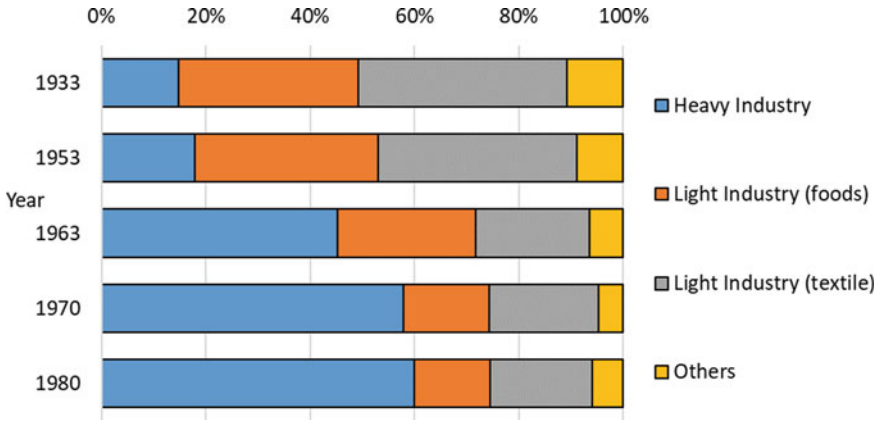

Fig. 9.4 Percentages of output value by industry, 1933–80.
Source Kubo et al. (2016), p. 73.
Note The figure of "Heavy Industry" is the total of "Metallurgy," "Machinery" and "Chemical" of the original table

(i) Governmental control of raw materials and product distribution

First, it had a great impact on the textile industry in that the distribution of raw materials and products was under the control of the government, in principle, by the introduction of the planned economy. Governmental control over the distribution of raw materials and products was promoted by the outbreak of the Korean War in 1950 and China's entry into the war, even before the First Five-Year Plan in 1953 (Izutani, 2007). Under the environment of increased military demand, state-owned enterprises (SOEs) and governmental organizations ordered products from private companies and outsourced processing, where SOEs that supplied raw materials and private companies that processed them expanded. As a result, the share of private companies in the total production value rose to 73.2% in 1952 (ZGG, 1958: 158; Izutani, 2007).

For the modern industrial sector of the textile industry, governmental control of raw material and product distribution meant that the business management function of private enterprises was replaced by governmental plans. In other words, enterprises became "factories" that engaged only in production activities. For the traditional handicrafts sector, such as hand-woven cotton cloth in rural areas, free production activities by peasants were restricted because the raw cotton yarn was distributed only by the government.

(ii) Nationalization and semi-nationalization of the modern industrial sector

In parallel with the governmental control of the distribution of raw materials and products, socialist transformation, which made private ownership of the means of production public, took place. With the completion of the socialist transformation in 1956, all private enterprises in the modern industrial sector became state-owned or

semi-state-owned (public and private jointly owned) enterprises. As a result, enterprise management was placed under the direct control of the central and local governments to which the state-owned and semi-state-owned enterprises belonged (Kajima, 2018). The textile industry was one of the industries most affected by this socialist transformation, as it was developed mainly by private companies until 1949.

(iii) Reorganization of the traditional handicraft sector

The other aspect of socialist transformation, the cooperativization of handicrafts, also had a great impact on the textile industry. As shown in Figure 9.2, traditional handicrafts still had a certain share of China's cotton cloth supply, even in the 1930s. The handicrafts of textile also held a prominent position in the whole handicraft industry; "spinning and weaving" and "sewing" accounted for 16.7% and 23.3%, respectively, for a total of 40%, to the total output value of all handicraft industries in 1956 (ZQSH, 1992: Vol. 1: 711).

In the process of the cooperativization of the handicraft industry, all existing handicraft workers were incorporated into the organization of handicraft cooperatives. The question here is how handicraft textile production, which existed as a household-side job widely in rural areas before 1949, was organized through the socialist transformation. In December 1955, just before the completion of the cooperative management of handicrafts, the 5th National Handicraft Production Cooperation Conference stated that there were about 10 million handicraft workers as a side job in the country. Among them, those whose main income was from handicrafts were organized into handicraft cooperatives. Those whose incomes from agriculture and handicrafts were equal, or whose income from handicrafts was not large but whose handicraft skills were relatively high, were organized into and worked for both agriculture and handicraft cooperatives. Those whose income from agriculture was high and whose handicraft industry was a non-commodity sideline were included in agricultural cooperatives (ZQSH, 1992: Vol. 1: 13). According to this statement, it is probable that the freedom for rural peasants to engage in handicraft textiles as household-side jobs were relatively restricted after 1956. Thus, organizing existing handicraft industries during the socialist transformation had a significant impact on the rural economy and the management of rural households.

(iv) Restraints on investment

While the textile industry was placed under governmental control with the formation of the socialist system described above, it suffered from the relative suppression of investment under the "heavy-industry-oriented strategy."

Figure 9.5 shows the changes in capital construction investment in the textile industry and some major heavy industries: metallurgy, machinery, and chemical industries. As seen in Figure 9.3, investment in the light industry was generally kept at a low level. Here, again, we can see that while there was a large increase in investment in the metallurgy, machinery, and chemical industry, the investment in the textile industry remained at a relatively low level of around 0.8–2 billion yuan consistently from 1953 to at least 1970. It suggests that the textile industry during the

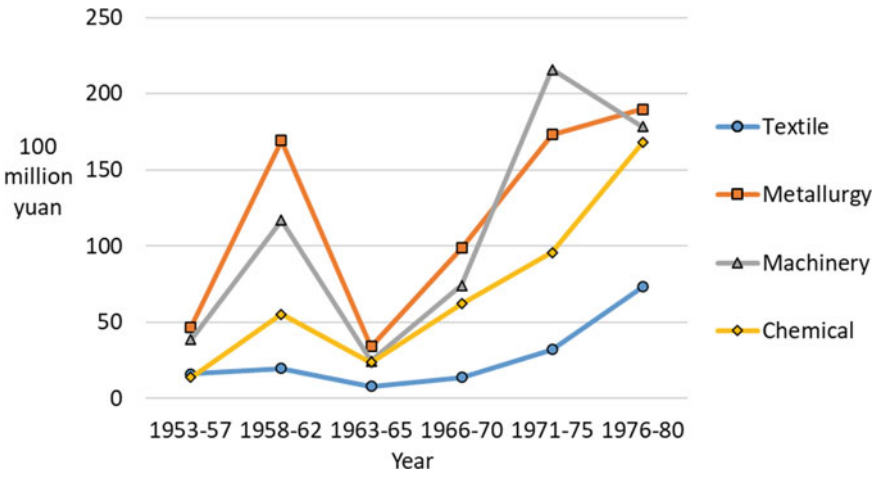

Fig. 9.5 Capital construction investment of main industries, 1953–80.
Source GTG (1987), pp. 88–89.
Note The figure of 1966–75 is an estimation

Mao era mainly relied on existing production facilities due to a lack of investment, and improvements in the level of technology were limited.

9.2.3 Contribution of the Textile Industry

While the socialist industrialization policy and the "heavy-industry-oriented strategy" in the Mao era had a great impact on the development path of the textile industry, we should not ignore the fact that the textile industry made a significant contribution to China's socialist industrialization.

Figure 9.6 shows the profits of the textile industry (including the machinery industry that produces facilities for the textile industry) and the machinery industry in Shanghai, which was a major center of the modern sector of the textile industry, as well as the profit-fixed asset ratio, indicating the capital efficiency of the two industries. The chart shows: (i) the absolute amount of profits in the textile industry generally exceeded the machinery industry, except for some periods such as the Great Leap Forward (1958–60), and (ii) the profit-fixed asset ratio of the textile industry tended to increase throughout the Mao era, while the machinery industry remained stagnant, except during the GLF period.

Under the socialist system, the profits of state-owned and semi-state-owned enterprises became the fiscal revenue of the government they belonged to (in this case, the Shanghai municipal government) as the category of "enterprise profits" (Kajima, 2018). Therefore, high profits in the textile industry made a financial contribution of no less than the machinery industry. In addition, the increase in the profit-fixed asset

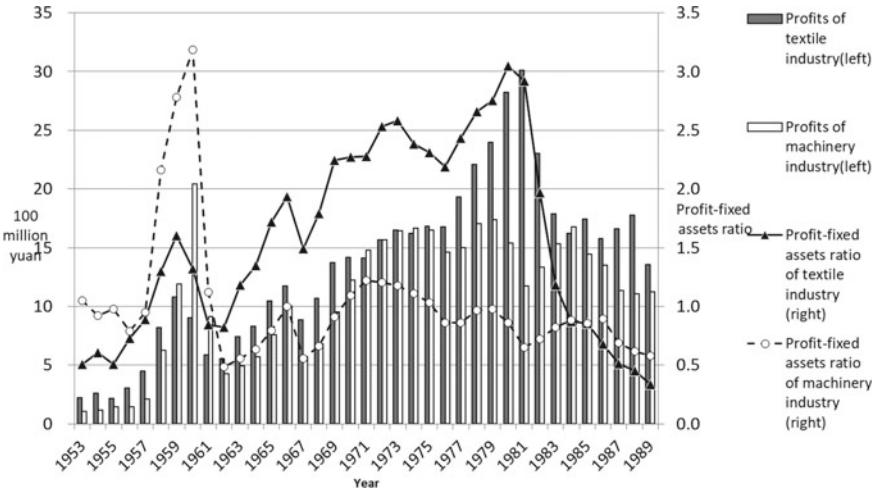

Fig. 9.6 Profits and profit-fixed assets ratio of textile industry and machinery industry in Shanghai, 1953–1989.
Source SFB (1998), pp. 278–284; SJB (1996), pp. 10–14.
Notes Fixed assets are depreciated value, and they are mid-term value which is calculated to average the year-end value and the previous year-end value in the original data

ratio of the textile industry shows that the textile industry earned profits by utilizing existing production facilities with limited investment, while the machinery industry was expanding its production with massive investment under the "heavy-industry-oriented strategy." Naturally, the profit and fixed asset ratios of the machinery industry, which require large-scale investment in the initial stage, would be relatively low. However, it is also true that the textile industry played a role in financially supporting the promotion of the "heavy-industry-oriented strategy."

Another important contribution of the textile industry was that its products became an important foreign currency earning export commodities for China during the Mao era. The export value of textile products was US$280 million in 1957, accounting for 17.7% of total exports; US$450 million in 1965, accounting for 20.3%; and US$2.15 billion in 1978, accounting for 22.1% (DCB, 1984: 637; Tomizawa, 2019: 217). Taking cotton products as an example, these export products were mainly produced in Shanghai using imported raw cotton, and in the 1950s, the export destinations included the Soviet Union, Eastern Europe, and other socialist countries, as well as Hong Kong (presumably including re-exports), Indonesia, Myanmar, and other East and Southeast Asian countries. The United Kingdom, Australia, and other countries were added to the list in the 1960s (Tomizawa, 2019: 217–221). In the Mao era, foreign currency was valuable for importing production goods needed to promote heavy industrialization; therefore, the textile industry's contribution to socialist industrialization was significant.

9.3 The Reform and Opening-Up Policy and the Long-Term Development of the Textile Industry

The reform and opening-up policy developed after 1978 led to the dismantling of the socialist system formed during the Mao era. The textile industry proceeded on a new way of development. This section examines the impact of socialist industrialization on the textile industry using long-term statistical data, including the period before 1949 and after the reform and opening-up policy.

Table 9.2 and Figure 9.7 show the number of production facilities and the amount of production of the cotton industry from 1936 to 1997. What can be seen here is that the production facility (spindles) and production amount of cotton yarn have not changed significantly around 1949, while those of cotton cloth has risen significantly since the 1950s. In addition, all indicators rose sharply in the 1965–78 and especially the 1978–89 periods.

Regarding the jump in cotton cloth production across 1949, it is possible that the traditional sector, which had been partially mechanized, was included in the statistics after 1949, while the figures for 1936 and 1947 cover only modern factories. The increase in all indicators for 1965–78 can be attributed to the increase in investment in the spinning and weaving industry after 1970, when the country emerged from the turmoil of the early years of the Cultural Revolution in 1966–69, and to the increase in exports of textile products due to Sino-American rapprochement in the early 1970s. Moreover, there was a development of the cotton industry led by local governments in areas other than the modern cotton industry concentration areas, such as Shanghai, during the same period (Tsuji, 2000: 442–443). However, the most remarkable rise occurred in the 1978-89 period, attributable to the rise of small-and-medium-sized enterprises, including township and village enterprises (TVEs), as discussed below.

The sharp rise in the number of production facilities and production amount in the cotton industry in the 1978–89 period is also shown in Figure 9.8, which indicates

Table 9.2 Facilities and production of machine-made cotton industry in China, 1936–97

	1936	1947	1952	1957	1965	1978	1989	1997
Facilities								
Spindles (10 thousand)	563.5	545.4	561.0	755.6	980.1	1,561.9	3,565.6	4,245.0
Looms (10 thousand)	5.8	6.6	…	42.1	30.9	49.7	83.8	75.3
Production								
Yarn (10 thousand bales)	203.9	149.7	361.8	465.3	716.4	1,327.9	2,656.1	3,123.6
Cloth (100 million m^2)	12.0	…	38.3	50.5	57.4	81.5	117.9	118.9

Source SMGTC (1950), p. 1, 3, 7; ZFNB (1983), p.196, (1991), p. 335, (2000), pp. 348–349, 364
Note "…" means no data available
"Cloth" after 1957 is "all cotton fablic", not including chemical fiber fablic etc
1936 and 1947 only includes the figures of modern factories
The figure of cotton cloth production in 1947 is converted from the original data in "pi"(疋) at the ratio of 33.44508 m^2 to 1 pi

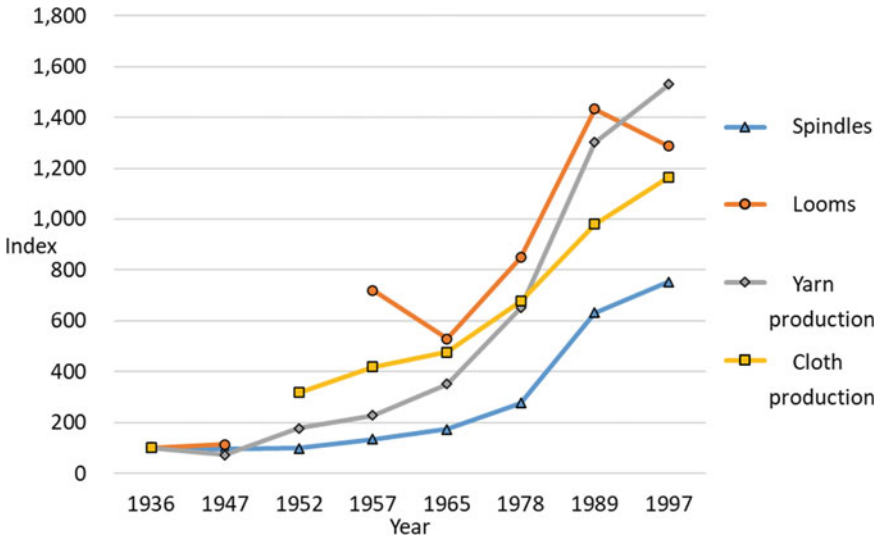

Fig. 9.7 Facilities and production of machine-made cotton industry in China, 1936–1997.
Source Table 9.2.
Note 1936 = 100

the trend in the number of workers in the textile industry. It should be noted that (i) the figures in 1933 include only workers in modern factories and not handicraft industries; (ii) those in 1952–78 include only SOEs belonging to the Ministry of Textile Industry; and (iii) those in 1989 and 1997 include TVEs that did not belong to the Ministry of Textile Industry. Despite taking these factors into account, the sharp increase in the 1978–89 period is impressive. Focusing on the breakdown by industry type, this increase in workers in 1978–89 consists of an increase in various textile industries, such as knitting and wool spinning, as well as cotton. Moreover, the increase in the garment industry in the period 1989–97 is also noteworthy as a new trend.

Much of this rapid growth in production facilities and product amount in the cotton industry and the number of workers in the textile industry in the 1978–89 period was mainly carried out by small-and-medium-sized textile enterprises, especially TVEs, which sprung up outside the existing planned economy through institutional changes following the reform and opening-up policy of 1978 (Naughton, 1995). TVEs originated from collectively owned enterprises belonging to the production brigades (a production organization consisting of approximately 200–300 farming households) and the People's Commune (an organization consisting of several production brigades), which were the production units of collective agriculture formed during the Mao era. The entry of these small-and-medium-sized enterprises in the post-1978 market economy brought about changes in the industrial organization of the textile industry dominated by large SOEs. Moreover, these small-and-medium-sized enterprises also absorbed the labor force in rural areas.

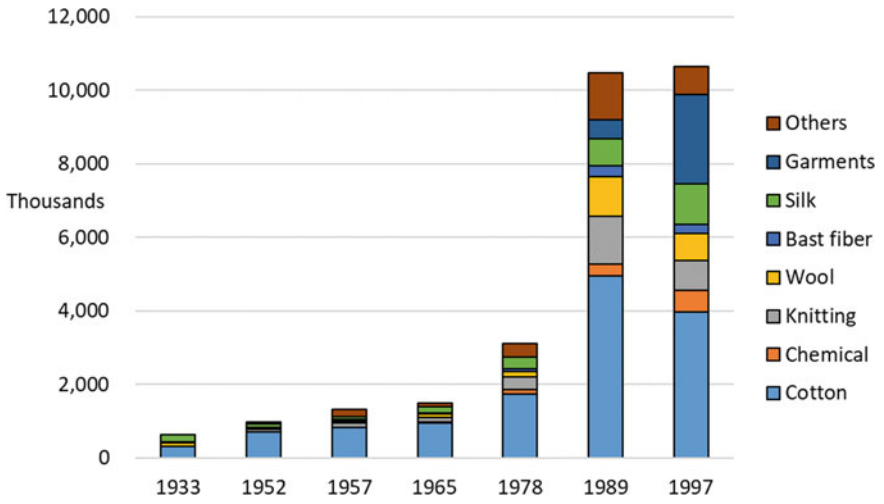

Fig. 9.8 The number of workers of the textile industry, 1933–1997 (year end).
Source Liu & Yeh (1965), pp. 426–428; ZFNB (1983), p. 191, (1991), p. 317, (2000), pp. 338–339, 355–356.
Note
The figures of 1933 only include the number of workers in modern factories, and those in 1952-78 only include that of staff and workers in state-owned enterprises which belonged to the Ministry of Textile Industry.
The figures of 1989 are the total of "textile ministry's industry" and "rural and township textile and sewing industries" of the original tables

Table 9.3 shows the number of enterprises, employees, and the output value of the whole textile industry and the cotton industry by enterprise type in 1989. Notably, the ratio of rural enterprises to the number of enterprises is extremely high (74.1%) in both the textile and cotton industries. In terms of the number of employees and output value, the ratio of rural enterprises is only 23.0–29.6%. These figures suggest that there were countless small-and-medium-sized rural enterprises alongside the existing state-owned textile enterprises. It should be noted that "state-owned" in this table includes not only large SOEs but also small-and-medium-sized local SOEs. Furthermore, as shown in the note to Table 9.3, the term "rural" enterprises here is limited to enterprises run by the village or township and does not include private enterprises run by individuals.

As for the post-1978 expansion of the textile industry centered around small-and-medium-sized enterprises, Grove (2006) points out the continuity between development up to the early 1950s and the post-1978 revival, focusing on Gaoyang County in Hebei Province, which had an industrial cluster of cotton weaving before 1949. On the other hand, Kou (2003) argues that the cotton industry since 1978 has been in a state of "excessive competition" in which the number of participating firms is excessive and inefficient firms have not been able to exit, whereas the profits of the whole cotton industry have declined. If these discussions are interpreted from the

Table 9.3 State-owned and rural enterprises in textile industry and cotton industry, 1989

Textile industry	**State-owned**	**Rural**	**Share of rural(%)**
Number of enterprises	10,913	31,287	74.1
Number of Staff and workers (thousand)	7,359	3,100	29.6
Total output value (100 million yuan)	1,340	540	28.7
Cotton industry	**State-owned**	**Rural**	**Share of rural(%)**
Number of enterprises	3,569	10,223	74.1
Number of staff and workers (thousand)	3,724	1,229	24.8
Total output value (100 million yuan)	695	208	23.0

Source ZFNB (1991), pp. 355–356
Note "Rural" covers enterprises run by townships and villages, does not include individual firms

perspective of this chapter, it can be seen that the private economic activities before 1949 were temporarily halted under the socialist industrialization policy during the Mao era, resulting in a rapid expansion after 1978. The textile industry, suppressed under the socialist system, once again took on the role of absorbing rural labor as a labor-intensive industry in the market economy after the reform and opening-up policy.

Conclusion

In this chapter, we discuss the impact of socialist industrialization policies on China's long-term industrialization process, focusing on the textile industry, a major light industry.

The textile industry was the core of China's modern industry until 1949. Chinese and foreign companies, especially Japanese cotton companies, were mainly located in the coastal areas and developed. On the other hand, the traditional handicraft sector still existed, with hand-woven cotton cloth accounting for a relatively high share of the cotton industry. Overall, it can be summarized that the modern industrial sector was in the process of gradual expansion while the traditional sector existed in the first half of the 20th century.

With the establishment of the People's Republic of China in 1949 and the introduction of a socialist system based on a planned economy and public ownership of the means of production throughout the 1950s, the textile industry was forced to undergo structural changes under the "heavy-industry-oriented strategy." Major changes were seen in four specific aspects: (i) governmental control of raw materials and product distribution, (ii) nationalization and semi-nationalization of modern industrial sectors, (iii) reorganization of the traditional handicraft sector, and (iv) restraint of investment in the textile industry. As a result, the development of the textile industry was relatively suppressed in both the modern industrial and traditional handicrafts sectors throughout the Mao era. However, the contribution of the textile industry to the socialist industrialization policy by earning relatively high profits and foreign currency through export should not be overlooked.

From a macroscopic point of view, these structural changes in the textile industry during the Mao era reflected the socialist industrialization policy under the socialist system, which systematically divided agriculture and industry, light and heavy industry, and rural areas and cities, placing greater emphasis on the mutual division of labor between them. In the 1980s, small-and-medium-sized enterprises, including TVEs, played an important role in reviving the textile industry, absorbing much of the rural labor force. It can be seen as a compressed process of gradual modernization that had taken place in the textile industry before 1949. In this sense, socialist industrialization policies in the Mao era significantly impacted China's long path of industrialization since the latter half of the 19th century.

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Chapter 10
Rural Industry: Policy on Five Small Industries with a Special Emphasis on the Fertilizer and Cement Industries

Takeshi Mine

Abstract China during the Mao era attempted to set up a geographically dispersed production structure in rural areas. This chapter analyzes the policy of rural industries with a special reference to the fertilizer and cement industries.

Introduction

When we examine the Mao era, we must consider the harsh international political environment surrounding China at that time. The Korean War began in June 1950, less than a year after the founding of the People's Republic of China in October 1949. Since then, the country has been in conflict with the United States (US).

Although China enjoyed the honeymoon relationship with the Soviet Union, particularly in the first Five-Year Plan (FYP), ideological confrontation began to appear gradually between the two nations. This was the so-called Sino-Soviet conflict. The Sino-Soviet confrontation became even more serious in the 1960s, resulting in military confrontation at the national border. In 1969, a large-scale military clash occurred in Damansky Island in the Ussuri River (Zhenbao Island, Heilongjiang Province) on the border. Military clashes were frequent in the eastern and western border regions, with China and the Soviet Union respectively deploying 2.5 million to 1 million troops in these areas.

At that time, the world was divided into the American camp and the Soviet camp, and the two countries were at odds with each other at every turn. However, both countries were hostile toward China and adopted a strategy of containment in China. Faced with difficulties due to the containment strategy, China adopted a self-reliance strategy under the leadership of Mao Zedong and implemented economic policies that assumed a wartime economy. Mao considered the possibility of the US and/or the

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Soviet Union attacking and invading China and subsequently designed a geographically dispersed production structure because a concentrated one might cause serious damage to the Chinese economy in case of an actual attack against China.

Such geographically dispersed structure is reflected in the layout of production plants as follows. In preparation for an attack by the US, China avoided coastal locations for its factories. In preparation for an attack by Soviet tanks, locations along the Soviet border were also avoided. Instead, China adopted a strategy of constructing many small plants in rural areas throughout the nation to produce goods to meet local demand.

Five small industries[1] (i.e., fertilizer; cement; machinery; steel and iron; and energy, including coal and hydropower), which were located in rural areas and driven by domestically developed technology, supported the economic foundation of socialist China and enabled Mao's self-reliance strategy. Among the five industries, the fertilizer industry was said to be the most successful in supporting China's agricultural production.

At the same time, we must pay attention to another side of the planned economy in which all goods were not always distributed under the central government's decision. From the production scale viewpoint, large-scale and medium-scale production was controlled by the central government under the principle of the planned economy, but small-scale production was controlled by the local government. Therefore, we must consider the motivation and intention of not only the local governments but also the central government.

Mao considered the steel industry as the most important. However, the steel industry in the Mao era was not successfully developed. Previous studies have indicated that the fertilizer industry was the most successful and that the cement industry was equally successful. In this chapter, the characteristics of the fertilizer industry and the technical development of ammonia, which is the key raw material of the fertilizer industry, are discussed in Section 10.1. Sections 10.2 and 10.3 respectively analyze how the fertilizer and cement industries in the Mao era changed through the reform and opening-up policy.

10.1 Fertilizer Industry as the Typical Case of Five Small Industries

10.1.1 Fertilizer Industry

Nitrogen, phosphate, and potassium are known as the three major nutrients of crops. In advanced agriculture, phosphate and potassium fertilizers are increasingly important, whereas in primitive farming, such as that in the Mao era, nitrogen fertilizers were the primary materials used. In primitive farming, agricultural productivity was clearly enhanced even with the use of nitrogen fertilizer alone. Hence, China focused on nitrogen fertilizer production in the Mao era.

From the production technology viewpoint, potash fertilizer production is very simple because the major component, that is, potassium chloride, is produced naturally. Moreover, potash is mainly obtained by mining. The production of phosphate fertilizer is also simple because it is produced by the chemical reaction of phosphate rock and sulfuric acid.

Meanwhile, the nitrogen fertilizer industry is quite different. Nitrogen fertilizers, such as ammonium sulfate (AS), ammonium nitrate (AN), and urea, are produced using ammonia as the raw material. Ammonia is produced by a catalytic reaction under high pressure and high temperature conditions, which could be dangerous. Hence, the process requires a high level of production technology. In the pre-war world, ammonia production was the most advanced field in the chemical industry.[2]

The analysis of ammonia production is integral to the analysis of the nitrogen fertilizer industry. Therefore, ammonia is discussed prior to the analysis of fertilizers in this study. Herein, fertilizer refers to nitrogen fertilizer unless otherwise stated.

The technology for synthesizing ammonia was invented by Harbor and Bosch in Germany at the beginning of the 20th century. The production capacity of the first ammonia plant was as small as 3,000 tons per year (t/y). The cost of ammonia production depends fundamentally on the scale of the production capacity. Increasing production capacity is a key factor in the research and development of ammonia production technology.

After World War I, countries such as the US, the United Kingdom, France, and Japan started ammonia production, and the capacity increased to 50,000 t/y through technological development during the interwar period. After World War II, the ammonia production capacity increased further to 330,000 t/y.

In this chapter, we define ammonia plants with 330,000, 30,000–50,000, and less than 10,000 t/y capacity as large-, medium-, and small-scale plants, respectively.

10.1.2 Fertilizers in the Mao Era

In 1909, small amounts of AS were imported and used by farmers for the first time in China. Since then, AS imports have increased year by year. In 1937, national capitalist Fan Xudong of the Republic of China (ROC) constructed an AS plant together with a medium-scale ammonia plant (33,000 t/y capacity) in Nanjing and imported the Nitrogen Engineering Corporation (NEC) technology of the US with the support of the ROC government. In addition to the AS plant, a 50,000 t/y ammonia plant was constructed in Dalian of Manchukuo[3] in 1935 by Japan. AS was the major fertilizer in the pre-war days as well as in the early days of the People's Republic of China.

In the first FYP, AN was introduced through the aid of the Soviet Union. Three AN plants, together with 50,000 t/y ammonia plants, were constructed in Jilin, Taiyuan, and Lanzhou. AS and AN were the major fertilizers in the early days of the Mao era. The central government controlled AS and AN production under the principles of the planned economy.

Meanwhile, ammonium bicarbonate (NH_4HCO_3, hereinafter referred to as AB) plants were constructed in rural areas for nitrogen fertilizer production. AB supported agricultural production under the Mao era's self-reliance strategy. However, AB is not an efficient fertilizer because its nitrogen content is low and easily decreases during transport and storage resulting from its unstable chemical structure. During this period, China was the only nation in the world to utilize AB as a fertilizer.

Nevertheless, the construction of AB plants was very cheap, and plant operation was easy. AB plants did not require high-grade steel, such as stainless steel. Hence, the production cost is very low. Furthermore, the deterioration of AB during transport and storage was comparatively minimal because AB plants were constructed in rural areas.

Furthermore, it is important to understand that both the production and distribution of AB were controlled by the local government. Specifically, the central government controlled the use of fertilizers such as AS and AN, but the production and distribution of AB were under the supervision of local governments. Local governments were very aggressive in increasing AB production, and AB became widely used in rural areas.

10.1.3 Ammonia Production by Scale

Table 10.1 shows the ammonia production by scale in China during 1952–1983. Until 1975, there was no large-scale ammonia production. Ammonia demand was covered by medium- and small-scale plants. Let us first examine how medium-scale plants were introduced in the People's Republic of China.

As shown in Table 10.1, two medium-scale plants started production in 1952. One of the two is the ammonia plant in Dalian with a capacity of 50,000 t/y, which was constructed in pre–war Japan. The other one is a plant with a capacity of 33,000 t/y, which was constructed in Nanjing by the national capitalist Fan Xudong during the pre–war period in ROC. These two plants were reconstructed by the new government of the People's Republic of China and began production in 1952.[4]

Additionally, three medium-scale plants with a capacity of 50,000 t/y were constructed in Jilin, Taiyuan, and Lanzhou for the first FYP through the technical cooperation of the Soviet Union. The three medium-scale plants in 1957 were two reconstructed plants in Dalian and Nanjing and a newly constructed one in Jilin. The eight plants in 1962 comprised two reconstructed plants, three newly constructed plants, and three copy plants based on Soviet technology.

The medium-scale plants that were constructed afterward were all copy plants based on Soviet technology. Starting in 1980, the number of medium-scale plants had reached 56. In the early days of the People's Republic of China, almost all ammonia production was performed in medium-scale plants. The share of medium-scale plants decreased gradually during the 1960s, and the share in 1970 was 59%. In 1973, the share of medium-scale plants was 45%, and that of small-scale ones

Table 10.1 Ammonia production by scale (1952–1983)

Year	Large-scale			Medium-scale			Small-scale			National production
	No. of plants	Production		No. of plants	Production		No. of plants	Production		
		1000t	%		1000t	%		1000t	%	1000t
1952				2	37	97	1	1	3	38
1957				3	153	100				153
1962				8	455	94	45	28	6	483
1965				22	1,301	88		185	12	1,484
1970				30	1,445	59	300	1,000	41	2,445
1973				38	2,155	45	961	2,589	55	4,744
1974				42	2,074	44	1,078	2,651	56	4,725
1975				45	2,533	42	1,199	3,544	58	6,077
1976	4	170	3	47	2,334	38	1,319	3,681	59	6,185
1977	5	1,245	14	49	2,579	30	1,450	4,880	56	8,704
1978	8	2,061	17	53	3,190	27	1,533	6,584	56	11,835
1979	10	2,706	20	54	3,518	26	1,539	7,257	54	13,481
1980	13	3,127	21	56	3,655	24	1,439	8,194	55	14,975
1981	13	3,359	23	56	3,667	25	1,357	7,808	52	14,833
1982	13	3,448	22	56	3,637	24	1,279	8,378	54	15,464
1983	13	3,631	21	56	3,683	22	1,244	9,457	57	16,771

Source Dandai Zhongguo Series (1986), *Today's Chemical Industry in China*, Appendix, Table 5, China Social Science Publishing Co.

Remark Large-scale refers to western technology with 330,000 t/y capacity. Medium-scale refers to Chinese technology with 30-50,000 t/y capacity. Small-scale refers to Chinese technology with less than 10,000 t/y capacity

was 55%. Then, the share of medium-scale plants continued to decrease, dropping to 22% in 1983.

As for small-scale plants, Table 10.1 showsonly one such plant in 1952. This was the reconstructed 900 t/y plant, which was originally a pilot plant of DuPont of the US and was bought and transferred to Shanghai by the national capitalist Wu Wenchu during the prewar period of the ROC.

As explained later, small-scale plants were constructed in the late 1950s by domestically developed technology, and by 1962, the number had grown to 45 (Table 10.1). The proportion of small-scale plants was 6% in 1962. Small-scale ammonia production increased dramatically in the latter half of the 1960s. In 1973, the share of small-scale plants was 55%, thereby exceeding that of medium-scale plants. Thereafter, small-scale plants became a major part of ammonia production.

The military containment strategy by the US and the Soviet Union was the reason for the dramatic increase in small-scale production. Mao adopted a self-reliance

strategy to cope with the containment by the US and the Soviet Union. Many small-scale ammonia plants were constructed in many rural areas, and they covered the peasants' demand for fertilizer. Small-scale ammonia production continued to increase even after the termination of the containment strategy of the US and the Soviet Union. This study later analyzes why the share of small-scale ammonia production continued to be the highest even after the reform and opening-up policy.

Next, we discuss large-scale plants. The year 1972 was the turning period of Mao's strategy. Following the agreement between Mao and Nixon of the US in 1972, Mao's strategy began to change gradually. China contracted the importation of 13 large-scale ammonia and fertilizer plants from the US, Japan, and European countries.

Table 10.1 shows that large-scale ammonia production began in 1976. There were four large-scale plants in 1976 and 13 in 1983. These 13 large-scale plants were constructed using imported western technology with a production capacity of 330,000 t/y. Four plants started production in 1976, and all of the 13 plants started production in 1980.

10.1.4 Controversy over Small-scale Production

The small-scale production policy was not consistently adopted in the Mao era. In the early Mao era, ammonia was synthesized under high pressure and high temperature conditions with the help of a catalyst and thus required advanced technology. Hence, small-scale ammonia production by domestically developed technology was not feasible during this period.This was partly because the world-famous chemical engineer Hou Debang, with whom Mao eagerly requested to cooperate for the development of the chemical industry of the new China, expressed a negative opinion toward small-scale ammonia production, which was supported by rational communist politicians, such as Chen Yun.[5]

According to the literature[6] of the Central Committee of the Communist Party of China in 2013, the advisability of small-scale production was discussed during the Fertilizer Group Meeting of the Central Committee in Guangzhou in 1961. The Minister of the Chemical Industry Department Peng Tao and the Minister of the First Machinery Department Wang Daohan were attendees, and Chen Yun served as the chairperson.

Group leader Chen Yun concluded that small- and large-scale ammonia plants were necessary in China. Consequently, China continued to develop technology for small-scale ammonia production and engaged in large-scale ammonia plant importation in 1963 with western companies, such as Humphrey Glasgow of the United Kingdom and Toyo Engineering of Japan. However, import contracts were not carried out partly because of the obstruction by the US and the ROC and the disorder in the society of China caused by the Cultural Revolution.[7]

Meanwhile, China successfully increased small-scale ammonia production using domestically developed technology. In the early days, the R&D of small-scale

ammonia production technology was conducted in Dalian. A 400 t/y ammonia plant was constructed in Dalian, but it was not successful. The production capacity was then increased to 800 t/y, and satisfactory results were obtained.

In 1956, the Department of Chemical Industry was established, and the R&D center in Dalian was moved to Shanghai as the Shanghai Research Institute of Chemical Industry. Dr. Hou Debang was the person primarily responsible for developing the technology for small-scale ammonia production. Dr. Hou Debang concluded that a production capacity of 2,000 tons per day (t/d) was better than 800 t/d for the model plant.[8] Thus, many small-scale ammonia plants were constructed in rural areas starting in the 1960s, as shown in Table 10.1.

As had been the major fertilizer since the pre–war days while AN was newly introduced during the first FYP through the Soviet Union. In addition, the technology to utilize AB as a fertilizer in China was at its infancy. Therefore, small-scale ammonia plants proved necessary and ideal for the production of AB.

The nitrogen content of AB is as low as 17.5% while those of AS and AN are 21% and 33%–35%, respectively. Furthermore, AB deteriorates easily during transport and storage, thus causing nitrogen content to decrease to less than 10%. Therefore, AB is not an effective fertilizer.

Nevertheless, the production cost of AB is very low, and peasants at that time could purchase this material at a considerably cheap price. Coal, which is the raw material of ammonia, is also widely available in China. Furthermore, AB plants were constructed using domestic pig iron instead of high-grade steel, such as stainless steel, which is indispensable for urea plants. Therefore, AB plants could be easily constructed on farming lands in rural areas.

China constructed AB plants across rural areas together with small-scale ammonia plants to supply nitrogen fertilizer to peasants. The geographically dispersed production structure reduced the losses incurred during transport and storage and addressed the defects of AB production. China was the only nation in the world that utilized AB as a fertilizer. Therefore, we can say that AB is the product of the so-called intermediate technology of Schumacher.[9]

10.1.5 Controversy Described in China Central Archives

Published in June 2013, the *China Central Archives* of the Central Committee Literature Research Office describes the above controversy over small-scale production. Reflecting the importance of fertilizer production at that time, it highlights as many as 15 instructions and reports between the Communist Party Central Committee and relevant organizations. Among the instructions and reports, five were on small-scale fertilizer production, and they are described in this section.

The first instruction was by the Central Committee and was dated August 29, 1958. The objective was to increase fertilizer production, which had been the basic policy of the new China. The second one, dated December 16, 1959, approved the decision of the Department of Chemical Industry to spread the 800 t/y production

capacity of the small-scale ammonia plant constructed as a model plant in Dalian. With this approval, the Department of Chemical Industry planned to construct many small-scale ammonia plants in the rural areas of China. The number of small-scale plants consequently increased from 45 in 1962 to 1,539 in 1979, as shown in Table 10.1. This increase appeared to be due to the controversy surrounding small-scale fertilizer production.

The third instruction was dated August 11, 1961, and it revealed a change in the policy of the Central Committee. Specifically, it described the approval of the construction of large- and small-scale plants. It also presented an overview of the Guangzhou meeting of the Fertilizer Small Group of the Central Committee, which was held in April 1961. It was decided in the Guangzhou meeting to increase agricultural production by constructing small- and large-scale fertilizer plants. It is a well-known fact that China made contracts with European and Japanese companies to import large-scale fertilizer plants in 1963–1964. From this third instruction, we can understand the policy changes in China during such periods.

The fourth instruction, dated December 29, 1962, described the role of the Department of Chemical Industry in increasing national fertilizer production and requested that local governments cooperate with the Department of Chemical Industry in managing small-scale plants.

The fifth instruction, dated August 14, 1963, highlighted many problems in small-scale plant management. The operation of many small-scale plants was said to be unsatisfactory due to problems with raw materials, transportation, electricity, water, etc. The Central Committee disapproved of the construction of the new 800 t/y ammonia plant because the actual production had been unsatisfactory. Instead, a 2,000 t/y ammonia plant was developed in Shanghai by the Ministry of Fertilizer Industry and became the model of small-scale plants, thus replacing the 800 t/y model.

10.1.6 China's Unique Development of Small Ammonia Technology

The new China learned ammonia production technology through the operation and reconstruction of pre–war plants in Nanjing and Dalian and the construction of three plants during the first FYP. All these plants were based on medium-scale technology. The operation of ammonia plants is very difficult because they are operated under a high pressure of 200–300 atmosphere and a high temperature of 400 °C–500 °C. These conditions increase the risk of explosion in ammonia plants.

Although China was able to construct and operate medium-scale ammonia plants, it could not easily do the same for small-scale ammonia plants. New China faced many difficulties in constructing and operating small-scale ammonia plants. Owing to the leadership of Dr. Hou Debang, China successfully developed 800 t/y ammonia plants, and the production capacity was later increased to 2,000 t/y.

According to a document[10] published by the local government in China, there was an attempt to develop a 400 t/y plant. However, no explanation was provided regarding the objectives of such development. A 400 t/y production capacity could have been regarded as suitable for counties, which served as base administrative districts of a self-sufficient economy. The document only mentioned the failure of the development of the 400 t/y model and the success of the 800 t/y model. As a result, the 800 t/y plant became the model of small-scale ammonia plants, as explained in the instruction of the Central Committee on December 16, 1959. However, the 800 t/y model was later rejected according to the instruction dated August 14, 1963, and was replaced with the 2,000 t/y model.

Here, we examine this situation through a historical review of the development of ammonia production technology in Europe and Japan. The first ammonia plant in the world was constructed by the German chemical company Badische Anilin und Soda Fabrik, and its operation began in 1913 with a capacity of 3,000 t/y. In Japan, ammonia production based on the Claude process of Italy was adopted with a capacity of 5 t/d, that is, 1,650 t/y, assuming 1 year = 330 days. Tokyo Kougyou Shikenjyou (Tokyo Industrial Laboratory) successfully established the first domestically developed ammonia production technology in Japan with a capacity of 20 t/d, that is, 6,600 t/y, assuming 1 year = 330 days.

Considering these actual achievements in Europe and Japan, one could regard China's original plan of developing a 400 t/y model as rather reckless. Even an 800 t/y production capacity would be too small for commercial plants. Our analysis of the development of ammonia technology reveals that a capacity of 2,000 t/y could be reasonable and that Dr. Hou Debang could have considered it as adequate for a small-scale model plant in China.

10.2 Change through the Reform and Opening-up Policy

10.2.1 Transition of AB Share

Figure 10.1 shows the transition of the shares of AB and urea during 1978–2015. The number of AB plants rose further after 1978, during which the opening-up policy was first implemented. There were 1,533 AB plants at the time, and this number increased to 1,539 in 1979. Local governments in rural areas faced serious supply shortages immediately after the beginning of the reform and opening-up policy.

Therefore, local governments strongly needed small-scale fertilizer plants, namely, AB plants, to increase agricultural production as it was within their discretion to construct and operate AB plants.

However, the AB share began to decrease gradually in the first half and rapidly in the latter half of the 1990s. The year 1997 was the turning point at which the share of urea became the largest and exceeded the share of AB. At present, no AB plants are being operated in the major regions of China. Moreover, there is no description

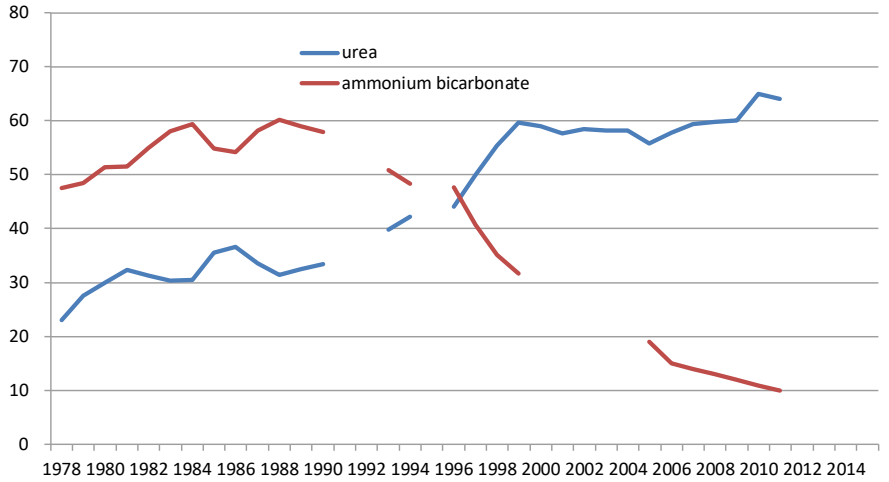

Fig. 10.1 Share of urea and ammonium bicarbonate.
Sources Zhonghua Renmin Gongheguo Huaxue Gongyebu (various issues) and other sources including web information.
Remark 1. The other nitrogen fertilizers are ammonium sulphate, ammonium chloride, aqua ammonia, compound fertilizers etc.
Remark 2. Ammonium bicarbonate figures after 2000 are obtained from internet and fertilizer magazines

of AB plants in the China Chemical Industry Yearbook after 2000. Although the official data on AB are unavailable, online resources indicate that the AB share in 2015, which is covered in the 12th FYP (2011–2015), was 6.5%. Hence, it appears that AB plants are still operating in remote regions.

Meanwhile, the share of urea continued to increase. The share of urea slightly exceeded 20% in 1978 and continued to increase up to 70% in 2015. In 1987, the share of urea exceeded the share of AB, and today, urea remains the most important nitrogen fertilizer. Other nitrogen fertilizers, such as AS and AN, continued to decrease consistently.

10.2.2 Peasants' Preference for Urea

The nitrogen content of AB is 17.5%, but the actual nitrogen content drops to less than 10% as it easily dissipates during transport and storage. In this process, AB tends to solidify; therefore, scattering AB as a fertilizer is not an efficient agricultural mechanism for peasants. Although local governments intended to increase AB production, peasants disliked the use of AB and preferred urea.

The nitrogen content of urea is 46% and is the highest among solid fertilizers. The nitrogen content of AS, which was the most popular nitrogen fertilizer in the

pre-war days, is 21%, and that of AN, which was introduced in China by the Soviet Union through the first FYP, is 33–35%. Originally, urea was used as the raw material for plastics during the pre-war days. After the war, the cost of urea dropped, thus prompting its use as a fertilizer.

In addition to its nitrogen content, the disadvantage of AS is that soil tends to become acidic when a large quantity of AS is used. Meanwhile, AN could cause explosions when mishandled. Basically, AN was good as a fertilizer in cold regions, such as the Soviet Union and East European countries, and was rather unpopular in other nations. As for Chinese peasants, urea was their preferred material.

Under these circumstances, local governments began to develop technology to convert AB plants into urea plants. This was because the raw materials of AB and urea were the same. Both AB and urea are produced using ammonia and carbon dioxide as the raw materials. In other words, AB is an intermediate product of urea synthesis.

With regard to construction materials, AB plants did not require high-grade steel, which was very difficult to obtain in the Mao era. AB plants were mainly constructed using pig iron. By contrast, the construction of urea plants required stainless steel because of urea's corrosive characteristic. Owing to the reform and opening-up policy after 1978, stainless steel became available even in rural areas. Local governments allocated a considerable amount of resources to develop the needed technology and later succeeded in converting AB plants to urea plants.

10.2.3 Conversion of AB Plants into Urea Plants

The central government was tasked to develop new technologies in the planned economy. For the fertilizer industry, the Shanghai Research Institute of Chemical Industry spearheaded the development of new technologies. We have discussed that the model of a small-scale ammonia plant with a production capacity of 2,000 t/y (later increased to 3,000 t/y) was developed by the Shanghai Research Institute of Chemical Industry. However, this organization was not responsible for the development of technology for converting AB plants to urea plants, with such innovation mainly emerging from rural areas.

According to the Chinese reference,[11] the first urea plant converted from an AB plant was constructed in the Pinged Fertilizer Factory of Shandong Province. The idea for it was first formulated in 1982, and the target production capacity was 40,000 t/y. The Pingdu Fertilizer Factory received the approval of this idea from the government of Shandong Province, and it started the conversion of the plant with the cooperation of the Department of Chemical Industry and Shanghai Research Institute of Chemical Industry. The first converted plant was completed mechanically in 1986, and after a year of technological improvement, the technology was established in the Pingdu Fertilizer Factory.

A Japanese expert in chemical engineering who has long been engaged in urea plant export business estimated that the cost of newly imported 40,000 t/y urea plant could reach 800–900 million Japanese yen, excluding the cost of utilities, such as electricity and steam. Meanwhile, the previously described Chinese reference indicates that the cost of converting AB plants to urea plants was 14.5 million Chinese yuan.[12]

Suppose 1 US dollar = 8.3 Chinese yuan = 120 Japanese yen. Then, 1 Chinese yuan = 14 Japanese yen. Therefore, the plant conversion cost of 14.5 million Chinese yuan was equivalent to approximately 200 million Japanese yen. This implies that the conversion of AB plants into urea plants with a capacity of 40,000 t/y by domestically developed technology was more economical than the importation of new urea plants with a capacity of 40,000 t/y by imported foreign technology with an estimated cost of 800–900 million Japanese yen.

The original ammonia plant of the Pingdu Fertilizer Factory had a capacity of 3,000 t/y and was designed by the Shanghai Research Institute of Chemical Industry. The Pingdu Fertilizer Factory later expanded the ammonia capacity to 25,000. With ammonia as the raw material, the converted plant was operated successfully.

The success was widely advertised by the Department of Chemical Industry and Shanghai Research Institute of Chemical Industry. As a result, many AB plants were converted into urea plants. The sharp decline in AB share and the increase in urea share in Fig. 10.1 were the result of the plant conversion.

Table 10.2 shows the small-scale urea production and share in the total national urea production in China in 1986–2007. It indicates that small-scale urea production started in 1986, during which the converted urea plant was successfully constructed and operated in Pingdu Fertilizer Factory.

The share of small-scale urea production, namely, the share of converted urea plants, increased rapidly in the latter half of the 1990s, and the share in 2005 was 51%, thus exceeding the share of large-scale urea production. The share of small-scale urea continued to increase afterward, reaching 58% in 2007, as shown in Table 10.2.

The rapid increase in small-scale urea production was caused by the rapid decrease in AB production. However, such decrease did not reduce the small-scale ammonia production. This is because the ammonia used for AB production was utilized by small-scale urea plants. Table 10.3 details the scenario.

Table 10.3 presents the amount and share of small-scale ammonia production in China in 1983–2007. The share of small-scale ammonia production was 56% in 1983, at which point AB was the most popular fertilizer in China. The share decreased slightly in 1985 and 1986, but it remained at the 50% level. It then increased to 55% in 1987 and reached 60% in 1996. The share in 2007 was as high as 69%, as shown in Table 10.3.

Table 10.2 Small-scale urea production in China (1986–2007)

Year	Production	Share
	1000t	%
1986	193	1
1987	212	1
1988	246	1
1989	324	1
1990	312	1
1991	916	3
1992	1,230	4
1993	1,538	6
1994	2,141	8
1995	3,569	9
1996	5,311	12
1997	6,767	29
1998	7,540	29
1999	9,870	34
2000	11,575	38
2001	12,848	41
2002	15,100	44
2003	16,812	47
2004	18,617	48
2005	20,983	51
2006	25,011	55
2007	28,981	58

Source China nitrogen fertilizer industry association (2008), *Historical development of China's small-scale nitrogen fertilizer industry*, Chemical Industry Publishing Co, p. 93

We can observe the transition of the ammonia production share by scale in Table 10.1. How did the figure change afterward? Unfortunately, consistent data are not available in official published references. Although the volume of published statistics has increased because of the reform and opening-up policy the amount of published data remains limited in China. Nevertheless, we present available data for the periods of 1987 and 1988 in Table 10.4.

According to Table 10.4, the shares of small-scale ammonia production were 57% in 1997 and 54% in 1998; in 1983, the share was almost 57% (Table 10.1). The shares of large-scale ammonia production in 1997 and 1998 were 24% and 27%, respectively; they were higher than those of medium-scale ammonia production. Meanwhile, the shares of medium-scale ammonia production decreased to 19%.

Table 10.3 Small-scale ammonia production in China (1983–2007)

Year	Production	share
	1000t	%
1983	9,457	56
1984	10,526	57
1985	8,203	50
1986	8,343	50
1987	10,637	55
1988	11,292	57
1989	11,615	56
1990	11,951	56
1991	12,390	56
1992	13,033	57
1993	12,300	56
1994	13,837	57
1995	15,187	55
1996	18,251	60
1997	17,038	57
1998	17,311	54
1999	18,730	54
2000	19,373	58
2001	19,189	56
2002	22,321	61
2003	23,838	63
2004	26,575	63
2005	30,563	66
2006	33,614	68
2007	35,698	69

Source China nitrogen fertilizer industry association (2008), *Historical development of China's small-scale nitrogen fertilizer industry*, Chemical Industry Publishing Co, p. 93

10.3 Cement Industry

10.3.1 Cement Industry in the Mao Era

The cement industry was another successful case for five small industries. During the building of a self-sufficient economy, bottle kilns that disappeared soon after World War II in the western world supported the economic construction in the rural area of China. In most countries, cement is generally used as a material for building construction in cities. During the Mao era in China, cement was widely used in rural

Table 10.4 Ammonia production by scale (1997–1998)

Year	Large-scale		Medium-scale		Small-scale		Total national
	Production (1,000t)	%	Production (1,000t)	%	Production (1,000t)	%	Production (1,000t)
1997	7,290	24	5,748	19	17,038	57	30,076
1998	8,605	27	6,035	19	17,246	54	31,886

Source Li (2000), "Analysis of China's small-scale nitrogen fertilizer industry development". *Tongji Yanjiu*, No. 10, p. 31

Remark Large-scale refers to western technology with 330,000t/y capacity. Medium-scale refers to Chinese technology with 30-50,000t/y capacity. Small-scale refers to Chinese technology with less than 10,000t/y capacity

areas. In those days, China lacked steel and wood; hence, cement was mainly utilized as construction/building material. For example, it was used to build not only ships for transporting fertilizers and crops but also reservoirs, irrigation canals, warehouses, cattle sheds, etc.

Table 10.5 shows the cement production in China by scale in 1953–1990. Almost all small-scale production utilized bottle kilns, with vertical kilns being used in the early stage of cement production. Similar to that in the fertilizer industry, small-scale cement plants were controlled by local governments. Specifically, both the production and distribution of small-scale cement plants were controlled by local governments while those of large-scale and medium-scale plants were controlled by the central government according to the planned economy.

Soon after the new Chinese government was established, cement was produced using the pre–war large- and medium-scale plants of ROC and Manchukuo, which were equipped with rotary kilns. Hence, cement production in the 1950s was mainly performed in large- and medium-scale plants, as shown in Table 10.5. Small-scale cement production increased from 1959 because of the Great Leap Forward. Although small-scale cement production decreased in 1962 and 1963, it increased again from 1964 and continued to increase in the 1960s. From 1973 onward, small-scale cement production exceeded large- and medium-scale production. Thereafter, the share of small-scale production continued to increase to as high as 80% in the latter half of the 1980s.

Almost all the small-scale plants shown in Table 10.5 were vertical kilns. There are two types of vertical kilns. One is a bottle kiln, which is very simple and is used in the early stages of cement production. The quality of cement produced in bottle kilns was very poor, but it did not pose a problem in rural areas. The other type is a mechanical kiln that mechanizes the feeding of raw materials and shipment of cement products. In 1884, a Dietzsch kiln was developed in Germany, and it was the most popular mechanical kiln in the pre–war days. Later, the Dietzsch kiln was further improved to the Schoefer kiln in Denmark. The operation of the Dietzsch and Schoefer kilns was continuous, whereas the operation of bottle kilns was intermittent, as in batch processing.

Table 10.5 Cement production by scale (1953–1990)

Year	National production		Large and medium scale		Small-scale	
	1,000t	%	1,000t	%	1,000t	%
1953	3,850	100	3,800	99	50	1
1954	4,600	100	4,530	98	70	2
1955	4,500	100	4,380	97	120	3
1956	6,390	100	6,180	97	210	3
1957	6,860	100	6,670	97	190	3
1958	9,300	100	9,030	97	270	3
1959	12,270	100	10,170	83	2,100	17
1960	15,650	100	11,020	70	4,630	30
1961	6,210	100	4,390	70	1,820	30
1962	6,000	100	5,050	84	950	16
1963	8,060	100	6,730	83	1,330	17
1964	12,090	100	8,920	74	3,170	26
1965	16,340	100	11,060	68	5,280	32
1966	20,150	100	13,110	65	7,040	35
1967	14,620	100	8,970	61	5,650	39
1968	12,620	100	7,440	59	5,180	41
1969	18,290	100	11,060	60	7,230	40
1970	25,750	100	15,170	59	10,580	41
1971	31,580	100	17,610	56	13,970	44
1972	35,470	100	18,060	51	17,410	49
1973	37,310	100	17,660	47	19,650	53
1974	37,090	100	15,780	42	21,310	58
1975	46,260	100	19,060	41	27,200	59
1976	46,700	100	17,590	38	29,110	62
1977	55,650	100	19,100	34	36,550	66
1978	65,240	100	22,710	35	42,530	65
1979	73,900	100	24,720	33	49,180	67
1980	79,860	100	25,590	32	54,270	68
1981	82,900	100	25,060	30	57,840	70
1982	95,200	100	25,930	27	69,270	73
1983	108,250	100	27,180	25	81,070	75
1984	123,020	100	29,060	24	93,960	76
1985	145,950	100	31,590	22	114,360	78
1986	166,060	100	32,350	18	133,710	82
1987	186,250	100	34,230	18	152,020	82

(continued)

Table 10.5 (continued)

Year	National production		Large and medium scale		Small-scale	
	1,000t	%	1,000t	%	1,000t	%
1988	210,130	100	35,450	17	174,680	83
1989	210,300	100	35,920	17	174,380	83
1990	209,710	100	39,850	19	169,860	81

Source Wang (2005), *History of China's cement industry development*, China Building Material Industry Publishing Co, pp. 241–242

The vertical kilns used in cement production in the Mao era were mainly bottle kilns. Bottle kilns were inexpensive and easy to operate, and the poor quality of cement was not a major concern in rural areas. The central government tried to replace bottle kilns with mechanical kilns. However, mechanical kilns were difficult to operate, particularly for uneducated peasants. Therefore, bottle kilns remained dominant in the Mao era.

10.3.2 Change through the Reform and Opening-up Policy

Although the data regarding the number of vertical kilns constructed in China are not available, Table 10.6, which is developed based on three independent references, shows us the transition of the number of vertical kilns in China. For example, there were 3,400 bottle kilns and 331 mechanical kilns in 1978. The economy in rural areas became buoyant because of the reform and opening-up policy and the demand for cement with good quality for industrial use increased.

In the 6th FYP (1981–1985), the central government planned to convert bottle kilns into mechanical Schoefer kilns. Hence, 1,000 bottle kilns were converted to mechanical kilns. According to Table 10.6, the number of mechanical kilns was 1,320

Table 10.6 Number of vertical kilns in China (1959–2000)

Year	1959	1960	1965	1970	1975	1976	1978	1985	1988	1996–2000
Bottle	503	665	200	875			3,400			
Mechanical					175	200	331	1,320	4,000	4,000
出所	A	B	B	A	A	B	A	B	B	C

Source

A; Dandai Zhongguo Series (1990), Today's building material industry in China. China Social Science Publishing Co, pp. 59–62

B; Wang (2005), History of China's cement industry development. China Building Material Industry Publishing Co, pp. 246–252

C; Ding, Hangsheng (1998), "Development of cement vertical kilns in China". Sichuan Cement, 1998, No 2, p. 1

in 1985, as about 1,000 (i.e., 1,320−331) out of 3,400 bottle kilns were converted to mechanical ones in 1978 because of the 6th FYP. Although reference B (Wang (2005)) did not specify the number of bottle kilns in 1985, we could estimate it to be around 2,400 (i.e., 3,400−1,000). A total of 1,000 mechanically converted bottle kilns were owned by counties and were therefore state-owned. In addition, 2,400 bottle kilns that were not mechanically converted were owned by communes/brigades, that is, they were not state-owned but were collectively owned.

Cement from converted mechanical kilns were expected to provide cement with improved quality soon after conversion, but such expectation was not met. Many accidents, such as the collapse of buildings and bridges, occurred in China in 1984–1985 when converted mechanical kilns were first operated.

It should be noted that converted mechanical kilns took time to produce cement with improved quality. In rotary kilns, the raw materials were automatically mixed uniformly and then burned. The same was not true for converted mechanical kilns; the operator had to control machines to mix the raw materials uniformly and regulate the heat exchange in vertical kilns. For most peasants, such task would have been difficult to manage.

In 1986, China asked for Japan's cooperation in improving its mechanical kilns. Japan accepted this request from China. The Japan Cement Association accepted China's request and proposed the construction of a model plant for vertical mechanical kilns. The Ministry of Foreign Affairs also agreed to accept China's request by providing the necessary funds for the model plant. The model plant was constructed in Shandong Province in 1990. The improved mechanical kiln based on the model plant designed by the Japan Cement Association was established in the 8th FYP (1991–1995).

During the 8th FYP, approximately 270 kilns were converted based on the model plant through funding from the central government. The model plant innovated the production management system by computers, and thus, the quality of products was as good as that of domestically developed new suspension preheater (NSP)[13] cement. In addition, the quality production cost decreased because the model plant adopted the heat exchange technology of NSP. The production cost of the model plant was also as low as 110% of the cost of imported 4,000 t/d NSP plants and lower than the cost of domestically developed 2,000 t/d NSP plants. Therefore, the model plant was highly profitable. Then, local governments began to convert the remaining 730 plants (i.e., 1,000−270) to the model plant through self-funding. Thus, the number of converted plants during the 8th FYP was 1,000.

Furthermore, the 2,400 bottle kilns owned by communes/brigades and not converted during the 8th FYP were eventually converted to the model plant through self-funding in the 1990s. As a result, the number of mechanical kilns increased sharply from the latter half of the 1980s to the 1990s.

Thus, cement quality was improved, and production cost was lowered. However, the environmental problem of the improved mechanical kilns remained. As the upper part of a vertical kiln was open, it was impossible to prevent the diffusion of dust and off-gas from kilns into the air. Meanwhile, China began to strengthen the crackdowns

on environmental issues from the 11th FYP (2006–2010) to the 12th FYP (2011–2015).

In these periods, there had been progress in restructuring the cement industry in China. Leading cement companies, such as Hairuo (China Anhui Conch) and CNBM (China National Building Material Co.), constructed many large NSP kilns that kept harmful substances within rotary kilns. Amid the emerging move toward the realignment of China's cement industry, vertical kiln cement companies became subsidiary companies of large companies, such as Hairuo and CNMB, through mergers and acquisitions. Thus, vertical kiln cement companies became distribution centers of large cement companies, and vertical kilns were closed one by one. Consequently, no vertical kilns are being operated in China.

Conclusion

The US–China study positively evaluated small-scale production in the Mao era. In the Joint Economic Committee of the US Congress, China studies were reported three times: in 1967 (President Johnson), 1972 (President Nixon), and 1975 (President Ford). Arthur G. Ashbrook, who wrote presentation papers in all three, positively evaluated the five small industries of China for their good fit with the actual situation in the Mao era.[14] Fertilizer and cement industries adopted such small-scale production.

Soon after the third Joint Economic Committee of the US Congress in 1975, a delegation was dispatched to China to see the actual situation of five small industries. The visiting report of the delegation states the following[15]:

"The pattern of small-scale industry development varies considerably between regions, but there are common themes. Central to all these themes is "self-reliance," the belief that all units in China (large or small, rural or urban) should not sit around waiting for outside help before setting out to improve their situation".

It further states the following[16]:

"First and foremost, China is developing a rural small-scale industry because this strategy is believed to be doing a better job of supporting agriculture than the large-scale strategies of the past."

Swedish scholar Jon Sigurdson also visited China and analyzed that the five small industries had contributed to supporting the economic foundation of China in the Mao era and that the fertilizer industry and cement industry were good examples of five small industries.[17]

For developing countries, the economist E. F. Schumacher, who is known for his work *Small is Beautiful*, advocated the importance of improving and applying technology to suit the resources, market, natural conditions, culture, etc. of each region instead of unnecessarily trying to introduce the latest advanced technology. Schumacher called it "intermediate technology." This theory of intermediate technology was evaluated by the United Nations and other organizations and developed into the concept of appropriate technology, which maximizes the final effect in achieving regional independence according to regional characteristics.

The production process of AB plants during the Mao era was simple. The raw material of AB plants was coal, which was abundant in China. AB plants did not require high-grade steel and were easy to construct. Although AB was an inferior fertilizer, the price was very low and thus affordable for poor peasants. AB was the product of Schumacher's intermediate technology in the Mao era.

Owing to the reform and opening-up policy. Chinese peasants became rich and could buy urea. At the same time, China became materially rich, and high-grade stainless steel, which was required in urea plants, became available in rural areas. Then, the technology to convert AB plants to urea plants was developed, and AB plants were converted to urea plants one by one, resulting in the small-scale urea production being larger than the large-scale urea production. This conversion contributed to regional self-reliance according to China's characteristics and maximized the final effect. We can say that the AB plants were converted to urea plants using the appropriate technology, as recommended by international organizations such as the OECD and UNIDO.

In the case of the cement industry, bottle kilns, which could be easily built and operated by peasants, were the product of Schumacher's intermediate technology in the Mao era when supplies were very scarce. The construction and operation of bottle kilns were very easy for uneducated peasants. They were also affordable as the production costs were very low. Although the quality of bottle kilns was poor, it was not a serious concern in rural areas.

Soon after the start of the reform and opening-up policy China sought the cooperation of Japan, which had the most advanced cement technology in the world, in improving its vertical kilns with Japanese technology. Japan accepted China's request. As a result, vertical kilns showed better quality and economy than domestically developed rotary kilns. The improved vertical kilns played a leading role in China's cement production until the beginning of the twenty-first century. The improved vertical kilns also proved suitable for the situation of China.

As described in the Introduction section of this paper, local governments controlled small-scale fertilizer production in China. However, this expression requires additional explanation.

Specifically, in actual rural areas, there was a demand for industrial production that was incompatible with the central government's policy. In other words, in actual daily operations, peasants sometimes requested materials that were not in line with the central government's policy. In response to these realities, such materials were produced and supplied to peasants by communes/brigades under the county government.

In the fertilizer industry, ammonia and AB were owned by local governments (mostly counties). The local governments' management policy was based on that of the central government. As fertilizer technology requires high-level education, there was no room for communes/brigades to supply fertilizers to peasants.

In the cement industry, the construction and operation of bottle kilns were simple and easy such that inferior quality cement was sometimes produced by communes/brigades and supplied to peasants at very low prices. Inferior quality

cement for use in building reservoirs, irrigation canals, etc. was not a concern in rural areas.

In the case of farm machines, machinery was produced and supplied by local governments. Fundamental parts and full-scale repairs were also provided by local governments. Meanwhile, small components were sometimes supplied by communes/brigades. Simple day-to-day repairs were also undertaken by communes/brigades.[18]

After the start of the reform and opening-up policy the industrial units of communes/brigades were actively engaged in industrial production regardless of the policy of the central government and became one of the driving forces behind the development of the rural economy. They were transformed into township and village enterprises, and they actively carried out the industrial production requested by rural areas. In this way, the active economic performance of township and village enterprises contributed greatly to the transition of the Chinese economy to the market economy.

Based on these economic activities by communes/brigades, many township and village enterprises were established in rural areas as the reform and opening-up policy started. These enterprises developed successfully and were thus able to provide the necessary goods and services to peasants in rural areas, resulting in the development of the rural economy in the early stages of the reform and opening-up policy.

Notes

1. Five small industries include other industries in rural areas. They can be better understood as small-scale industries in rural areas.
2. Ammonia is also the key raw material to produce explosives. Hence, it is indispensable for the independent economy.
3. A puppet country established by Japan in the northern region of China in 1932.
4. Mine (2009), pp. 45–146.
5. Li and Chen (2001), pp. 246–255.
6. Zhongyan Danganguan/Zhonggong Zhongyan Wenxian Yanjiushi Bian (2013), pp. 345–360.
7. Chen (1981), pp.34–35; Maruyama (1988), pp. 76–78.
8. Later, the 3,000 t/d plant replaced the 2,000 t/d plant as the model plant.
9. Schumacher (1986), pp. 195–205.
10. Liaoning Sheng Shiyou Huaxue Gongyeting (1993).
11. Shanghai Huagong Yanjiuyuan Qingbaoshi (ed.) (1987), p.1.
12. ditto.
13. NSP, which was developed jointly by Ishikawajima–Harima Heavy Industries and Chichibu Cement of Japan, is the advanced technology used by almost all cement producers today.
14. Ashbrook (1975), pp. 30–32.
15. The American Rural Small-Scale Industry Delegation (1977), p.3.
16. ditto.: 9.
17. Sigurdson (1977), pp. 133–135.
18. Under the reform and opening-up policy the production of home appliances achieved a remarkable development in rural areas. The demand for home appliances in these areas increased as economic activity became more active, but the traditional system was unable to meet this demand. It was the township and village enterprises that accommodated this demand. The

township and village enterprises were the successors of communes/brigades. Home appliance manufacturers with roots in communes/brigades include Meidi (general home appliances), Kelong (air conditioners), and Galanz (microwave ovens). They had grown rapidly because of their ability to adapt to the market economy and their high degree of freedom in management. Haier, which acquired the white goods business of Sanyo Electric in Japan and is now a leading brand of white goods in the world, is sometimes reported to be a township and village enterprise in Qingdao, Shandong Province, but this is not the case. Haier is an enterprise established in a city, not a township and village enterprise established in a rural area. The author worked in Beijing as a chief representative of a Japanese chemical company in 1994–1999 and visited the head office in Qingdao because the Tianjin subsidiary of the company where the author worked was set to supply insulation materials for electric refrigerators to Haier. According to the memorandum during the business trip, the predecessor of Haier was a handicraft production joint venture established in the urban area of Qingdao in 1955. During the planned economy period, it produced electric fans and electric motors. After the economic reform and open-door policy, in 1984, it introduced the technology from Germany and started the electric refrigerator business, which was successful. It later developed into a comprehensive home appliance manufacturer.

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Chapter 11
Chinese Societies During the Mao Era: Work and Life in the "Shanghai Small Third Front"

Tomoo Marukawa

Abstract Several million workers and engineers moved inland from the coastal and northeastern provinces during the 1960s for the construction of the "Third Front"—a vast geographical area in China's interior where basic and military industries were developed and constructed. They experienced the most drastic changes in their lives because the factories were situated in the valleys of mountainous regions in inland provinces to conceal them from airstrikes. This chapter explores the work and life of those who moved from Shanghai to the "Shanghai Small Third Front," which was a huge military industry complex located in Southern Anhui province having 81 factories and facilities and 67 thousand employees. It was an isolated enclave of Shanghai in the mountainous region of Anhui province, and therefore the employees depended heavily on their firms for the provision of various services and means of living, such as residence, food, entertainment, education for children, medical care, public security, and even spouses. This chapter describes how the complex operated, how people lived there, and how the complex was closed.

Introduction

Chinese societies during the era of Mao Zedong (1949–78; hereafter, the Mao era) are often characterized as "static and closed" (Hishida, 1989). An important factor that incited such characteristics was the introduction of the household registration system in 1958, which divided people into "agricultural households" and "non-agricultural households." This system restricted people's liberty in selecting jobs and places to live. Those born in agricultural households were destined to become peasants, while those born in non-agricultural households were destined to become factory workers or clerks when they reached adulthood.

However, this static image is only one aspect of Chinese society during the Mao era. It was also true that various government policies forced many people to change

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their jobs and places to live. For example, beginning in 1968, most junior and senior high school graduates in the cities (the so-called "educated youths" or "*zhiqing*") were sent to the countryside to work with the peasants in people's communes. This movement lasted for approximately ten years. In addition, millions of urban bureaucrats and teachers were sent to "May 7th Cadre Schools" in the countryside, where they engaged in farm work and received "re-education to become revolutionaries."

Another important policy that led to large scale migration during the Mao era was the construction of the "Third Front"—a vast geographical area in China's interior where basic and military industries were developed and constructed (Marukawa, 1993, 2002). This policy was initiated in 1964, when US air forces began attacking North Vietnam, and China felt the threat of getting involved in a large-scale war against the US. Mao Zedong warned that the possibility of entering into a war against the US was very high. He required that the factories that produced munitions and machinery, and their main inputs in the coastal and northeastern provinces, be moved to inland China, including Sichuan, Guizhou, and Hubei provinces. In response to Mao's direction, more than two thousand factories and research institutes were built in the inland and several million workers and engineers moved inland from the coastal and northeastern provinces (Zhang, 2020).

Generally, populations shift from the countryside to cities in conjunction with economic development, and people move upward in the echelons of social strata along with an increase in income. During the Mao era, however, the government intentionally reversed this tendency by moving people from cities to the countryside, from the more-developed coastal and northeastern provinces to the less-developed inland provinces, and from the upper and middle social strata (cadres and workers) to the lower social strata (peasants).

Employees sent to factories in the Third Front experienced the most drastic changes in their lives because the factories were situated in the valleys of mountainous regions in inland provinces to conceal them from airstrikes. They were required to move from coastal cities to isolated districts in the inland, which entailed various difficulties in daily life and degradation in social status (Zhang, 2020).

The purpose of this chapter is to explore the living conditions of those who moved from Shanghai to the Third Front, with a focus on the "Shanghai Small Third Front." The construction of the Third Front can be subdivided into the "Big Third Front (*Da sanxian*)," which included the bases constructed by the central government ministries, and the "Small Third Front (*Xiao sanxian*)," which comprised bases constructed by local governments. Large-scale iron and steel, chemical, and munitions factories built in the western regions, such as Sichuan, Guizhou, and Hubei provinces, belonged to the Big Third Front. In addition, each of the 28 province-level local governments built its own Small Third Front (STF). In most cases, the STF projects consisted of a few weapon factories constructed in the mountainous region of each province. Even Sichuan, which accepted many Big Third Front projects, built two STF factories within its boundaries (Xu, 2018). The strategic merit of adding two small factories to the Big Third Front projects in Sichuan is dubious. This instance suggests that local governments often implemented STF projects simply to demonstrate their obedience to Mao Zedong's order rather than to achieve a strategic goal.

The Shanghai STF was an exception among the STF projects, because the Shanghai City government poured a considerable amount of human power and resources into its construction, which contributed to the supply of weapons to the People's Liberation Army (PLA) during a certain period. In total, province-level local governments built 268 factories and facilities with 256.5 thousand employees for STF projects throughout China (Xu, 2018). The Shanghai STF alone had 81 factories and facilities and 67 thousand employees, accounting for one-fourth of the national total. The Shanghai STF was not located in Shanghai but was scattered across a vast region in the southern Anhui province. Most of the workforce came from Shanghai and had a non-agricultural household status. The building of the Shanghai STF entailed drastic geographic and social movements of people, similar to the movements that corresponded with the building of the Big Third Front.

This chapter describes the work and life of the Shanghai STF using oral histories (ZGSH, 2013; ZGAH, 2018; ZGCZ, 2017. See the References for the details of these abbreviations.) dictated by people who worked and lived there. This study is intended to be a case study of urban society during the Mao era. The readers may question the validity of calling a society located in the mountainous regions of Anhui an "urban society." The Shanghai STF was an enclave of Shanghai, where the residents could enjoy the same benefits as the non-agricultural households in Shanghai; therefore, the features of urban societies could be observed.

A common feature of urban societies during the Mao era was people's dependence on their firms for the provision of wages as well as for various services and means of living, such as residence, food, entertainment, education for children, medical care, public security, and even spouses. In short, people depended on their firms in all aspects of their lives; therefore, I will refer to them as "firm societies" in the remainder of this chapter. This feature was even more evident in the Shanghai STF because it was an enclave of urban society in a rural mountainous region.

This feature of urban firm societies in China has been pointed out by several authors (Chen, 2000; Lu, 1989) who use the term "*danwei*" or "*danwei* society." These terms derive from *danwei* (units), the word used to refer to workplaces in China. However, it is inappropriate to use a Chinese term when similar types of firms may be identified in other countries. Thus, instead of using "*danwei,*" I propose referring to such a society as an "isolated society." This means that the workplace (firms and institutions) is isolated and self-contained in its productive activities and various aspects of life from the surrounding society. Of course, no firm society can sustain its production and the lives of its employees in absolute isolation. All firm societies require an input of materials for production and food to feed their employees. Isolation can be measured in relative terms, such as the degree of isolation measured by the percentage of productive input produced in the firm, or the degree of isolation in family relationships, such as the percentage of spouses or children working in the same firm. If the degrees of isolation measured by these indices are high, the firm can be regarded as relatively isolated.

This chapter is structured as follows: The following section introduces important works that report and analyze isolated societies in China. The third section describes the brief history of the Shanghai STF from its building to its closure and its isolation

in its productive activities. The fourth section analyzes the isolation of people's lives in the Shanghai STF, focusing on their marriages, food supply, and relationship with the local rural society. The fifth section briefly describes the firms and employees after the closure of the Shanghai STF, which is followed by concluding remarks.

11.1 Isolated Societies During the Mao Era

Baotou Iron and Steel Corporation (hereafter referred as "Baotou") was built in the middle of a vast steppe in Inner Mongolia during the 1950s. Because it was located far away from any other city, it formed an isolated community and its employees depended heavily on the firm in their daily lives. When the factory started operation, most of its employees were male, because the heavy workload in steel production was regarded as suitable for men. However, soon thereafter, the employees began complaining about their lack of spouses. In response, the government built a cotton textile factory near Baotou, where most of its employees were female, to provide candidates for becoming the wives of workers in Baotou. Many employees of the two firms soon got married and lived in apartments provided by Baotou. When the couples began to have children, Baotou built kindergartens, elementary schools, and high schools for them. When the children graduated from high school in the 1970s, they could not find anywhere to work. It was difficult for Baotou to expand the size of its employment, therefore, the firm allowed its incumbent employees to retire before the official retirement age and give their positions to their children. The retirees would remain in the firm's apartments and receive pensions from the firm. In this way, inbreeding of employees became very common in Baotou, which led to the deterioration of production efficiency and high costs. Fei Xiaotong, a famous sociologist, visited Baotou several times beginning in 1984 and pointed out these problems (Fei, 1986). He commented that Baotou had lost "human-ecological balance." His prescription for revitalizing Baotou was to strengthen its connection with the local economy and rectify its isolation from the local community.

Lu Feng, a political scientist, asserted that the problems that Fei Xiaotong observed in Baotou were common in China's urban societies (Lu, 1989). He wrote that the firm societies ("*danwei*") in China had political, as well as productive, functions through the party organization in the firms and social functions of providing medical care, education, and other public services to the employees and their families. People could not register for marriage, stay in hotels, or travel by air without permission from the firm society. Urban citizens depended heavily on the firm society in many aspects of their lives, making it difficult to live without. In turn, the firm society relied on the state for the provision of resources. Lu insisted that the firm-society system should be reformed because it led to the low efficiency of firms and people's dependence on it.

Lu was apt to point out the problems of urban societies, but he failed to view such societies in China from a comparative perspective. People's dependence on the firm society did not occur solely in China. The former Soviet Union had hundreds of

"monotowns"— cities that depended on a single firm. Even in Japan, large corporations maintain various welfare facilities for their employees, and in-house marriages are common. In China, the degree of employee's dependence on the firm society differed between regions. Baotou's case should be regarded as an extreme case of an isolated society. In cities like Shanghai, Tianjin, and Guangzhou, which had a long history of urban development, there were many citizens who did not rely on the firm society for the provision of housing and public services. Not all firm societies were able to provide sufficient housing for their employees, and therefore, many employees lived outside of the firms' premises. Such residents, governed by sub-districts (*jiedao*) and resident committees (*jumin weiyuanhui*), relied on the firm societies for certain aspects of their lives and on the sub-districts and resident committees for other aspects (Whyte & Parish, 1984).

On the one hand, there were closed and isolated firm societies, such as Baotou, where employees depended heavily on the firms, and on the other hand there were less isolated firms where employees' dependence was light. The Third Front firms, including the Shanghai STF, which constituted urban enclaves amid rural society, were likely to become isolated societies. However, as we will see in the remainder of this chapter, there were interactions with people living outside the premises of Third Front firms. While the Third Front firms were largely isolated from the local community, they were not completely isolated.

It seems appropriate in the case of China to consider the following points to gauge the level of isolation of a firm society. First, the marriage of employees and the employment of their families must be considered. If a large proportion of employees get married to other employees of the same firm and if most of the employees' children are employed by the same firm, then the firm society can be regarded as highly isolated. Second, the supply of food, housing, medical care, entertainment, and education must be considered. If employees are highly dependent on the firm for their supply, then the firm society is regarded as highly isolated. The supply of these basic necessities is mostly conducted through rationing in a planned economy. If the supply comes from the firm, then the employees will become highly dependent on the firm. The third point relates to the firm's relationship with the local economy in terms of industrial input and output. As pointed out by Fei Xiaotong's analysis of Baotou, the societal isolation of a firm society from the local community is closely related to its industrial isolation from the local economy. If the firm starts procuring inputs from the local economy, it is likely that its societal isolation will decrease accordingly.

Based upon these three points, Third Front firm societies, erected in remote mountainous areas of the inland provinces, were the most isolated. With regard to the first point (marriage and employment of family), Zhang (2002) reports the situation of a Third Front firm constructed in the western part of Guizhou province. He recounts that its employees created informal groups through marriage and inbreeding, which began to influence the firm's management. When the firm was established in 1966, 700 workers were sent to the firm from a machinery manufacturer in Jiangsu province. In the same year, 150 technicians were sent from Liaoning province, and 300 local workers, who also worked in local people's communes, were added. When Zhang

conducted fieldwork at the firm, 62% of the workforce had spouses who were also employed by the firm, which ran elementary and high schools for the employees' children. Nearly all of the employees' children were educated there, and most of them were employed by the firm after graduation. Therefore, all employees had one or more family member employed by the firm. Forty-six percent of the employees had six or more and 10% had 15 or more family members employed by the firm. When the firm was in the process of construction, some interactions with the local community occurred through the employment of temporary construction workers. However, such interactions became scarce after the completion of the firm's facilities.

It was costly for the firm to build and run the facilities to provide housing, medical care, and entertainment for its employees. Many state-owned enterprises that provided such facilities were forced to downsize the scale and scope of services for employees during the 1990s, because their economic performance did not allow them to provide such luxury. Li (2019) describes the process of the collapse of a Third Front firm located in Jiangyou, Sichuan, which previously offered a full range of facilities for its employees. As the firm's economic performance deteriorated during the 1990s, the firm had to close its cultural and entertainment facilities due to maintenance costs. In 1997, the Sichuan provincial government replaced the firm's manager and ordered him to reduce its workforce from 30,000 to 10,000. Employees lost hope in the firm's future. Employees' embezzlement and theft of corporate assets became rampant. Managers and engineers who earned relatively high salaries bought apartments in nearby cities and moved out of the firm-owned apartments, which became dilapidated due to the lack of maintenance fees. Only low-salaried workers remained in firm-owned apartments.

11.2 The Construction of the Shanghai Small Third Front and Its Production

11.2.1 The Plan

In October 1964, Mao Zedong ordered the coastal and central provinces to build their own small third fronts (STFs) to prepare for the ensuing war with the United States. Based on Mao's order, Premier Zhou Enlai, the Vice Premier and PLA's Chief of Staff Luo Ruiqing provided detailed directions on the construction of the STFs (SHHF, 2017). In February 1965, Luo Ruiqing designated 14 locations as sites for constructing the STFs of coastal and central provinces. Per Luo's arrangement, the STFs of Shanghai and the other eastern provinces would be built in the mountainous region that encompassed southern Anhui, western Zhejiang, northeastern Jiangxi, and southern Jiangsu. The East China Bureau of the Central Committee of the Chinese Communist Party arranged the Shanghai's STF to be positioned in the region that encompassed Huangshan, Anhui Province and Tianmushan, Zhejiang province.

In response to the Central Committee's policy, Shanghai City's Party Committee developed a plan for its STF, which consisted of warehouses to store important documents on administration and technology, cultural assets, and important materials. In addition, Shanghai planned to establish research institutes and experimental factories in its STF so that they could supply new materials and equipment when a massive war erupted. At that time, Shanghai had no plans to produce weapons in its STF, because none of the factories under the jurisdiction of the Shanghai City government had experience producing them.

Dissatisfied with this plan, the East China Bureau urged Shanghai to change it per Mao's direction. Mao required that STFs become the basis for producing weapons to be supplied to the front line of war. In addition, he stipulated that the STFs should have their own iron and steel mills. In January 1967, the so-called "January Turmoil (*yiyue fengbao*)" occurred in Shanghai, during which the city's leadership was usurped by the "rebel faction" (*Zaofanpai*) that pledged loyalty to Mao. Under their leadership, the Shanghai STF's original plan was discarded and replaced with a plan to construct a weapon production base.

From March to May 1968, the Defense Industry Office of the State Council, the State Planning Commission, and the State Construction Commission organized a nationwide conference in Beijing on the construction of STFs. The outcome of the conference determined that the STFs should focus on the production of anti-aircraft guns, radars, and gunsights. Based on this decision, Shanghai City decided to produce anti-aircraft guns and their artillery shells in its STF. In February 1969, a detailed plan of the Shanghai STF was finalized to include factories for anti-aircraft guns and shells, casted and forged metal parts, explosives, and cement. The plan also entailed the construction of ancillary facilities, including four hospitals, five high schools, transportation facilities, power plants, and substations.

11.2.2 Construction of Factories and Production

In the central government, the Fifth Ministry of Machinery Industry was responsible for the production of conventional weapons such as anti-aircraft guns and grenades. However, there was no corresponding division in the Shanghai City government because weapons were not produced by firms under their jurisdiction. Therefore, Shanghai mobilized its Bureaus of Light Industry, Chemical Industry, Machinery and Electric Industries, Instrument Industry, and the firms supervised by these bureaus to produce weapons in the STF. In addition, Shanghai's Bureau of Building Materials Industry erected a cement plant in the Shanghai STF to supply cement to its construction sites. The Bureau of Metallurgical Industry built the "Bawu (Eight-Five) Steel Factory," which smelted steel scrap with an electric furnace and produced cast and forged weapons.

The factory's name likely derived from a state-owned enterprise that contracted its construction—Shanghai's Fifth Steel Factory—however, it remains unusual to name a casting and forging factory as a "Steel Factory." This name may have been chosen

to deceive Mao and his ardent followers who dominated Shanghai. Mao demanded the construction of an iron and steel mill in each STF. However, the planners of the Shanghai City likely believed that it was economically unfeasible to erect an iron and steel mill in STF. They must have remembered the disastrous result of erecting small backyard furnaces during the Great Leap Forward (see Chap. 2). By naming a casting and forging plant a "Steel Factory," the planners feigned the fulfillment of Mao's requirements. Fortunately, no political leader in Shanghai paid attention to this unusual name.

The construction of the STF required the Shanghai City government and the firms under its jurisdiction to engage in weapon production, for which they had no prior experience. For example, a soft drink manufacturer was responsible for the assembly of artillery shells. The manufacturer had to make special equipment for the required task. The Shanghai City government reorganized its bureaus to adopt the task of producing weapons. Around 1971, the Defense Industry Office, which acted as an intermediary that conveyed orders from the central government's Fifth Ministry of Machinery Industry and the PLA to the Shanghai STF, was established in the city government. The Nanjing Military Region of the PLA determined the types of weapons that would be produced in the Shanghai STF (ZGSH, 2013: 97, 185). Weapon production in the Shanghai STF was conducted under PLA surveillance. Representatives of the PLA resided in each factory, and the factories' gates were guarded by soldiers (GCQW, 2018, p. 73).

The Shanghai STF consisted of 54 factories and 27 facilities scattered across 12 counties in southern Anhui province and Linan county of Zhejiang province. The entire area of the counties where the Shanghai STF factories were located encompassed 20,000 km^2. Each bureau that assumed responsibility for a specific part of the Shanghai STF built one or two clusters that consisted of a few factories and ancillary facilities. The Chemical Industry Bureau constructed three explosives factories in Dongzhi county, the Light Industry Bureau built artillery shell factories in Jixi County, the Machinery and Electric Industries Bureau constructed artillery shell, grenade, mortar, and anti-aircraft gun factories in Ningguo and Guichi counties, the Instrument Industry Bureau erected radar factories in Tunxi County and gunsight and searchlight factories in Jingde County, the Building Materials Bureau built a cement plant in Ningguo County, and the Transportation Bureau erected a truck repair workshop in She county.

The location of the factories followed the general policy of the Third Front, which was to "locate them near the mountain, scatter them, and hide them," but to also consider the availability of water supply (GCQW, 2018, p. 4). The chosen locations focused too much on hiding the factories from the enemy's airstrikes, and therefore led to difficulties in transporting intermediate goods to and from factories. The aforementioned Bawu Steel Factory, a factory that produced weapon components with 5400 employees, was located 35 km from its nearest port by the Yangtze River. More than 20 trucks had to travel two or three times a day between the port and the factory to transport materials, food, and daily commodities to its employees. As the factory was situated in the mountains, the trucks needed to pass through narrow roads. Many local peasants were injured and killed by traffic accidents caused by

trucks (ZGAH, 2018: 95–97). Factory locations with too much emphasis on defense were the primary reason for the isolation of the Shanghai STF factories.

The 54 factories that constituted the Shanghai STF maintained a specific division of labor among themselves, but had almost no connection with the local industries in Anhui province, except for the procurement of pebbles, bricks, and tiles from local producers during the initial stage of construction. Most of the workers in the factories and facilities were dispatched from firms in Shanghai that managed the construction of the STF or were new recruits from Shanghai. Construction workers employed temporarily during the construction period and those employed as compensations for the appropriation of land from the local people's communes were the only employees who originated from the local community. Thus, the Shanghai STF was almost completely isolated from the local economy in terms of industrial linkage and employment.

The economic function of the Shanghai STF was to produce several types of weapons. In the original plan, the Shanghai STF's main product was supposed to be the 57-milimeter anti-aircraft gun, but the PLA refused to purchase it due to its poor quality. Strangely enough, the Shanghai STF continued to produce 562 anti-aircraft guns until 1980. In contrast, high-explosive shells that would be launched by anti-aircraft guns made by the Shanghai STF were approved by the PLA and the Fifth Ministry of Machinery Industry, and their mass production began in 1971. The cumulative amount of shells produced in the Shanghai STF was four million shells by 1985.

During the military confrontation at the Sino-Soviet border in 1969, conventional anti-tank rocket launchers turned out to be ineffective. Thus, the PLA began developing a new type of 40-milimeter rocket launcher, which was named "Type 69." The Shanghai STF was designated as one of the main production sites for the production of Type-69 rocket launchers, and its mass production began in 1970. The Shanghai STF produced 520,000 launchers between 1970 and 1980 and 1.9 million rockets between 1970 and 1985. From 1981 to 1986, it produced improved "Type 69-I" rocket launchers which totaled 20,000 launchers and 105,000 rockets. Rocket launchers were used in the Cambodian Civil War in 1972 and the Sino-Vietnamese War in 1979. When the Soviet Union invaded Afghanistan in 1979, the United States purchased Type 69-I rocket launchers from China and Pakistan and supplied them to the mujahideen (Rottman, 2010, p. 64).

In addition, explosives produced by factories built by the Bureau of Chemical Industry in Dongzhi County were used in the Sino-Vietnamese War. "Type 65" 82-milimeter recoilless guns and "Type 67" grenades were also products of the Shanghai STF.

In 1966, the Shanghai City government established its branch office in Tunxi, Anhui province, to supervise the construction and operation of the STF, which was named as "the 229 Construction Command Office." In 1969, Shanghai erected another office in Guichi, Anhui province, which was named as "the 507 Construction Command Office," to supervise the firms that were arranged to produce anti-aircraft guns. The two offices merged in 1973 and were renamed "the Shanghai Interior Base Party Committee." Although it bore the name "Party Committee," in reality, it

was an administrative entity that supervised the production, construction, and party affairs in the Shanghai STF. This Party Committee supervised the Machinery and Electric, Light Industry, Instrument and Electronics, and Chemicals Corporations, which governed the firms in the Shanghai STF that were constructed by the bureaus of Shanghai City. Because these corporations were named after the bureau that oversaw the Shanghai STF's construction, their names did not necessarily correspond to the products produced by the firms in the corporations. The Light Industry Corporation, for example, produced artillery shells. The bureaus in Shanghai managed the production plans and financial accounts of the STF firms they had constructed and arranged the supply of materials to them (ZGSH, 2013: 428). The STF firms resembled fetuses connected to Shanghai's bureaus by umbilical cords, through which production orders, money, and materials were transported to them from Shanghai.

11.2.3 Difficulties and Withdrawal

The Shanghai STF performed a certain economic function by supplying a considerable number of weapons to the PLA between 1972 and 1980. Table 11.1 shows the production values and profits of the Shanghai STF. Because the prices of weapons were determined to ensure that the manufacturer earned a 5% profit (GCQW, 2018: 7),

Table 11.1 Production value and profit of the Shanghai STF

		(Million Yuan)	
Year	Production value	Profit remitted to the state	Profit
1972–77	1,759		129
1978	465		63
1979	480	68	
1980	410	30	
1981	323	2	−2
1982	280		2
1983	337		9
1984	365		24
1985	356		40
1986	230		24
1987	276		47

Source SHHF

Notes The profit of 1987 can be mistaken in the original source. It is written in a passage that profit in 1987 was "116% of 1986," which is 28 million yuan. This latter figure is consistent with the production value

the Shanghai STF earned profits nearly every year. However, this does not necessarily imply that it was efficient.

The peak of the Shanghai STF's economic performance occurred in 1979, when the Sino-Vietnamese War and the Soviet invasion of Afghanistan increased the demand for weapons. The favorable performance of the STF prompted Shanghai to establish a new bureau, named the "Interior Base Administration and the Fifth Bureau of the Machinery Industry," to specialize in weapon production in 1979. It was supposed to manage all of the firms in the Shanghai STF instead of the conventional bureaus (light industry, machinery, electric industry, etc.) that had constructed and taken care of STF firms until then (ZGSH, 2013: 431).

However, the Chinese government started to reduce military expenditures in 1980, which led to a decline in the demand for weapons. In the 3rd Plenum of the 11th Central Committee of the Chinese Communist Party, held in 1978, the Party declared the start of the policy of "military-civil fusion (*junmin jiehe*)." This meant that military industry complexes, such as the Shanghai STF, should start to expand the production of civilian goods to compensate for the decrease in orders for weapons from the PLA. However, the newly established bureau, which specialized in weapon production, was unable to gather the orders for civilian goods and organize their production in the Shanghai STF.

Thus, the Shanghai City government rearranged the administrative jurisdiction of the Shanghai STF in 1980 and returned the STF firms to conventional bureaus. Those that belonged to the Light Industry Corporation were returned to Shanghai's Light Industry Bureau, and those that belonged to the Machinery and Electric Corporation were returned to the First Bureau of Machinery and Electric Industries. While these bureaus arranged production planning and material supply of the STF firms, the Interior Base Administration, established in 1979, oversaw the political aspects and daily lives of employees in the STF. The conventional bureaus that managed civilian goods production could place orders for parts and components for civilian goods to the Shanghai STF. The Light Industry Bureau, which oversaw electric fans, watches and clocks, and bicycles, placed orders for their components on the STF. The First Bureau of Machinery and Electric Industries placed orders for air conditioner motors and parts of textile machines. The Bawu Steel Factory, supervised by the Bureau of Metallurgical Industry, received orders for steel to make ball bearings, wire rods for making sewing needles, and low-carbon wire rods. Thus, the Shanghai STF attempted to transition to the production of civilian goods with the assistance of the Shanghai government bureaus.

However, the increase in civilian goods production was not enough to compensate for the loss of demand for weapons. As indicated in Table 11.1, the production value of the Shanghai STF decreased sharply until 1982. In 1981, the Shanghai STF recorded a deficit. Only 24% of the STF firms maintained normal operations while the operation rates of the other firms were less than 70%.

STF employees began to express their dissatisfaction with being isolated in the mountains since 1979. In March 1979, a demonstration involving 2000 employees erupted in the Shanghai STF, which led to the suspension of production in some factories. The news of Guangdong province's STF moving out of the mountains caused

Shanghai STF employees to want to return to Shanghai. If weapon production was less important in the operation of the STF, there was no point in hiding the factories in the mountainous region. However, the government's policy on STF factories was indecisive. The plan made by the Planning Bureau of the Defense Industry Office, State Council, in October 1980 on the adjustment of STFs disappointed the people living in STFs. It stipulated that the STFs should shift their focus on civilian goods production, but also emphasized that they should maintain the capacity of weapon production in preparation for a war. This plan meant that the STFs would maintain their military functions and, thus, remain in the mountains.

The proportion of civilian goods production at the Shanghai STF started to increase in 1980 and reached 88% in 1984. This is why the Shanghai STF's production value and profits increased in 1983 and 1984 (Table 11.1). In 1983, the first initiative was undertaken to relocate the Shanghai STF from Anhui back to Shanghai. Realizing that there was a plan to build a ship-recycling workshop on Chongming Island, which lies in the Yangtze River Delta and is a part of Shanghai City, the factory managers of the Bawu Steel Factory notified the State Council and the Fifth Ministry of Machinery Industry, asking them to allow the factory to move to Chongming Island and assume the task of ship recycling. They appealed that by using the Factory's equipment and personnel, the workshop could begin production immediately and save the cost of investment. In addition, they argued that the living conditions in the current location were terrible and that the Factory faced managerial difficulties. The Shanghai City government became angry with the Factory's neglect of correct administrative procedures for communicating with the high echelons of state bureaucracy through its superiors. The city government ordered Bawu's management to stop thinking about moving to Chongming and to consider collaboration with Maanshan Steel Works in Anhui Province. In the same year, the Defense Industry Office of Shanghai City advised the vice mayor to rotate employees in the STF after working for seven or eight years. This mediocre remedy might alleviate the dissatisfaction of the STF workers, but it did not address the fundamental problem that the STF no longer had a reason to remain in the mountains.

During a visit to Hunan province in March 1984, Premier Zhao Ziyang made a remark that paved the way for the withdrawal of all remaining STF firms. Zhao advocated for offering STF firms the right to make decisions regarding their future. He stated that STF firms should pave their way through their own efforts and that they should shut down if unsuccessful after several years of effort. He did not officially talk about withdrawal, but local governments interpreted his remarks to mean that they could make decisions on the withdrawal of the STFs on their own (ZGSH, 2013: 339). In July 1984, Shanghai's Defense Industry Office proposed a withdrawal. The STF firms were either transferred to Anhui province, moved to Shanghai, or closed. The employees who had gone to the STF would move back to the suburbs of Shanghai, and those employed in Anhui would find new jobs in Anhui. Shanghai City's Party Committee accepted this proposal, and in August 1984, when the State Planning Commission and the National Defense Science Industry Commission held a conference on STFs in Beijing, Shanghai's policy was reported and approved.

In January 1985, Shanghai City began negotiations with Anhui Province on the transfer of the STF firms. Perhaps Anhui province recognized that the employees of the Shanghai STF dearly wanted to return to Shanghai. Anhui took a tough position in the negotiation, and Shanghai agreed to transfer all the STF firms and facilities to Anhui without any payment in return. During October 1986 and August 1988, 81 firms and facilities, which had a total fixed asset value of 561 million yuan and 79 million yuan in cash, which had been owned by the STF firms and facilities as current capital, were transferred to Anhui. Among the 67,000 employees in the Shanghai STF, 1568 were former peasants who had been employed in Anhui. They were dismissed in exchange for 9000-yuan compensation per person and left in Anhui. There were also some employees who came from and had household registration in Shanghai, but preferred to stay in Anhui. In such cases, Shanghai City paid 2000 yuan per person to the firm in Anhui, which accepted such employees (ZGAH, 2018: 27).

11.3 Life in an Isolated Society

11.3.1 Marriage

Although the author could not find any statistics on the age structure of employees in the Shanghai STF, oral histories suggest that a large proportion of them were in their 20 s and 30 s. Therefore, difficulty in finding a spouse was significant, similar to the case of Baotou. However, unlike Baotou, the Shanghai STF was surrounded by counties with rural residents, thus, marriages between the male employees of the Shanghai STF and local women were possible. For the rural women in Anhui, the STF was an enclave of Shanghai City, therefore, marrying a person employed in the STF meant an upward shift in their social status. However, for employees in the STF, marrying a local woman might entail a risk of not being able to return to Shanghai with their wives when allowed. Therefore, most employees from Shanghai preferred to marry an individual from Shanghai.

When the Shanghai STF withdrew from Anhui, it turned out that the wives of STF employees who had agricultural household registration in Anhui, which amounted to 500 people in total, were also allowed to move to the suburbs of Shanghai on the condition of not changing their household registration status (SHHF, 2017: 393). In addition, there were 1000 people who preferred to stay in Anhui when the STF withdrew because they had married a local person in Anhui. Judging from the number of employees (67,000), the number of married couples in the Shanghai STF could have been around 30,000. The number of couples between employees from Shanghai and those with local household registration can be calculated as 1500 from the above figures, which means that only 5% of the couples had different household registration statuses. Most couples comprised individuals with Shanghai household registration. In this regard, the Shanghai STF was a highly isolated society.

As the Shanghai STF focused on weapon production, the majority of its employees were male, making it a challenge for them to find spouses. In 1980, there were more than 700 unmarried men who had already reached marriageable age in the Bawu Steel Factory, which had 5400 employees in total. There were nearly 8000 unmarried male employees looking for spouses in the Shanghai STF. This imbalance led to several incidents such as infidelities, suicides, and homicides.

Consequently, the Communist Youth League of the Bawu Steel Factory decided to ask *Shanghai Youth News*, a newspaper published by the Shanghai Communist Youth League, to post advertisements that the Factory was searching for women who would marry its employees in 1981 and 1982. The condition was that the woman had a non-agricultural household registration status and was working in a state-owned or collective-owned work unit. If the woman married an employee from the Factory, she would be employed by the Factory and would be able to return to Shanghai every year during holidays. In response to the advertisement, applications flooded into the factory, and the Youth League succeeded in matching more than 600 couples. The applications did not come from Shanghai, but from the "educated youths," who had been sent from Shanghai to rural areas or to the interior provinces. They thought that the Shanghai STF had better living conditions and was located closer to Shanghai compared to their current locations.

The spouses with non-agricultural household registration statuses, who came to the Shanghai STF for marriage, were offered jobs in canteens, retail shops, and transportation facilities. The spouses coming from the countryside with agricultural household registration statuses were offered less privileged jobs such as cleaning toilets, and were given the status of collective-owned firm employees, which was inferior in wages and benefits than the regular state-owned firm employees. There was a discrimination in employment status based on the household registration status.

It is a widely observed fact in contemporary China that marriage occurs between two people belonging to the same social stratum or between a man belonging to a higher stratum and a woman belonging to a lower stratum, but rarely between a man of a lower stratum and a woman of a higher stratum. In consideration of this rule, the above-mentioned stories about marriage in the Shanghai STF suggest that the structure of social strata was as follows: living in Shanghai and registered in Shanghai > (superior to) living in the STF and registered in Shanghai > living in the interior or the countryside and registered in Shanghai > living in the STF and registered in rural Anhui > living in the countryside and registered in rural Anhui. The most preferred marriage was between a Shanghai-registered couple. However, due to the shortage of women in the STF, women of lower strata were called in to marry male employees in the STF. Marriage between a Shanghai-registered female employee of the STF and an Anhui-registered man was rare. In one instance, a female employee who had household registration in Shanghai committed suicide because her parents did not allow her to marry a man from Anhui (ZGCZ, 2017: 212). When the couple belonged to different social strata, marriage between adjacent strata was preferable. Otherwise, the spouse belonging to the lower strata faced harsh discrimination.

11.3.2 Food Supply

In the previous section, the Shanghai STF firms were compared to fetuses connected to Shanghai's bureaus by umbilical cords. For the supply of food and consumer goods in particular, the STF firms depended heavily on Shanghai. Trucks loaded with consumer goods for employees arrived at the STF from Shanghai every day. When the Shanghai STF existed, consumer goods were distributed mainly through the planned economy system. Grain, meat, fish, tobacco, sugar, detergent, and soap were rationed as they were not usually available from other sources during the planned economy period. Shanghai STF employees were treated more favorably than workers in Shanghai in the ration of meat and fish.

However, living with only rationed food was not possible. The residents in Shanghai made up for the shortage of vegetables, eggs, poultry, and pork by buying these items in the free market, which sold the produce provided by suburban peasants. However, such free markets did not exist around the Shanghai STF in its initial stage, thus, employees had to reclaim the land around the factories and grow vegetables or raise pigs. Nearly all firms in the Shanghai STF maintained their own vegetable farms, orchards, pig farms, and fish-raising ponds. In 1978, the total area of fields owned by the Shanghai STF firms amounted to 200 hectares, which produced 8600 tons of vegetables, and raised more than 20,000 pigs (SHHF, 2017, p. 348).

The transactions of commodities between the Shanghai STF and peasants in the surrounding area developed gradually. Free markets that sold vegetables and poultry produced by local peasants began to appear in the central township of nearby counties, where STF employees ventured to procure food. On some occasions, STF employees brought tobacco, sugar, and soap, which they acquired through rationing, and exchanged them for eggs and poultry brought by the peasants.

11.3.3 Relationship with the Local Society

When the Shanghai STF was still under construction, construction engineers and workers stayed at local peasants' houses. Many local peasants were employed as temporary construction workers. They welcomed the opportunity to earn cash, but they were not informed about what the factories were going to make. As the peasants were not familiar with handling dynamite, some were injured or died from accidents (GCQW, 2018).

Except for the Bawu Steel Factory, which had 5400 employees, most of the firms in the Shanghai STF were mid-sized with several hundred employees. Each firm had its own canteen, workers' apartments, and an elementary school for the employees' children, but most were not large enough to run high schools and hospitals. Each corporation, which constituted clusters of a few factories supervised by the same bureau in Shanghai, had its own high schools and hospitals. Each cluster under the corporations formed an isolated firm society with a full range of service facilities.

The cultural and economic gap between the employees of the Shanghai STF and the peasants living in the surrounding area was significant. The peasants had never seen trucks before the Shanghai STF came to Anhui; therefore, when they first saw trucks, they asked why the trucks could run so fast and have such power without eating fodder. As they were not accustomed to automobile traffic, they were often injured by traffic accidents. In one year, 33 local residents were killed in traffic accidents caused by automobiles traveling to and from the Shanghai STF.

The Shanghai STF made several efforts to improve its relationship with the local society. First, local peasants were employed in exchange for appropriating local farmland. For every 20 are (=3 *mu*) of farmland, one job post was offered to the local production team. This team then selected a person to work at the STF firm. According to a peasant who worked in an explosive factory in the Shanghai STF, he was not informed about what the factory was producing before he went to work there. Aware that many soldiers had visited the factory, he did not want to go there because he thought that he would be sent to war if he did. After a few years of the factory's operation, however, the local society gradually became aware of what was going on inside the factory and appreciated the opportunity to work there (ZGAH, 2018). The workers who were employed in exchange for land appropriation were treated as regular employees—they received the same amount of wages as those coming from Shanghai and were allocated the same amount of food and daily goods. However, when the Shanghai STF withdrew from Anhui, they were dismissed by the firm in exchange for severance payments and remained in Anhui.

During the season when the local peasants were busy harvesting and rice planting, the Shanghai STF firms sent their workers to help the peasants. The STF provided building materials such as steel rods and cement when the local community was building dams and water channels, because the STF enjoyed an ampler supply of such materials compared to local societies. The Shanghai STF also provided funds and materials to erect small chemical fertilizer plants in local regions in Anhui. Before the Shanghai STF was built in Anhui, there was no supply of electricity. The STF had its own power plants and substations and supplied electricity not only to the STF firms and their ancillary facilities, but also to the local farm houses without asking for payment. In addition, schools and hospitals run by the STF firms accepted local children and patients (GCQW, 2018, p. 11, 72; ZGAH, 2018, p. 137, 151).

Despite the extensive assistance and generosity offered by the STF, there were several conflicts between the STF and local peasants. On one occasion, dissatisfied with the amount of materials the STF provided the local community, the peasants dug a ditch in the road to impede traffic to the STF. On another occasion, a chemical factory in the STF built a water purifying plant and supplied water to its own factory and local farms. When the plant was unable to deliver sufficient water to the local farms due to a shortage of rainfall, peasants plundered water by destroying the conduit.

When the Shanghai STF was under construction during the 1960s, the Shanghai City government sent only politically qualified people to Anhui, because the STF was a highly classified project. When the STF began mass production of weapons in 1972, Shanghai City began to send new recruits without strict screening. The young

workers from Shanghai then began to cause trouble with the local community by, for example, stealing chickens from farm houses or participating in fights with peasants.

The Shanghai STF firms held outdoor movie screenings every week on their premises, and local peasants came to watch them. In September 1975, an STF firm asked peasants who came to watch movies to pay entrance fees. The peasants refused to pay and had a large quarrel with firm employees. A leader of the local production brigade came to mediate the quarrel, but was seriously injured and conflict between the firm and the local society further escalated. Two months later, the conflict was finally settled by the intervention of the Party Committees of Anhui and Shanghai, and the leaders on both sides were held responsible (SHHF, 2017, p. 347). After the conflict, the entrance fee of outdoor movie screenings was set at 0.1 yuan for the employees and 0.05 yuan for the local peasants.

11.4 After the Withdrawal

After the Shanghai STF firms were transferred to Anhui province between 1986 and 88, the Shanghai City government had to arrange jobs and places to live for the 60,000 returnees. The government invested in township and village enterprises in the suburbs of Shanghai and started new businesses there, such as the production of power generation equipment, motors, television sets, soft drinks, glass products, cameras, bicycles, and electrocardiograms. These industries belonged to the jurisdiction of the Bureaus which supported the STF firms. The workers of the Bawu Steel Factory were reemployed by Shanghai's Fifth Steel Factory, which was under the supervision of the Bureau of Metallurgical Industry. These gestures indicate that the Bureaus, which oversaw the construction and operation of the STF firms, took further care to provide the returnees with jobs. According to Table 11.1, both the production value and profits of the STF increased in 1987. These figures include the production and profit of firms that returned to Shanghai from Anhui.

Returnees were arranged to live in the suburban counties of Shanghai, such as Pudong, Minhang, Qingpu, and Songjiang. It is likely that most of them lived in the inner districts of Shanghai before they went to the STF. For such people, living in these counties may seem to be a degradation of status. Considering the congestion in Shanghai's inner districts during the 1980s, the city government had no choice but to situate the returnees in suburban counties. The city government built 3 million square meters of housing for returnees.

The firms that were transferred to Anhui ceased to produce weapons. Five factories in Guichi County, which produced weapons when the Shanghai STF existed, were disbanded and their equipment was sold to private companies that produced sewing machines, machine tools, and bearings (GCQW, 2018, pp. 18–19). The only factory that somehow retained its original shape was the former Ziqiang Chemicals Factory, which produced explosives. After being transferred to the Dongzhi county government, the factory faced a serious financial difficulty in 1995, but Dongzhi County saved it by selling the assets of the other ex-STF factories. In 1999, however,

the factory experienced another crisis, and was bought out by 53 employees. After being privatized, the factory received an investment from a wholesaler, after which it was renamed the Anhui Huaertai Chemicals Co. The company has been on the development track since then and currently produces nitric acid and other chemical materials (ZGCZ, 2017, pp. 298–303, Chen, 2018). The cement factory established by the Bureau of Building Materials Industry was transferred to Anhui province in 1985 and was later acquired by the Ningguo Cement Factory (ANDF, 1996: 4–5, 8–10), which was established by the State Bureau of the Building Materials Industry in 1978. Ningguo Cement Factory used the same mountain limestone as the STF factory and became the largest cement manufacturer in China.

Conclusion

This chapter has characterized the urban societies in China during the Mao era as "isolated societies" and describes in detail the production and life of the Shanghai STF, which was an extreme case of an isolated society. With regard to industrial linkages, the Shanghai STF relied heavily on the Shanghai City government for the supply of materials, and the division of labor was confined within the STF firms and Shanghai, having no industrial linkage with the local economy. Most employees preferred to marry a spouse with household registration in Shanghai, and marital linkages with the local society were scarce. From its conception in 1966 to its final withdrawal in 1988, the Shanghai STF existed for only 22 years. If it had existed for a longer period, it is likely that the children of STF employees would have graduated from high schools and been employed by the STF firms. The isolated society would have reproduced itself by inbreeding, as was the case in Baotou.

However, it is also noteworthy that interactions with local peasants occurred through several routes. Local peasants were employed as temporary construction workers when the STF was built. They sold vegetables to STF employees and exchanged poultry and eggs for the employees' rationed products in free markets. Peasants came to see movies at the STF firms, and attended schools and hospitals run by the STF firms. The STF maintained no relationship with the local economy in weapon production and food rationing, which were the realms governed by the planning system. Transactions with the local community took place in realms that were not managed by the planning system. The human connections created between STF employees and local peasants during the time when the Shanghai STF existed remained in the 1980s, and more than 10,000 peasants from Jingde County later migrated to Shanghai to work using such connections (ZGSH, 2013, p. 213). The Shanghai STF should have been one of the most isolated societies during the Mao era, but even in such an isolated society, connections with the local community were established.

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Epilogue: What Are the Initial Conditions for the Reform and Opening-up?

Katsuji Nakagane

Abstract What were economic institutions and policies of the Mao era inherited in the Deng Xiaoping era and what led to the achievement of such long-run high growth that is rare in world history? To answer these questions, we first consider the initial conditions for economic development and systemic transition using the framework of economic system theory in a formalistic manner. Then, we introduce the views of several scholars on initial conditions for contemporary China's growth, present our own views and hypotheses regarding the roles of these conditions for high economic performance in post-reform China, and discuss the remaining issues to be addressed in the future.

Introduction

From various perspectives, we have examined the transition of economic institutions and policies during the Mao era and some of the aspects that characterized them. As noted in Preface, this book mainly aims to explore the legacy, or the initial conditions of the Mao era in terms of the economic development theory, as an instrument to the reform and opening-up. Because of these initial conditions, the post-reform policies that started in 1978 became possible and were promoted. Further, with this background, the Chinese economy was able to grow dramatically, which has attracted much attention globally. Then, based on the previous discussion, what were economic institutions and policies of the Mao era inherited in the Deng Xiaoping era and what led to the achievement of such long-run high growth that is rare in world history? To answer these questions, let us first consider the initial conditions for economic development and systemic transition using the framework of economic system theory

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in a formalistic manner. Then, we introduce the views of Barry Norton and others on initial conditions for contemporary China's growth, present our own views and hypotheses regarding the roles of these conditions for high economic performance in post-reform China, and discuss the remaining issues to be addressed in the future.

E.1 What Are the Initial Conditions for Economic Development and Systemic Transition?[1]

Now, following Marx, if we divide the social system into a superstructure and an infrastructure (economic foundation), and if we decompose the infrastructure into production relations and productive forces, the social system S in general comprises the policy and philosophy P corresponding to the superstructure, economic system I corresponding to the production relations, and technology, goods, and services (or economic resources) T corresponding to the productive forces. As the economic system is not determined only by internal factors, it can be formally written as $S = f(P, I, T, E)$, where E is the external environment (e.g., worldwide political environment and international relations). Each consists of many elements. Thus, $P = P(P_1, P_2, P_3, \cdots P_x)$. Here, for example, P_1 = people's conception, consciousness, or ideology, P_2 = government's economic strategy, P_3 = traditional customs, etc.; and $I = I(I_1, I_2, I_3, \cdots I_y)$ such as I_1 = market system, I_2 = financial system, I_3 = agricultural system, etc. Generally, T includes factors of production such as technology, capital, labor, land, etc., and production of millions or tens of millions of goods and services, or economic outcomes.

Each of them changes over time t; thus, if we include the time factor, $S_t = f(P_t, I_t, T_t, E_t)$. As time passes, P_t, I_t, T_t, and E_t change, and system S changes accordingly. In this study, we do not assume a causal relationship in which the productive forces determine the production relations and the infrastructure determines the superstructure, respectively, as in orthodox Marxism and historical materialism. According to the changes in the system during the Mao era, as discussed in Chap. 2, unlike the materialist view of history, the superstructure and production relations determined the infrastructure and productive forces, respectively, in China of the Mao era. For example, an institution called People's Commune was created not by the development of the productive forces T, but by Mao's policy (or rather dream) P.

Let us now divide modern and contemporary China into three eras. The traditional China before the founding of the communist regime ($t = 0$), China during the pre-reform of the Mao era ($t = 1$), and China after the reform and opening-up in 1978 ($t = 2$). The social system S_0 of traditional China was transformed into system S_1 of the Mao era, while system S_1 was transformed into system S_2 after the new era of the reform and opening-up was initiated (see Fig. E.1).

Clearly, $S_0 \Rightarrow S_1$ is not only an economic development but also a process of systemic transition in that the entire system was socialized. Similarly, $S_1 \Rightarrow S_2$ is not only an economic development but also a process of systemic transition with

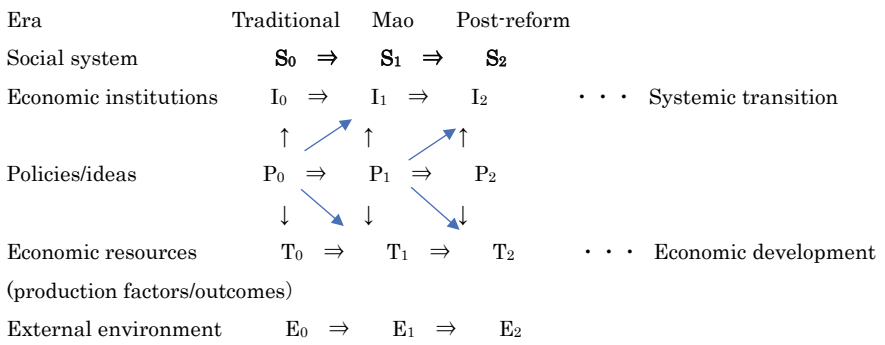

Fig. E.1 Transformations of China's social system. *Notes* The arrows indicate the directions of not only system transformations but also influences other systems/elements. The functions of the external environment to other systems/elements are omitted for brevity. These arrows indicating influences such as $I_0 \rightarrow P_1$, T_1, or $T_0 \rightarrow I_1$, P_1, are also skipped to avoid making the figure too complicated

the establishment of a capitalist system. Incidentally, economic development in the narrow sense is described as a process of $T_0 \Rightarrow T_1 \Rightarrow T_2$, and systemic transition in the narrow sense as a process of $I_0 \Rightarrow I_1 \Rightarrow I_2$.

In such an economic development and systemic transition, when system I_1 of S_1 is formed based on some components of S_0 (e.g., institutions in traditional society I_0), system I_0 is called the initial condition for I_1. Similarly, in the process of $S_1 \Rightarrow S_2$, for example, I_2 is institutionalized on the basis of I_0 and I_1, and I_0 and I_1 are the initial conditions for I_2. Here, $I_0 \Rightarrow I_2$ is the first legacy for post-reform China's economy, as described by Barry Norton in the Preface, and $I_1 \Rightarrow I_2$ is the second legacy of this era. The initial conditions were not only limited to system I. All the components of P, I, and T (and even E) in the previous era become such conditions for the subsequent era. To summarize this argument, we can express $S_2 = g(S_0, S_1)$.

Note that initial conditions have different aspects, which are positive and negative. The positive aspect is easy to understand, where the components of S_0 develop to create new components of S_1, and new components of S_2 are created based on the systems/components of S_1. However, cases can exist in which decision-makers of one era discover that the system of the previous era did not function properly and this system had to be modified to create new components suitable for the next era. The negative components of the previous era may then stimulate decision-makers to find and create positive conditions for the next era. Mao Zedong once said, somewhat paradoxically, that it was not a bad thing to be "economically poor and culturally blank" (*yiqiong erbai*); if you are poor, you will strive to become rich, and if you have a white paper, you can draw a new picture, namely a new blueprint. In some cases, negative circumstances can certainly create a positive environment, as a popular proverb teaches us "misfortune can be turned into a blessing."

The above abstractions and formalisms may be difficult to understand clearly. Hence, let us attempt to explain the initial conditions for the reform and opening-up of the Chinese economy based on concrete examples that are more in line with historical reality.

E.2 What Has the Reform and Opening-up Era Inherited from the Traditional and Mao Eras?

Let us now consider the first process of $S_0 \Rightarrow S_1$, that is, the legacy from traditional society to the socialist economy of the Mao era. Norton's interpretation is as follows. Clearly, the negative legacy inherited by Mao China from the previous era was the destruction and chaos caused by the Sino-Japanese War (1937–1945) and the civil war (1946–1949). Moreover, he adds that the invasion and oppression of China by Western powers since the Opium War (1840–1842) generated strong antipathy and suspicion toward Western institutions and worldviews, which helped the communist regime become socialist or anti-capitalist. In terms of positive legacies, heavy industries in the former Manchuria and the industries and enterprises created by the Resource Committee under the Kuomintang (KMT) government were well-known to become nationalized after the founding of New China and laid the foundation for the industrialization of the Mao era. Norton also points out that, in terms of human resources, literacy was relatively high in traditional China. In addition, there were engineers who had returned from Europe, the United States, and Japan, where they obtained a certain level of technological capability. Moreover, traditional China already had modern industrial and transportation capital, all of which worked in favor of the economic development after 1949. However, his statement on the high level of literacy among the people before 1949 seems to be a considerable overestimation. This is because the school attendance rate of elementary school students in China in general, even during the Mao era, had not reached even the level of Japan at the end of the Meiji era (Minami, 1990), excluding those in urban areas that accounted for only 10% of the population. Similarly, the emphasis on the development of industry and transportation in the prewar era seems to be a slight exaggeration, because China in 1952 was behind India in 1950 in terms of the development of railroad networks and electricity per capita.

What was the first legacy ($S_0 \Rightarrow S_2$) that the post-reform economy inherited from traditional China? Norton points first to the traditional family economy, typically the rural family management system that revived immediately after the collective agriculture dismantled in the post-reform era. In this respect, he points to the revival of traditional market forms of organizations, such as Township and Village Enterprises (TVEs), along with the private economy. Second, he focuses on the resumption and expansion of traditional trade and investment relations especially through overseas Chinese network with "China of the Sea" (i.e., with the East and South China Seas).

In particular, the "Special Economic Zones" created in Shenzhen and other coastal cities have played a significant role in this process (Naughton, 2007).

Our interpretation is as follows. The economy of traditional China was more marketized than has been generally assumed, so the price mechanism was operating in a nationwide market. This is indirectly evidenced by the fact that the same goods showed similar price fluctuations in different regions (Nakagane, 2010). Thomas Rawski also analyzes the economy of the KMT era regarding four key concepts: domestic, private, civilian, and competitive (Rawski, 1989). Basically, pre-war China was dominated by a sufficiently competitive market economy led by the private sector.[2] Similarly, Muramatsu Yuji emphasizes the competitive, but unregulated, nature of the traditional Chinese economy (Muramatsu, 1949). Certainly, the transportation and information infrastructure were not as developed as in modern China. Thus, the competitiveness of such markets in traditional China has limits. However, at least people were adapting to the fluctuating market economy, reacting to changing prices, and acting "in a rational economic way." Moreover, such a spirit and culture were shared by the ordinary people at that time. The spirit could not be eradicated under no more than a quarter of a century of socialist educational movements and rules during the Mao era.[3] Sometimes, it was expressed in the rural free markets called "*jishi*," sometimes in the black market, and even during the period of fierce political movements, such as the Cultural Revolution. Further, the spirit was still alive and rooted deeply in the minds of the common people. In the framework shown in Fig. E.1, (a part of) P_0 was directly incorporated into S_2.

Meanwhile, what is the specific legacy that the social system of the Mao era left to the post-reform era ($S_1 \Rightarrow S_2$)? Norton argues that, although positive legacies, such as the formation of human capital through basic education and health care, exist, and the provision of a minimum standard of living, legacies from the Mao era are mostly negative. That is, the arbitrary concentration of power in the leadership to maximize investment in industrialization has resulted in a bias toward the industry. This bias has upset the balance between agriculture and industry and made it impossible to create productive employment for the surplus labor force. Consequently, even the Party leadership after Mao recognized past policies as a deviation from orthodox socialism, taking a step to find a way to the reform and opening-up in the coming era.

Loren Brandt and Thomas Rawski attribute the greatest failures in the planned economy of the Mao era to three factors, namely, the pursuit and implementation of non-economic objectives, weak institutionalization, and declining incentives, leading to a lack of productivity growth and widespread inefficiency (Brandt and Rawski 2008). Precisely, excessive emphasis was placed on national defense and ideology, which caused inefficient investment allocations (e.g., the Third Front construction) and political activism. In addition, under the planned economy system, business activities were carried out without entrepreneurial spirit and lacked the institutional mechanism for technological innovation. Additionally, the stimulus to expand sales and increase profits was lost without competition among producers. Therefore, with the death of Mao, the leadership was able to agree to reform the economy to change the status quo, although the ultimate goal was still then undecided.

Indeed, Mao's economic policies, which were "destructive," had a paradoxical positive effect on Deng Xiaoping's policies. Hu Angang says that "the failure of Mao's later years was the mother of Deng's success in reforms" (Hu, 2008: 788). In his view, with Mao's "failure" of the Cultural Revolution (hereinafter called CR) as a teaching material by negative example, Deng succeeded in reforming the Chinese economic system. Basically, Mao's policy P_1, which plunged the economy into chaos during the CR period, served as a teacher by negative example, prompting the reform and opening-up, creating a new policy P_2, and giving birth to a new system S_2. Here, too, the negative legacy of the Mao era has been turned into a positive one, "dialectically" to use Mao's favorite phrase.

Wang Hui says that "without the Cultural Revolution, today's reform and opening-up would not have been possible" (Wang, 2013: 516). First, he looks at the fact that the CR removed the superstition in the realm of thought about Mao Zedong himself. Second, he points out that the overthrow by Mao of the centralized planned economic system prepared the ground for the creation of the subsequent market system. Certainly, Mao encouraged the destruction of the existing system through the CR, saying that "Destroy first and then establish" (*xianpo houli*). However, he failed to establish a new and effective economic system. Given the reality of China as a developing country, which we have already cited as "economically poor and culturally blank," drawing a blueprint for a social system on a blank sheet of paper would have been possible, but Mao did not draw an effective and concrete plan. Deng drew such a plan in effect, even if he did not intend to do so. Emphasizing that "being poor is not socialism," Deng drew up a series of blueprints for an economic system on the market, imitating real capitalism, including the introduction of foreign capital and the operation of a stock company system, which had been considered taboo during the Mao era (see Chap. 2).

E.3 How Should We Evaluate the Economic Institutions and Policies of the Mao Era?

In summary, the argument about the Mao legacy of economic institutions and policies for the reform and opening-up is still largely negative (including a paradoxical one). Thus, the question is whether Deng Xiaoping started from absolutely nothing, or even a negative legacy, and whether he merely inherited an economy and system in turmoil from Mao Zedong, despite that they may have had a teaching material by negative examples. In our view, the economy in the Mao era left such great legacies for the initial conditions of the Deng era as follows.

First, as referred to directly and indirectly in this book, a certain industrial base was clearly created in that period, along with a certain amount of technological progress (see Introduction and Chaps. 8 and 9). The "Third Front construction" in the 1960s, which has been criticized in post-reform China as an inefficient investment arrangement, was also significant as a positive legacy from the perspective of sowing

the seeds of industrialization in inland areas (described in Chap. 11). Chris Bramall (2007) particularly emphasizes the significance of this type of construction policy in the industrialization of Sichuan Province. Only through this policy that heavy industrial bases, such as Panzhihua Iron & Steel, were transplanted to the interior of Sichuan. In addition, the rural water conservancy construction projects, which were carried out extensively in rural areas both before and after the start of the Great Leap Forward, were highly effective in building basic infrastructure (e.g., dams and irrigation canals in various areas) and contributed to the transformation of cropping systems (including rice cultivation) and to the improvement of agricultural productivity (see Chaps. 4 and 6). Thus, the rural industrialization that developed in the countryside during the CR became the foundation for the development of TVEs after the reform and opening-up (see Chap. 10), and its contribution to the market economy expansion was extremely significant.

Second, in terms of the economic organization, the Mao era can have had some effects. Additionally, other great achievements in the Mao era are collectivization of agriculture, stabilization of rural society through the practice of "shared poverty" (see Chap. 5), and creation of the first nationwide, full-fledged financial organization in rural areas, namely, the Rural Credit Cooperatives (see Chap. 7). The reorganization of the entire economy into a unified national system, under the name of "socialist transformation," immediately after the founding of the country was also an attempt to organize the entire economic system (see Chap. 3). Moreover, the basic industrialization framework in the form of state-owned enterprises was carried over into the reform and opening-up era, along with the characteristics of capital-led growth (see Introduction).

Examining the above from a different perspective, China's model of economic development was indeed formed during the Mao era. Despite the economic and technological assistance from the Soviet Union and other communist countries in the 1950s, the development model of accumulating, investing, and growing by utilizing domestic resources under the principle of self-reliance and domestic rehabilitation was created in this era. The greatest of these domestic resources was labor, especially surplus labor in the rural areas. Using the Preobrazhensky model explained in the Introduction, if agricultural products, especially food grains produced in the agricultural sector, are supplied to the industrial sector at low prices, the labor force in the industrial sector can be fed at low wages. Consequently, a large amount of profit is generated in the industrial sector, which in turn is absorbed by the state to become investment capital. Moreover, given that the state allocated investment funds under the planning system, more funds are expected to be invested in the heavy and chemical industrial sector for national defense to facilitate rapid development. Although some controversies over whether the agricultural sector or the state provided this source of investment funds exist, China (as summarized in Chap. 7) has adopted Preobrazhensky's theory of the "scissors price differential," that is, pricing agricultural products below their value and industrial products bought by farmers above their value. However, provided that no definitive way is available to measure the value initially, this argument, in our view, is not quite effective or useful. Regardless of the validity of this argument, in the agricultural sector during the Mao era, the peasantry

certainly endured a low standard of living for a long period of time and contributed greatly to the formation of industrial capital, albeit indirectly, other than through the direct route of deposits in rural credit cooperatives and agricultural banks.

To make this model effective, taking away from the peasants their right to decide on production and sales of their products was necessary. However, to ensure that the state has the right to determine all prices, these two systems—collectivized agriculture and the "unified purchase and sale" system—(as discussed in Chap. 4) were completed and put into operation during this era. In addition, as state investment in the agricultural sector was little, collectivization was quite useful for the "labor accumulation," or creation of fixed capital for agriculture, such as dams and waterways, by the mobilized peasants themselves (see Chap. 6). Clearly, this development model underwent a major transformation with the reform and opening-up policy, and the major parts of industrialization funds were financed by savings in the non-agricultural sector, alongside foreign investment. It should be noted that such basic organizations and institutions as investment fund circulations were arranged at any rate during the Mao era.

However, these legacies, definitely positive in certain senses, were formed at terrible sacrifices, as emphasized in the Introduction and Chap. 2. The socialist transformation that proceeded in the 1950s was developed in conjunction with the "counterrevolutionary suppression" (*zhenfan*) and "counterrevolutionary purge" (*sufan*) movements to disclose, expose, and suppress the opposition to the regime and the Party. Similarly, the compulsory purchase of food by the state (as discussed in Chap. 4) contributed to the creation of a tremendous number of people who died of starvation during the Great Famine after the Great Leap Forward (as discussed in the Introduction).

Sacrifices made by people during the Mao era were not only human. For example, the above-mentioned "labor accumulation" (the main theme of Chap. 6) was carried out on the assumption that rural labor was free from the government's perspective. The relocation of factories to remote inland areas in the third front construction was carried out from the national defense standpoint, completely ignoring the economic efficiency. As pointed out in Chap. 2, Mao's political economy was devoid of any notion of efficiency or productivity.

However, in our view, the most important legacy inherited by Deng Xiaoping from Mao was not only the material, technological, and institutional legacies but also the basic governance principles on which the entire social system was constructed. More specifically, the three main governance principles of contemporary China—power, elitism, and pragmatism—the "three sacred treasures" of Mao politics seemed to be the most important legacies of his era. These three sacred treasures were formed and strengthened during Mao's reign: power first, which is a doctrine to regard the maintenance and expansion of power as the supreme objective; elitism, in which everything should be decided not by the masses but by an excessively limited elite circle of the Communist Party, or solely the Secretary General or Chairman as an extreme case; and pragmatism, in which any types of ideas, ideologies, or doctrines could be used to achieve the Party's supreme objective (Nakagane, 2021). This is precisely

because of these governance principles, in our view, that the strong governing structure with the Communist Party at its core has neither collapsed nor wavered, despite the tragic chaos and casualties caused by extraordinary policies, such as the Great Leap Forward and the Cultural Revolution.

Let us now consider the question posed at the outset: "what were the main factors that enabled the Deng regime to achieve a long period of high growth, unpreceded and rare in the world history, with the initial conditions inherited from the Mao era?" Our hypothesis is:

The first one is what Norton calls the first legacy: the marketization and its spirit inherited from the traditional economy, which was temporarily suppressed during the Mao era, but never died out, and continued to live on, contrary to Mao's expectations. In terms of the previous notation, $S_0 \Rightarrow S_2$ is one of the largest factors that enabled explosive economic development in the Deng era. This was largely because the period of the "socialist planned economy" was relatively short in China, as well as the fact that, reflecting Mao Zedong's political philosophy, an institutionally rigorous planning mechanism was not created as in the Soviet Union; that is, institutionalization was weak, in a way different from that of Brandt and Rawski. Meanwhile, Norton's second legacy $S_1 \Rightarrow S_2$ (i.e., the initial conditions inherent to the Mao era) that had at least a positive effect on the reform and opening-up seems to have been less effective compared to the first legacy.

Second, due to marketization, and in fully realizing its results, the improvement of the external environment has led to a major contribution to China's rapid growth. Specifically, at the end of the Cold War at the end of the 1980s, China was able to further enter the international market. With its accession to the WTO in 2001, the Chinese economy became more globalized and more easily accessible to both international markets and foreign capital. Marketization, along with the large domestic market created by the country's large population, has attracted large-scale investment internationally, which in turn has further expanded the market and encouraged the entry of foreign capital with advanced technology, resulting in further expansion of exports and accumulation of foreign currency. Thus, a virtuous dynamic cycle of the economic development was generated.

Finally, but most importantly, the initial political conditions, rather than the initial economic conditions, laid the foundation for the high growth that followed the reform and opening-up policies. Basically, using the above-mentioned three governance principles, after the new era started, Deng Xiaoping established his ideal of socialism, more appropriately "capitalism with Chinese characteristics," or "state capitalism" (Bremmer, 2011), and China began to follow a long-term path of rapid growth. The authoritarian system established during the Mao era and carried over to the Deng era was a strong reflection of the traditional Chinese political system and ideology. Using the previous notation, the superstructure P_0 (or part of P_0) that had shaped the ideology and political system in traditional China was incorporated into P_1 in the Mao era and remained in P_2 even after adopting the new reform strategy.

An almost "conventional wisdom" among Western scholars is that marketization, or economic decentralization, is incompatible with authoritarian regimes, such as single-party dictatorship or political centralization. Daron Acemoglu and James

Robinson, for example, argue that extractive political systems, such as political dictatorships, are incompatible with inclusive economic systems, such as market systems (Acemoglu & Robinson, 2013). However, even if this is true in the (extremely) long run, the two institutions and policies seem to be compatible, at least for a certain period of time, provided that these three governance principles are effective. The Chinese experience has shown this to be the case. Kato Hiroyuki writes "We cannot stand on the pessimism that no growth can be expected under an extractive political system, nor on the optimism that all will be well as long as there is an inclusive political system. I believe that there is no way for this country to **sustain** growth except by inheriting and developing political and economic systems that match China's 'own conditions"'(Kato, 2014). Typically, the scale and speed of investment, and therefore of economic growth, would differ greatly (e.g., even in the case of construction of an airport) between a democratic country that has long struggled to reconcile private rights and public opinion and another autocratic country where land acquisition can be easily carried out with a single piece of notification.

Nevertheless, whether the three principles of governance will continue to function effectively in China for many years is unclear. Take corruption as an example that is likely to hinder economic growth. Is Lord Acton's famous maxim that "power corrupts. Absolute power corrupts absolutely" not relevant to China? Has China never suffered a wave of corruption scandals? Would the authoritarian regime of a single-party dictatorship not favor state-owned enterprises, constrain privately owned enterprises, and hinder marketization and institutional reforms? If, on the other hand, the marketization demand is expected to increase, but not weaken in the future, it seems unlikely that an unchanged political system will be able to adapt effectively to a changing social system and particularly to people's changing needs and attitudes. As Kato mentioned, neither the "own conditions" nor the social system S in our terminology can be expected to remain unchanged permanently.

Conclusion: Remaining Issues

Economic institutions and policies are numerous and vary widely, and such institutions and policies unique to the Mao era, as discussed in this book, are only a few of them. There are many topics and issues to be addressed, for example, the "barefoot doctor" system, which was the basic medical system in rural areas during the CR; the "one-child policy," which was formally introduced in post-reform China in 1979, but had virtually been implemented since the early 1970s; the "family registration" (*hukou*) system, which has divided urban and rural areas; and, in terms of foreign relations, the Soviet Union's economic and technical assistance policies under the Sino-Soviet Friendship Treaty.

Thus far, many analyses of long-term macroeconomic dynamics are available, including those of the Mao era. However, economic studies on the effects of individual institutions and policies have been insufficient. Moreover, to the best of our knowledge, analysis of the microscopic effects of institutions and policies in this era has not been conducted. This is because full-scale surveys of the actual situation

were not conducted at that time in China to the same extent nowadays. Even when they were conducted, the results of these surveys were not made public so that they could be analyzed by outside researchers.[4]

As one example, the "Red Flag Canal (*hongqiqu*)" in Lin County, Henan Province, which was built self-reliantly by local peasants themselves, mobilized during the CR. It has become nationally famous as it was exactly the agricultural infrastructure built by using the "labor accumulation" method discussed in Chap. 6 and is now a tourist attraction. To the best of our knowledge, this canal has not been sufficiently investigated, even in China, in terms of how many hours of labor forces were mobilized, how much it costed, and how effectively it contributed to agricultural production in the localities concerned. Similarly, before the CR, Mao Zedong greatly admired the Dazhai Production Brigade of Xiyang County in Shanxi Province, which was subsequently advertised as the nation's top model village of self-reliant farming. However, it has become clear that the village was not a model of self-reliance, but was subsidized by the state, and it has now returned to being an ordinary and capitalistic village, developing various industries not farming. Then, what should we evaluate that "Learn from Dazhai" movement that swept across China? Thus, a full-fledged political economic analysis of the development and results of this movement remains untouched.

The issues to be studied are not limited to rural and agricultural concerns. In the Mao era, how did the planning tasks for urban state-owned enterprises come under the so-called planned economic system? Through what processes were they accomplished or not accomplished? In addition, how did managers behave under the "economy of shortage" in Kornai's sense? What incentive mechanism for workers worked in enterprises? How effective was such a mechanism? As far as we know, there are few studies in China that analyze the realities of the actual planning mechanism during the Mao era from a microscopic perspective.

Only because the Chinese economy has achieved remarkable growth and changes since the new development strategy began to work, journalism and the media, as well as scholars, have tended to focus on such dramatic performances. However, we believe that more attention should be paid to the historical conditions that have made this unprecedented performance possible. Let us enjoy a historical dialogue with the past, the Chinese economy during the Mao era.

Notes

1. The description in this section extends and modifies the discussion and model in the Introduction of Nakagane (2010).
2. For details, see Nakagane (1992). The terms "domestic" is against the view that China was dominated by foreign capital, "private" is against the view that the economy was controlled by bureaucratic capital, and "civilian" is against the view that military activities were dominant in Nationalist China.

3. The quarter century refers to the period from 1953, when the state controlling almost all prices of goods and services began in China, until 1978, when the reform and opening-up policies substantially started.
4. The Agricultural Production Cost Survey used in Chap. 4 is one of the few publicly available statistics.

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