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REFORM AND DEVELOPMENT IN CHINA

ABSTRACT

In recent decades, the policy of reform and opening has turned China into a dynamically developing country with one of the largest economic potentials. China has long demonstrated one of the highest rates of economic growth in the world, while its enormous internal market offers attractive investment opportunities for foreign capital. The author investigates the main characteristics and achievements of the Maoist era and the reform process, comparing the development results of China and India and paying special attention to the Sino-American economic competition. He also evaluates the role of reform numerically, relying on international specialist literature and the results of his own investigation into the Chinese economy for the period 1955–2010.

Key words: market reforms, economic development, estimation of production functions, international analyses and comparisons, People's Republic of China

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1. Introduction

Due to the policy of reform and opening, an extremely rapid economic development has been taking place in China since the late 1970s, the foundations of which were laid down in the pre-reform period. Today China and India pose an increasing competitive challenge to the three traditional centers of the world economy, namely the United States, the European Union and Japan.[2] In 2010, China produced 13.5 percent of the world's gross domestic product (GDP) based on purchasing power parity (PPP), whereas Japan accounted for 5.9, the European Union (EU-15) for 18.0 and the United States for 19.4 percent according to the IMF, World Economic Outlook Database.

The cited figures show that China's emerging economy is an important global player. Therefore, the economic reform in China in the context of development problems deserves special attention. In this connection, a *hypothesis* put forth here is that *the outstanding growth performance of China has primarily been determined by improving equipment of the employed workforce with physical capital viewed as the mobile type of technical progress*. Though the importance of human capital is also increasing, it has not yet become a decisive factor of economic growth.

As for the *structure of the paper*, the introduction is followed by a discussion of some relevant postulates of development economics. Thereafter a general model of world economic development (from Simon 2008) will be presented, verified by an investigation on 131 countries.[3] This general model considers both physical and human capital, as well as time, which plays the role of event space of creative economic activity. Its main components are the intensity functions mapping the fundamental types of technical progress determining the mechanism of economic development from the initial state without physical capital to our days. Economic issues of the Maoist era and the subsequent policy of reform and development will be expounded separately, followed by a presentation of main economic results achieved by China in comparison with India and the United States. The role of reform will also be evaluated with the help of the above-mentioned general model numerically. In that context, the author will rely on international specialist literature and the results of his own investigation into the Chinese economy. In addition, special attention will be paid to the topical issue of Sino-American economic competition.

[2] The main trends concerning the competition among the traditional centers of world economy have been investigated in Simon and Simon Jr. 2008.

[3] See the list of investigated countries including China in Simon 2000.

2. Theoretical Framework

2.1. Some Postulates of Development Economics[4]

Economic development in general can be viewed as a process whereby traditional low-income economies are transformed into modern industrial ones. Although this term is sometimes used as a synonym for *economic growth*, usually it is employed to describe changes involving both qualitative and quantitative improvements.

(i) For countries like China there is no clear-cut agreement on what constitutes *underdevelopment*. In broad terms, however, it is generally accepted that the level of national income per inhabitant is a good indicator of a country's prosperity and, therefore, of the level of its economic development.

(ii) There are very significant differences among developing countries that make it difficult to draw general conclusions about the reasons for their underdevelopment and the most effective methods of transforming their economies. Nevertheless, some generalizations can be made that are necessary to illustrate *basic principles*. As a rule, theories of economic development assume that existing differences in income levels between the developed and underdeveloped nations are not primarily the result of natural and climatic conditions, so all countries have the potential to attain developed status. In this context, the task of development economics is to determine how this potential can best be realized. This in turn involves the study of the principal causes and symptoms of underdevelopment.

(iii) *Despite the wide differences among developing countries, they share a number of common characteristics.* In most of them, primary (agricultural or extractive) production accounts for a very large proportion of national income, and not infrequently a disproportionate share is taken by one or two products. The level and range of secondary industrial activities tend to be very low and marked by poor technological development. Most of these countries have large quantities of *surplus labor*, considerable unemployment or underemployment and fairly high rates of population growth. Another common feature is inadequate infrastructure such as poor road and transport networks or lack of sufficient irrigation. Equally important are the *underdevelopment of human resources* in terms of skills and education and the weakness of economic and financial institutions.

2.2. Development Economics and Growth Economics

Differently from development economics, growth economics is concerned with the study of the long-run, or steady-state, equilibrium growth paths of the economically developed countries, which have long solved the problem of initiating development.

Growth theory generally assumes the existence of a fully developed modern market economy with a sufficient supply of entrepreneurs responding to a well-articulated system of economic incentives to drive the growth mechanism. Typically, it concentrates on macroeconomic relations, particularly the ratio of savings to total output and the aggregate capital-output ratio. Mathematically, this can be expressed by the *Harrod-Domar growth equation* (Harrod 1948, Domar 1957) as follows: the growth in total output (g) equals the savings ratio (s) divided by the capital-output ratio (k), i.e. $g = s/k$. Whatever is saved will be automatically invested and converted into an increase in output on the basis of a given capital-output ratio. Since a given proportion of this increase in output will be saved and invested on the same basis, a continuous process of growth is maintained.

[4] Based on Ray 1998.

Myint 1971 points out that *the Harrod-Domar growth equation has been frequently applied or misapplied to the economic planning of a developing country*. Its weakness arises from the assumption of a fixed overall capital-output ratio, which disregards all the vital problems affecting the developing country's capacity to absorb capital and invest its saving in a productive manner. These problems include the central problem of the efficient allocation of available savings among alternative investment opportunities and the associated organizational and institutional problems of encouraging the growth of a sufficient supply of entrepreneurs; the provision of appropriate economic incentives through a market system that correctly reflects the relative scarcities of products and factors of production; and the building up of an organizational framework that can effectively implement investment decisions in both the private and the public sectors. Such problems constitute the core of development economics. Development economics is needed precisely because the assumptions of growth economics, based as they are on the existence of a fully developed and well-functioning modern market economy, do not apply to the majority of developing countries. In analyzing catch-up development like that of China there is also a need to find a connection between development economics and growth economics, which can be made with the help of production functions.

2.3. Economic Growth and Technical Progress

Economic growth mechanism is essentially an interaction of fundamental factors of production and the operation of economic force fields generated by these factors. As a result, output emerges, characterized today by the gross domestic product (GDP) at a national economy level and by (gross) value added in individual sectors. *Growth mechanism determines not only the volume of an economy's output, but also price formation, income distribution and accumulation* (see Simon 2005). As is well-known, economics has been dealing with these issues since the 18th century (see e.g. Mátyás 1999, 2002). However, mathematical modeling and model assumptions were confronted with factual data only in the 20th century, with the construction of the *Cobb-Douglas production function* (Douglas 1957). The latter became a starting point of the *neoclassical growth theory* marked by Solow's name (Solow 1956, 1957; Samuelson and Nordhaus 1998), having acquired a dominant position in contemporary economic thought. The later *endogenous growth models*, though in some important respects, different from the orthodox approach, have been elaborated within the framework of neoclassical theory and therefore leave the fundamental questions of economics essentially unsolved (see e.g. Romer 1986, Lucas 1988, Jones 1995, Barro and Sala-i-Martin 2004, Romer 2012). This situation points to a need for a cardinally *new approach* to the problems of economic growth.

2.3.1. Neoclassical Models and their Augmented Versions

The production function of the standard *neoclassical growth model* (Solow 1956) can be written down in the following form: $Y = A_o K^{\alpha} L^{1-\alpha} e^{\lambda \Delta t}$, (1)
where Y is output, A_o is a multiplier of efficiency (constant), K is physical capital (practically fixed capital), L is labor (as a rule, the number of persons employed or the number of working hours), t is time, Δt is the number of years ($t–t_o$) elapsed from an initial point of time (t_o), and α, $1–\alpha$ and λ are the elasticity of output by physical capital, labor and time, respectively. The model assumes that, in a situation of equilibrium, the parameter α corresponds to the profit share in the GDP, which regarding the developed capitalist countries is usually taken as 1/3.

The Solow model corresponds to the fundamental theses of neoclassical economics when it sets out from the determinant role of supply, explaining value creation and income distribution by the marginal products of labor and capital. Furthermore, Solow adequately maps the economic growth mechanism when he supposes homogeneity of degree one, a constant return to scale, thus excluding the "big bang" problem (see Solow 1994).

The most serious problem in connection with the assumptions of the Solow model is the *specific role of the time factor*. The point is that a major part of economic growth appears not as a return to capital and labor, but as a function of time. This model component was previously called *neutral technical progress* and recently has become *total factor productivity* (TFP). However, the expression technical progress is not appropriate here, since in the model, economic growth has another part, dependent on change in capital, which is also a result of technical progress, or rather *embodied technical progress*, contrary to the disembodied one, or TFP.

As the future result of total factor productivity can only be guessed, we cannot reliably estimate the rate of economic growth. A further problem is that, according to Mankiw, Romer and Weil 1992, the elasticity of output by capital (α) is almost twice as what is supposed by neoclassical theory on the basis of income distribution proportions. In the neoclassical model, the effect of time factor is also increased by the fact that one considers as capital only physical and, within it, usually merely fixed capital. Thus, there is no return to human capital as well as to scarce natural resources, viz. to arable land and mineral wealth (in our time, chiefly crude oil and natural gas resources). The effects of disregarded factors are very divergent in different countries, sectors and phases of economic development. Therefore, there is no explanation for many growth phenomena, while mass media are occasionally resounding with various "economic miracles".

Several researchers, namely P. Romer and R. Lucas Jr. endeavored to *endogenize the neoclassical growth model by including components of human capital*, such as research and development (R&D), education and learning by doing, to explain the time-dependent technical progress of the Solow model. But in essence, they also gave up the first-degree homogeneity of the growth model (Romer 1986, 1994; Lucas Jr. 1988). These endogenous models were sharply criticized by Solow 1994 and Jones 1995.

Growth mechanism determines not only an economy's dynamics, or the change rate of its output, but also its stagnancy, or the level of development. An adequate growth model must give an answer to the questions why there are such extreme income differences between developed and developing countries and what the role of growth factors is therein. In the case of the neoclassical model, the underestimation of the parameter α leads to divergences by order of magnitude in comparing the incomes of developed and developing countries (Romer 2012). A similar role is played by differences in human capital, as well as in natural, mainly oil and gas resources if the latter facts are disregarded.

2.3.2. Basic Assumptions of the General Model[5]

A *general model* mapping economic growth mechanism should retain the positive features of the Solow model. The latter features include the determinant role of supply, homogeneity of degree one and a constant return to scale. Such an approach would make it possible to overcome the existing problems. To the author's knowledge, it was *Professor György Simon, Sr.* who first aspired to achieve that objective relying on his latest empirical results. The *basic assumptions* made in this connection by him are presented below.

[5] A detailed description of the general model and its verification procedure can be found in the Appendix.

2.3.2.1. For economic growth, two groups of acting causes can be distinguished: *growth and other factors*. Growth factors fundamentally determine output. Other factors can change the quantity or efficiency of all factors, thus affecting economic growth, primarily in the short run. Within their scope are, inter alia, the weather, natural catastrophes (e.g. floods, hurricanes), certain political events (wars, civil wars, regime changes, military coups, etc.), economic policy, corporate governance, business cycles and international economic conditions, viz. world-market prices, exchange rates, capital and labor force flows, as well as economic integration. The *efficiency impact* of other factors can be evaluated by comparing an economy's actual performance with the performance according to the general model.[6]
2.3.2.2. Among *growth factors* fall labor, physical and human capital, as well as time. Labor can be reproductive and creative. R&D represents a specialized form of creative labor, while non-specialized creative labor is often called "learning by doing" in the specialist literature.
2.3.2.3. The *amount of labor* (*M*) is expressed by working years in the general model. Theoretically, one must consider the length of working time as well as labor intensity. However, for working time statistical data are only partly available and not always reliable, whereas for labor intensity there are no data at all. Actually, working time relatively moderately affects output, mainly because in case of longer hours of work there is a diminishing labor intensity. Besides, less time is spent on extra-school acquisition of knowledge, therefore *labor creativity* is smaller (cf. Simon 2001).
2.3.2.4. The *fundamental types of physical capital* are fixed capital, arable land and mineral wealth. The latter is represented by the oil and gas resources in the general model. The stock of fixed capital is its average annual gross value at comparable prices. The other two types of capital can be measured by natural indicators in hectares and metric tons of oil equivalent, similarly to labor and human capital.
2.3.2.5. The main *components of human capital* are the workers employed, as the basic component, education, viz. the number of schooling years, as well as the scientists and engineers engaged in research and development, considering the time spent on research.
2.3.2.6. In growth mechanism, *time* together with space is a frame of reference, which plays a manifold role. In growth models, time coordinates are concretely (yearly or quarterly) taken into consideration, while space coordinates figure with a country and therein a sector or branch denotation. Time is also an *event space* for both reproductive and creative labor. As a growth factor, it appears in connection with creative economic activity.
2.3.2.7. Growth mechanism contains certain *effect lags*. In terms of research and development, it is on average two years, which is taken into consideration in the general model.
2.3.2.8. Growth factors exert their effect together, in an *interaction* with each other. There are four fundamental interactions: additive, multiplicative, inverse multiplicative and exponential. The neoclassical model reckons with the first two, but the other two are also of utmost importance. Thus, the *inverse multiplicative interaction* derives from the fact that the return to capital types depends on their ratio to the number of persons employed, their so-called *intensity*. In this connection, we distinguish *capital intensity* (K/L), where K is the stock of fixed capital, *land intensity* (Z/L), where Z is the area of arable land in hectares, *mineral wealth intensity* (O_{t-1}/L), where O_{t-1} is the oil and gas wealth in metric tons of oil equivalent at the end of the year preceding the reference year, *education* (H/L), where H is the number of schooling years, and *research intensity* (R_{t-2}/L), where R_{t-2} is the number of scientists and engineers engaged in R&D in the second year preceding the reference year.
2.3.2.9. In the general model, intensity indicators figure as *intensity functions* (see the Appendix), which are normalized intensity values increased by unity in a logarithmic form.

[6] Among the other factors, the role of international economic conditions and economic policy has been dealt with, inter alia, in the following papers: Simon and Simon Jr. (2005, 2006) and Simon Jr. (2006, 2007).

By a logarithmic conversion, the exponential interaction between various intensity types can be written down in a multiplicative form. The degree of logarithmic conversion can be regulated with normalizing coefficients, similarly to the Box-Cox transformation (see e.g. Hansen 2014). The normalizing coefficient of capital intensity depends on prices used. When shifting to other prices, it should be modified by the price index of fixed capital.

2.3.2.10. In case of certain modification – by taking for zero the independent role of time and considering the number of employed – growth mechanism can be mapped by *concretizing the parameter α of the Solow model* with the use of intensity functions and the time factor. Thus, the range of growth factors (*Z*, *O*, *H*, *R* and *L*) is complemented, and the model will comprise the inverse multiplicative and exponential interactions. The *time factor* will have a new role, the role of the event space of creative activity. This model structure is economically motivated by the fact that the economy, with the appearance of fixed capital, or tools, stepped from the initial state and, in the course of its development, increasingly became a function of capital equipment. Moreover, a successful operation of human capital also supposes adequate physical capital equipment.

2.3.2.11. The connection between the effects of fixed capital intensity and economic growth is contradictory, as there are both accelerating and decelerating effects, or in a cybernetic language, positive and negative feedbacks. The situation is similar with other types of physical capital.

2.3.2.12. The general model through intensity functions maps not only *economic growth* comprehended as a quantitative change, but also *economic development* from the initial state without tools to our days and presumably even beyond. Why is it important? First of all, a good part of developing countries even today is not too far from the initial state of the economy lacking physical capital. In that sense, the past is here in the present, and world economy cannot be understood without knowing the past. The same is true for the future. There are economic sectors, e.g. power stations or chemical plants, being almost completely automated today and thus representing the technology of the future. So the future, too, is here in the present.

2.3.2.13. The *main characteristic of economic development* is the rise in productivity (*Y/L*, *Y/M*) through technical progress embodied in physical and human capital. It should be stressed that according to the general model, there is no disembodied, exclusively time-dependent technical progress, which "falls like manna from heaven". To raise productivity, one needs to increase physical and human capital intensity and/or conduct R&D, which requires inputs, i.e. accumulation in a wider sense. This is a very important moment, as *it draws attention to influencing economic growth not only in a short, but also in a longer run, to the possibility of forming a conscious and efficient economic policy*. The three *components of technical progress* are its immobile, mobile and creative types. The first two appear where new technology is used, the third where it is created.

2.3.2.14. Any type or component of technical progress comes into being as a joint effect of several growth factors, therefore the function used to map it can be called a *complex factor*, or otherwise a factor of technical progress.

2.3.2.15. The direction of the *immobile technical progress* in the course of economic development is positive to the end; the attribute immobile, similarly to mobile, pertains to the direction of effect. Its main characteristic is the increase in elasticity of output by physical capital at higher values of intensity functions. Kaldor 1957 in his technical progress function supposed that research and development should affect economic growth through investment. This, in essence, can also refer to other types of physical capital: arable land and mineral wealth. Thus, it is mechanization and chemicalization that make it possible to increase the area cultivated by an agricultural worker. Furthermore, technical progress has a prominent role in the exploration of mineral wealth, the crude oil and natural gas resources.

2.3.2.16. In the course of immobile technical progress, the elasticity of output by physical capital begins with zero at the outset of economic development and then asymptotically tends to unity (function G_I) during a gradual *transition to an automated social production*, whereas capital intensity as a result of R&D is not increasing limitedly. As is well-known, *in our days research is dominated by a few developed countries, primarily the United States*. The technology created there reaches other countries by means of foreign trade, as well as capital flows and multinational companies.

2.3.2.17. The *mobile technical progress* first increases and then decreases the elasticity of output by capital. It plays a very important role in the initial phase of economic development, but later on, its effect slackens. Moreover, at very high values of capital intensity it asymptotically tends to zero (function G_M). This type of technical progress emerges through technological changes and better work organization (e.g. a shift to moving band production, specialization and cooperation, etc.), which largely depends on the magnitude of capital intensity: to a certain level, positively and, later on, negatively, since the increasingly massive, in many cases automated productive equipment becomes inertial, resistant to changes. *The effect temporarily ensuring a very significant return is one of the fundamental causes of the rising and later falling "economic miracles".*

2.3.2.18. The *creative technical progress* is expressed in a productivity rise induced by specialized and non-specialized creative activities, the work of researchers and other qualified workers. The effect is larger if workers are more qualified, the employment share of scientists and engineers engaged in R&D is higher and more time is available. The creative technical progress, like the mobile effect, depends on capital intensity, since a more developed technology initially provides more opportunities for further development but subsequently becomes increasingly difficult because of the enlarged inertial effect. In addition, with technical progress, the returns to education and particularly R&D are rapidly increasing, as they amount to many times the social expenditures on these objectives.

2.3.2.19. The elasticity of output depending on creative technical progress, the function G_{KR}, can be mapped by a product of three components ($G_H\, G_R\, G_T$). The first concerns the impact of education (G_H), the second research and development (G_R) and the third time (G_T).

2.3.2.20. While increasing the growth factors in the same proportion at a point in time, the output in the general model also increases in that proportion. Thus, like in the Solow model, a *constant return to scale* is fulfilled. However, in the general model, the constant return to scale does not exclude that the return to some factors could be increasing, since there is a factor, the number of employed, the return to which is negative and, in an absolute value, equals the joint return to all the other factors. The negative return originates from the fact that if solely employment is increased, there will be a decrease in the indicators of intensity, in the returns derived from them.

2.3.2.21. The return to labor in the general model is constant. The marginal product of labor does not differ from its average product. The elasticity of output by labor is unity, whereas that by the other factors, according to the preceding basic assumption, is jointly zero. Thus, despite the possible existence of increasing returns, *the general model is homogeneous of degree one*.

2.3.2.22. The *verification of the general model* has required a world economic investigation, while the estimation of parameters a sector- or branch-level one, exclusively treating manufacturing, the pulling sector of the modern economy, where the bulk of R&D activity is concentrated today (see the Appendix).

3. The "Chinese Model": Policy Issues

Recently it has become fashionable to speak of a "Chinese model". According to Tálas 2011: 311,

"the 'Chinese model' is a catch-up model fitting into the worldwide process of modernization which has emerged in the most populous independent country of the world with the oldest continuously existing civilization under specific historical circumstances in the globalizing phase of capitalist world development and which has demonstrated to the Chinese people and the world greater results in a relatively short time than all the foregoing catch-up attempts."

A fundamental requirement for the country's political leadership is not the maximal assertion of individual freedoms, but the defense of collective rights, social justice and solidarity in accordance with the traditional Confucian principles (ibid. 331). But how has this model evolved? This will be discussed in the next section.

3.1. The Maoist Era

On October 1, 1949, the *People's Republic of China* (PRC) was proclaimed in Beijing, bringing to power the *Chinese Communist Party* (CCP), which had *adopted Marxist ideology and believed in class struggle and rapid industrial development*. Extensive experience in running liberated areas and waging war on both the Japanese and the *Kuomintang*[7] had given the CCP deeply ingrained operational habits and proclivities. A land reform had begun in parts of the country under Communist control already before 1949. By redistributing land to landless and smallholder peasants, the *Agrarian Reform Law* adopted in June 1950 virtually eliminated rural landlords as a class. When Mao's regime began to establish localized mutual aid teams, *China's countryside was placed on the path toward collectivization*. Although Nationalist China had participated in the *General Agreement on Tariffs and Trade* (GATT) since January 1, 1948, the PRC withdrew from it on May 5, 1950. *By 1951, the CCP brought under its control the whole mainland, having confined the defeated Kuomintang largely to the island of Taiwan.* Inheriting a war-torn economy, the *Central People's Government* led by *Mao Zedong*, Chairman of the CCP Central Committee, focused its attention above all on restoring public order and curbing hyperinflation which had gained ground under the Kuomintang administration. To rehabilitate the economy and undercut the inflation, the CCP tried to discipline the workforce, win over the confidence of the capitalists and implement drastic fiscal policies. However, in 1951–1952, several Chinese capitalists were accused of bribery, tax evasion, theft of state property and economic information, and cheating on government contracts. Moreover, even some Communist cadres were targeted who had become too close to the capitalists (Kapitsa 1979: 6–26).

Originally, Mao Zedong saw China's future in the Sino-Soviet relations and a Soviet-type centrally planned economy. Therefore a *State Planning Commission* was set up in 1952. Western hostility to the PRC, sharpened by the latter's role in the Korean War (1950–1953), contributed to the intensity of the ensuing Sino-Soviet relationship. After the victory of socialist revolution, the primary objectives were the liquidation of starvation, the reconstruction of the national economy and the development of heavy industry. A priority goal was to raise China to the status of a great power. While pursuing this goal, the centre of gravity of Communist policy shifted from the countryside to the city, but Mao insisted that the revolutionary vision forged in the rural struggle would continue to guide the party. Mao's stance was necessitated by the current international situation and the foregoing experience of

[7] The Chinese National People's Party led by Generalissimo *Chiang Kai-shek*.

the Communist movement. *Later the CCP's economic policy substantially changed as the PRC increasingly come into conflict with the USSR* because of the *de-Stalinization process* initiated by *Nikita S. Khrushchev* at the 20th Congress of the CPSU in February 1956 (Thürmer 2013: 9–10).

The CCP established a state control of foreign trade, confiscated the property of big (bureaucratic) business and gradually sequestered a major part of foreign enterprises. As a result, a state socialist sector emerged, which gained key positions in finance and banking, heavy industry, sea and railway transport and foreign trade. *By the end of 1952, the reconstruction of the war-torn national economy had been completed. The agrarian reform was accomplished, with the exception of some national minority areas, in February 1953.* In the cities, however, many former bureaucrats and capitalists were retained in positions of authority in factories, businesses, schools and governmental organizations. Thus, the Communist leadership temporarily accepted out of necessity the lower priority for revolutionary goals and a higher place for organizational control and enforced public order.

During 1952–1954, the Chinese Communists established a set of central ministries and other government institutions that were close copies of their Soviet counterparts. *On September 20, 1954, the first session of the National People's Congress* (NPC) *adopted the first Constitution of the PRC.* However, the CCP's attitude toward popular participation in politics soon became more rigid and bureaucratic than it had been before the socialist revolution. Many Communists considered these changes a betrayal of the revolution, and the issue eventually began to divide the once cohesive revolutionary elite (Kapitsa 1979: 27–76).

The implementation of the *First Five-Year Plan* (1953–1957), linked with the transition to collective forms of economic management, initialed *China's rapid industrialization*. A strong central governmental apparatus supervised the rapid development of heavy industry where the vast majority of investment went leaving agriculture relatively starved for resources. The plan provided for substantial income differentials to motivate the labor force in the state sector, and it established a "top down" system in which a highly centralized government apparatus exercised detailed control of economic policy through industrial ministries in Beijing. Despite some serious policy issues and problems, the Communist leadership seemed to have the overall situation well in hand. Public order improved and many saw a stronger China taking form. Some *important industrial sectors were newly created*, such as aircraft, automotive and machine-tool industries, as well as the branches of chemical, machine-building and defense industries. *The First Five-Year Plan was explicitly modeled on Soviet experience* and the Soviet Union provided both material aid and extensive technical advice on its formulation and execution.

The Soviet government assisted China in the building and reconstruction of industrial objects and to deliver the necessary equipment for which the Chinese government paid by deliveries of consumer goods to the Soviet Union. *The enterprises built with Soviet assistance laid the foundation of China's modern industry and subsequently ensured the implementation of the country's industrialization.* These enterprises allowed the PRC to create new branches of industry and increase capacities producing the main sorts of industrial output. China's industrialization was also assisted by thousands of Soviet specialists and by the provision of extensive scientific and technological documentation. In Soviet enterprises and institutions of higher education, many Chinese specialists and workers were trained. Bilateral trade was successfully developing and cultural relations were widening. But since Soviet financial assistance was in form of loans, not grants, China had to repay more each year than it borrowed in new funds. Thus, *the PRC after 1956 could no longer count on the USSR for net capital accumulation in its industrialization efforts*. *A significant assistance in the development of Chinese economy was provided also by East Germany, Poland, Czechoslovakia, Hungary and other socialist countries.* The Soviet Union also played a major

role in China's foreign policy. Coordinating with the USSR, the PRC supported revolutionary activity throughout Asia and opposed compromise with neutralist regimes.

Meanwhile, in 1955, village-based brigade cooperatives emerged. *By the end of 1956, the overwhelming majority of China's peasant holdings had been organized into advanced agricultural producers' cooperatives.* These cooperatives modeled on Soviet collective farms brought with them the outside political controls that were necessary to extract the agricultural surpluses required to pay for China's capital equipment in its industrialization and to feed the workers moving into the cities to man the growing industries. Thus, Chinese agriculture had reached the approximate level of collectivization achieved in the Soviet Union – a peasant owned his house, some domestic animals, a garden plot and his personal savings. Mao combined the transformation of agriculture with a call for a socialist transformation of industry and commerce, in which the government would become, in effect, the major partner. Therefore, in 1955–1956, *most of private capitalist industrial and commercial undertakings were transformed into state capitalist* (mixed state-private) *enterprises managed by the government*. Many Chinese capitalists saw this transformation as an almost welcome development since it secured their position with the government while costing them little in money or power. It was envisioned that the former owners of private enterprises would annually receive for some years five percent of their capital. Small private commercial and cottage craft enterprises formed cooperatives.

The de-Stalinization policy announced by Khrushchev in February 1956 *angered Mao Zedong* for two reasons. Mao correctly thought that it would undermine Soviet prestige, with potentially dangerous consequences for Eastern Europe, and he chafed at Khrushchev's warning to other Communist parties not to let a willful leader have his way unchecked. Thus, *antagonisms* based on different national traditions, revolutionary experiences and levels of development that had previously been glossed over *broke through to the surface in Sino-Soviet relations*. The *1st session of the 8th Congress of the CCP* (September 1956) confirmed the party's basic line on the construction of socialism and emphasized that the Chinese Communists should be guided by the ideas of Marxism-Leninism. However, the *2nd session of the 8th Congress of the CCP* (May 1958) revised the decisions of the 1st session and replaced them by the course of *Three Red Banners*, including a New Basic Line, a Great Leap Forward and rural People's Communes, which essentially meant a rejection of planned economic development and caused a crisis in the national economy.

As economic difficulties provided reasons for moving away from the Soviet model, many Chinese leaders began to question the expediency of closely following the USSR. In this situation, *nationalists livened up in the CCP*, who during the Sino-Japanese War (1937–1945) and the subsequent Civil War (1946–1949) as well as in the first years of people's power followed, though not always consequently, the Chinese Internationalists, the CPSU and the world Communist movement. *The leader and chief ideologue of these nationalists was Mao Zedong. It was under their influence that the Chinese leadership decided to carry out the Great Leap Forward.* It was aimed at transforming agricultural cooperatives into *people's communes*, in which the principle of payment by results was abolished, all auxiliary household plots and personal property were socialized, and a military organization of life and work was introduced. The people's commune was a rural unit that pooled the labor of tens of thousands of peasants from different villages in order to increase agricultural production, engage in local industrial production, enhance the availability of rural schooling and organize a local militia force. An important element of the course on Great Leap was the decision on the switch-over of a significant part accumulated funds to an accelerated creation of China's own missile and nuclear potential in accordance with Mao's strategy of combining nuclear deterrence with guerrilla warfare (ibid. 77–103).

The *Great Leap Forward* triggered by a poor harvest in 1957 was made between 1958 and 1961. It represented an attempt of *rural-based industrialization* using traditional technology to produce inputs and mechanization for agricultural production. The basic idea was to convert the massive labor surplus in China's hinterlands into a huge production force through a radical reorganization of rural production. A social pattern emerged of a town with a group of villages functioning as an essentially self-sufficient unit. *Traditional market towns became people's communes, the villages became brigades, and sub-village or smaller village groups became production teams. Individual households were at the bottom of this economic division* (Rosser and Rosser 2004: 427).

Mao believed that through radical organizational changes, combined with adequate mobilization techniques, the Chinese countryside could be made to provide the resources both for its own development and for the continuing rapid development of the heavy industrial sector in the cities. Through this *self-sufficient development strategy of "walking on two legs"*, meaning a *departure from the Soviet model*, China wanted to ensure the simultaneous development of industry and agriculture and, within the urban sector, of both large- and small-scale industry. However, *the Great Leap disorganized the national economy*; many productive capacities were put out of action, and the volumes of industrial and agricultural output sharply contracted. Serious difficulties emerged in the provision of population with industrial and agricultural goods (Kapitsa 1979: 162–167). The catastrophe in agriculture caused the worst *famine* in China's recorded history, with 15 to 30 million deaths occurring during 1959–1961 (Smil 1993: 17). Rural industry developed in backyard production facilities, and pig iron and other basic industrial goods output increased in 1958–1959, although the quality was generally very poor. Industrial output growth decelerated in 1960 and fell sharply in 1961 as disorganization and catastrophe overwhelmed the economy (Rosser and Rosser 2004: 427).

The Great Leap Forward was a major economic failure, because it constituted a fundamental attack on the institution of family, the basic unit of Confucianism and the backbone of Chinese society. That society was altered by a planned economy in which the government provided food, housing, health care and schooling to all the people. But while the Chinese people were often short of material comforts, crime rates were low and corruption was not tolerated (Wang 2007: 99–100).

After the failure of the Great Leap, Chairman Mao, who continued to head the CCP dealing with general political questions, gave the administrative and day-to-day direction of party and state affairs to *Deng Xiaoping*, General Secretary of the CCP Central Committee in 1956–1966, *Liu Shaoqi*, President of the PRC in 1959–1968, and *Zhou Enlai*, Premier of the State Council of the PRC in 1954–1976. The CCP worked out a series of documents on *adjustments in major economic policy areas*. The communes were to be reorganized to make them small enough to link peasants' efforts more clearly with their remuneration. *Individual and family enterprises were restrictively permitted as well as household farming and free-market sales of agricultural produce. In central planning, development priority was reversed from heavy industry to agriculture, with light industry favored over heavy industry.* Famine disappeared as both agriculture and manufacturing were growing solidly. *Deng was a crucial figure in this policy shift.* By 1962 in many areas of rural China the collective system in agriculture had broken down completely and individual farming was revived. Then the unit of rural income accounting was lowered from the brigade to the production team, where it remained until 1978. In industry, the hands of managers were strengthened and workers' efforts were made more closely attuned to their rewards. Similar policies were adopted in other areas.

Meanwhile, *disagreements with the Soviet Union led to an ideological split which induced Moscow to withdraw all its specialists from China and terminate assistance to it in*

July 1960. *Mao perceived Soviet policy after Stalin's death* (March 5, 1953) *to have degenerated into "social imperialism"*. He and his closest associates became convinced that China, too, was headed down the road toward revisionism. Therefore they used class struggle and ideological campaigns, as well as concrete policies in various areas, in an attempt to prevent and reverse this tendency (Rosser and Rosser 2004: 418, 422, 426–428). Simultaneously, *the Chinese leaders began pursuing a line on curtailment of economic links with socialist countries and reorientation of those links toward capitalist countries*, expanding them chiefly with Japan and Western Europe. As a consequence, China's scientific-technological, cultural and social contacts with other socialist countries were almost totally thwarted. Moreover, China challenged the Soviet Union's system of alliance by forming closer ties with Albania between 1961 and 1978. From 1960, there was a sharp rise in the frequency of illegal crossings of the Sino-Soviet border. To avert further incidents, the Soviet government initiated consultations with its Chinese partners, which started in Beijing in 1964 on the specification of the boundary on its certain sections. However, these consultations were soon interrupted by the Chinese leadership. Although the issue of the Sino-Soviet border had long been resolved by treaties between China and tsarist Russia, the Maoists put forward claims on a significant part of the territory of the USSR in the Far East and Central Asia.

On October 16, 1964, the PRC acquired nuclear weapons carrying out its *first atomic explosion*. Although the Soviet Union had supported China's nuclear program for a time, after June 1959 its implementation was taken over completely by Chinese experts. *Following the break with the USSR, the Chinese leadership came out in favor of speeding up the revolutionary process in the developing countries* of Asia, Africa and Latin America by imposing on them the concept of "people's war of Chinese type". Having proclaimed China the centre of world revolution, the Maoists openly announced their claim to leadership in the international Communist and National Liberation movements. *The Chinese interference in the domestic affairs of developing countries of Asia and Africa became especially active from the early 1960s.* The Maoists stirred up conflicts both inside these countries (Iraq, Nigeria, Indonesia, etc.) and between them (India, Pakistan) and were also organizing incursions of Chinese troops (Burma, India). *This policy led to a serious aggravation of relations between the PRC and many African and Asian countries* (Kapitsa 1979: 168–201, 211–238, 304–306, 419–471).

The *Great Proletarian Cultural Revolution* initiated in May 1966 assaulted traditional culture and social values, throwing China into an even greater turmoil than the Great Leap Forward. The debated issues concerned differences over policy directions and their implications for the organization of power and the qualifications of senior officials to lead. Much of the struggle went on behind the scenes; in public it took the form of personal vilification and ritualized exposés of divergent worldviews and lines of policy. The personality cult of Mao Zedong was fanned to an unprecedented extent, accompanied by intensified anti-Soviet and chauvinistic campaigns. A "revolution in the superstructure" envisaged a transformation from a bureaucratically run state machine to a more popularly based system led personally by Mao and a simplified administration under his control.

With the help of public security services and the army, as well as detachments of *Red Guards* and *Rebels* specially organized for show of a mass movement from politically immature school, student and other urban youth, Mao's closest supporters put to humiliations and then banished to "re-education by work" in the countryside or placed under house arrest hundreds of thousands of responsible party workers, civil servants and intellectuals. The relevant directive to "bombard the headquarters" was issued by Mao at a plenary session of the CCP Central Committee in August 1966, which laid down the broad outlines for the Cultural Revolution. The immediate aim was to seize power from "bourgeois" authorities in their urban strongholds. The party committees and popularly elected government bodies in the

provinces and counties were actually dissolved and replaced by *"revolutionary committees"* appointed from above, in which the main role belonged to the representatives of the *People's Liberation Army* (PLA). Trade unions, the Young Communist League and all social organizations as well as schools and institutions of higher education temporarily ceased to function. Hundreds of central and local newspapers and magazines were closed along with all libraries, museums and theatres.

The movement to overthrow provincial party committees and to create new organs of power instead of them started in January 1967. The following "seizures of power" ultimately resulted in the establishment of the above-mentioned "revolutionary committees". The chaos accompanying these acts induced many CCP leaders to call in February 1967 for a halt to the Cultural Revolution. During this attempt to beat back Maoist radicalism, conservative forces clamped down on Red Guard activism in numerous cities. However, this movement was quickly suppressed and a new radical upsurge began. By the summer of 1967, large armed clashes occurred throughout urban China. The Red Guards splintered into zealous factions, each purporting to be the "true" representative of the thought of Mao Zedong. During 1967, Mao called on the PLA under Defense Minister *Lin Biao* to step in, but his politico-military actions produced more division within the army than support from radical youth. In 1968, Mao decided to rebuild the CCP and bring the situation in the country under greater control. Army officers and soldiers were dispatched to take over schools, factories and government agencies. The army simultaneously forced millions of urban Red Guards to move to the hinterlands, thereby eliminating the most disruptive elements from the cities. China's security concerns in connection with the Soviet invasion of Czechoslovakia in August 1968 gave these measures added urgency. At that time, Chinese foreign policy was characterized by a sharp increase in anti-Soviet propaganda and actions. In March and June-August 1969, border infringements and armed clashes between Chinese and Soviet troops occurred in areas of the USSR adjacent to the PRC.

The grave condition of the national economy, disorganization of the country's internal life and the negative outcome of the so-called *Red Guards Diplomacy* (1967–1968) for the PRC compelled the Chinese leadership to set course for rolling back the Cultural Revolution. In April 1969, the *9th Congress of the CCP* was held, with delegates hand-picked by the Maoists. It allowed the army to tighten its grip on Chinese society, as both the Central Committee and the new lower-level party committees being established throughout the country were dominated by military men. It actually rejected all decisions of the 8th Congress, including those on the basic line of socialist construction in China and on the course of the PRC and CCP for unity with socialist countries and the international Communist movement. *The ideas of Mao Zedong were ultimately acknowledged as the ideological foundation of the CCP.* The Chinese leaders announced that in foreign policy, they would hitherto follow the principles of *peaceful coexistence*, the UN Charter and other generally accepted international norms (ibid. 284–303).

The Cultural Revolution initially brought about a new decline in production and living standards, as economic policy was again oriented toward the strengthening of socialized (state and cooperative) ownership. *The policy emphasis from the mid-1960s was on national and regional self-reliance.* The regional element of self-reliance involved substantial decentralization to local government planning units. Fear of a Soviet invasion led to the *Third Front policy***,** which emphasized major industrial expansion in south-western provinces like Sichuan, away from both the Soviet border and the coastal regions vulnerable to U.S. attack. Local areas built input supply systems for industrial production, relying on foundations laid during the Great Leap Forward. The resulting framework of multiple hierarchical levels of responsibility, with restraint by higher levels, allowed for *planning flexibility* crucial for the later period of very rapid growth. In the 1960s and 1970s, *rural industrialization programs*

were carried out, whereas *planning, investment and income distribution* were *significantly decentralized* (Rosser and Rosser 2004: 418, 427–429).

The Cultural Revolution caused inestimable damage to the development of China's scientific and technological potential. The Maoist dogmas in education distorted the way of thinking of entire generations of the Chinese intelligentsia. The initial interruption and the subsequent restoration of instruction had paralyzed the educational system for years. The consequences of nearly two decades of trials for Chinese intellectuals, including re-education by physical work and other humiliations, are felt even today in the shortage of well-trained specialists (Mészáros 2000: 30).

After the 9th Congress of the CCP, the Chinese leadership took some measures to overcome the country's almost total international isolation caused by the Cultural Revolution. *On 25 October 1971, the rights of the People's Republic of China in the United Nations and its Security Council were restored.*[8] *The Sino-American relations were gradually normalized between 1972 and 1978. Developed capitalist countries, particularly Japan, became China's main partners in its external economic links.* At the same time, *the Chinese government,* aspiring to take a leading position in the Third World, *announced the PRC was a developing country.*

The *political situation* in China *after the Cultural Revolution* remained unstable. The struggle continued between various groupings for power and on the main issues of domestic and foreign policies. There was corruption within the CCP and the government, as the terror and accompanying scarcities of goods during the Cultural Revolution had forced people to fall back on traditional personal relationships and on extortion in order to get things done. In September 1971, an abortive assassination plot against Mao led to the murder of his deputy, Lin Biao, who opposed the rapprochement with the United States. Some prominent members of the CCP Central Committee and its Politburo and virtually the entire high command of the PLA were purged in the weeks following Lin's death. After these events, Premier Zhou Enlai with Mao's approval tried to stabilize the system. He encouraged a revival and improvement of educational standards and brought numerous previously repressed people back into office. The national economy continued the forward momentum that had begun to build in 1969, while *China was increasing its trade and other links with the outside world.*

The *10th Congress of the CCP* held in August 1973 condemned the counterrevolutionary grouping of Lin Biao and strengthened the intraparty position of Jiang Qing, Wang Hongwen, Zhang Chunqiao and Yao Wenyuan, the so-called *Group of Four*. *On January 10, 1975, the NPC adopted the second Constitution of the PRC,* which recognized only socialist ownership of people's and collective forms. It confirmed the position of "revolutionary committees" engendered by the Cultural Revolution in the country's political system. Formally, they were bodies of local authority along with the local people's congresses and people's governments. However, in fact, the people's congresses were not being convened, and the "revolutionary committees" gained importance as the political base of the state. The 1975 constitution also defined the status of rural people's communes combining state power with economic management.

In January 1975, Zhou Enlai, with Mao's approval, appointed Deng Xiaoping First Vice Premier of the State Council of the PRC. This resulted in the sharpening of conflict between the ultra leftist Group of Four and the supporters of Zhou Enlai. Deng sought with Zhou's support to put the *Four Modernizations* of agriculture, industry, science and technology, and defense at the top of the country's agenda. He rehabilitated many victims of the Cultural Revolution and commissioned the drafting of documents that laid out the basic principles for work in the party, industry and science and technology. After Zhou's death on January 8,

[8] The Republic of China (later confined to Taiwan) had been a member of the United Nations and a permanent member of its Security Council since October 24, 1945.

1976, *Hua Guofeng* became premier and Deng disappeared from public view to be demoted formally from his government post in April. Mao died on September 9, 1976 and was succeeded by Hua as party chairman. This enabled a coalition of political, police and military leaders to purge the *Gang of Four* and rehabilitate Deng in October 1976. The *11th Congress of the CCP* (August 1977) condemned the Gang of Four and announced the *end of the Cultural Revolution*. It allowed Deng, who had re-entered the central leadership a month earlier and remained First Vice Premier until September 1980, to begin the implementation of Four Modernizations. The tasks set by them found reflection in the *third Constitution of the PRC adopted by the NPC on March 5, 1978*. It envisaged the transformation of China by the end of the 20th century into a powerful state with modern agriculture, industry, defense, science and technology. Some provisions of the 1954 Constitution were restored concerning the status of state organs and the rights of citizens and national minorities. At the same time, as a compromise between hardliners and reformers, it retained for the "revolutionary committees" the competences of local people's governments and called them also the executive bodies of local people's congresses (Kapitsa 1979: 393–418, 472–575; Rosser and Rosser 2004: 428–429).

3.2. The Policy of Reform and Opening

In December 1978, the CCP Central Committee on the initiative of Deng Xiaoping proclaimed a policy of reform and opening. This was the beginning of a new course with primary accent on comprehensive socio-economic and political modernization and development of external links. As an undisputed leader of Chinese reformers, Deng rehabilitated the cadres purged during the Cultural Revolution. He retained a direct control of the armed forces, but eschewed the highest leading positions. From June 1981 to November 1989 he held the post of Chairman of the Central Military Commission of the CCP and from June 1983 to April 1990 was Chairman of the Central Military Commission of the PRC. By the early 1980s, Deng had removed Hua Guofeng and other hard-line Maoists from power. The reform policy was then continued under the formal leadership of *Hu Yaobang*, who in 1981–1982 held the post of Chairman of the CCP Central Committee and then assumed the title of its General Secretary. In 1987, his successor on the latter post became *Zhao Ziyang*, who had served as premier from 1980. Between 1989 and 2002, the Chinese party and state were headed by *Jiang Zemin*. He was succeeded by *Hu Jintao*, who retained the leading position until 2012 when *Xi Jinping* came to power.

The policy of reform and opening led to a gradual demolition of the centralized system of planning from 1979 onward. The emphasis in economic development shifted from self-reliance to an active trade policy with importing foreign capital and technology. In September 1982, the *12th Congress of the CCP* ultimately condemned the Cultural Revolution and declared the party's intention to purge the socialist system of the vices of Maoism. The *fourth constitution of the PRC adopted on December 4, 1982* vested all national legislative power in the hands of the National People's Congress and its Standing Committee. The State Council was made responsible for executing rather than enacting the laws. The general framework of this basic division of power was also specified for each of the country's administrative-territorial units. Eventually, *an economic system has emerged in which state-owned, cooperative, private, mixed and foreign enterprises operate on a formally equal base. The main directions of socio-economic development are determined by the government, which retains control of the key industries, such as power supply, transport, telecommunications or the military-industrial complex.*

The Chinese government initiated price and ownership incentives for farmers, which enabled them to sell a portion of their crops on the free market. The government established

special economic zones (see below) for the purpose of attracting foreign investment, boosting exports and importing high-technology products. Additional reforms, which followed in stages, sought to decentralize economic policy-making in several sectors, especially trade. *Economic control of various enterprises was given to provincial and local governments*, which were generally allowed to operate and compete on free-market principles, rather than under the direction and guidance of state planning. Additional coastal regions and cities were designated as *open cities* and *development zones*, which allowed them to experiment with free-market reforms and to offer tax and trade incentives to attract foreign investment. In addition, state price controls on a wide range of products were gradually eliminated (Morrison 2010: 59–60; Thürmer 2013: 7, 10).

Since the beginning of reform and open door policies, *China has formally entered the world market and privatized poorly operating state-owned enterprises* (SOEs). The government permitted individual business ownership. A liberal joint-venture law and numerous other laws, such as one governing patents, created an attractive environment for foreign capital Thus, *the economic system was dramatically altered, which helped establish China as one of the fastest growing economies in the world* (Wang 2007: 100).

China's reform policy included numerous experiments with regard to agriculture, industry, finance, banking, planning, urban economic management, and foreign economic links. This policy has gone through *several phases* (Simon Jr. 2001: 674–677).

1. The *rural phase of* the gradually unfolding Chinese *reform* (December 1978 – September 1984) led to the establishment of a family-based *household responsibility system* in agriculture, which *replaced the* previous *communal system in the countryside*. This involved recognition of property rights and of production teams' adherence to the principle of "to each according to his work"; restoration of the right to private plots and respect for household boundaries; allowance of free rural markets; and increases in state purchases of and price increases for agricultural commodities.

The household responsibility system introduced in 1979 allowed rural households to manage their own production to achieve maximal output. It recognized household as the principal unit of account and introduced a two-tier price system under which households could freely sell anything they produced above their quota. The quota sales would be at a centrally fixed (and lower) price, while the surplus would be sold at free-market prices. Thus, *the collective farming system was gradually dismantled in favor of a return to family farming*. Agricultural land owned by communes was parceled and, together with other important means of productions, leased out to peasant families, which had contractual obligations to sell certain amounts of grain and some other products (e.g. cotton, oil-seeds, tea, etc.) to purchasing organizations at prices determined by the state. They could freely dispose of the surplus produce through consumption, utilization as forage, or sales on the free market. Moreover, the replacement of the centralized forestalling of agricultural products by contracts and orders preferring producers resulted in a change of the price difference between industrial and agricultural products in favor of the latter. Rural households were allowed to lease equipment from higher units and engage in long-term transferable leases for the right to use land, although land remained formally owned by villages, now juridical entities again since the dissolution of the communes, brigades and teams in the course of *de-collectivization of agriculture*

In China's agriculture *four different systems* came into being, all presuming ultimate land ownership by the villages:

(i) Most widespread is the *dual-field system*, with equal distribution of land for self-provision plots to families and the majority leased out for market production by auction.

(ii) Another is *capitalization of contract rights*, in which monetized shares are bought in farms, a system popular in the more capitalist-oriented southeast.

(iii) A third involves *direct transfers* among farmers *of contract rights to a farm*.

(iv) The fourth is the *collective farm system*, popular in well-off areas, where income is based on a farmer's output relative to a normal target and the collective provides many services (Rosser and Rosser 2004: 431).

In industry, initially mainly *enterprise consolidation* was on the agenda. With a significant expansion of enterprise autonomy, various management reform experiments were carried out in the public sector. The reforms in industry sought to provide material incentives for greater efficiency and to increase the use of market forces in the allocation of resources (cf. Bagchi 1987). *In the rural as well as the urban economy, the Chinese reformers tackled some of the fundamental building blocks of the Soviet system that had been imported during the 1950s.*

After the Cultural Revolution, China's leaders became gradually convinced that large amounts of foreign capital could speed up the country's modernization. In 1979, the first *four special economic zones* (Xiamen, Shantou, Shenzhen and Zhuhai) were created in the provinces of Fujian and Guangdong. Actually, these were industrial parks operating in customs-free areas. *The idea was to move toward opening ever larger sections of the country to extensive foreign trade and investment with an introduction of true capitalist relations.*[9] The *decentralization of foreign economic links* was to facilitate the implementation of the *strategy of modernization and export-oriented development*. With the start of the reform process, China endeavored to avoid disputes and encouraged the peaceful evolution of events in Asia, except the conflict over the Vietnamese invasion of Cambodia. *Diplomatic relations between the PRC and the U.S.* were established on January 1, 1979, with ambassadors exchanged on March 1. *In April 1980, the PRC assumed responsibility for China's relations with the International Monetary Fund (IMF) and the World Bank, previously held by Taiwan.* In 1982, the Chinese leadership announced a policy of "opening in all directions" which, among others, implied the development of economic relations with the Soviet Union and other socialist countries (Rosser and Rosser 2004: 435–436, Thürmer 2013: 6).

2. The *urban phase of reform* (October 1984 – December 1991) brought about a *wider decision-making autonomy for industrial enterprises* along with the *right of profit disposal* and striving for a more efficient resource allocation. The comprehensive market-building, the price reform, the reform of macro-level management and planning, and the separation of government and enterprise functions led to the emergence of a *transitional economic system*, in which the number of obligatory plan targets was substantially reduced and an increasing role was given to methods of market regulation. *The system of planning would now comprise obligatory and guiding plans, whereas the price system would consist of obligatory plan prices, so-called guiding plan prices or contractual prices, as well as free prices. In agriculture, lease transfers were permitted, and the government supported various forms of tenancy on the principles of compensation and commodity character of land use.*

In 1984 and 1985, China concluded agreements on the reconstruction of industrial facilities built during the 1950s with the Soviet Union and other East European countries. In March 1985, the NPC took a decision on a *structural reform in the fields of science and technology* emphasizing that science should serve production with the aim of strengthening the economy. In this connection, the external strategic task was the acquisition of scientific and technological knowledge through such forms of advanced technology imports as license,

[9] Jordán 2000 points out that due to the reform process and policy of opening, the Chinese economy has gone through a significant restructuring and has achieved high rates of growth. Both internal and external factors contributed to this outcome. Of the latter, the inflows of *foreign direct investment* (FDI), the ban on which had already been lifted in 1972, were not only capable of making up for capital shortages, but also facilitated the access to advanced technology and the entry into international markets. We will return to this issue in connection with the discussion of the *globalization effect* below.

know-how and foreign direct investment. The internal strategic task envisaged increasing the role of scientific and technological development in economic construction. The *13th Congress of the CCP* (October-November 1987) set the goal of attaining *by the middle of the 21st century the development level of the middle income countries* (Mészáros 2000: 41–42).

In the mid-1980s, *joint stock companies* were introduced on an experimental basis. In sequel to the policy of opening, a *fifth special economic zone* including the island of Hainan and 14 maritime cities was established in 1986, followed by the creation of a sixth one, the *Pudong New Area* of Shanghai, in 1990. Thus, the deltas of the Pearl and Yangtze rivers were opened for foreign investment, as well as the coastal triangle covering in part the southern counties of Zhejiang and the northern counties of Fujian province. In December 1990, China's first *stock exchange* was opened in Shanghai. *On the models of South Korea and Taiwan, high-tech parks, economic and technological development zones, off-shore processing zones producing for exports and duty-free territories were created.*

In 1979–1981 and 1989–1991, the Chinese leadership, seeking to restore the unbalanced basic macroeconomic proportions and to consolidate the corporate sector, pursued a *policy of adjustment*, which subordinated the dynamics of economic growth to considerations of equilibrium. In 1988, tighter central price controls were temporarily imposed by the government of *Li Peng* in order to cut inflation. *Mikhail S. Gorbachev*'s *visit to the PRC in May 1989 resulted in a complete normalization of Sino-Soviet relations, and laid the foundation of strategic partnership between Russia and China after 1991.* Meanwhile, thousands of students had occupied *Tiananmen Square* to demand democracy, but their movement was crushed by the army in June 1989. Deng supported the crackdown, seeing the uprising as too dangerous for the system. He managed to defend the socialist society, so *China for the time being avoided the fate of the East European socialist countries* (Rosser and Rosser 2004: 430, Thürmer 2013: 2). Although the Chinese economy relatively quickly overcame the consequences of ensuing capital flight and reduction in revenues from tourism, the departure abroad of young intellectuals may have set back for years the country's scientific and technological development (Mészáros 2000: 30).

3. *In 1989–1991, the collapse of communism in Eastern Europe and the subsequent disintegration of the Soviet Union deeply disturbed the Chinese leaders*, some of whom tried to slow down economic liberalization. As China's elderly revolutionaries reverted to a more conservative economic policy in an attempt to re-establish control over the CCP, Deng Xiaoping sought to renew the reform efforts. As a result, *the Chinese leadership resumed economic reforms in 1992*, following Deng's visit to Shenzhen, near Hong Kong.

On 9 June 1992, Jiang Zemin announced at a High Party School students' conference that the CCP's main task was the construction of a *socialist market economy*. This was officially made the objective of the reform of economic management by the *14th Congress of the CCP* (October 1992). The necessity of *linking up plan with market through effective coordination* induced Chinese decision-makers to *shift the focus of economic policy from the demolition of old institutions to the building of a new system*, from individual and partial measures to complex and coordinated reforms. To increase the own assets of enterprises, the foregoing rather low rates of depreciation were revised and, for the technical overhaul of productive equipment, a faster writing-off was introduced. In the course of transition to a market economy, *industrial policies of gradual adaptation to market conditions* and the requirements of more efficient management were pursued. Following Japanese and South Korean patterns, relatively competitive companies and company groups were established. *In November 1993, the CCP held a plenum* to accelerate reforms in the fields of banking, taxation, trade and capital construction, *which confirmed the party's desire to achieve a socialist market economy*. Since then, *only in larger SOEs has majority ownership been retained*. But even these enterprises are to be transformed into companies and, in some cases,

into joint stock companies, whereas smaller firms could be leased out or sold (Jordán 1996: 48).

In January 1994, the earlier double exchange rate of the *Chinese yuan* (CNY) was abolished. Instead, a *unified* official *exchange rate* was *introduced* on the basis of the level determined on inter-enterprise foreign exchange markets. In 1996, the *convertibility of the yuan on the current account* was achieved. Emphasizing the need to diversify the relations of ownership, the Chinese leadership at the *15th Party Congress* in September 1997 took a decision on a *large-scale privatization* of SOEs. In 1999, the *private sector* was *recognized* as legitimate in the Constitution of the PRC. In 2000, Jiang Zemin formulated the *idea of three representations* implying that the CCP represents the interests of progressive productive forces, the progressive culture and the basic interests of the vast majority of the Chinese people.

The comprehensive *reform of the financial, budget and tax systems* had a basic objective to increase budget revenue and make it more transparent, as well as to form a more rational and fair proportion in tax revenue between the central and territorial budgets. With respect to budget revenue, the authorities strive for rational savings and a more effective use of resources relying on a more rigorous control.

The *bank reform* has led to the emergence of a *three-tier banking system*. At its first tier is the country's central bank, the *People's Bank of China*, which regulates the financial sphere and also exercises control and supervision over it. At the second tier, the *specialized state banks* and the *commercial banks in mixed ownership* can be found, which carry out financial transactions. Between these two tiers are the so-called *political banks*, such as the State Development Bank, the Import-Export Bank of China and the Agricultural Development Bank of China, which support the implementation of the government's investment, trade and agricultural policies. These banks accumulate financial assets and invest them in production. However, China's financial system still faces many problems, the greatest of which lie in its low-efficiency banking management and a vast number of bad loans.

Deng Xiaoping believed that under Chinese conditions, two social systems *were possible within one state.* According to this logic, one could speak of socialism in the PRC and of capitalism in Hong Kong and Macau. *China's policy of "one country, two systems" provided a framework for successful negotiations with the United Kingdom on the return of Hong Kong in 1997 and with Portugal on the return of Macau in 1999.* These territories were given special administrative status. *On December 11, 2001, the PRC acceded to the World Trade Organization* (WTO). The struggle over accession brought conflicts between pro- and anti-reform groups to a head. Although China has increasingly opened to foreign trade, trade barriers between provinces have proliferated, partly reflecting each province's broader tendency to go its own way. At the same time, China generally assumed a more constructive, less combative stance in international organizations and became an advocate of arms control (Rosser and Rosser 2004: 430, 436; Thürmer 2013: 6–7, 10–11; Wang 2009: 118).

The 16th Congress of the CCP (November 2002) *entered the idea of three representations into the Party Constitution*. This concept like earlier party decisions focused on economic development. The working class retained its position among the social groups represented by the party, but a stronger voice was given to public interests. With reference to the representation of progressive productive forces, room was made for representatives of entrepreneurial, essentially capitalist, strata in political life, including the CCP. In 2003, the Chinese government set up a *State Asset Supervision and Administration Commission* (SASAC) to control the activities of about 180,000 public firms. Simultaneously, several *industrial ministries were wound up*. *About a half of state-owned enterprises were transformed into stock companies and became quoted on the stock market.* Today the SASAC

coordinates the economic activity and cadre policies of 108 giant state corporations (Thürmer 2013: 7, 11).

When Hu Jintao came out in favor of a scientific development approach, this was enacted in the Party Constitution by the 17th Congress of the CCP held in October 2007. This approach includes scientific socialism and the striving after sustainable development, social welfare and a harmonically developing socialist society. The Chinese leaders realized that rapid economic development yielded not only results, but also contradictions. Although there was a rise in the living standards of the whole society, the life of urban population changed faster than the life of villagers. *Tensions appeared between the rich and the poor, and corruption became a serious social problem. The raw material and energy intensity of economic development turned out to be extremely high and thus unsustainable in the longer run.* It also became questionable how long economic growth could be based predominantly on exports (ibid. 8).

The 18th Congress of the CCP (November 2012) *modified the Party Constitution declaring that the party's basic line followed, along with Marxism-Leninism, the teachings of Mao Zedong, the theory of Deng Xiaoping and the idea of three representations, the scientific development approach*. At the Congress, *Xi Jinping confirmed that socialism with Chinese specifics would remain the party's long-term strategy*. It was also decided that *instead of permanent export expansion, increasing domestic consumption must become the engine of future development*, which would require a rise in personal incomes. In this context, important role will be assigned to considerations of environmental protection and economical management. The Congress stated that this way must be followed so as to arrive by 2020 at a thoroughly developed harmonic socialist society (ibid. 5, 8–9, 14).

3.3. Some Outcomes of the Reform Process

In China, following the Communist takeover in 1949, enterprises owned by comprador and foreign capital were nationalized, including 34.7% of industrial businesses (Riskin 1987: 96). The resulting mixed economy with a small producer, state-owned, cooperative, private capitalist and state capitalist sectors had operated up to the mid-1950s. A large share of industrial output was directed and controlled by the state, which set production goals, controlled prices and allocated resources. During the 1950s, when China followed the model of centralized planning and income distribution, the state-owned sector was expanding rapidly under the impact of industrialization began with the support of the Soviet Union and Eastern European countries. The collectivization of small-scale industries in 1955–1956 led to an almost total liquidation of the small producer sector, whereas private capitalist enterprises were acquired by the state capitalist sector. In the course of the Great Leap Forward of 1958–1961, state-owned enterprises became dominant in the Chinese industry (Simon Jr. 2001: 673).

After initial moves in 1980, major enterprise reforms came in 1984, when most firms were allowed to replace plan targets with *responsibility contracts* that enabled them to retain and freely dispose of any surplus beyond a generally small contracted production and financial obligation (Rosser and Rosser 2004: 433). It should be separately noted that *state-owned enterprises have put a heavy strain on the Chinese economy*. By some estimates, over half of them are unprofitable and most should be supported by subsidies, mainly through state banks. *Government support of such enterprises diverts resources away from potentially more efficient and profitable economic units.* In addition, the poor financial condition of many SOEs makes it difficult for the government to reduce trade barriers out of fear that doing so would lead to widespread bankruptcies and rising unemployment (Morrison 2010: 73). Yet *China's strategy of acquiring advanced technology from abroad has had positive effects on*

output and productivity. That strategy has focused on promoting imports of capital and immediate goods for those production processes which the Chinese economy cannot produce itself. These types of goods that are imported from industrially developed countries are expected to have embodied technical progress that is also relatively cheaper, thus boosting both capital accumulation and its efficiency (Herrerias and Orts 2012: 196).

The policy of reform and opening has mobilized additional sources for technological development. The change was felt primarily in the rapid growth of technology and license imports. Until the mid-1970s only few technology purchase deals had been concluded, but in the early 1980s the number of such deals jumped to several hundreds. This qualitative change was connected with *the rejection of the practice supported by Hua Guofeng who* as Premier of the State Council of the PRC (1976–1980) *sought to insure accelerated development of the Chinese economy through mass purchases of complete plants*. *Instead, license purchases would be preferred.* This policy is advantageous for China from many viewpoints. The pressure from competitors increases the concern of foreign partners in the business. Despite all administrative impediments, it becomes possible for them to enter the market. In addition, the majority of license deals are related to numerous spare parts provision, transport and other service opportunities. At the same time, license purchases also encourage the modernization of domestic production (Mészáros 2000: 33).

The present *principles and forms of China's technology imports* came into being in the period 1981–1985. In order to raise the efficiency of technology transfer, strategic decisions were taken, such as:

- the decentralization of technology imports and a gradual utilization of opportunities offered by the special economic zones;
- a more extensive use of technology imports for raising the technological level of operating industrial facilities;
- the utilization of technology transfer for reconstruction of obsolete plants for raising the quality of output and for saving materials and energy;
- the insurance of the predominance of productive technology in the structure of imports;
- the improvement in conditions of technology transfer through legal regulation; and
- the attraction of bank loans and foreign investments to technology transfer deals (ibid. 33–34).

The policy of opening resulted in a widening range of technology transfer opportunities characterized by such basic forms as information exchange between specialists or imports of machinery and equipment if they represent an adaptable technological level. The latter forms include leasing of machinery and equipment, purchases of licences and know-how, and training of maintenance personnel. Particularly important are foreign direct investments which may cover a whole scope of technology imports.

However, the efficiency of imported technology was low, which can be explained primarily by an inadequate preparedness of Chinese enterprises for adaptation. This made necessary the accentuation of the imports of adequate technology. The centre of gravity in centralized technology imports shifted from machinery, equipment and complete plants to technological software. From the viewpoint of further priorities, those imports became important, which could be used for production of tradable goods. It was joint venture that proved to be most efficient from the viewpoint of technology imports (ibid. 34).

The policy of reform and opening substantially strengthened the entrepreneurial class. In 2007, the number of private enterprises employing more than eight workers was 5.5 million, while the invested capital concentrated in the hands of 14 million people. In these enterprises, 58.5 million employees worked. For the sake of comparison, it is worth mentioning that in 1956, there were 600,000 private entrepreneurs in China. After 1995, their

number increased by 800,000 per annum. The new capitalists have been recruited from urban employees, workers and intellectuals, who support China's contemporary policies. Moreover, today about a third of sole proprietors are members of the CCP (Thürmer 2013: 13).

The market reforms also resulted in the increasing role of the middle class in the Chinese society. The share of middle strata in China's population increased from 15 percent in 1999 to 23 percent in 2007, while in the cities, this share rose from 8 to 48.5 percent (ibid.).

Reform policies also caused substantial changes in the working class. Firstly, the number of workers had expanded. Second, within workers, there was an increase in the share of people coming from the countryside. Third, there was a rise in the number of private firm employees. Significant peasant masses moved to the cities, as the accelerating industrialization increased the need for manpower. In 1978, 118 million people worked in urban industry and services, which corresponded to 29.5 percent of the total employment. By 2007, their number rose to 455 million and their share to 59.2 percent (ibid. 14).

In China, there were large *pressures of people on the land* already during the Great Leap Forward and Cultural Revolution, both of which, despite limited duration, had disastrous consequences for the country's environment. The market reforms unfolding since the late 1970s have spurred economic development in all parts of the country at the cost of arable land. Illegal land acquisition, which implicates local government throughout China, is perhaps the gravest threat to the country's diminishing arable land. The root of the problem is the *lack of a property right to land of farmers*. Local governments illegally lease and sell land, the prices of which have become inflated due to a booming land and property market. *Corruption has become rampant through officials' siphoning off land sale proceeds and abusing land use powers to improperly allotted land.*

At the same time, *increased population, urbanization and economic development have had some benign effects on food production* in China. Certainly, rapid economic development has already made China one of the world's leading economic powers and earned it the foreign exchange to purchase whatever food it cannot produce to sustain its population. But economic development and industrialization in particular have had mostly adverse impacts on food production, such as land erosion, deforestation, desertification, and land, air and water pollution (see McBeath and Huang McBeath 2010: 91–102).

Many rural workers were released from the agricultural sector and transferred to non-agricultural activities in township industries and urban areas. As a result, a significant increase in agricultural output has been achieved despite the fact that production gradually shifted to higher-value non-grain commodities, while grain remained to be subject to some central planning and quotas. The acceleration of agricultural growth after 1978 reflected improved incentives provided by changed pricing policies, loosened restrictions on crop specialization, greater inter-regional trade caused by relaxation of the self-reliance doctrine and a *full shift to material rather than moral incentives*.

However, the further expansion of Chinese agriculture is limited by such factors as the *small size of farms*, disinvestment in infrastructure formerly built and maintained by teams and brigades, unfavorable terms of trade as prices were freed in other sectors and growth began to focus there, whereas some price controls on grain continued, and a long-term decline in the amount of cultivated land. Yet *China's agricultural improvements have been substantial, and its food consumption patterns now resemble those of middle-income countries more than those of poor countries.* The single fact of ending famine in the world's most populous nation is an outcome of historic proportions (Rosser and Rosser 2004: 431–432, Shen 2004: 49–50). A further important achievement is that *China has lifted about 300 million people out of poverty* and plans to move 300 million more out of rural areas into the cities in the immediate future (Wang 2007: 100).

In the reform period, the modernization of Chinese agriculture has aggravated the problems of employment and effective use of the workforce, which were somewhat lightened by the emergence of a wide network of *township and village enterprises* (TVEs) in industry, construction, transport, trade and other services. These enterprises can be viewed as a remnant of the disbanded rural communes. They are establishments of *rural collectives* owned by the governments of towns or villages that formerly comprised the communes and lower-level brigades. Most of the TVEs are small factories, which have taken up land once used for farming in rural areas. A large number of TVE factories sit in industrial parks covering more than a hectare of land. These enterprises, which formally belong to the cooperative sector, are free from central planning and in fact rather operate as private undertakings, some of them even engaging in foreign trade activities.

The managers of TVEs are usually appointed at the county level. The system of interaction between the county, town and village levels of Chinese government with the local enterprises has been described as *local state corporatism*. The "four wheels of rural enterprise" of this system are township-owned, village-owned, jointly owned and individually owned economic units. Many of these entities existed under Mao as commune or brigade enterprises, but they have greatly expanded their operations since then. TVEs face *hard budget constraints* and operate in vigorously competitive markets more than the centralized SOEs. The earnings of the TVEs go not only to enterprise wages and reinvestment, but also to local public services.

Compared to regular SOEs, TVEs have greater flexibility and freedom from central control, allowing them to fill niches where SOEs are limited, such as light industry. TVEs allow local communities to turn control of assets into income, even without access to asset markets. This applies to labor as well in an environment where *labor mobility continues to be limited*, despite some recent loosening of restrictions. TVEs have had a competitive edge over strictly private firms as well because of their lower tax rates, and they have an advantage in negotiating with the authorities. Many of them operate as subcontractors for foreign private firms in the special economic zones or are located near urban areas. Others are the direct extensions of the former suppliers of regionally self-sufficient Maoist rural industrial complexes (McBeath and Huang McBeath 2010: 90–91; Rosser and Rosser 2004: 418, 433–434).

In China's agriculture, the establishment of voluntary associations of individual producers is currently on the agenda for procurement of agricultural technology, joint tillage of land and sales of products. The country's its *food security* remains a primary state objective in the early 21st century. As a developing country, China is now largely self-reliant in food supplies, its farmers producing about 95% of the staples consumed (McBeath and Huang McBeath 2010: 85–86).

Many observers believe China's environment is in crisis (for early studies, see Ross 1988, Smil 1993), as population increases reduce arable land and water sufficiency. At the same time, population stress indirectly increases deforestation and desertification as well as over-fishing. In addition, climate warming has an impact on plant diseases, pests and invasive species. Behind these factors lies the pattern of anthropocentric thought that subjects nature to perceived human needs.

The environmental challenges to China's food producing lands and waters have been huge, and the state has responded in kind with standard bureaucratic routines as well as large-scale projects. The examples of *state responses* are: (1) the policy restricting arable land conversion, (2) the one-child policy, (3) investment in irrigation systems, (4) the South-North Water Diversion Project, (5) large-scale forestation and reforestation campaigns, and (6) the program to convert marginal agricultural lands to forests and grasslands (McBeath and Huang McBeath 2010:. 102).

Of these six state responses, controls on population growth and conversion of arable land, as well as accelerated investment in irrigation systems, probably have had the greatest positive impact on food production. The recent focus of attention in China has been on increasing the efficiency in use and productivity of available arable land. This entails the improvement of cultural practices of farmers and more efficient utilization of fertilizers (Ibid. 109).

Chinese Communist leaders have stated that in a historical perspective, *the primacy of social ownership will for long coexist with other forms of ownership, including private property*. The latter are equal in rank, competing with one another. It has also been declared that labor income will remain the primary form of income distribution despite its probable coexistence with various other forms of income, including capital income, in the long historical perspective. These forms are of equal value. Accordingly, in the last eight-ten years, the development of capitalist forms of ownership speeded up, the class of proprietors became stronger, and the social differentiation also increased (Thürmer 2013: 8).

In 2012, there were 344,769 industrial enterprises in China with annual revenue from principal business of over CNY 20 million. Of them, 280,455 were small, 53,866 medium-sized and 9,448 large enterprises. The share of state, collective and cooperative enterprises made up 7.2, that of private enterprises 55.1, that of enterprises with funds from Hong Kong, Macau and Taiwan 7.5 and that of foreign funded enterprises 9.0 percent. Of the total assets of the surveyed industrial units, 33.7 percent concentrated in the state and cooperative sector, 19.8 percent in the private sector and 22.4 percent in the foreign sector.[10]

In aspiration for equality, the Chinese government rewards inefficient enterprises and punishes the more efficient ones. Therefore efficient enterprises are not willing to reveal their actual results. In the hope of more grants, these enterprises made their situation appear worse than it was in reality. Thus, the two objectives of the Beijing leadership, namely profitability and equality, came into conflict with each other. The government's endeavor to keep under control state-owned enterprises prevents the majority of them from implementing decentralization and raising productivity (see e.g. Xu 1997).

Despite numerous economic and social problems, the reform process brought about the implementation of the most balanced development policy in the history of the PRC. *One of the factors of China's economic and political successes in the past three decades is the ideology and practice of Chinese socialism.* Even Western critics recognize socialism with Chinese specifics, particularly the policy of reform and opening. At the same time, they find unsatisfactory the transformation of the political system and urge further reforms. They deem insufficient the economic reforms as well, demanding a comprehensive privatization and economic liberalization (Mészáros 2000: 29, Thürmer 2013: 2).

The reform process in China has led to a considerable increase in the volume of production and serious improvements in the assortment, quality and competitiveness of the produced goods and services. The stimulation of foreign investment, establishment of joint ventures and exclusively foreign-owned enterprises have facilitated the use of advanced technology and management methods. At the same time, the question of *profitability of state-owned enterprises* has recently become acute, as a significant part of them is loss-making. The economic reform confined to individual sectors and regions has been characterized by successive waves of liberalization and recentralization, whereas in the political sphere, *no system of democratic institutions* resembling those in the developed Western nations emerged (cf. Pin 1999).

[10] China Statistical Yearbook, National Bureau of Statistics, Beijing, 2013: 473.

4. Development of the Economy

The People's Republic of China has enormous territory and population as well as a formidable military potential. Following the convulsions of the Maoist era, its economic growth rate has frequently surpassed the world average, especially in recent decades. All this predestines it to the role of a great power. The policy of reform and opening made China's economy face problems of efficiency and competitiveness. These problems are a consequence of reduced extensive growth reserves exacerbated by the impact of globalization and worldwide technological change.

China's economic development will be analyzed here from the standpoint of the *role of reform*. We search for an answer to the following *main questions*: 1. Has the reform speeded up China's economic growth, and if yes, then to what extent (we will have a closer look at this chiefly in section 5)? 2. How has the China's level of economic development changed before and after the announcement of reform in comparison with India, whose development started from a similar level, and the United States, a superpower representing the advanced world level (the Sino-American economic competition will be considered in more detail in section 6)?

Table 1. *Value Added and Employment by Main Sectors in China*
(in percentage of the total)

Year	*Gross value added in current prices*			*Employment*		
	Agriculture	Non-agriculture	*Of which*: Manufacturing	Agriculture	Non-agriculture	*Of which*: Manufacturing
1955	46.9	53.1	19.1	71.8	28.2	5.6
1978	28.9	71.1	38.1	61.0	39.0	11.4
1990	28.1	71.9	32.6	60.6	39.4	15.0
2000	15.7	84.3	34.9	50.2	49.8	14.6
2010	10.7	89.3	34.8	36.8	63.2	19.2

Calculated from: China Statistical Yearbook, National Bureau of Statistics, Beijing, various volumes; Timmer, de Vries and de Vries 2014; The Conference Board 2015.

First of all, we will examine the *main structural changes that happened in the Chinese economy*. As ascertained from data in Table 1, between 1955 and 2010, non-agricultural activities became dominant in both production and employment. This was accompanied by *a considerable decline in the share of agriculture and a significant increase in the share of manufacturing*, the engine of rapid economic growth, *which corresponded to worldwide trends*.

Regarding *structural changes in employment*, the periods before and after the announcement of reform differ characteristically from each other. The share of agricultural employment has been declining over the whole investigated period. However, in the course of reform it decreased faster (by 24.2 percentage points, from 61.0 to 36.8 percent) than in the preceding years (by 10.8 percentage points, from 71.8 to 61.0 percent). At the same time, the share of employed in manufacturing increased by 5.8 percentage points (from 5.6 to 11.4 percent) before the reform and by 7.8 percentage points (from 11.4 to 19.2 percent) after it.

By comparing *current price* data on the structure of production with data on the structure of employment, one can conclude that up to the present day, in China, like in other developing countries, the price level of manufactured goods is relatively high, while the price level of agricultural product is relatively low.

Table 2. *Expenditure on GDP in China*
(in percentage of the total)*

Year	*Final consumption expenditure*	*Gross fixed capital formation*	*Change in stocks***	*Exports of goods and services*	*Imports of goods and services*
1978	62.8	29.4	8.3	4.6	5.1
1990	61.9	25.7	10.2	15.9	13.7
2000	63.1	33.9	1.0	20.7	18.7
2010	49.6	44.9	2.5	26.2	23.2

* Based on current price data. - ** Including statistical discrepancy.
Source: World Bank, World Development Indicators Database.

How has the *structure of expenditure on gross domestic product* (GDP) changed in China? An answer to this question can be received from data in Table 2, which pertain to the reform period. Previously, the Chinese economy had been characterized by a prevalence of consumption over production. However, since 1990 the situation has changed as China was able to accumulate significant trade surpluses and became a net exporter. China's economy not only increased the degree of its openness but also enhanced its export orientation supported by a *high and increasing rate of investment*.

Table 3. *Average Annual Growth Rates of GDP, Investment and Exports in China*
(in comparable prices, %)

Indicator	*1956–2010*	*1956–1978*	*1979–2010*	*1979–1990*	*1991–2000*	*2001–2010*
Gross domestic product	7.8	4.8	10.0	9.5	10.3	10.2
Gross fixed capital formation	9.4	7.6	10.7	7.9	11.6	13.3
Exports of goods and services	...	...	14.3	10.1	16.3	17.4

Calculated from: China Statistical Yearbook, National Bureau of Statistics, Beijing, various volumes; Summers, Heston and Aten 2006; World Bank, World Development Indicators Database.

Table 4. *Average Annual Change Rates of GDP, Employment and Productivity in China, India and the United States, 1956–2010*
(in comparable prices, percent)

Period	*GDP*			*Number of employed*			*Labor productivity*		
	China	India	U.S.	China	India	U.S.	China	India	U.S.
1956–2010	7.8	5.2	3.1	2.0	2.3	1.4	5.7	2.9	1.6
1956–1978	4.8	4.2	3.6	2.6	1.6	1.8	2.2	2.6	1.8
1979–2010	10.0	5.9	2.6	1.5	2.7	1.1	8.3	3.1	1.5
1979–1990	9.5	5.2	3.0	2.7	3.5	1.8	6.6	1.7	1.2
1991–2000	10.3	5.2	3.3	1.1	2.5	1.3	9.0	2.6	1.9
2001–2010	10.2	7.6	1.7	0.6	2.0	0.2	9.6	5.5	1.5

Calculated from: Statistical Yearbook, National Accounts Statistics, United Nations, New York; Yearbook of Labour Statistics. ILO, Geneva; China Statistical Yearbook, National Bureau of Statistics, Beijing; Statistical Yearbook/Abstract of India, Ministry of Statistics and Programme Implementation, Government of India, New Delhi; Statistical Abstract of the United States, U.S. Department of Commerce, Bureau of the Census, Washington, D.C., various volumes; U.S. Department of Commerce, Bureau of Economic Analysis; Summers, Heston and Aten 2006; Timmer, de Vries and de Vries 2014; The Conference Board 2015.

What characterizes *economic growth* in China *from the demand side*? The general trends are shown in Table 3.

An effective economic policy should encourage investment and exports to increase faster than output (cf. Erdős 2006: 26). It can be stated that in the period under consideration *the growth of Chinese economy was on the whole driven by investment* both before and after

the announcement of the policy of reform and opening. The only exception was the period between 1979 and 1990, when investment grew slower than output. For exports, data problems do not allow us to consider the entire investigated period. However, it is evident that exports increased in China at an accelerating rate during the past three decades and its growth has been more rapid than the growth of both output and investment. In that sense, one can also speak of an *export-led economic growth* in contemporary China (see Table 3).

How dynamic is the Chinese economy internationally? Comparing the reform period with the pre-reform one, we see that *in the course of reform, economic growth in China accelerated by more than five percent per annum*, while the *rate of productivity increase* almost *quadrupled*. In both periods, the number of employed significantly expanded, though in the post-Maoist era the expansion slowed down, which particularly concerns the third phase of reform begun after the turn of millennium. The Chinese economy was initially relying mostly on its *vast labor reserves*. Its growth had predominantly been of extensive character until the late 1970s. By contrast, *the acceleration of economic growth in the reform period was entirely a result of improved productivity*. The average annual growth rate of GDP in China before the reform exceeded the analogous indicators of India and the United States 1.1 and 1.3 times, respectively. In the reform period, the Chinese economy's growth rate surpassed 1.7 times the growth rate of Indian and 3.8 times the growth rate of U.S. economy (see Table 4).

Table 5. *GDP per Inhabitant and per Person Employed in China*
(in U.S. dollars of 2000, at PPP*)

Year	*GDP per inhabitant*			*GDP per person employed*		
	China (USD)	in percentage of:		China (USD)	in percentage of:	
		India	United States		India	United States
1955	356	41.8	2.6	838	33.8	2.5
1978	671	50.0	2.9	1,381	31.0	2.7
1990	1,678	88.2	5.8	2,966	54.6	5.0
2000	4,001	151.6	11.4	7,047	100.5	9.9
2010	9,988	213.6	26.4	17,607	147.6	21.2

* Purchasing power parity: in China, USD 1 = CNY 1.96; in India, USD 1 = INR 7.84.
Calculated from: see the preceding table.

A characteristic feature of the Chinese reform is that *economic growth* did not become slower *in the period of transition* but, on the contrary, *considerably speeded up*. Furthermore, although after the announcement of reform *a decline in the rate of employment* could be observed, this *did not result in the emergence of a nationwide mass unemployment*. It is not difficult to see that the former peculiarity is not a little extent a consequence of the latter. However, it should be noted that the problem of employment has not yet been solved completely. For a part of peasants, farming does not provide secure living anymore, and they mostly find only casual work in other sectors. This is not only a problem of employment but also increasingly a problem of public security and public health, whose solution can be hoped in a longer run, under the conditions of further rapid economic growth.[11]

How has the *Chinese economy's development level* changed since the mid-1950s and since the announcement of reform?

As seen from data in Table 5, China's *GDP per inhabitant* compared to India's analogous indicator went through a 1.2-fold increase in the pre-reform and a 4.3-fold increase

[11] According to a study by the World Bank (Dahlman and Aubert 2001), the main sources of job creation in China in the early 21st century are still such labor-intensive sectors as, for example, textile industry or services. The majority of new jobs are created in construction, transport, communications, tourism and trade, but the importance of high value-added services by the private sector (marketing, logistics, distribution, financial consulting, management, etc.) is also increasing.

in the reform period. As a result, by the end of the investigated period, the indicator in point had become more than twice higher in China than in India. In 1955, the standard of living in China made up less than 3 percent of that in the United States. In the reform period between 1978 and 2010 this proportion increased 9.1 times and eventually reached about a quarter of the American level, having become an *upper middle income country*. In terms of *GDP per person employed*, China improved its performance 4.4 times relative to India and 8.5 times relative to the United States. *Regarding economic potential, China today increasingly becomes a match for the United States.*

Despite rhetoric about developing the rural base, Stalinist industrialization policies increased urban-rural inequality during the Maoist period. Although this inequality decreased during 1979–1984, when rural incomes rose sharply, later the former trend toward inequality has emerged again. The striking development of the 1990s was that income inequality increased sharply in almost all categories, between the coast and the interior, between urban and rural areas. The causes of this widespread increase have been much debated, although this has been a well-entrenched trend since the start of the reform process. Factors that have been identified include the relative decline of the more egalitarian state-owned sector; inflation; impacts of foreign trade; regressive rural fiscal transfer policies; commercialization of urban housing; increases in rent-seeking activities and in insider control and monopoly power and corruption; reduction of urban subsidies; and transfers of benefits to private property. Without question, the sharply rising income inequality has become a serious problem facing China (Rosser and Rosser 2004: 437–438).

Table 6. *Income Distribution in China*

Year of survey	*Income share held by*:						*Gini index**
	lowest 20%	second 20%	third 20%	fourth 20%	highest 20%	highest 10%	
1981	8.7	13.1	17.4	22.9	37.9	22.9	29.1
1990	8.0	12.2	16.5	22.6	40.7	25.3	32.4
1999	6.4	10.3	15.0	22.2	46.1	29.7	39.2
2005	5.0	9.8	15.0	22.2	48.0	31.7	42.5
2010	4.7	9.7	15.3	23.2	47.1	30.0	42.1

* 0 = perfect equality, 100 = perfect inequality.
Source: World Bank, World Development Indicators Database.

In the reform period, income differences increased not only across various strata of the population but also across China's individual regions. According to some estimates, four percent of the population is currently living below the absolute poverty line.[12]China's 1979 *Gini index* on household incomes of 0.33 was less equal than in several other East Asian nations (Riskin 1987: 250). But accounting for social services increases China's equality measure. The Gini index then drops to 0.26 for 1979 (Selden 1993: 157), reflecting the widespread provision of education and medical care in rural areas. Detailed data on *income distribution* in China are available from the early 1980s (Table 6). These show that under the impact of social differentiation caused by the reform, there was a reduction in the income share held by the lower first 20 percent of the population. At the same time, a significant increase could be observed in the relative weight of the highest 20 and therein the richest 10 percent. Therefore the Gini index in China approached the level of the United States.

Maoist policy left more state revenues in poorer provinces and directed investment toward them. However, since 1978 regional inequality at the county, provincial, and broader levels has increased, as investment has been directed more at the coastal provinces. Since the late 1980s, the aspiration for efficiency has come into the focus of economic activity in China.

[12] A communication by Dr. Barna Tálas.

This, among others, resulted in the reallocation of resources into regions promising higher output. As a consequence, increasing differences could be observed in the developmental levels of the country's regions (Jordán 1998: 83).

In this connection, Schiere 2010 argues that a major potential source of social tension in transition and developing countries is not poverty as such, but vulnerability to poverty. He demonstrates how many of the recent reforms to the public sector in China (such as decentralization from central to local government; the reduction in public services provided by the state; the increasing practice of local governments charging formal and informal fees for basic services which were formerly freely accessible; de-collectivization of the rural commune system and market sector experimentation in economic processing zones) have made many households extremely vulnerable to poverty. Having to find funds to pay for health and education leaves households and migrant families exposed, should macroeconomic fluctuations related to factors such as trade, resource imports and financial volatility have an adverse overall impact on the Chinese economy. *To become less vulnerable to macroeconomic shocks, China will need to shift from an export-oriented to a domestic consumer demand-driven development strategy.* This recently announced strategy would need to be supported by strengthening of public service provisions in the health and education sectors as well as expanding social security programs.

Income differentiation in a certain sense is a natural consequence of transition to a market economy. Its degree in less developed countries in many cases is greater than in developed ones. Therefore, we can hope that the situation in this respect, too, will be improved by China's further rapid economic growth.

Table 7. *Average Annual Change Rates of Value Added, Employment and Productivity in the Chinese, Indian and U.S. Manufacturing, 1956–2010*
(in comparable prices, percent)

Period	*Manufacturing value added*			*Number of employed*			*Labor productivity*		
	China	India	U.S.	China	India	U.S.	China	India	U.S.
1956–2010	13.8	6.0	3.1	4.3	2.4	-0.4	9.1	3.5	3.5
1956–1978	16.5	5.5	3.5	5.8	3.0	0.9	10.2	2.4	2.5
1979–2010	11.9	6.4	2.8	3.2	2.0	-1.4	8.4	4.3	4.2
1979–1990	9.0	6.0	2.3	5.1	0.9	-0.2	3.7	5.1	2.4
1991–2000	16.2	5.7	4.4	0.9	0.6	-0.8	15.2	5.1	5.3
2001–2010	11.2	7.4	1.7	3.4	4.6	-3.3	7.6	2.7	5.2

Calculated from: see Table 4 as well as Yearbook of Industrial Statistics, United Nations, New York; International Yearbook of Industrial Statistics, UNIDO, Vienna, various volumes.

Between 1956 and 1978, the growth rate of *manufacturing* output in China was higher three times than in India and 4.7 times than in the United States. In the pre-reform period, already more than three-fifths of manufacturing growth was insured by the rise in productivity, while the resources for industrialization were drawn from agriculture. Between 1979 and 2010, despite a certain slowdown, manufacturing in China still grew faster almost twice than in India and 4.3 times than in the U.S. In the reform period, productivity rise gave on the whole five-sevenths of output growth. In that period, the highest rates of output and productivity growth were achieved between 1991 and 2000 (see Table 7).

In the reform period, the growth of GDP per employed in China in general positively affected *wage formation*, as shown by the investigation that was conducted considering monthly wages corrected by the consumer price index (by the example of manufacturing). From data in Table 8, it can be calculated that in 1979–2010, the average annual growth rate of real wages in Chinese manufacturing made up 6.9 percent. Regarding the relative wage level, China after the announcement of reform reduced nearly nine times its lag behind the United States and by the end of study period more than three times exceeded the Indian level.

Table 8. *Real Wages per Worker in Chinese Manufacturing*
(in U.S. dollars of 2000, at PPP*)

Year	*USD per month*	*Index: 2000=100*	*Average annual growth in percent*	*Relative wage level in percentage of*:	
				India	United States
1978	126.86	33	-	42.7	3.7
1990	189.27	50	3.5	79.3	6.3
2000	379.78	100	7.2	186.6	12.2
2010	1062.84	280	10.8	318.5	33.0

* In China, USD 1 = CNY 1.92; in India, USD 1 = INR 9.68.
Calculated from: Yearbook of Labour Statistics, ILO, Geneva, various volumes; LABORSTA and ILOSTAT Databases; Summers, Heston and Aten 2006.

Wu 2001 emphasizes that the catching-up of Chinese manufacturing, the pulling sector of the national economy, with the level of more developed countries gained stronger momentum with increasing competition during the reform period, when changes in economic policy enabled China to improve more than earlier its economic efficiency and engage in wider technology transfer. Before the reform, central planning was unable to insure an adequate distribution of resources. By contrast, with the development of market economy in the reform period, comparative advantages received greater accent. The driving forces of post-reform growth and catch-up were industries having such advantages.

In the period of central planning complete plants were acquired to increase productive capacity, whereas later the focus shifted toward renewal and updating of existing obsolete production facilities, so as to improve productivity and efficiency. Before the reform, Chinese manufacturing was characterized by decreasing returns to scale, which could be brought in connection with over-employment and a relative shortage of capital. By contrast, in the reform period, due to a better system of incentives and more efficient management reckoning with developing market relations, constant returns to scale became characteristic (see Wu and Xu 2001, Herrerias and Orts 2012).

Table 9. *Average Annual Change Rates of Value Added, Employment and Productivity in the Chinese, Indian and U.S. Agriculture, 1956–2010*
(in comparable prices, percent)

Period	*Agriculture value added*			*Number of employed*			*Labor productivity*		
	China	India	U.S.	China	India	U.S.	China	India	U.S.
1956–2010	3.6	2.7	2.7	0.7	1.4	-1.3	2.9	1.3	4.1
1956–1978	2.3	2.4	1.5	1.8	1.6	-2.6	0.5	0.8	4.1
1979–2010	4.6	2.9	3.6	-0.0	1.2	-0.4	4.6	1.7	4.0
1979–1990	5.6	2.8	4.4	2.7	2.1	-0.5	2.8	0.7	4.9
1991–2000	3.8	2.7	3.1	-0.8	1.0	0.2	4.6	1.7	2.9
2001–2010	4.1	3.1	3.1	-2.5	0.3	-1.0	6.8	2.8	4.2

Calculated from: see Table 4 as well as FAO Production Yearbook, Rome; FAOSTAT Database.

In China, as generally in the developing countries, the role of *agriculture* is of utmost importance. *What results has the reform brought* in this respect?

It is expedient to compare above all the development of agriculture in China and India, as both countries took off from a similar level (Table 9). Considering the whole period 1956–2010, *the Chinese results are better.* In China's agriculture, the average annual growth rate of output and productivity exceeded India's analogous indicators 1.3 and 2.2 times, respectively. At the same time, *prior to the reform India's results had mostly been more favorable, and the situation changed only following the announcement of reform.* The post-reform Chinese agriculture that got rid of feudal relics and of earlier policy errors has developed much more successfully than the Indian agriculture that is still significantly burdened by feudal relics. As ascertained from Table 9, in 1956–2010 the average annual growth of agriculture value added

in China exceeded 1.3 times the performance of the United States, too. However, *productivity* rise in China's agricultural sector reached only about five-sevenths of the American level. *Comparing the reform and pre-reform periods, it can be stated that the growth rate of agricultural output has doubled.* Even more striking are the differences in terms of productivity. *In the pre-reform period, productivity in Chinese agriculture was stagnating. After the announcement of reform, productivity became the determinant factor of agricultural growth.*

Table 10. *Gross Value of Fixed Capital Stock per Person Employed in China*
(in prices of year 2000)

Year	*National economy*			*Manufacturing*			*Agriculture*		
	Thousand USD*	Index: 1955=100	Average annual growth (%)	Thousand USD*	Index: 1955=100	Average annual growth (%)	Thousand USD*	Index: 1955=100	Average annual growth (%)
1955	1.07	100	-	1.34	100	-	0.05	100	-
1978	3.43	321	5.2	5.67	423	6.5	0.38	760	9.2
2010	55.95	5229	9.1	73.78	5506	8.3	3.67	7340	7.3

* USD 1 = CNY 2.66.
Calculated from: China Statistical Yearbook, National Bureau of Statistics, Beijing; various volumes; Summers, Heston and Aten 2006; Timmer, de Vries and de Vries 2014; The Conference Board 2015.

Table 11. *Relative Capital Intensity in China*
(based on 2000 dollar prices)

Year	*National economy in percentage of*:		*Manufacturing in percentage of*:		*Agriculture in percentage of*:	
	India	United States	India*	United States	India	United States
1955	35.3	0.6	13.7	2.8	71.4	0.1
1978	54.2	1.4	17.8	6.4	61.3	0.2
2010	364.7	14.4	35.5	32.0	91.8	1.2

* In the case of *India*, factory industry data are cited. *PPP conversion rate* for all economic spheres, USD 1 = INR 13.06.
Calculated from: National Accounts Statistics, United Nations, New York; Yearbook of Labour Statistics, ILO, Geneva; China Statistical Yearbook, National Bureau of Statistics, Beijing; Statistical Yearbook/Abstract of India, Ministry of Statistics and Programme Implementation, Government of India, New Delhi; Statistical Abstract of the United States, U.S. Department of Commerce, Bureau of the Census, Washington, D.C., various volumes; U.S. Department of Commerce, Bureau of Economic Analysis; Heston and Aten 2006; Timmer, de Vries and de Vries 2014; The Conference Board 2015.

From Table 10, it is calculable that in the period 1956–2010, *capital intensity* in China's economy grew by 7.5 percent per annum. In manufacturing and agriculture, a somewhat faster, 7.6 and 8.1 percent growth took place. By comparing these data with the dynamics of GDP and sectoral values added per person employed (see Tables 5, 7 and 9), it can be ascertained that at the growth rate of capital intensity exceeded 1.3 and 2.8 times the growth rate of labor productivity at the level of national economy and in agriculture, respectively; whereas in manufacturing, the ratio in point made up only about four-fifths.

As seen from Table 11, China's *relative capital intensity* as compared to the United States was very low both in the national economy and in manufacturing and agriculture, but in the reform period, the differences had mostly decreased, particularly in manufacturing. Regarding the total economy, China's capital intensity level had considerably surpassed that of India by the end of the study period. Manufacturing data for India are not strictly comparable, since they pertain not to the whole sector but only to factory industry. The latter in terms of employment is just a third or fourth of total manufacturing, for which unfortunately there are no output and capital data.

Comparing capital intensity data from Table 11 with productivity data from Table 5, it can be ascertained that in China, compared to the U.S. level, relative productivity was higher than relative capital intensity. This means that China used less physical capital for a unit of output than the United States.

Table 12. *Educational Attainment in China between 1955 and 2010*
(based on data for population aged 15 and over)

Year	*Average years of schooling per person*	*China in percentage of*:		
		United States	India	Developing countries
1955	1.86	21.2	175.5	82.7
1960	2.34	25.5	210.8	93.6
1970	3.43	31.8	218.5	102.4
1980	4.75	39.5	203.0	108.7
1990	5.62	46.0	163.4	106.4
2000	7.11	55.9	168.5	112.3
2010	8.11	62.0	156.0	112.6

Source: Barro and Lee 2012: 17 and data set.

As shown by data in Table 12, educational attainment in China between 1955 and 2010 was higher than in India and from 1970 also exceeded the average of developing countries. China in this respect, too, was able to narrow its gap with the United States. This happened owing to a significant development of education. However, "brain drain" was taking place in China as well.[13]

Table 13. *Share of Scientists and Engineers Engaged in R&D in China*
(in the total number of persons employed)

Year	*Per mille*			*Index: 1955=100*			*Average annual growth* (%)		
	National economy	Manu-facturing	Agri-culture	National economy	Manu-facturing	Agri-culture	National economy	Manu-facturing	Agri-culture
1955	0.07	0.80	0.0002	100	100	100	-	-	-
1978	0.24	1.43	0.001	343	179	500	5.5	2.6	7.2
2010	2.10	5.40	0.02	3000	675	10000	7.0	4.2	9.8

Calculated from: China Statistical Yearbook, National Bureau of Statistics, Beijing; UNESCO Statistical Yearbook, Paris, various volumes; UNESCO Institute for Statistics, Montréal Data Centre; Timmer, de Vries and de Vries 2014; The Conference Board 2015.

Table 14. *Relative Research Intensity in China*

Year	*National economy in percentage of*:		*Manufacturing in percentage of*:		*Agriculture in percentage of*:	
	India	United States	India*	United States	India	United States
1955	175.0	2.3	275.9	9.2	66.7	0.02
1978	64.9	4.7	70.4	8.7	100.0	0.03
2010	525.0	24.9	97.6	9.4	100.0	0.2

* Factory industry.
Calculated from: China Statistical Yearbook, National Bureau of Statistics, Beijing; Statistical Yearbook/Abstract of India, Ministry of Statistics and Programme Implementation, Government of India, New Delhi; Statistical Abstract of the United States, U.S. Department of Commerce, Bureau of the Census, Washington, D.C; Yearbook of Labour Statistics, ILO, Geneva; UNESCO Statistical Yearbook, Paris, various volumes; UNESCO Institute for Statistics, Montréal Data Centre; Timmer, de Vries and de Vries 2014; The Conference Board 2015.

What results has China achieved in the field of *research and development* since the mid-1950s?

[13] Thus, in the period 1979–1995, of the 220,000 Chinese citizens who traveled chiefly for post-gradual training to western countries only 70,000 returned home (see Mészáros 2000: 32).

Relying on the indicators of *research intensity*, data in Table 13 give a picture about the role of R&D in the Chinese economy. China is compared to India and the United States in this respect, too (see Table 14).

In the period 1956–2010, research and development in China generally grew at a relatively fast rate, not only in the economy as a whole (6.4%), but also in manufacturing (3.5%) and particularly in agriculture (8.7%). Compared to the United States, the R&D activity in China was rather small to the end, but it used to surpass significantly the Indian level.

Table 15. *China's Inward and Outward FDI Stocks*

Year	*Inward stock*			*Outward stock*		
	USD million	in percentage of:		USD million	in percentage of:	
		GDP	world total		GDP	world total
1980	1,074	0.4	0.2	0	-	-
1990	20,691	5.1	0.9	4,455	1.1	0.2
2000	193,348	16.2	2.7	27,768	2.3	0.4
2010	587,817	9.9	3.0	317,211	5.3	1.6

Source: UNCTADSTAT Database.

As seen from Table 15, between 1980 and 2010 the total stock of foreign direct investment in China increased 547 times. China, as developing countries in general, is characterized by a net capital importer position. Thus, in 2010 the inward FDI stock exceeded almost twice the outward one. By the late 2000s, capital imports and exports had expanded considerably, both in absolute terms and relative to the GDP, which could be brought in connection with more determined liberalization in the reform process.

In terms of aggregate investments, China since 1992 has become the largest destination of FDI inflows among developing nations and, in recent years, the second largest in the world following the United States. Foreign firms tend to invest proportionately more in industry than in agriculture and services. Since 1997, from about half to over two-thirds of inward FDI has usually gone into manufacturing industry, the pulling sector of the Chinese economy. This has happened due in part to the supply of cheap labor and the relatively low cost of materials. Today China is making a transition from a low-tech to a high-tech manufacturing environment. With adopted foreign capital, management know-how, trained labor and technology spill-over effects, China possesses the capacity to adopt high technology intensive manufacturing, especially in the chemical, machinery, and electronic and telecommunication industries (see Liu and Daly 2011).

As globalization has a manifold and increasing effect on the development of almost all countries, we can speak of a *globalization effect* in the case of China, too. Concerning the mechanism of economic growth, the most important is the effect of capital imports, which is essentially double: quantitative and qualitative. The quantitative effect is connected with the fact that capital imports increase the stock of physical capital if they are higher than the burden of interest and profit repatriation. The qualitative effect means first of all an *improvement in efficiency*.

For the purpose of investigating the globalization effect in the Chinese economy, the following model of linear regression will be applied:

$$Y - Y_{est} = \hat{\eta} K_G + \varepsilon. \quad (2)$$

Here Y and Y_{est} are the actual and estimated real values of China's GDP and manufacturing value added (MVA), K_G is the globalizing capital (cumulative stock of FDI for the national economy and manufacturing deflated by the U.S. investment price index) and ε is a residual. The initial data of regression analysis can be found in the Appendix.

Table 16. *FDI and Globalization Effect in China, 1980–2010*
(Dependent variable: $Y–Y_{est}$)

Sphere	$\hat{h}$	standard error, %	R^2	*t* statistic
National economy	0.0297	3.6	0.811	3.11
Manufacturing	0.0440	8.1	0.561	3.18

On the basis of relation (2), the main indicators summarized in Table 16 were obtained using the ordinary least squares method. The surplus results of national economy and manufacturing are quite close to one another (R^2 = 0.895). *Manufacturing industry has played a decisive role in the production of globalization effect in the Chinese economy.* What is the role of globalizing capital in China's economy?

It can be stated that there is a *close enough correlation* between the FDI stock flowed in China (K_G) and the achieved productivity surpluses ($Y–Y_{est}$), first of all at a macro level. The estimated values of regression coefficient ($\hat{h}$) are significant but rather low, which attests to a *relatively weak globalization effect in China*. At the same time, the standard error is less than five percent for the national economy and less than ten percent for manufacturing, which is not a bad result.

Table 17. *External Debt of China*

Year	*Total external debt in million U.S. dollars*	*Of which*:		*Total external debt in percentage of GNI*	*Total debt service in percentage of exports of goods and services*
		Long- and medium-term debt	Short-term debt		
		in percent			
1980	4,504	100.0	-	2.2	8.0
1990	55,301	83.2	16.8	15.5	11.7
2000	145,648	91.0	9.0	12.3	9.1
2010	559,772	37.9	62.1	9.5	3.4

Sources: Global Development Finance: Country Tables, The World Bank, Washington, D.C., various volumes; World Bank, World Development Indicators Database.

Rapid economic development has been facilitated by favorable conditions created by the fact that China did not accumulate a significant *external debt* stock. Although that stock increased 124 times between 1980 and 2010, its level relative to gross national income (GNI) did not approach the 40 percent limit. The relative debt service was also far away from the critical 25 percent of exports (see Table 17). Therefore, as seen above, a very significant part of GDP could be used for investments. However, recently short-term loans has prevailed in the structure of China's external debt. This unfavorable development seems to be connected with the deepening problem of corporate indebtedness.

5. Growth Factors and the Role of Reform

The process of China's becoming an economic great power has already been in the center of interest of economists dealing with growth theory and other analysts for quite a long time. In the specialist literature, several works have tackled the role of growth factors in the development of Chinese economy. What results have the foregoing investigations yielded?

Krugman 1994 has stated that China will become an economic great power even if it reaches just a fraction of the productivity level of Western countries, though in his opinion, Chinese statistical data showing rapid growth are not reliable enough.

Démurger 1995 investigated the relationship between reform policy and industrial development in the period between 1988 and 1991 relying on a database covering 434 Chinese cities. She has found that growth is affected by two fundamentally important mechanisms: the access to foreign technology and the positive externalities deriving from the stimulating effect of exports on production.

Raiser 1995, who also made a representative sampling, has come to a conclusion that in reform measures in Chinese industry brought about not only an expansion in production by state-owned enterprises but also a reduction in their profitability as a consequence of increasing market competition.

Bosworth and Collins 1996 in the wake of their macroeconomic investigation have found that in China between 1960 and 1994 total factor productivity made contributed more to economic growth than fixed capital per employed.

Hu and Khan 1997 found that the rise in productivity had been the driving force of the Chinese economy's take-off after 1978. The decisive role in this was played by market reforms, which made enterprises interested in maximizing profits and thus promoted economic growth.

Timmer 1999 compared manufacturing productivity levels in China, India, Indonesia, South Korea and Taiwan with the United States as the reference country for the period 1963–1993. He has found that physical capital per working hour in Chinese manufacturing still remains much below the American level and there is ample room for increasing the capital-output ratio. He has pointed out that late starters in industrialization cannot profit automatically from the world's rising technological level but only then if they increase capital equipment as well.

Young 2000 examined TFP at a macro level and in the non-agricultural sector. Similarly to Krugman, he concluded that the post-reform growth of Chinese economy had been much slower than shown by official data. In his opinion, Chinese enterprises between 1978 and 1998 underestimated inflation which in the non-agricultural sector led to a 2.5 percent per annum overestimation of the rate of growth.

Dayal-Gulati and Husain 2000, by analyzing province-level time series, have found that the Chinese economy's take-off is mostly due to technology transfer with the help of foreign operating capital. This at a regional level – at least in a short run – is accompanied by growing income differences in favor of the country's eastern provinces.

Zheng, Liu and Bigsten 2000 examined productivity in 700 state-owned enterprise of Chinese industry over the period 1980–1994. They found a low average efficiency in the investigated enterprises. They revealed that education and material incentives positively affected the rise in productivity.

Fan and Zhang 2002 have used household surveys of food consumption in China to argue that the official agriculture statistics may overstate the growth of output.

Shen 2004 analyzed the connection between agricultural growth and food supply in China by emphasizing the global implications of the relevant problems.

Bosworth and Collins 2008 investigated patterns of economic growth for China by uncovering the main growth factors for each economy. They found that China stood out for the explosive growth in its industrial sector, which was fuelled by the country's willingness to act more quickly and aggressively to lower its trade barriers and to attract FDI inflows..

Herrerias and Orts 2012 have shown that in China equipment investment and exports are two of the most important determinants of both labor productivity and output in the long run even after controlling for other sources of growth, such as human capital and infrastructure.

Regarding the role of growth factors and reform, *two basic questions* arise: 1. What was the role of various types of technical progress and, in this connection, of economic reform in China in the study period? 2. What was the efficiency impact of factors independent of the mechanism of technical progress? Below we will investigate both questions not only at the level of national economy but also by the examples of manufacturing as a pulling sector and agriculture.

The main subject of our research is productivity and its determinant factors in China's economy, on which essentially depend the changes in living standards and accumulation, as well as cross-country income differences. As the economic result of *technical progress* is characterized primarily by the increase in productivity, the analysis of the latter's factors means also the investigation of technical progress. The inclusion of the mechanism of technical progress in a model of economic growth makes it possible "to kill two birds with one stone". On the one hand, it will be possible to investigate how and to what extent the frequently inadequate social infrastructure and other factors worsen the economic performance, where and what kind of changes, reforms are needed. On the other hand, it seems to be even more important that economic processes should be influenced in order to *obtain from an economy that of which it is potentially capable owing to the mechanism of technical progress*.

To investigate productivity, the general model should be rewritten by a logarithmic conversion of both sides of the production function shown in the Appendix:

$$\ln (Y/gM) = F_K G + \varepsilon, \quad (3)$$

where g is a multiplier of efficiency (a constant), M is the number of working years, ε is a logarithmic residual, and $F_K G = F_K G_I + F_K G_M + F_K G_{KR} + F_K G_O$, function G describing *capital mechanism*, or the mechanism of technical progress in a narrow sense.

Chinese economic data from the Appendix make it possible to break down the *rate of productivity growth*, regarded as a dependent variable in relation to the initial state, as follows:

$$\Delta \ln (Y/gM) = \Delta F_K G + \varepsilon, \quad (4)$$

where $\Delta F_K G = \Delta F_K G_I + \Delta F_K G_M + \Delta F_K G_{KR} + \Delta F_K G_O$ for the national economy and $\Delta F_K G_I + \Delta F_K G_M + \Delta F_K G_{KR}$ for manufacturing and agriculture. It should be noted that for the former sector, functions and parameters concerning natural resources are not considered at all.

Table 18. *Actual and Estimated Magnitude of Productivity Growth in China* ($\Delta Y/M$, annual averages in percent)*

Period	*National economy*	*Manufacturing*
1956–2010	5.69 (0.00)	9.14 (0.47)
1956–1978	2.20 (-0.23)	10.16 (0.78)
1979–2010	8.28 (0.19)	8.42 (0.26)
1979–1990	6.58 (0.25)	3.70 (0.16)
1991–2000	9.04 (0.22)	15.21 (0.88)
2001–2010	9.59 (0.11)	7.62 (-0.22)

*In parentheses : fact – estimate.

Source: own calculations from the Appendix. The same concerns the following tables if not otherwise indicated.

The econometric investigation of Chinese economy is made difficult by a *fundamental difference in the economic conditions before and after the reform.* In this connection, a *question* arises whether *the general model gives an explanation for the development of Chinese economy and the role of reform policy* in the more than half-century period under consideration. Let us first examine the changes in actual and estimated productivity. The most important empirical results obtained in this respect are summarized in Table 18.

It can be stated that, *regarding the whole investigated period* (1956–2010), *the Chinese economy developed essentially in a way expected on the basis of the general model, with a considerable productivity surplus accumulated in manufacturing.* At the same time, in the pre-reform years, macroeconomic development lagged behind the level according to the model but after the reform surpassed it. In manufacturing, however, both sub-periods produced significant surpluses. Here the results of the pre-reform era were somewhat better, owing presumably to the Maoist policy of forced industrialization. In the post-reform period, these results were surpassed only during the last decade of the 20th century. But after the turn of millennium, productivity growth in manufacturing roughly halved and thus plunged below the equilibrium level. It is obvious that *in the case of China the non-manufacturing sectors of the national economy demonstrated a delayed catch-up under the conditions of a rapid development starting from a very low level*.

Table 19. *Causes of Difference between Actual and Potential Rates of Productivity Growth in China, %*

Period	*Mobile factor* $\Delta F_K G_M$	*Creative factor* $\Delta F_K G_{KR}$	*Oil factor* $\Delta F_K G_O$	$\Delta \ln(Y/gM)$	
				difference	actual/potential growth
1956–2010	-0.784	-0.550	-0.007	-1.341	80.5
%	*58.5*	*41.0*	*0.5*	*100.0*	
1956–1978	-0.581	-0.423	-0.003	-1.007	68.3
%	*57.7*	*42.0*	*0.3*	*100.0*	
1979–2010	-1.019	-0.704	-0.013	-1.736	82.1
%	*58.7*	*40.6*	*0.7*	*100.0*	
1979–1990	-0.828	-0.619	-0.012	-1.459	81.4
%	*56.8*	*42.4*	*0.8*	*100.0*	
1991–2000	-1.059	-0.734	-0.015	-1.808	82.7
%	*58.6*	*40.6*	*0.8*	*100.0*	
2001–2010	-1.354	-0.841	-0.013	-2.208	80.6
%	*61.3*	*38.1*	*0.6*	*100.0*	

The analysis of China's economic development is interesting not only because the People's Republic developed very rapidly in the post-reform period but also because we are able to picture in what degree a bad economic policy may hinder the use of an economy's potentialities (pre-reform period) and in what degree a better economic policy may insure a gradual manifestation potential development opportunities that were previously unused (post-reform period).

As seen from Table 19, in the more than half-century period under consideration, the difference between actual and potential productivity growth in the People's Republic of China emerged overwhelmingly as a consequence of decelerating effects and negative feedbacks connected with the operation of the mobile and creative factors in the national economy, whereas the role of the oil factor was negligible. Overall, China's performance in this respect improved by 13.8 percent in the post-reform years compared to the pre-reform ones, which is a very good result.

Table 20. *Factors of Productivity Growth in China*

Period	*Annual averages in percent*						*In percentage of* $\Delta\ln(Y/gM)$				
	$\Delta\ln(Y/gM)$	$\Delta F_K G_I$	$\Delta F_K G_M$	$\Delta F_K G_{KR}$	$\Delta F_K G_O$	ε	$\Delta F_K G_I$	$\Delta F_K G_M$	$\Delta F_K G_{KR}$	$\Delta F_K G_O$	ε
National economy*											
1956–2010	5.537	1.617	2.436	1.833	0.005	-0.354	29.2	44.0	33.1	0.1	-6.4
1956–1978	2.174	0.530	1.009	0.796	0.002	-0.163	24.4	46.4	36.6	0.1	-7.5
1979–2010	7.954	2.651	3.362	2.450	0.008	-0.437	32.2	42.4	30.8	0.1	-5.5
1979–1990	6.367	1.745	2.859	2.260	0.006	-0.503	27.4	44.9	35.5	0.1	-7.9
1991–2000	8.656	2.718	3.670	2.689	0.009	-0.424	31.4	42.4	31.0	0.1	-4.9
2001–2010	9.157	3.507	3.608	2.335	0.009	-0.302	38.3	39.4	25.5	0.1	-3.3
Manufacturing											
1956–2010	8.746	2.711	4.163	2.484	-	-0.612	31.0	47.6	28.4	-	-7.0
1956–1978	9.671	2.882	5.348	2.824	-	-1.383	29.8	55.3	29.2	-	-14.3
1979–2010	8.081	2.537	3.451	2.238	-	-0.145	31.4	42.7	27.7	-	-1.8
1979–1990	3.628	1.001	1.698	1.143	-	-0.214	27.6	46.8	31.5	-	-5.9
1991–2000	14.160	4.064	5.975	4.064	-	0.057	28.7	42.2	28.7	-	0.4
2001–2010	7.346	2.806	2.836	1.638	-	0.066	38.2	38.6	22.3	-	0.9
Agriculture											
1956–2010	2.821	0.781	1.475	0.418	-	0.147	27.7	52.3	14.8	-	5.2
1956–1978	0.472	0.141	0.236	0.087	-	0.008	29.9	50.0	18.4	-	1.7
1979–2010	4.510	1.191	2.372	0.600	-	0.347	26.4	52.6	13.3	-	7.7
1979–1990	2.755	0.711	1.477	0.421	-	0.146	25.8	53.6	15.3	-	5.3
1991–2000	4.538	1.085	2.274	0.739	-	0.440	23.9	50.1	16.3	-	9.7
2001–2010	6.589	1.884	3.486	0.646	-	0.573	28.6	52.9	9.8	-	8.7

* Calculated from aggregated data.

Our empirical results for China's economy concerning the role of endogenous factors in productivity growth are summarized in Table 20. They allow us to draw the following *conclusions*.

1. *Productivity growth* in the Chinese economy including agriculture speeded up substantially in the reform period compared to the pre-reform years. However, in manufacturing the situation was somewhat different as the increase in productivity there slowed down after 1978. At the same time, it was considerably higher in the second phase of the reform period (1991–2000) as compared to the pre-reform era (1956–1978). However, in this sector, there was a sharp slowdown in productivity rise after the turn of millennium.

2. The *mobile technical progress* ($\Delta F_K G_M$) reflecting the *equipment of workers with physical capital* made the relatively largest contribution to the growth of macroeconomic and manufacturing productivity and the absolutely largest contribution to the growth of productivity in agriculture. Although its relative weight showed in most cases a declining trend, this factor was *one of the fundamental causes of China's improved economic performance after the announcement of reform*.

3. The *immobile technical progress* ($\Delta F_K G_I$) related to *learning by doing* held the second place. Its contribution was constantly increasing and came considerably closer to the mobile factor, particularly in manufacturing after the turn of millennium.

4. The share of *creative technical progress* ($\Delta F_K G_{KR}$) expressing the joint *economic effect of education and R&D* was also decreasing; it contributed on average about a third of productivity rise in both the national economy and manufacturing but less than a fifth in agriculture.

5. China's *oil and gas resources* ($\Delta F_K G_O$) played a marginal role from the standpoint of macro-level productivity growth and technical progress.

6. The policy of reform and opening greatly improved the *efficiency impact of factors operating outside the mechanism of technical progress* (ε), especially at a micro level. However, the actual performance of the Chinese economy and its manufacturing sector

remained on the whole significantly lower than the performance calculated with the model. In this connection, one should bear in mind that China's modern economic development started for a very low level. Initially, erratic economic policies (Great Leap Forward, Cultural Revolution) had retarded that development for some two decades. At the same time, these policies were accompanied by the accumulation of potential energy, particularly in agriculture and services, the direction of which toward the economy after the reform made a considerable contribution to its spectacular results.

6. The Sino-American Economic Competition

As economic growth in China has long been much more dynamic than that in the United States, it is now poised to overtake the latter as the world's largest economy. Therefore the Sino-American competition is one of the most important processes taking place in the world economy today. Its outcome will much determine the character of international relations in the 21st century. A key aspect of this competition is *economic efficiency*. Setting out from the assumption of the *catch-up character of Chinese economic development*, this important criterion of any economic activity can be well understood by comparing the factors of productivity growth and technical progress in China and the United States.

Since the victory of the socialist revolution in 1949, the catching-up of mainland China with the advanced world has been taking place under a communist leadership. In this context, *Chinese socialism in a wider sense* means the country's contemporary reality, the society under construction in the People's Republic of China. *In a narrow sense*, it includes (1) the whole complex of ideological postulates of the Chinese Communist Party; (2) the CCP's theoretical views about political power and the practical realization of these views; (3) the CCP's views and practical solutions concerning economic development; (4) the CCP's concept on party functions and its practical accomplishment; and (5) the principles and practice of the CCP's and the PRC's international activities (cf. Thürmer 2013: 2).

As shown above, there is a general trend of China's *convergence* with the United States in terms of both GDP per inhabitant and GDP per person employed. The latter indicator shows substantial improvement in the relative productivity of the Chinese economy. But despite the achieved progress, the Chinese economy is still far behind the American one in terms of both living standard and productivity (see Table 19).

Table 21. *Average Annual Rates of Economic Catch-Up*
(China/United States)

Period	*GDP per inhabitant*	*GDP per person employed*
1956–2010	4.30	3.96
1956–1978	0.48	0.34
1979–2010	7.15	6.65
1979–1990	5.95	5.27
1991–2000	6.99	7.07
2001–2010	8.76	7.91

Source: calculated from data in Table 5.

What can be said about the *speed of* China's *economic catch-up* with the United States?

As ascertained from Table 21, China actually started to catch up with the United States in the post-reform period. Within that period, the Chinese economy achieved the most favorable results of convergence after the turn of millennium. These results are on average about twice better than the results of the whole investigated period.

The empirical results expounded above allow us to make *some further comparisons* between China and the United States regarding their economic performance in the period

under consideration. Therefore below we will examine what factors induce the very significant productivity differences between the two countries.

The *question* here is in what degree we get an explanation from the general model for productivity differences. In this connection, we will use at a first approximation relation (4), where, however, symbol Δ denotes now not temporal but cross-country (United States minus China) difference. An analogous relation can be written down using a standard neoclassical model (see below, we assume that the production elasticity coefficient is 1/3):

$$\Delta \ln (Y/gM) = 1/3\, \Delta \ln (K/L) + \varepsilon, \quad (5)$$

where ε is a logarithmic residual (cf. Simon 2003: 50).

Having made calculations with both relations, the results summarized in Table 22 were obtained.

Table 22. *Estimation of Productivity Difference: China and United States*

Sphere	*Model*	*Year*	*Fact*		*Estimate*		*ε*	
			ln	%	ln	%	ln	%
National economy	Neoclassical	1955	4.148	100.0	1.740	41.9	2.408	58.1
		1978	4.561	100.0	1.826	40.0	2.735	60.0
		1990	4.677	100.0	1.872	40.0	2.805	60.0
		2000	4.816	100.0	1.906	39.6	2.910	60.4
		2010	4.829	100.0	1.934	40.0	2.895	60.0
	General	1955	4.148	100.0	3.899	94.0	0.249	6.0
		1978	4.561	100.0	4.160	91.2	0.401	8.8
		1990	4.677	100.0	4.378	93.6	0.299	6.4
		2000	4.816	100.0	4.686	97.3	0.130	2.7
		2010	4.829	100.0	4.718	97.7	0.111	2.3
Manufacturing	Neoclassical	1955	3.537	100.0	1.274	36.0	2.263	64.0
		1978	4.049	100.0	1.472	36.4	2.577	63.6
		1990	4.325	100.0	1.567	36.2	2.758	63.8
		2000	4.704	100.0	1.660	35.3	3.044	64.7
		2010	5.143	100.0	1.683	32.7	3.460	67.3
	General	1955	3.537	100.0	2.593	73.3	0.944	26.7
		1978	4.049	100.0	3.721	91.9	0.328	8.1
		1990	4.325	100.0	3.966	91.7	0.359	8.3
		2000	4.704	100.0	4.892	104.0	-0.188	-4.0
		2010	5.143	100.0	5.143	100.0	-	-

Calculated from: Statistical Yearbook, National Accounts Statistics, Industrial Statistics Yearbook, Energy Statistics Yearbook, United Nations, New York; Yearbook of Labour Statistics, ILO, Geneva; FAO Production Yearbook, Rome; UNESCO Statistical Yearbook, Paris; International Yearbook of Industrial Statistics, UNIDO, Vienna; OPEC Annual Statistical Bulletin, Vienna; China Statistical Yearbook, National Bureau of Statistics, Beijing; Statistical Abstract of the United States, U.S. Department of Commerce, Bureau of the Census, Washington, D.C., various volumes and issues; U.S. Department of Commerce, Bureau of Economic Analysis; FAOSTAT Database; UNESCO Institute for Statistics, Montréal Data Centre; Summers, Heston and Aten 2006; Barro and Lee 2012; Timmer, de Vries and de Vries 2014; The Conference Board 2015.

The standard neoclassical growth model considers the difference in capital and land intensities as the only divergence in the magnitude of factors determining productivity in various countries. By contrast, according to the chosen endogenous model (the general model), all intensities affect the differences in productivity along with the time elapsed from the base year (see Simon 2008: 30–31).

The relevant results for China and the United States are contained in Table 22. It is visible that *the general model with an error of a few percent gives an explanation for the differences in productivity, while the neoclassical model is incapable of that*. In our case, the neoclassical model does not give an explanation for about three-fifths of the productivity difference between the United States and China at a macro level and close to two-thirds in the

manufacturing sector (in a logarithmic form). The situation is similar to that noticed by David Romer for India and the United States (see Romer 2012).

The *reason* for such bad results of the neoclassical model is presumably that it does not reckon with implicit and explicit, complementary and non-complementary effects of *human capital* and creative technical progress, which *considerably and in different proportions increase* the elasticity of output by (physical) capital.

The latter contention is backed up by the estimation results obtained with the *general model*, proving that with this model it is possible to *explain the basic developmental differences, in the given case between China and the United States.*

Let us now turn attention to a more detailed analysis of *factors of economic catch-up*, using our endogenous growth model (Table 23).

Table 23. *Factors of Productivity Difference: China and United States*

Sphere	*Year*	$\Delta F_K G$		$\Delta F_K G_I$		$\Delta F_K G_M$		$\Delta F_K G_{KR}$		$\Delta F_K G_O$	
		ln	%	ln	%	ln	%	ln	%	ln	%
National economy	1955	3.899	100.0	2.874	73.7	0.745	19.1	0.261	6.7	0.019	0.5
	1978	4.160	100.0	3.623	87.1	0.504	12.1	0.025	0.6	0.008	0.2
	1990	4.378	100.0	4.181	95.5	0.306	7.0	-0.118	-2.7	0.009	0.2
	2000	4.686	100.0	5.178	110.5	-0.131	-2.8	-0.375	-8.0	0.014	0.3
	2010	4.718	100.0	6.034	127.9	-0.934	-19.8	-0.401	-8.5	0.019	0.4
Manufacturing	1955	2.593	100.0	1.286	49.6	0.970	37.4	0.337	13.0	-	-
	1978	3.721	100.0	2.426	65.2	0.971	26.1	0.324	8.7	-	-
	1990	3.966	100.0	2.661	67.1	0.849	21.4	0.456	11.5	-	-
	2000	4.892	100.0	3.508	71.7	0.563	11.5	0.821	16.8	-	-
	2010	5.143	100.0	2.705	52.6	0.185	3.6	2.253	43.8	-	-

Calculated from: see the preceding table.

Data in Table 23 show the factors of productivity difference between China and the United States by components of the general model. *The most striking change in the study period is the significant increase in the effect of learning by doing ($\Delta F_K G_I$), to which in manufacturing added the combined effect of education (schooling) and R&D ($\Delta F_K G_{KR}$).* In that pulling sector of the economy, *more than two-fifths* of the normative productivity difference ($\Delta F_K G$) is already attributable to the latter factor. At the same time, the Chinese economy has exceeded the American one with respect to the logarithmic magnitude of the factor relating to the *equipment of workers with physical capital* ($\Delta F_K G_M$) at the macro level and approached it closely in manufacturing. *Natural resources* (in our case, the *oil factor*, $\Delta F_K G_O$) *does not play an important role* in the given relation, viz. China and the United States, as there remain significant differences between the two countries in terms of mineral wealth intensity.

Considering the model relations and the parameters obtained due to a worldwide econometric investigation, it can be contended that the Chinese economy will come closer to U.S. standards as much as its human capital equipment approaches the American level.

7. Concluding Remarks

7.1. *In the pre-reform period, government policies kept China's economy relatively stagnant and inefficient,* mainly because of few profit incentives for firms and farmers, a virtually non-existent competition, as well as price and production controls which caused widespread distortions. Therefore China's living standard was substantially lower than that of many other developing countries, including India.

7.2. The changes in economic policy had a rather restraining effect on China's *catch-up development* in the period of central planning, but made a decisive contribution to its

spectacular achievements after the announcement of the policy of reform and opening in the late 1970s. *Since the initiation of the policy of reform and opening, China has become one of the world's fastest growing economies whose living standard surpassed that of India.* However, the recent global economic and financial crisis has somewhat reduced foreign demand for Chinese exports.

7.3. Our analysis of China's economic development has shown that the difference between actual and potential productivity growth in China emerged primarily as a consequence of decelerating effects and negative feedbacks connected with the *mobile type of technical progress*, which made the relatively largest contribution to productivity growth in the investigated period. Thus gained corroboration our *hypothesis* put that the outstanding performance of Chinese economy has primarily been determined by improving equipment of workers with physical capital.

7.4. *Human capital* has not yet become the decisive factor of economic growth in China. It usually had a declining share in productivity rise in the study period, but retained an important economic role expressed in the *creative technical progress*. Therefore if decision-makers want to influence economic processes so as to obtain from the Chinese economy that of which it is potentially capable owing to the mechanism of technical progress, they should further improve the quality of growth by investing more in education and R&D.

7.5. Regarding the *factors of economic catch-up*, China has already exceeded the United States in the equipment of workers with physical capital at the macro and came very close to it at the micro level, but still lags behind America in terms of the economic effects of learning by doing and, in manufacturing, also of creativity. Although the Chinese economy may soon catch up with the American one in the absolute volume of output, its quality indicators are still far away from the advanced U.S. standards.

7.6. Currently, China faces such internal challenges as the continuation of rapid development, absorption of the increasing numbers of migrants and unemployed persons from the countryside by its already overcrowded cities, improvement of international competitiveness and the reduction of group and regional income differences. To these problems must be added the *unbalanced economic growth* through over-reliance on exports and fixed investment, oscillating inflationary tendencies, lack of rule of law and growing public unrest, including the discontent of national minorities, a dysfunctional financial system, an increasingly weak and inefficient state-owned sector with bad debts dragging down the banks, severe environmental degradation and pervasive government corruption. To achieve further successes under the changing circumstances of international markets, the Chinese economy must take advantage of the opportunities provided by the development of information society in the field of agriculture, industry and particularly services. Also, China must carry out a *transition to an ecologically sustainable economy* which can better utilize the relatively scarce natural resources.

APPENDIX

The General Model[14] and the Database

Variables:

$Y_{(i)}$ – volume of output: GDP or (gross) value added in comparable prices (in billions of 2000 dollars);
K – average annual (gross) stock of fixed capital, including apartments in the case of national economy, in comparable prices (in billions of 2000 dollars);
L – average annual number of persons employed (in millions);
M – number of working years (at an annual level, $M = L$);
H – number of schooling years per capita (for population aged 15 and over);
R_{t-2} – full-time equivalent (FTE) number of scientists and engineers engaged in research and development (R&D) considering a two-year lag (in thousands);
Z – arable land area (in million hectares);
O_{t-1} – crude oil and natural gas resources (at the end of the year preceding the reference year, in million metric tons of oil equivalent);
N – mid-year population (in millions, an exogenous variable);
$\Delta t = t - t_0$, where t is time in years and t_0 is the base year, 1950.

All model variables are a function of time. The time index is put out in the case of retarded effects. In the formulas, a capital letter denotes a function, a small letter a parameter (except the variable t).

PPP conversion rates:
USD 1 = CNY 1.96 for GDP, 2.66 for fixed capital stock, 2.19 for manufacturing and 2.59 for agriculture[15] value added. Data for China do not include data for Hong Kong and Macau.[16]

Value indicators of China in national currency (Y, K) were converted into U.S. dollars on the basis of Heston, Summers and Aten 2006. Manufacturing and agriculture values added were corrected considering Inklaar and Timmer 2012. The conversion rates pertain to purchasing power parities.

Fixed capital values of China were estimated using data on fixed capital investments, subtracting a supposed two percent average annual real depreciation and assuming a one-year lag. The starting values of capital stock were estimated with the help of the following formula:

$$\frac{K}{Y} = k\frac{I}{Y}\exp\left(-k_1\frac{I}{Y} - k_2\dot{Y}\right),$$

where $k = 45.1$, $k_1 = 3$ and $k_2 = 100$ (for the 2000 dollar prices).

The number of schooling years was taken into consideration on the basis of Barro and Lee 2012. Data on population aged 15 and over were used, assuming that they also pertain to the persons employed.

Intensity functions:

$F_K = \ln(1 + n_K K/L)$ (capital intensity);

[14] Based on Simon 2000 and 2008.
[15] Agriculture includes hunting, forestry and fishing.
[16] China resumed its exercise of sovereignty over Hong Kong on July 1, 1997 and over Macau on December 20, 1999.

$F_H = \ln (1 + n_H H/L)$ (education);
$F_R = \ln (1 + n_R R_{t-2}/L)$ (research intensity);
$F_Z = \ln (1 + n_Z Z/L)$ (land intensity);
$F_O = \ln (1 + n_O O_{t-1}/L)$ (mineral wealth intensity).

The *normalizing coefficients* are $n_K = 1/385$, $n_H = 1$, $n_R = 1$, $n_Z = 1$ and $n_O = 1/1000$ where parameter n_K refers to the 2000 dollar prices. These are rounded values which do not differ significantly from the estimated ones. The estimation was made together with the parameters, starting from certain initial values.

The *basic version* of the general model does not contain the oil factor, which in most countries has a relatively small weight.

$$Y = gM \exp [F_K (G_I + G_M + G_{KR})]. \quad \text{(A1)}$$

The parameter g is the output produced *without fixed capital* during a working year that approximately corresponds to an economy's productivity level in an initial state. Its estimation was made similarly to the other parameters. Among the components of relation (A1) in parentheses, G_I is a function concerning the immobile, G_M the mobile and G_{KR} the creative technical progress. In formulas:

$G_I = 1 - \exp\{-g_I F_K - g_Z F_Z\}$;
$G_M = g_M F_K \exp(-g_{KM} F_K - g_{ZM} F_Z)$;
$G_{KR} = G_H G_R G_T$,
where $G_H = g_H F_H \exp(-g_{KM} F_K)$,
$G_R = 1 + g_R F_R^2$ and
$G_T = \exp(g_T \Delta t)$.

Sectoral investigations require some modifications. For manufacturing, the model components and parameters pertaining to the *land factor* should be omitted.

What is the *economic interpretation* of this general model? If fixed capital (K) is zero, i.e. there are no tools; the economy is in an initial state, in which the output is gM. If capital is greater than zero, then in relation to the initial state, output and productivity grow depending on the magnitude of all intensities, including the economy's endowment with natural resources, as well as the amount of time available for creative economic activity.

The *immobile technical progress*, viz. the complex factor $F_K G_I$, depends positively on capital and land intensity. The value of G_I is a magnitude between zero and one, which at a very high level of capital intensity asymptotically tends to unity. A common feature of the other two components of technical progress ($F_K G_M$ and $F_K G_{KR}$) is that their magnitude is enlarged by capital intensity only to a certain limit. Afterward it will decrease, and if capital intensity grows beyond all limits, their values will tend asymptotically to zero. The *mobile technical progress* ($F_K G_M$) is also negatively affected by land intensity, since land is a relatively inert factor from the viewpoint of technological development and work organization.

The *creative technical progress* ($F_K G_{KR}$) depends positively on education, research intensity and time available for creative economic activity. The role of education is double: reproductive and creative. In the case of reproductive role, it is substantially complementary to physical capital; its effect does not appear independently. The situation is, however, different regarding the creative effect of education, the most obvious form of which is research and development, a very important growth factor of modern economy. All creative activities mean, in a certain sense, learning as we learn how better results can be achieved. In that sense, R&D can also be called learning by doing. At the same time, if learning was the only issue, then most results could be achieved by the least educated, since they have most to learn. Empirical results show the opposite, which points to the fact that a primarily creative activity is at issue, of which the more educated are much more capable.

In the model, a *quadratic form of research intensity function* (F_R^2) figures essentially for two reasons. On the one hand, a higher volume of concentrated research is, as a rule, more efficient. On the other hand, the effect of such research may more markedly overreach the given production unit. Thus, an additional economic result, a "spill-over", comes gradually into being. The model also considers the fact of research and development multiplying the explicit economic effect of education, which is true vice versa, too, since research results are more utilizable in an economy where workers have higher qualifications.

The *verification* of the general model was carried out in several phases, based on panel data. The *estimation method* was essentially the same. In the first approximation, parameters were estimated with logarithmic data, using the corresponding auxiliary variables by the least squares method (OLS). Thereafter, the results were made more accurate based on non-logarithmic data by the non-linear least squares method.

In the first phase of verification, the parameters of the basic model were estimated using *sectoral data*. Manufacturing and non-manufacturing were respectively considered based on time series for the United States, Japan, Federal Republic of Germany, United Kingdom and France in the period 1950–2003. Productivity (Y/M) served as a dependent variable, considering 530 observations (5×2×53). Value data (Y, K) were taken into account at 2000 dollar prices like in the case of a wider investigation expounded below.

The second phase meant the estimation of GDP and national economic productivity, respectively, on the basis of 265 (5×53) observations. Two methods were available: an aggregated and a disaggregated one. In the first case, the estimation was made based on national economic data. In the second case, an estimation broken down by sectors (in our case, two: manufacturing and non-manufacturing) was carried out; the national economic values were determined by summarizing the latter's results. *Because of a smaller aggregation error, the disaggregated estimation is more accurate, especially regarding the returns to fundamental growth factors.*

In the third phase, the investigation was extended over 131 countries of the world,[17] using data by Heston, Summers and Aten 2006 and singling out three years (1970, 1988 and 2003). The investigation covered both developed and developing countries together with the oil exporters.[18] It has been assumed that the parameters of the basic model are valid for all countries, including those not considered in estimating the parameters.

To consider the *oil factor* not figuring in the basic model, an approximate formula ($F_K G_O$) was applied and verified based on world economic data for 131 countries. This augmented model presented below can be called a *world model*, since it is applicable for any country of the world. It can be written down as follows.

$$Y = gM \exp[F_K(G_I + G_M + G_{KR} + G_O)], \qquad \text{(A2)}$$

where $G_O = g_O F_O \exp(-g_{HO} F_H - g_{OO} F_O - g_{ZO} F_Z)$.

The parameter g_O of the oil factor is positive, while the other parameters are connected with negative effects. Education (F_H) negatively affects the return to oil factor because the creative activity in mining is mostly absorbed by the exploration of oil and gas resources; therefore, the latter's separately accountable result is relatively smaller. In the approximate formula for national economy, the relation appears in an inverse form. Among the two other negative effects, the first ($g_{OO} F_O$) is connected with the fact that countries immensely rich in crude oil and natural gas annually extract relatively less of their oil and gas reserves, the second ($g_{ZO} F_Z$) indicates that in agrarian countries the economic importance of oil and gas

[17] See the list of these countries including China in Simon 2000.

[18] In other world economic investigations (Mankiw, Romer and Weil 1992, Nonneman and Vanhoudt 1996, Hall and Jones 1999) the *oil exporting countries* were not included and thus the effect mechanism of that extremely important contemporary growth factor remained unexplored.

production is usually smaller. In mining, the latter factor has no role, since no arable land is utilized.

A positive feature of relation (A2) is that it makes easily measurable the economic growth effect of oil and gas resources. It should also be noted that for estimating the parameters of the function G_O, there were 380 observations available within the framework of investigation on 131 countries.[19] At the level of national economy, the formula G_O concerning the role of the oil factor yields realistic results in the case of countries having great oil and gas resource intensity. For the other countries, it is expedient to apply the basic model, i.e. relation (A1).

Table A1. *Parameters of the General Model*

No.	*Denotation*	*Model version*	*Estimated value*	*t statistics*
1	g	Basic model	522	22.46
2	g_I	Basic model	0.0781	22.45
3	g_M	Basic model	0.319	22.42
4	g_H	Basic model	0.273	22.29
5	g_R	Basic model	278	17.44
6	g_T	Basic model	0.0065	20.28
7	g_Z	Basic model	0.082	20.95
8	g_{KM}	Basic model	0.34	-22.52
9	g_{ZM}	Basic model	0.30	-19.14
10	g_O	Function G_O	1.94	16.45
11	g_{HO}	Function G_O	1.54	-19.04
12	g_{OO}	Function G_O	0.47	-19.34
13	g_{ZO}	Function G_O	0.75	-8.46

Source: Simon 2008: 20.

The *estimation results* obtained for the *parameters* of the general model are summarized in Table A1 and make it possible to draw several *conclusions*.

1. The parameters are significant, as seen from *t* statistics. Their standard error in the vast majority of cases is around 1/20 of their estimated value.

2. The sign of parameters meets theoretical expectations. Among the nine parameters of the basic model, seven are connected with accelerating effects and positive feedbacks, two (g_{KM} and g_{ZM}) with decelerating effects and negative feedbacks.

3. The results obtained for the magnitude of parameters seem realistic. In the general model, there are no such conditions as for the parameter α in the neoclassical production function. From the viewpoint of order of magnitude, perhaps the most verifiable result is the estimated value of parameter g. The productivity of least developed countries in 2003 was approximately two-three times higher than that (see Heston, Summers and Aten 2006).

4. The approximately two-thirds percent annual value of the time factor of creative activity does not seem large (g_T). Yet a very significant effect is at issue. In the case of constant capital intensity, the same education and research intensity in 2003 produced a result more than 40 percent greater than in 1950.

From Table A2, it can be ascertained that the general model, with a determination exceeding 90 percent, fits the actual productivity values in terms of both the leading capitalist countries and the world economy (131 countries). The table contains the corrected coefficients of determination (R^2) where the number of degrees of freedom is decreased by the joint number of parameters, normalizing coefficients and parameter-like model components. But this does not affect significantly the results because of a large number of observations. The cumulative results are better than the annual ones, i.e. the estimation errors do not

[19] It is not 393 (3×131) because a few countries after 1988 ceased to exist, or extraordinary events (wars, civil wars) happened, and in some cases data problems arose.

cumulate but decrease in time. This is connected with the circumstance that the other factors, e.g. business cycles, affect growth mostly in the short run. Presumably, a role is also played by the fact that in our case an essentially *economic development model* is at issue.

Table A2. *Fit of the General Model*
(Dependent variable: *Y/M*)

Sphere	*Number of countries*	*Number of observations*	R^2		*Standard error* (%)	
			Annual	Cumulative	Annual	Cumulative
Manufacturing and non-manufacturing	5	530	0.974	0.994	7.8	6.3
Manufacturing	5	265	0.965	0.986	10.2	9.6
Non-manufacturing	5	265	0.970	0.997	6.4	4.5
National economy:						
aggregated	5	265	0.972	0.996	6.8	5.1
disaggregated	5	265	0.976	0.998	6.3	3.7
World economy	131	380	0.928	0.957	29.9	25.9

Source: Simon 2008: 21.

In the case of world economy, the estimation errors are greater than for the leading capitalist countries. However, the standard error exceeding 20 percent emerged by relating to a thousand or several thousand percent productivity and income differences. For example, in 2003 the productivity of the U.S. economy was more than 4500 percent higher than the Ethiopian one (see Heston, Summers and Aten 2006). Therefore, this result cannot be called bad either, proved by a coefficient of determination above 90 percent.

Main Macroeconomic Indicators of China

Year	*Y*	Y_i	*K*	*L*	*H*	R_{t-2}	*Z*	O_{t-1}	*N*
1955	217	186	276	259	1.86	17.5	108	16	609
1956	241	204	306	266	1.95	20.7	110	28	621
1957	252	211	337	275	2.04	21.4	112	40	637
1958	286	233	392	295	2.14	23.9	108	70	653
1959	296	243	465	309	2.24	26.5	104	101	666
1960	292	227	545	305	2.34	26.2	104	112	667
1961	240	204	564	302	2.42	25.8	104	123	660
1962	239	203	568	302	2.51	29.1	104	160	666
1963	259	226	577	308	2.59	32.9	104	198	682
1964	292	266	597	319	2.69	37.4	104	234	698
1965	327	305	628	330	2.78	42.0	104	273	715
1966	354	328	663	342	2.90	43.5	103	344	735
1967	343	327	684	355	3.02	48.5	103	415	755
1968	333	319	701	367	3.15	50.3	102	486	775
1969	369	353	733	381	3.29	56.0	102	557	796
1970	410	408	787	396	3.43	61.9	102	628	818
1971	449	431	873	410	3.53	68.1	101	1000	841
1972	461	440	967	418	3.64	72.7	101	1380	862
1973	495	477	1054	424	3.75	78.4	100	1799	882
1974	505	492	1154	433	3.86	84.1	101	2167	900
1975	540	508	1256	441	3.97	90.2	99.7	2436	916
1976	550	520	1372	450	4.12	96.0	99.7	2828	931
1977	581	546	1476	457	4.27	106	99.7	2971	943
1978	641	601	1590	464	4.43	113	99.4	2973	956
1979	702	642	1739	474	4.59	120	99.5	3369	969
1980	738	677	1890	487	4.75	138	99.3	3217	981
1981	795	725	2048	502	4.85	147	100	3314	994
1982	894	792	2204	518	4.94	158	105	3286	1000
1983	964	884	2366	534	5.04	172	111	3260	1023
1984	1097	1023	2547	550	5.14	190	118	3230	1037
1985	1194	1156	2768	567	5.25	202	125	3200	1051
1986	1379	1255	3063	584	5.32	225	127	3198	1067
1987	1534	1394	3377	599	5.40	243	127	3197	1084
1988	1644	1525	3479	615	5.47	263	128	3196	1102
1989	1677	1542	3853	629	5.55	280	130	3540	1119
1990	1904	1743	4225	642	5.62	296	131	3880	1135
1991	2067	1890	4588	651	5.77	320	132	4230	1151
1992	2306	2140	4980	658	5.93	343	131	4240	1165
1993	2512	2432	5427	665	6.09	380	130	4450	1178
1994	2926	2782	6003	671	6.24	405	130	4570	1192
1995	3260	3225	6690	678	6.41	442	130	4695	1205
1996	3563	3537	7485	685	6.54	482	130	5400	1218
1997	3973	3859	8347	694	6.68	522	131	6276	1230
1998	4315	4161	9298	702	6.82	548	131	6900	1242
1999	4624	4480	10321	710	6.97	588	130	6278	1253
2000	5053	4850	11387	717	7.11	486	129	6742	1263
2001	5442	5253	12498	726	7.21	531	127	6742	1272
2002	5923	5726	13764	730	7.30	695	126	6742	1280
2003	6396	6303	14343	735	7.39	743	123	4770	1288
2004	7042	6947	16069	740	7.49	811	124	4770	1296
2005	7845	7732	17903	744	7.60	862	125	4769	1304
2006	8841	8714	21097	747	7.70	926	121	4231	1311
2007	10096	9955	25013	751	7.80	1119	122	4231	1318
2008	11065	11000	29723	753	7.90	1224	122	5043	1325
2009	12083	11994	35152	756	8.00	1423	122	5120	1331
2010	13364	13291	42466	759	8.11	1592	122	5120	1338

Main Indicators of Chinese Manufacturing and Agriculture

Year	*Manufacturing*				*Agriculture*			
	Y	*K*	*L*	R_{t-2}	*Y*	*K*	*L*	R_{t-2}
1955	3.58	19.5	14.6	11.7	122	9.13	186	0.037
1956	5.46	26.5	18.8	11.3	128	10.8	185	0.037
1957	5.93	32.9	16.3	13.6	132	12.4	193	0.039
1958	12.6	49.0	53.9	15.1	133	16.9	155	0.031
1959	17.0	69.8	41.1	12.3	115	22.6	163	0.033
1960	18.0	92.4	31.3	13.7	98.6	29.0	171	0.051
1961	12.7	96.9	21.7	14.4	100	30.6	199	0.059
1962	11.5	98.8	15.7	11.6	105	31.2	213	0.064
1963	13.4	101	15.5	15.9	118	33.5	220	0.066
1964	18.0	104	16.6	23.4	136	37.0	228	0.068
1965	23.8	111	18.3	28.7	150	41.6	234	0.070
1966	30.7	120	19.8	32.3	162	44.7	243	0.073
1967	26.9	127	20.3	33.5	165	46.7	252	0.075
1968	24.6	130	20.9	30.5	162	48.1	261	0.104
1969	36.8	139	23.1	41.3	163	51.0	271	0.108
1970	56.4	156	26.8	54.3	176	55.9	278	0.111
1971	64.3	172	30.4	57.2	179	61.1	284	0.114
1972	68.9	189	32.5	52.2	177	66.2	283	0.113
1973	75.2	207	34.2	56.2	194	71.8	289	0.144
1974	76.3	225	35.9	59.2	202	77.0	292	0.146
1975	90.7	246	39.2	66.4	206	83.7	295	0.147
1976	88.5	263	42.7	74.8	202	91.0	294	0.147
1977	102	279	44.4	76.0	198	98.8	293	0.176
1978	120	300	52.9	75.7	207	108	283	0.198
1979	130	322	54.7	82.8	220	117	286	0.200
1980	147	345	58.5	94.8	217	128	291	0.233
1981	149	364	60.7	103	232	129	298	0.268
1982	158	391	62.8	108	259	130	309	0.278
1983	173	418	64.6	116	280	132	312	0.311
1984	199	448	69.9	132	316	135	309	0.309
1985	235	483	73.7	147	322	136	311	0.342
1986	258	520	79.8	160	333	137	313	0.374
1987	292	572	83.2	172	349	138	317	0.412
1988	334	631	85.2	180	358	140	322	0.451
1989	334	672	83.0	185	369	141	332	0.498
1990	338	709	96.4	196	396	142	389	0.546
1991	382	756	98.2	218	406	144	391	0.595
1992	472	810	100	241	425	141	387	0.626
1993	583	885	102	260	445	150	377	0.646
1994	746	971	103	284	463	152	366	0.668
1995	955	1085	104	306	486	157	355	0.759
1996	1086	1199	108	322	511	163	348	0.823
1997	1199	1283	110	334	529	172	348	0.894
1998	1302	1355	110	318	548	187	352	0.996
1999	1398	1660	107	343	563	214	358	1.16
2000	1517	1984	105	370	577	243	360	1.35
2001	1657	2335	104	399	593	274	364	1.57
2002	1822	2723	99.1	430	610	309	366	1.83
2003	2054	3170	102	464	625	349	362	2.13
2004	2181	3633	112	501	664	401	348	2.48
2005	2433	4226	122	540	699	457	334	2.89
2006	2830	5029	130	582	734	525	319	3.36
2007	3267	6051	139	628	761	605	307	3.92
2008	3609	7340	141	677	796	701	299	4.56
2009	3924	8844	145	731	829	834	289	5.31
2010	4397	10772	146	788	864	1023	279	6.18

Foreign Direct Investment in China and Chinese Investment Abroad

Year	*Foreign direct investment flows in million current U.S. dollars*			*U.S. Investment Price Index: 2000 = 100*
	Inward, total	*Of which*: manufacturing*	Outward	
1980	57	(40)	0	66.44
1981	265	(186)	0	73.66
1982	430	(301)	44	78.65
1983	916	(641)	93	78.97
1984	1419	(993)	134	80.24
1985	1956	(1369)	629	81.49
1986	2244	(1571)	450	83.74
1987	2314	(1620)	645	86.15
1988	3194	(2189)	850	88.99
1989	3393	(2105)	780	91.87
1990	3487	(1955)	830	93.86
1991	4366	(2212)	913	95.30
1992	11008	(5040)	4000	95.27
1993	27515	(113919	4400	96.55
1994	33767	(17120)	2000	97.97
1995	37521	(22850)	2000	99.33
1996	41726	(25954)	2114	99.26
1997	45257	28120	2562	99.23
1998	45463	25583	2634	98.52
1999	40319	22604	1774	98.75
2000	40715	25844	916	100
2001	46878	30908	6885	101.24
2002	52743	36801	2518	101.99
2003	53505	36936	2855	103.58
2004	60630	43017	5498	107.19
2005	72406	50955	12261	111.41
2006	72715	46242	21160	115.35
2007	83521	45649	26510	116.66
2008	108312	58490	55910	117.57
2009	95000	49352	56530	115.60
2010	114734	53811	68811	113.81

* Figures in parentheses are author's own estimates.

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