ECONOMIC LIBERALISATION, DUALISM AND THE INTERNATIONAL TRADE PATTERN OF CHINA: THEORY AND EVIDENCE

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This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

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SELECTED ABBREVIATIONS

ARs:	Agricultural residents
ERP:	Effective rate of protection
FK:	Fixed capital
FTCs:	Foreign trade corporations
GATT:	General Association of Tariffs and Trade
GDP:	Gross domestic product
GNP:	Gross national product
GOV:	Gross output value
ICP:	Income consumption path
LDCs:	Less developed countries
MDCs:	More developed countries
NARs:	Non-agricultural residents
NER:	Net export ratio
NIEs:	Newly industrialised economies
NOV:	Net output value
OLS:	Ordinary least square
PPC:	Production possibility curve
RCA:	Revealed comparative advantage
RCVA:	Real cost of value added
RMB:	Renminbi, unit of Chinese currency
REs:	Rural enterprises
RUMR:	Rural-urban migration restrictions
STIC:	Standard international trade classification
SOEs:	State owned enterprises
SSB:	State Statistical Bureau
SV:	Sales value
TC:	Textile and clothing
TVEs:	Township and village enterprises
URIP:	Urban-rural isolation policy
VA:	Value added
WB:	Wage Bills

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ABSTRACT

China's international trade grew dramatically over the 1980s and the change in its export composition was remarkable. China's primary exports declined sharply over the reform decade and its manufacturing exports increased rapidly, along with the diminishing of the importance of its mineral exports after the 1986 oil price drop. After 1985, the exports of manufactures increased and the share of these items in total exports reached more than 80 per cent by 1990. This structural change was nearly three times as fast as the structural changes in world trade in terms of increasing manufacturing share over the same period.

In this thesis, the origins of this dramatic economic growth and rapid expansion of foreign trade, and the changes in China's export composition are examined both theoretically and empirically. Differing from all previous studies, this thesis attributes China's rapid economic growth and radical changes in export composition to the nature of its partial economic liberalisation in general, and to the dualism of China's economy in particular. It argues that the emergence of the rural enterprises improved the country's industrial structure and changed its export composition, but it was not strong enough to eliminate the dualism between a capital intensive urban sector and a labour intensive rural sector (the latter is involved in both agricultural and manufacturing activities).

Two distinct conclusions are stressed. First, when China's domestic factor markets were regulated in the pre-reform era, the country tended to produce more agricultural products and capital intensive manufacturing goods at the expense of labour intensive manufacturing goods. As a result, its agricultural exports and

some capital intensive manufacturing exports were greater and labour intensive manufacturing exports were less than that expected in a competitive circumstance. Second, when this distorted economy was liberalised in a particular way, i.e., keeping the divergences between rural and urban sector unchanged but promoting the development of rural industries by partially releasing the capital mobility restrictions, the dualism remained in the economy. This also affected the export pattern of the country. As a result, both capital intensive and labour intensive manufacturing exports were encouraged but agricultural exports declined. Price distortions accelerated this trend over time.

A dualism in production and exports implies that should this dualism be removed by encouraging factor mobility and abolishing price distortions, further economic gains are available. If the reforms proceed in these directions, the share of China's agricultural exports may decline more rapidly and its exports will become even more labour intensive. This in turn, will generate economic growth as well as allocative efficiency in the future.

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To My Family

CHAPTER ONE

INTRODUCTION

1.1 China's Economic Performance in the 1980s

China's economic growth has been very impressive in the 1980s and early 1990s. The average annual growth rate of China's GDP reached more than 8 per cent in constant prices over the decade, far exceeding those in developed countries and East European economies. China's international trade grew dramatically and this growth made the country the third largest exporter of manufactures in the developing world. Between 1979 and 1991, China's international trade (imports plus exports) grew by more than 13 per cent per year by average in current prices, compared with an average growth rate of between 8 and 9 per cent between 1952 and 1978 (Lardy, 1992b:14). The trade ratio, defined as the total trade value to GNP, even calculated by a conservative method when adjusting the distorted exchange rates and national GNP, increased from 5.8 per cent in 1978 to 9.4 per cent in 1988 (Lardy, 1992b:154). The increasing presence of China on the world trade scene signified that the Chinese economy had turned from being a closed to a more open one. In 1978, China was the world's thirty-second ranked exporting country. It became the world's thirteenth largest trading nation by 1989 (Lardy, 1992b:1). According to the latest Chinese news in 1992, China's foreign trade was further extended

by more than 22.1 per cent over the previous year, reaching US$ 165.6 billion. This breaks down into exports of US$ 85 billion, up 18.3 per cent, and imports of US$ 80.63 billion, up 26.4 per cent (*People's Daily*, 8 January, 1992). On the basis of Table 1.11, Figure 1.1 plots the index (1952=100) of China national income, national income per capita, foreign trade and exports over the period of 1972-91. Figure 1.1 shows a significant divergence in income growth and trade growth after 1978, when all indicators increased more rapidly in the 1980s than in the 1970s. This divergence became more significant after 1989.

Another distinguishing feature of China's foreign trade is the change in its export composition. China's primary exports declined sharply over the reform decade and its manufacturing exports increased dramatically, along with the diminishing of the importance of its mineral exports after the 1986 oil price drop. Figure 1.2 plots China's export shares in three items: agriculture, fuels, minerals and metals; and manufactures in the period of 1965 to 1990, in the basis of Table 1.2. The figure indicates that during the early period (1965-80), agricultural exports dropped more than 20 per cent, but this gap was filled by increasing exports of fuels, mineral and metal. This export structure remained relatively stable in the first half of the 1980s until 1986, when the world oil price collapsed. After 1985, the exports of manufactures increased dramatically and the share of these exports reached more than 80 per cent by 1990.[1] This

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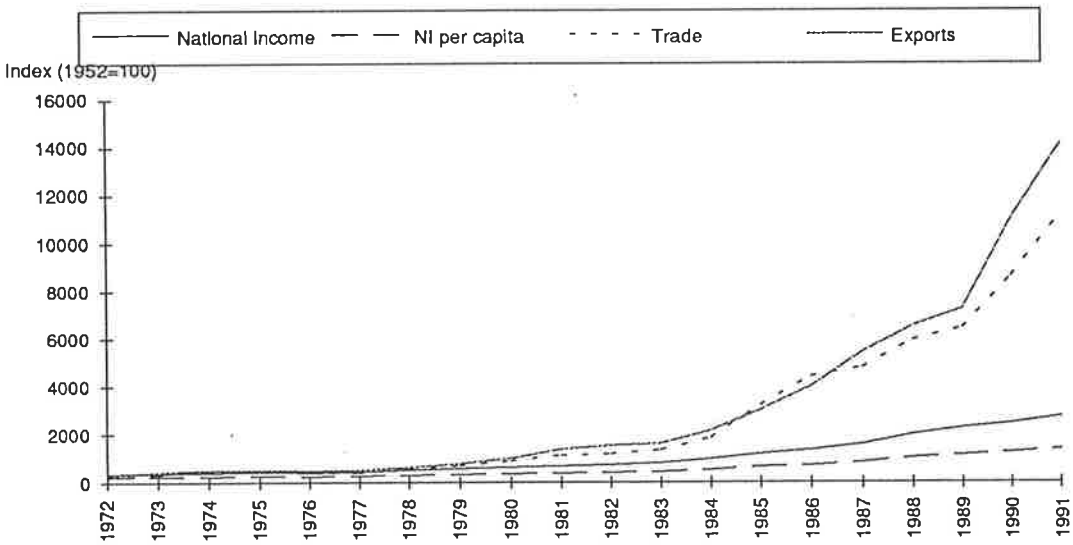
1 This figure is based on United Nation's statistics (International Economic Data Bank, the Australian National University) and it is different from the Chinese official data, which are more than 5-10 per cent lower than the figure reported here. This divergence may be due to: [1] The United Nations collected export data from the destination country rather than from the exporting country's customs statistics. Discrepancies in these two sets of statistics are bound to occur because of the possible differences in the exchange rates used to convert non-U.S. dollar into U.S. dollar values, the difference in the time exports and imports are recorded in the customs of China and its trade partners, the difference in the values assigned to the barter trade

structural change was so distinct that it tripled the structural changes in the world trade in terms of increasing manufacturing share over the same period (Xue Yongjiu, 1991:4). This structure change continued in China in 1992 (*People's Daily*, 19 January, 1993:2)

Figure 1.1 Growth of China's National Income, Trade and Exports, 1972-91



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taking place between China and its trading partners, and so forth (Hsu, 1989:32). [2] different definitions of manufactures and primary goods in China than the standard ones used by United Nations. China includes more of what the United Nations would classify as "manufactured goods" in its "processed agricultural goods" category of foreign trade statistics (Anderson and Tyers, 1987:127); However, there are also differences among China's official reports. For example, State Statistics Bureau (ZGTJNJ, 1991:618) reported that the shares of China's manufacturing exports are 71.3 and 74.4 per cent respectively in 1989 and 1990, while the Ministry of Foreign Relations and Trade (ZGDWJJMYNJ, 1990:296) reported a lower share of 65.3 in 1989. Lardy (1992b:12) clarified the difference between these two Chinese official sources as that the latter does not count the value of either the imported goods for processing or the payment in kind to the foreign supplier of those processing goods.

Table 1.1 Growth of China's National Income and International Trade, 1952-91

Year	National income Y billion	National income per head RMB yuan	Total trade Y billion	of which Export Y billion	Import Y billion
1952	59	102	6.46	2.71	3.75
1953	71	121	8.09	3.48	4.61
1954	75	124	8.47	4.00	4.47
1955	79	128	10.98	4.87	6.11
1956	88	140	10.87	5.57	5.30
1957	91	140	10.45	5.45	5.00
1958	112	169	12.87	6.70	6.17
1959	122	182	14.93	7.81	7.12
1960	122	184	12.84	6.33	6.51
1961	100	151	9.07	4.77	4.30
1962	92	137	8.09	4.71	3.38
1963	100	145	8.57	5.00	3.57
1964	116	165	9.75	5.54	4.21
1965	139	191	11.84	6.31	5.53
1966	159	213	12.71	6.60	6.11
1967	149	195	11.22	5.88	5.34
1968	142	180	10.85	5.76	5.09
1969	162	200	10.70	5.98	4.72
1970	193	232	11.29	5.68	5.61
1971	208	244	12.09	6.85	5.24
1972	214	245	14.69	8.29	6.40
1973	232	260	22.05	11.69	10.36
1974	235	258	29.22	13.94	15.28
1975	250	271	29.04	14.30	14.74
1976	243	259	26.41	13.48	12.93
1977	264	278	27.25	13.97	13.28
1978	301	313	35.50	16.76	18.74
1979	335	343	45.46	21.17	24.29
1980	369	374	57.00	27.12	29.88
1981	394	394	73.53	36.76	36.77
1982	426	419	77.13	41.38	35.75
1983	474	460	86.01	43.83	42.18
1984	565	542	120.10	58.05	62.05
1985	702	663	206.67	80.89	125.78
1986	786	731	285.04	108.21	149.83
1987	931	852	308.42	147.00	161.42
1988	1174	1057	382.20	176.67	205.53
1989	1318	1169	415.59	195.60	219.99
1990	1438	1258	556.01	298.58	257.43
1991	1612	1392	722.93	383.06	339.87

Sources: ZGTJNJ: 1992:32:77:627.
Note: Price data are current prices and the indexes are derived from the current prices.

Figure 1.2 Changes of China's Export Pattern, 1965-90

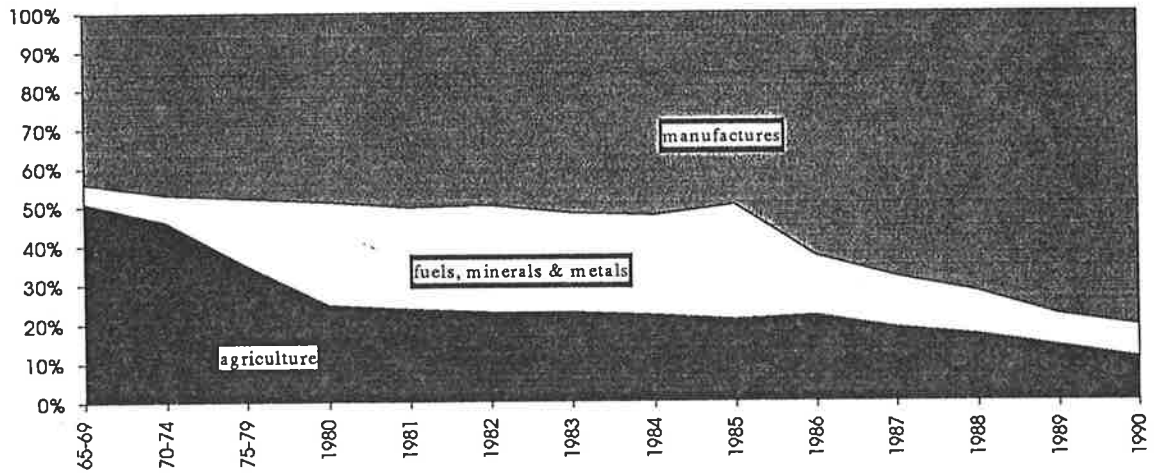

Table 1.2 The Structure of China's Exports, 1965-89, US$ million

Year	Agriculture		Fuels, minerals & metals		Manufactures		Total exports	
	US$m	%	US$m	%	US$m	%	US$m	%
1965-69	902	51	96	5	769	44	1767	100
1970-74	1544	46	233	7	1572	47	3350	100
1975-79	2887	35	1423	17	4020	48	8337	100
1980	4422	25	4530	26	8517	49	17480	100
1981	4921	24	5300	26	10435	51	20662	100
1982	4644	23	5642	27	10328	50	20631	100
1983	4803	23	5179	25	10869	52	20858	100
1984	5440	22	6253	25	12928	52	24626	100
1985	5864	21	7918	29	13817	50	27603	100
1986	7018	22	4913	15	19927	63	31864	100
1987	7933	19	5396	13	29056	69	42386	100
1988	9634	17	5864	11	39611	72	55111	100
1989	9100	14	5470	8	51598	78	66207	100
1990	8955	11	6757	8	64387	80	80100	100

Sources: International Economic Data Bank, Australian National University, 1992.
Notes: 1965-69, 1970-74 and 1975-79 data are five year average.
The definitions of the commodity groups are:
Agriculture: STIC 0+1+2-27-28+4.
Fuels minerals & metals: STIC: 27+28+3+68
Manufactures: STIC 5+6-68+7+8+9.

Several issues arise from China's experience:

First, what are the origins of this dramatic economic growth and rapid expansion of foreign trade?

Second, what are the main origins of the changes in China's export composition?

Third, did this rapid growth of income and trade change the dualism in China's economy?

In economic literature the first question is widely noted and broadly discussed. An answer to this question is that the change of China's development strategy from import substitution to export promotion contributed to the rapid trade growth. As revealed by the standard international trade and development theory (see, for example, Balassa, 1978, Krueger, 1978), foreign trade is glorified as an engine of growth. Since the opening of an economy will generally encourage a more rational allocation of its domestic resources, it will also generate economic efficiency by, for example, exploiting economies of scale, accelerating technological transfer and extending the opportunities of employment. A wide range of empirical investigation reveals that countries pursuing externally-oriented development strategies achieved significantly higher rates of growth (World Bank, 1987).

However, since international trade liberalisation programs often start from an initial situation of extensive controls on domestic economic activity in

less developed countries (LDCs), the gains from trade liberalisation are likely to be limited unless domestic economic policies are also liberalised. Lardy (1992b:2) stressed that this linkage would be even more important for a reforming socialist economy where various forms of government control have imposed more severe distortions in a larger number of domestic markets than in most developing countries. Furthermore, as revealed by second best theory, removal of some of the current distortions when other distortions remain may not necessarily raise welfare.

Among a large number of studies of China's international trade, at least three of them noticed the linkage between internal and external market reforms and identified its importance. Reynolds (1987) linked urban unemployment and income distribution with China's international trade growth. He argued that the trade pattern of 1981 would reduce employment in China. "China in 1981 was a net importer of labour". He argued that the impact of foreign trade in 1981 was job-displacing rather than job-creating, at a time when the country had serious unemployment problems. However, Reynolds found that China's foreign trade by 1985 was playing a much more positive role in employment-creation, "due largely to the impact of reform on production and trade of agricultural products". He concluded that there was no evidence to suggest that reform in industry or in the foreign trade system was affecting the job-creation potential of foreign trade.

Srinivasan (1987, 1990) reviewed economic liberalisation in China and India and argued that liberalisation of external transactions is likely to yield only limited benefits unless it is accompanied by elimination of controls on domestic transactions in these countries. Since efficiency in resource allocation

requires that the marginal return to a resource is the same in all its uses, any divergences in factor return (or in factor marginal productivity) induced by government interventions will reduce national welfare. Partial reforms in foreign trade may lead to some other problems such as deterioration in the balance of payments when domestic production is still controlled.

Lardy (1992a) identified three reasons for China's international trade growth: decentralisation of foreign trade; reforms in the pricing of traded goods and an abandonment of an overvalued exchange rate. After a comprehensive review of China's foreign trade reforms, Lardy (1992b) concluded that more potential economic gains can be derived from further reforms in both factor and commodity markets. Further reforms could include a more flexible price (including foreign exchange rate) system, encouraging labour mobility, as well as establishing capital markets and permitting the market forces to determine interest rates. Recent developments in China are moving in those directions.

In contrast to the first question, the second one, concerning the change in China's export mix, has attracted little attention. A possible answer to the question is to be found in China's rapid capital accumulation and increases in productivity. According to standard development and trade theory (see, for example, Krueger, 1977, Leamer, 1987), if a poor country opens itself to international trade, it will tend to specialise initially in the exports of primary products; although the more densely populated that country is the less is this specialisation. If, over time, the country's domestic incomes, capital stock and productivity grow faster than the rest of the world's, in the absence of distortionary policy interventions, its export specialisation will gradually shift away from primary products and toward manufactures. The shares of

production and employment in the primary sectors, especially agriculture, will decline with economic growth as the demand for nontradables and the production of manufactured goods and services expand. The country will follow a path of development, and upgrade the capital intensity of its manufacturing exports. Anderson and Tyers (1987), Anderson (1989), among others, have argued that the changes in the structure of China's economy away from agriculture in favour of light manufacturing are precisely what theory and the experience of other East Asian economies lead one to expect. However, the decline of the share of agricultural exports in China's total exports was more rapid than that predicted by Anderson and Tyers (1987:129). By 1990, the share of agricultural exports dropped to 11 per cent, well below the projected level (18-20 per cent). On manufacturing exports, questions arise when China's export data are further disaggregated. For example, data show that there has been a continued increase in exports of capital intensive mechanical and electrical products, which are unlikely to represent China's comparative advantage. The share of these products to total exports rose from 8.5 per cent in 1985 to 19.6 per cent in 1991 (Zhang Zhongyong, 1992, Ehara, 1992:20) and further extended to 22.5 per cent in 1992. The total export value of this industry reached US$ 14.69 billion in 1992 and increased by more than 38.2 per cent over the previous year (*Economic Daily*, 22 December, 1992:1). This unusual export pattern differs from that predicted by the standard international trade theory.

Since China's trade sector is monopolised by the government, the tests of the predictions from theories of the composition of international trade should consider some policy variables. Krueger (1977) argues that government subsidies could make any product exportable. Therefore further investigation

should consider a country's foreign trade policy as well as internal market conditions.

Shan (1989), Hsu (1989) and Lardy (1992a, 1992b) discussed China's trade determination and its specific foreign trade regime. Shan (1989:40) showed that the foreign exchange retention rate was high in the electronic and defence industries (100 per cent) in 1986 and 1988. Hsu attributed China's import incentives to the so called "investment hunger" hypothesis. Lardy clarified the importance of the foreign exchange rate in China's export growth. Despite the notable contributions of these studies, other questions remain. For example, are there any other conditions rather than trade policy that have affected the rapid growth of capital intensive machinery and electrical exports in the 1980s? How could one explain the rapid growth of the exports from rural industries, which were often depressed rather than promoted by the government in the 1980s (Zweig, 1991)?

The third question about the dual nature of the Chinese economy had not been well identified in the English literature until a group of papers on China's dualism were published recently (e.g., Anderson, 1990a, Putterman, 1992), including a paper by the author (Zhang, Xiaohe, 1992a). The dualism in development literature is defined as the dichotomy between a modern sector, in which workers are hired at an institutional wage in numbers that rise with the growth of the industrial capital stock, and a traditional sector, in which workers subsist at an income level that is somewhat below the industrial wage and is linked to their average rather than marginal productivity (Lewis, 1954, Ranis and Fei, 1961). In such a dual economy, factor rewards will not equal either

their marginal productivity or their opportunity cost, and factor reward divergences exist for the same factor used in different sectors.

According to this theory, the dualism between a capital intensive industrial sector and labour intensive agricultural sector implied a misallocation of resources since more could have been produced through additional investment in agriculture and use of less capital intensive industrial technologies in the industrial sector. However, when the modern sector absorbs surplus labour from the traditional sector until the value of marginal product is equal in the two sectors, the dualism ends and the entire economy allocates labour and other resources according to the rule of equal marginal productivity of each factor of production across sectors.

Putterman (1992) argued that China was a standard dual economy prior to the reforms, and this dualism was ended by creating a nonstate-nonstaple third sector. The author in Zhang (1992a) examined the likely impact of the dualism on China's production and international trade pattern. These studies initiated some new insights into the research. For example, is the development of the third sector (basically rural enterprises) sufficient to end the dualism? What is its likely impact on national industrial structure and composition of exports? More importantly, how did the emergence of the third sector generate economic efficiency and improve national welfare? Is there any potential for further improvement? Since there is no comprehensive study that has provided clear-cut answers for these questions, the current study is designed to fill this gap.

This thesis sheds light on all of these issues from a slightly different viewpoint, in contrast to all previous studies. It attributes China's rapid economic growth and radical changes in export composition to the nature of its partial economic liberalisation in general, and to the dualism of China's economy in particular. It argues that the emergence of the rural enterprises (the third sector) improved the country's industrial structure and changed its export composition, but it was not strong enough to eliminate the dualism between a capital intensive urban sector and a labour intensive rural sector (the latter is involved in both agricultural and manufacturing activities). Therefore further economic gains may be available should this "new dualism" be removed by encouraging factor mobility and abolishing price distortions.

In order to provide a background to China's reforms, the next section reviews the reform process briefly and identifies the nature of the dualism and its impact. The structure of this thesis is summarised in section 1.3.

1.2 The General Features of China's Economy

1.2.1 Prior to the Reforms: "All People are Soldiers"

Despite sharing common characteristics with other developing countries and centrally planned economies, China has several specific features that are rooted in its special cultural, historical and political background. This makes the economy more cumbersome to analyse by standard economic instruments such as the general equilibrium approach derived from a competitive economic environment. As one of the largest developing countries, and also one of the remaining large centrally planned economies, China's special characteristics

make examination of its economy extremely difficult. The elimination of all market forces in the late 1950s makes China's price signals meaningless. Before the 1978 reforms, China's production and international trade were organised more like an army unit than any kind of market economy. One common slogan initiated by Chairman Mao Zedong in the 1960s can be used to describe this kind of economy: "all people are soldiers". These soldiers can be used in fighting during wars, both internal and external, as well as used in production and international trade. In this special army, all production, transaction and external trade is subject to planning, i.e., the commands from the central government.

The objective of the economy was to catch up with the advanced market economies as quickly as possible. "Overtaking the British and catching up the United States" was the most common slogan in the 1950s. In order to attain such an ambitious goal, a heavy industry biased development strategy was adopted at the expense of agriculture and labour intensive light industries. The widely used government interventions, such as the restrictions on rural-urban migration and capital mobility, a biased price structure in favour of capital intensive industry at the expense of the agricultural sector, and a government monopoly in foreign trade, constructed a standard dual economy (Putterman, 1992).

Dualism in an economy prevents full exploitation of the economy's potential resources and comparative advantage. It should be removed when the economy develops towards more advanced stages of industrialisation. Nevertheless, a command economy, like China's, will tend to consolidate such a dualism rather than to end it. Since political stability and national security are

the priority, self-sufficiency in all economic activities, especially in heavy industrial production requires a capital intensive modern sector to be established. Agricultural production, due to its importance in the national economy, is protected by substantially adding labour inputs until the marginal product of labour reaches its limit (zero). As a result, a great number of rural surplus labourers exist, which in turn, further consolidates the dualism.[2]

In such an economy, international transactions would hardly be economically rational. Since they were used only to balance the plan, economic costs and benefits were not the priority. "Exporting in order to import" was a common slogan in the foreign trade sector in the 1960s and 1970s and it is still quoted by some Chinese economists nowadays. As a result, China's trade was relatively small and strongly inward looking, if not autarchic prior to the reforms. For instance, the total trade value (exports plus imports) was US$ 4.8 billion in 1971, accounting for only 3.5 per cent of the same item in 1991 (*People's Daily*, 23 November, 1992:5). The average rate of protection was very high when measured by "correct" prices or tariff equivalents rather than the government fixed prices and official exchange rates. Direct controls and licensing in the traditional export sectors were pervasive, and the exchange rate was significantly over-valued (Lardy, 1992b). These features began to change only since the late 1970s.

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2 A number of Chinese studies estimated that rural surplus labourers were around 100 million in China in the early 1980s (Reynolds, 1987:481).

1.2.2 Toward A Market Economy

China's reforms started from 1978 and were market oriented, like all other East European economies. To a greater or lesser degree these economies shared similar experiences of reform, such as decentralising the planning system, contracting out the enterprises, reforming price regimes and liberalising internal as well as external trade transactions. Perhaps the most important phenomenon is that when the force of command planning was eroded, market forces emerged and displaced the command system. The "army" has been demobilised and the people became individuals.

However, as pointed out by Putterman (1992), China's reform put an end to the dualism, but did so by creating yet another institutionally distinct sector rather than creating a unified market economy. This sector, basically composed of rural enterprises, urban private enterprises and foreign joint ventures,[3] played a very important role in China's economic growth and the structural changes of its international trade pattern (trade pattern hereafter). Since the rural enterprises accounted for a relatively large share in the so-called third sector, the following discussion will focus on rural enterprises only.

The growth of the rural enterprises has been very impressive in the 1980s and early 1990s. The total number of rural enterprises increased to over 19 million in 1991, more than a threefold increase over 1984. Their total labour force was over 96 million in 1991, compared to a total rural labour force of 430

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3 Urban collective enterprises especially those so-called big-collective (dai jiti) may not be included into this group given the nature of its local government ownership.

million and a total urban labour force of 145 million. Total labour force in rural enterprises was extended to over 100 million in 1992, surpassing the total employment in state-owned enterprises (*People's Daily*, 13 January, 1993:2). Table 1.3 shows the importance of rural enterprises in the national economy after 1984. In 1984 the share of rural enterprises was 13 per cent of national output value and about one third of rural output value. These shares rose to 26.5 per cent and nearly 61 per cent respectively by 1991. From 1980 to 1991, the annual growth rate of China's rural enterprises' gross output value was about 25 per cent (in 1980 constant prices), much faster than the growth rate in state owned enterprises. The gross output value of rural enterprises jumped from 100 billion yuan in 1983 to over 1000 billion yuan in 1991, a ten-fold increase over the space of 8 years. In contrast the time period for achieving the same goal in the state-owned enterprises (SOEs) was over 31 years (*Economic Daily*, 12 July 1992:2). According to the latest report from China, the output value of rural enterprises is expected to reach 1500 billion yuan in 1992 (*Economic Daily*, 30 November, 1992:2).

Rural enterprises now account for significant shares of national exports. In 1990, it was reported, their export earnings made up some 25 per cent of the national total (Zweig, 1991:717, *People's Daily*, 15 May, 1991:2). In 1991 there were 65,000 rural enterprises producing for export, of which 24,000 channelled 90 per cent or more of their production into export. These outward looking rural enterprises generated US$ 18 billion foreign exchange earnings in 1991 (*People's Daily*, 12 November, 1992:1). The dramatic increase of rural enterprises' exports significantly affected China's trade pattern. In 1992, rural enterprises' exports were over Y 100 million, the capacity of earning foreign exchange was over US$ 20 billion (*People's Daily*, 23 January, 1993:2).

Table 1.3 Rural Enterprises in the National Economy, 1984-91

Year	A Gross Output Value of Rural Enterprises (Yb)	B Gross Output Value of Rural Society (Yb)	C Gross Output Value of National Society (Yb)	A/B %	A/C %
1984	170.99	503.38	1316.60	33.97	12.99
1985	272.84	634.00	1658.80	43.03	16.45
1986	354.09	755.42	1906.60	46.87	18.57
1987	474.31	943.16	2303.40	50.29	20.59
1988	649.57	1253.47	2980.70	51.82	21.79
1989	742.84	1448.02	3451.90	51.30	21.52
1990	846.16	1661.92	3803.50	50.91	22.25
1991	1162.17	1900.41	4380.30	61.15	26.53

Sources: **ZGTJNJ, 1988:37:214:294, 1990:49:333:401, 1991:7:52:65. 1992:47:327:390. ZGXZQYNJ, 1990:72-77.**

Notes: **Y: Renminbi yuan.**
Rural enterprises include all enterprises in rural sector.

In contrast, the state-owned sector, though often under government protection, has not yet achieved remarkable growth. It is the loser in the competition with rural enterprises. Table 1.4 provides a comparison of the output shares between state owned industry and rural industry in the national economy over the period of 1985-1991. The share of state owned industry declined eventually from 65 per cent in 1985 to 53 per cent in 1991. The share of rural industry, on other hand, increased dramatically from 18 per cent to 28 per cent over the same period.

Table 1.4 Gross Output Value of SOEs and REs in Industry Sector, 1985-91

Year	SOEs Y million	%	REs Y million	%	Others Y million	%	Total Y million	%
1985	630212	65	172138	18	169297	17	971647	100
1987	825009	60	318781	23	237509	17	1381299	100
1988	1035128	57	467243	26	320129	18	1822500	100
1989	1234291	56	567175	26	400240	18	2201706	100
1990	1306375	55	650296	27	435765	18	2392436	100
1991	1495458	53	791547	28	537796	19	2824801	100

Source: ZGTJNJ: 1992:403.
Notes: SOEs: State-owned enterprises.
REs: rural enterprises, include private and cooperative rural industries.
Others include urban collective, cooperative and private industries.

To verify the origins of changes in China's export pattern, the impact of reforms in the foreign trade sector should not be neglected. As the most tightly controlled sector under the command system, the foreign trade sector also experienced a radical reform in the 1980s, and these changes continued in the first two years of the 1990s. The most significant reforms in this sector include the introduction of a guidance plan into the conventional planning system (1978-87), contracting out of the foreign trade authorities from the central government to the local government and trade corporations (1988-90), and introducing a full self-responsibility regime (1991). The over-valued foreign exchange rate has been depreciated several times during the decade, from 1.68 RMB per dollar in 1978 to 5.30 per dollar in 1991. Tariff rates have been cut several times since the late 1980s and the last cut at the end of 1992 reduced the average tariff level by 7.3 per cent (*Peoples Daily*, 5 December, 1992:1).

These events have a general effect of export promotion, but it is not even among all industries, especially when most price distortions remain. Some of the reform programs, such as the discriminatory foreign exchange retention rates, protected capital intensive industry and encouraged its exports. It can be seen that before a comprehensive reform program is completed, a dualism in production and export patterns may still exist.

1.3 The Scope of This Thesis

This study attempts to search out the origins of China's export growth and structural changes and to consider further trends by clarifying the following issues either empirically or theoretically: [1] the initial market situation in which China's reforms occurred and how these characteristics affected its production and trade pattern when the country opened to the world; [2] the possible direction of changes in production and international trade when the reforms remove some of the distortions and others remain unchanged; and [3] the possibility of achieving further improvements without introducing new distortions to the economy (i.e. a Pareto improvement) in the near future.

This study does not attempt to resolve all the potential effects of liberalisation on China's domestic markets and international trade. It merely verifies the possible direction of changes in production and trade patterns in the process of market liberalisations in the so-called socialist countries taking China as a special case. In order to make this task manageable, the thesis focuses on the issues particularly relevant to China's manufacturing export growth, and links this growth with domestic market liberalisation and the consequential emergence of rural industrial exports. While these linkages are

discussed in detail, other issues such as trade policy, price reform and the erosion of the planning system are only briefly reviewed. For the same reason, the impact of international market and domestic demand changes on China's export growth are also ignored.[4]

This thesis is organised in the following way. In order to examine China's production and trade pattern in detail, the next chapter provides an independent classification of 40 of China's industries by a group of factor intensity indicators. A careful adjustment is made to remove the distortions in data that are based on current prices. The industries are classified as labour intensive, human capital intensive, physical capital intensive and natural resource intensive. This classification is frequently used in the later chapters to shed light on the issues of China's production structure and export composition.

Chapter 3 highlights the changes in China's production and trade pattern in association with the economic reforms, on the basis of the industrial classifications. A group of trade performance indicators, such as "revealed comparative advantage", "trade intensity", "net trade ratios" and their changes are used as indicators of changes in China's trade pattern. The evidence reveals that China's exports were composed mainly of agricultural products initially and then turned to labour intensive products. However, the growth rates of human capital intensive exports were the highest and the share of those exports in China's total exports increased over time.

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4 There are two more reasons for ignoring of the demand side effects. First, China is assumed to be a small country in world economy for its share of trade on world trade was just 1.85 per cent in 1990 (Fei Changhong, 1992:2). Second, China's domestic consumption would have only limited impact on exports when the foreign trade was monopolised by the government and most of the important consumer goods were rationed.

In order to contribute to an explanation of the paradoxical phenomenon identified in Chapter 3, Chapter 4 provides a detailed discussion of China's market distortions and their changes after the reforms. The factor market distortions were characterised by restrictions on rural-urban migration and capital mobility. The commodity market distortions were characterised by "price scissors" gaps between agricultural and manufacturing products, and between raw materials and final goods. The distortions on foreign trade were characterised by a comprehensive government control on the international trade sector, incorporating an import substitution trade policy. Some of these distortions have been removed since the reforms, although on different timetables.

Chapter 5 presents a theoretical explanation of the main events in China's production and trade when distortions such as those identified in Chapter 4 remain. The factor market distortions are abstracted from commodity market distortions to simplify the analysis. When factor mobility is prohibited, national welfare is reduced and price signals lose their function in resource allocations. As a result, trade reversal is possible.

To deal with commodity market distortions, a four factor and four goods model is developed for the sake of both simple theoretical exposition and empirical verification. A theoretical simulation on the effects of industry-agriculture scissors price gaps and an import substitution strategy is provided and the possible consequences of economic liberalisation on both factor and commodity markets are examined. Given the comparative static feature of the model, the conflicts between urban industry and rural industry in competing for

the use of capital are identified. Since the output in different sectors responds to changes in factor endowments and relative prices, the industry-agriculture price gaps and tariff cuts on urban capital intensive industry all encourage rural industry to expand. Nevertheless, since the reforms are incomplete, a dualism in production and export pattern may result. Some of these hypotheses, namely the reversals of China's trade and the dualism in production and exports are examined in the following chapters.

Chapter 6 examines China's trade reversals by providing a comparison of production and international trade pattern in a global perspective. Several country groups, classified by both national income and natural resources (in per capita terms) are compared in association with their production and trade pattern. Even after the reforms, the proportions of China's agricultural and capital intensive exports in national exports were still higher and its labour intensive export share was lower than other developing countries at the similar income level. This may indicate that the reversals exist.

Chapter 7 turns to examine the dualism in China's production structure and export composition in the last decade by analysing two parts of China's economy: rural versus urban sectors. The rural-urban isolation is identified as the root of the rural industry boom that emerged in the 1980s. As a result of this isolation, the rural industries became more labour intensive, and the urban sector more capital intensive. Rural industry exports occupied a relatively large share of China's labour intensive exports and contributed to the rapid growth of China's labour intensive manufacturing exports. Given the conflicting features of the urban and rural enterprises, the government tried to protect the urban enterprises by administrative levers such as the control of bank credit and

biased trade policies in favour of high-tech industry. As a result, urban capital intensive exports were also promoted. This chapter attributes, at least partially, the dualism of China's export pattern to the dualism in its production pattern.

Chapter 8 presents a case study on a particularly labour intensive export item: textile and clothing products. China's textile and clothing industries have been its largest hard currency earner since 1986, and are likely to retain this status up to the year 2000. Therefore these industries provide a very good case for analysing China's labour intensive exports and examining the different policy suggestions in the economic literature. Two intermediate inputs used in the textile industry, namely cotton and chemical fibres, are incorporated into the picture to derive some interesting insights. This chapter is complementary to the main arguments in Chapter 5 and the analysis of the aggregate data in Chapters 6 and 7. The examination confirmed that for the labour intensive textile and clothing industry, rural industries increased their production and export share over time. The cotton production faced a dilemma of shortage in domestic markets and, simultaneously, an export boom, due to the specifications in China's price distortions and trade policy. However, the chemical fibre industry expanded in both rural and urban sectors in spite of its high ranking in capital intensity. This consequence reflects the fact that chemical fibres are over-priced in China's domestic market.

Chapter 9 presents conclusions and some policy implications. Suggestions for further research are also noted.

CHAPTER TWO

A CLASSIFICATION OF CHINA'S INDUSTRIES

According to standard international trade theory (Heckscher-Ohlin), a country exports commodities whose production requires relative use of productive factors found in relative abundance. Since China's most abundant factor is unskilled labour, one may expect that China will export labour intensive products. However, there are so many goods produced within a country using quite different technologies that some measures of classifying industries or commodities in terms of factor intensity are desirable.

The classification of industries or commodity groups by factor intensity is straight forward if one can use competitive prices to measure free trade factor intensities (Krueger 1977 and Deardorff 1979, 1984). The introduction of intermediate products does not vary the fundamental results. The only difference is that the unit value is replaced by unit value added in the calculations.

An industry census in China in 1985 provided sufficient information for this purpose. In that census, all industrial branches above the village enterprises

level were included therefore it was quite representative of the national industrial structure of the country.[1]

The presence of trade barriers could distort the pattern of trade and specialisation. Under the prevalence of governmental intervention, price signals may be also misleading. The impact of these distortions should be removed before the ranking and classifications are made.

The objective of this chapter is to investigate the relative factor intensity of 40 of China's industrial branches. The next section explains the classification criteria. Section 2.2 reports primary results that are based on the current data. Section 2.3 adjusts the distorted data and Section 2.4 reports the results of the final classification.

2.1 Classification Criteria

Various indicators can be used to measure factor intensities. Hufbauer (1970), followed by Hirsch (1974), estimated capital intensities by the indexes of capital per man and a skill ratio. Capital per man measures the ratio of fixed capital investment to the number of employees in the industry under consideration. A high ratio indicates a capital intensive industry and a low ratio a labour intensive one. Since capital stock rather than capital flow is concerned, this measure is useful in

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1 Village and rural private enterprises were excluded from this census. This would, though not significantly, lead to an over-estimation of China's capital intensity in industries. However, since village and rural private enterprises accounted for a relatively low proportion (less than 10 per cent) in national production in 1985, the bias would not be sufficiently serious so as to reverse the classification result.

comparing not only the capital consumed but also the capital stock required in the process of production. The skill ratio is used as a surrogate for the innovative content of the goods manufactured. It can be estimated by the share of professional technical and scientific personnel in the total labour force. The higher the ratio, the more intensive is the human capital used in the industry.

A popular measure for classifying different commodity groups in terms of factor intensity is the value added per worker (VA/worker). Krause (1982) first identified labour intensive goods as those with low levels of value added per worker. This classification is the same as that used by Garnaut and Anderson (1980).

In addition, labour requirement per unit of value added (represented by labour share in value added) was used by Findlay and Li (1992) as an index of the capital intensity of China's textile and clothing industries. The wage bill, if not distorted, can be used as an approximate indicator of the labour requirement. But a high ratio of wage bill to value added (WB/VA) might be due to either an intensive use of a large number of low-wage unskilled workers or of fewer skilled workers with a high wage rate. In the first case it is labour intensive and in the second case the activity is human capital intensive. In order to distinguish between these two possibilities use of both VA/worker and WB/VA is necessary.

The distinctions between these measures should be noted. Fixed capital per worker indicates capital stocks rather than capital flows in operating the production process. Value added per worker represents the productivity of a worker, given the nature of the commodity and the fixed capital equipment level. They coincide with one another to the extent that a high value added per worker of

the product is more likely when labour is working with a relatively large stock of capital.

Another distinction can be made. FK/worker and the skill ratio are usually the result of long term investment in the industry. For this reason, the classification based on them can be called the "*industry method*". The classification based on VA/worker and WB/VA is called the "*commodity method*", since they involve the result of current value adding activity. Table 2.1 and 2.2 provide a summary of the comparison of these two methods.[2]

Table 2.1 Identifying Industries by Factor Intensity
(Industry Method)

		Fixed capital per worker	
		Low	High
Skill ratio	Low	labour intensive	physical capital intensive
	High	human capital intensive	human & physical capital intensive

2 The significance of the distinction between the two measures should not be ignored. The classification based on the industry method is instructive to new investment projects, implying that establishment of industries that use relatively scarce factors of the country would lead to inefficiencies in the long run, given the factor endowment of the country. The commodity method, in contrast, is instructive concerning the activities of established industries, by way of attaining the maximum economic efficiency and rational allocation of the factor endowments of the country.

Table 2.2 Identifying Commodities by Factor Intensity (Commodity Method)

		Value added per worker	
		Low	High
Wage share in value added	Low	labour or capital intensive	human capital intensive
	High	physical capital intensive	human & physical capital intensive

One can also combine the two methods together and then classify the industries or commodity groups under a combination of variables. Table 2.3 summarises the expected relativities between each indicator and factor intensity.

Table 2.3 A Comprehensive Classification of Industries by Factor Intensity

	Ranking by ascending order
Fixed capital per worker >--->	Increasing physical capital intensity
Skill ratio >--->	Increasing human capital intensity
Value added per worker >--->	Increasing capital intensity (P & H)
Wage bill on value added >--->	Increasing labour intensity

2.2 Primary Results

The data used for classification is taken from China's official statistics based on an industrial census made in 1985. The data on China's manufacturing sector can be divided into a number of groups including: [1] ownership type, for example state owned, collectively owned and the others; [2] industrial division, such as heavy and light industries; [3] scale division, for example large, medium and small; and [4] sub-industrial level, i.e., industrial branches.

The importance of the aggregate in terms of gross output value (GOV) and value added (VA) is shown in Figure 2.1 and 2.2.[3] The two graphs reveal that the state owned, as well as the heavy industries, were dominant in the Chinese economy in 1985, although the small sized industries accounted for a relatively large share of the total output.

3 The definition of gross output value is the monetary representation of industrial output of a production sector in a given time period (usually one year). The net output value is derived by subtracting raw materials and depreciation of fixed capital from gross output value. Value added is equal to net output value plus depreciation of fixed capital.

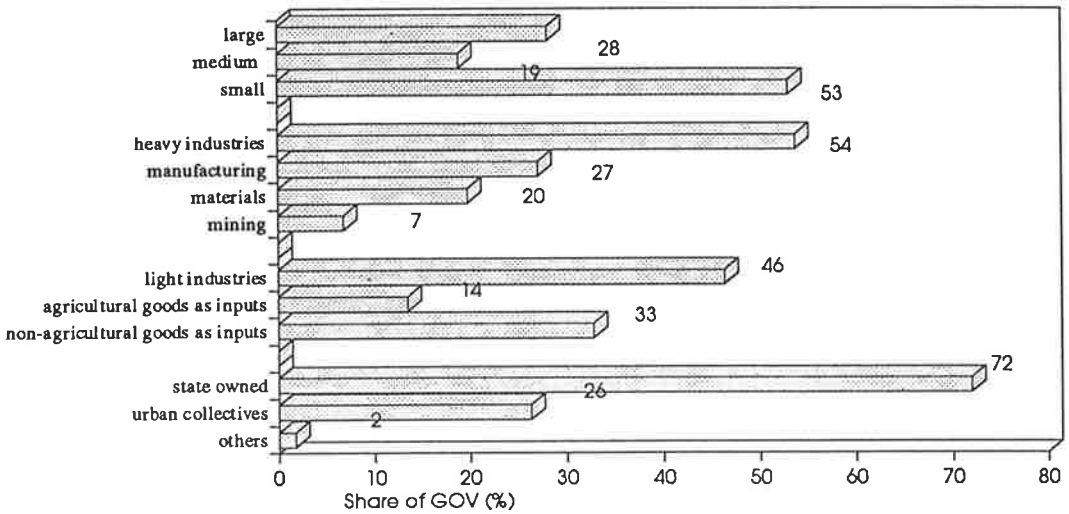

Figure 2.1 China's Industrial Structure, in terms of the share of GOV, 1985.

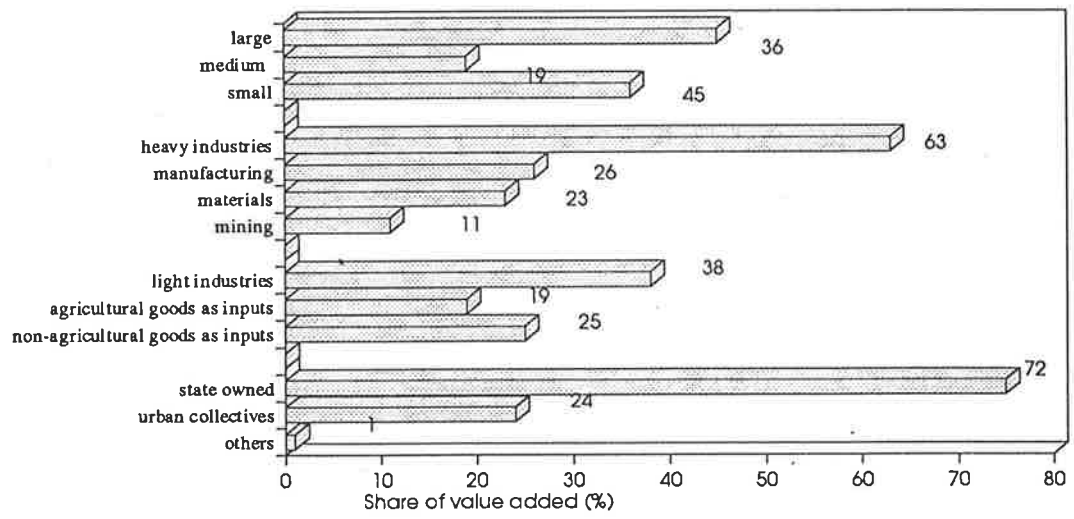

Figure 2.2 China's Industrial Structure, in terms of the share of VA, 1985

2.2.1 The Industry Method

The first attempt at ranking China's industries by using fixed capital per worker (FK/worker) and skill ratio (industry method) at an aggregate level is reported in Figure A1.1 and A1.2 in Appendix 1. These graphs present different levels of capital intensity in different ownerships, different categories and sizes of the industries. State owned large enterprises, as well as the heavy industries, were more capital intensive than collective, small sized and light industries. For example, state owned industries as a whole were nearly 5 times more capital intensive than collective industries (include township enterprises) in terms of fixed capital per worker and more than 9 times more human capital intensive in terms of the skill ratio. The capital intensity of heavy industry was more than double that of light industries in terms of both FK/worker and skill ratio. The large enterprises, classified by both FK/worker and skill ratio, were about 1.5 times more capital intensive than the medium sized enterprises and 6 times more than the small ones.

The ranking and classification at the sub-industry level are shown in Figure 2.3 and Table A1.2 in Appendix 1. Power generation appears to be the most capital intensive industry (both human and physical) since it is ranked 40th by the fixed capital per worker and 37th in skill ratio, while the electronic and telecommunication equipment industry appears to be the most human capital intensive, given its top ranking in skill ratio and 25th ranking in FK/worker out of 40 industries; the clothing industry, however, is the most labour intensive given its first ranking in FK/worker and second ranking in the skill ratio.

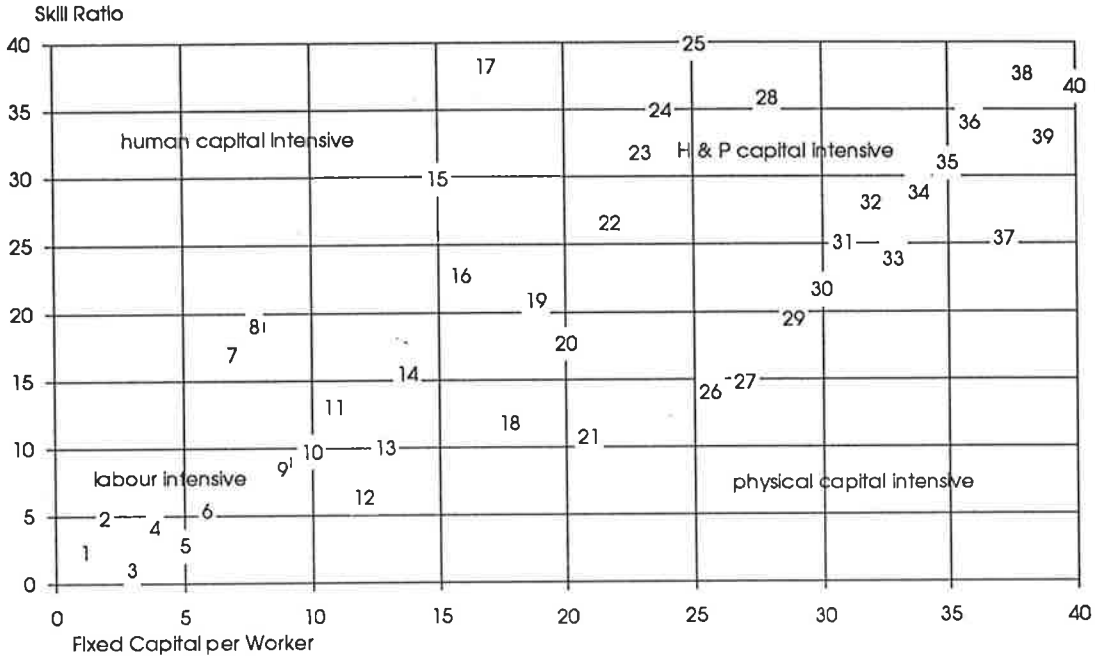

Figure 2.3 Ranking of China's Industries by FK/worker and Skill Ratio, 1985

Note: Numbers in the body of the chart refer to the following industry codes:

1 clothing
2 arts & crafts
3 mining of other minerals
4 furniture manufacture
5 others
6 leather, furs & manufactured goods
7 cultural, educational & sports materials
8 metal products
9 timber processing, bamboo, cane, palm fibre
10 mining & preparation of building materials
11 plastic manufactured goods
12 printing
13 building materials & other non-metal goods
14 textile manufacture
15 electric equipment & machinery
16 rubber manufactured goods
17 instruments, meters & other measuring equipment
18 food manufacture
19 beverage manufacture
20 paper making & manufactured goods
21 animal feed manufacture
22 logging & transport of timber & bamboo
23 machine building
24 medical & pharmaceutical goods
25 electronic & telecommunication equipment
26 tobacco manufacture
27 salt mining
28 transportation equipment
29 coal mining & preparation
30 ferrous metals mining & preparation
31 non ferrous mining & preparation
32 chemical industry
33 coking, gas & coal-related products
34 smelting & pressing of ferrous metals
35 smelting & pressing of non-ferrous metals
36 chemical fibres
37 production & supply of running water
38 petroleum processing
39 petroleum & natural gas extraction
40 power generation steam & hot water supply

2.2.2 The Commodity Method

The first attempt to rank China's industries by using the commodity method led to obvious errors in the results. For example, tobacco ranked as the most capital intensive in terms of value added per worker and coal mining and preparation as the second most labour intensive one (the most labour intensive one is mining of other minerals). The ranking of the ratio of the wage bill to value added (WB/VA) is similar to the ranking of VA/worker. In this case chemical fibre is the most capital intensive and coal mining and preparation the most labour intensive. These suspicious results are due to China's price distortions. For example, the extremely high capital intensity of the tobacco industry is due to the high price level of tobacco, in which government taxation accounts for a large share of its value added. Coal mining and preparation, on the other hand, is considered as a labour intensive industry by the current calculation but would be a capital intensive one if its price had not been undervalued.[4] China's statistics revealed that in the tobacco industry, the rate of profit and taxes on total investment of state owned enterprises reached 218.18 per cent in 1985, while the coal mining and preparation industry only had a low rate of 0.16 per cent in the same year (ZGGYJJTJZL, 1987:67).

In the presence of price distortions, information derived from the ranking will have little value for policy making, especially for the commodity method. However, some action can be taken to adjust the data.

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4 This situation has been discussed by Thompson (1990). His procedure lowered the labour share to value added in the coal industry from 79 per cent to 42 per cent. The estimates of price distortions he provided could not be matched exactly with the industries available here and so have not been used.

2.3 Adjusting the Data to Remove Price Distortions

One indicator of the extent of distortion is the difference in profit level in each industry. In an economy with mobile capital and flexible prices all industries should have the same (or zero) economic profit in the long run. A divergence in profit level at any point in time, given the same competitive conditions, could be due to different abilities of management. But under conditions of free entry, one cannot imagine that an industry as a whole can consistently make losses while others can earn large profits. However, the data suggest that this was the situation in China in 1985, when profit and tax levels on total investment differed more than 100-fold between different industrial branches.

2.31 The Adjustment of Commodity Market Distortions

The adjustment of the commodity price distortion can be processed as follows:

First, divide the plan price into the following four parts:

Plan Price = Raw materials and supplement (RM)
+ Depreciation of fixed assets and
interest of loans, rents etc. (DI)
+ Labour cost (wage, allowance, etc) (LC)
+ Profit and taxes (PT) [1]

For simplicity, write [1] as

$$P = RM + DI + LC + PT \qquad [1a]$$

in which, the value added (VA) is

$$VA = DI + LC + PT \qquad [2]$$

Now assume that the price distortions are reflected in the divergence of profit and taxes among industries. In order to eliminate these distortions, one can subtract profit and taxes from value added and define the remainder as the cost of value added (CVA) as:

$$\begin{aligned} CVA &= VA - PT \\ &= DI + LC \end{aligned} \qquad [3]$$

In the absence of data on other allowances, the wage bill was used as the estimate of labour cost. Further adjustments can be made to CVA to allow for factor market distortions.

2.32 The Adjustment of Factor Market Distortions

Within China's urban industrial sector, the most commonly observed distortion in labour markets is that payments to skilled, unskilled workers and technicians were usually the same, even reversed (Chen Bing, 1990). This distortion will lead to an under-estimate of the human capital intensity of the corresponding industries and commodity groups that use more technical staff than others, i.e., the industry with a low ratio of wages to value added could be under-estimated in terms of human capital intensity.

An adjustment is needed for this problem. The method is to find a proper rate of return to human capital and use it as an adjustment coefficient. If we assume that the technicians had been under-paid by 10 per cent, a 10 per cent multiplier weighted by the skill ratio, can be added to the original wage bill of the industry under consideration.

On the other hand, as will be discussed in Chapter 4, China's urban capital was under-priced. In order to allow for an appropriate return on capital invested, and assuming that the rate of return to China's capital was under-estimated by 10 per cent, the adjustment for this kind of distortion is also simply achieved by adding 10 per cent in the return to total capital (fixed plus circulating) in value added.[5]

Now one can compare the real cost of value added across industries, rather than comparing the unadjusted value added. The real cost of value added (RCVA) is defined as revised capital consumption (RKC) plus revised wage bill (RWB). Thus the new criteria used in the classification becomes:

$$RCVA_i/worker_i = (RC_i + RWB_i)/employee_i \quad [4]$$

$$RWB_i/RCVA_i = (RC_i + RWB_i)/RCVA_i \quad [5]$$

where i denotes the corresponding industry under consideration.

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5 There have been several adjustments to China's interest rates since 1989. By 1986, the interest rate on medium and long term loans in China was only around 6 to 12 per cent. (ZGJRNJ, 1986)

The ranking and classification of the industries by the commodity method are presented in Figure 2.4 and Table A1.3 in Appendix 1.

Comparing the two kinds of classification, the "industry" method (using FK/worker and skill ratio) is expected to be more reliable than the "commodity" method (using RCVA/worker and RWB/RCVA). This is partly because the adjustment of the current data cannot allow accurately for distortions in commodity and factor markets. However, it turns out that the results of the commodity method are not very sensitive to change in coefficients. In order to test the sensitivity of the ranking to the adjustments, other alternative coefficients of the return to human capital and physical capital (total investment) were used. Reducing the coefficients from 10 per cent to 5 per cent in both cases would not change the final classifications. In fact, in the absence of any adjustments to the factor market distortions, the ranking by the commodity method is not changed significantly.

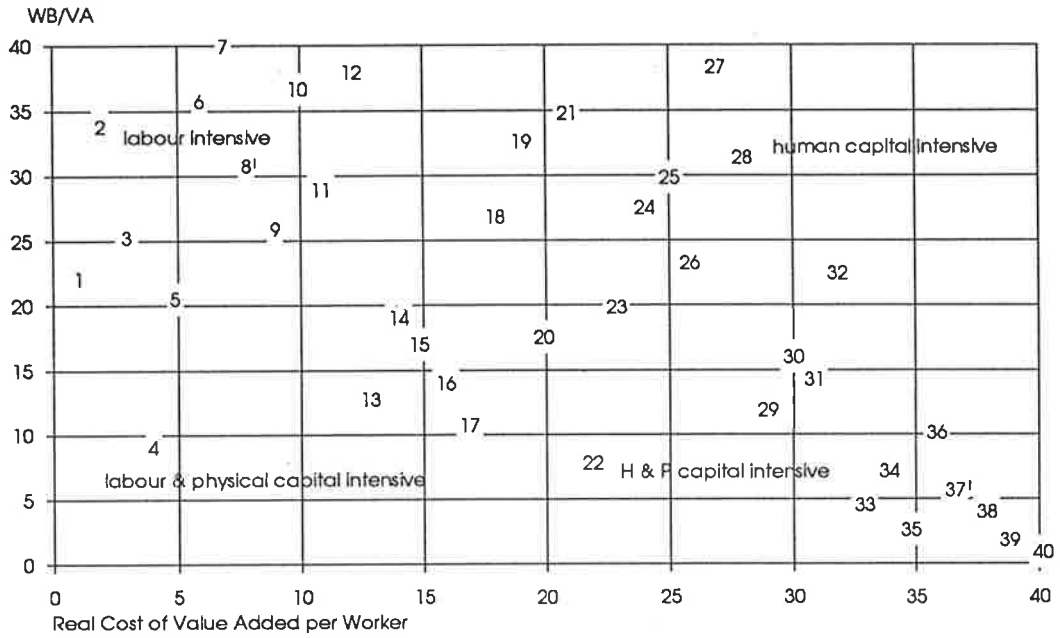

Figure 2.4 Ranking of China's Industries by RCVA/worker and WB/RCVA, 1985

Note: Numbers in the body of the chart refer to the following industry codes:

1 mining of other minerals
2 timber processing, bamboo, cane, palm fibre
3 clothing
4 others
5 arts & crafts
6 furniture manufacture
7 mining & preparation of building materials
8 building materials & other non-metal goods
9 leather, furs & manufactured goods
10 metal products
11 printing
12 cultural, educational & sports materials
13 plastic manufactured goods
14 textile manufacture
15 paper making & manufactured goods
16 food manufacture
17 animal feed manufacture
18 ferrous metals mining & preparation
19 coal mining & preparation
20 rubber manufactured goods
21 logging & transport of timber & bamboo
22 beverage manufacture
23 coking, gas & coal-related products
24 electric equipment & machinery
25 machine building
26 non ferrous mining & preparation
27 instruments, meters & other measuring equipment
28 transportation equipment
29 chemical industry
30 medical & pharmaceutical goods
31 smelting & pressing of ferrous metals
32 electronic & telecommunication equipment
33 tobacco manufacture
34 production & supply of running water
35 salt mining
36 smelting & pressing of non-ferrous metals
37 chemical fibres
38 petroleum processing
39 power generation steam & hot water supply
40 petroleum & natural gas extraction

2.4 The Final Classification

After the adjustments for the price distortions, the ranking of the industries and commodity groups in terms of factor intensity is shown by the tables and figures in Appendix 1. The 40 industries are classified into three groups; namely labour intensive, human capital intensive and physical capital intensive. To these a special group, i.e., natural resource intensive industries, are added as the fourth group. This group is composed of those industries in which the production process is directly based on or related to the country's natural endowments. Basically they are mining activities. One characteristic of these industries is that they are usually also physical capital intensive. Because they are the most apparent, they are categorised first.

In Table 2.4, based on Table 2.3, the remaining industries are divided into three groups: those ranked in the first 20th places of FK/worker are classified as the labour intensive (with FK/worker less than 8429 RMB yuan); those ranked between 20th and 30th places by FK/worker are classified as human capital intensive; to these are added those whose ranking by the skill ratio is higher than the 30th place even if their ranking by FK/worker is less than 30th place. The rest are physical capital intensive industries. Given that the physical capital intensive industries usually are also human capital intensive, the classification is determined by FK/worker, that is, if the FK/worker and skill ratio are ranked at same level the industry is classified as physical capital intensive. Power generation, petroleum processing and chemical fibres are examples.

Table 2.4 Classification of China's Industries by Factor Intensity, 1985

Classification	Ranking FK/worker	Skill ratio	RCVA	RWVA
1. Natural resource intensive				
mining of other minerals	3	1	1	22
mining & preparation of building materials	10	10	7	40
logging & transport of timber & bamboo	22	27	21	35
salt mining	27	15	35	3
coal mining & preparation	29	20	19	33
ferrous metals mining & preparation	30	22	18	27
non ferrous mining & preparation	31	25	26	24
coking, gas & coal-related products	33	24	23	20
petroleum & natural gas extraction	39	33	40	1
2. Labour intensive				
clothing	1	2	3	25
arts & crafts	2	5	5	21
furniture manufacture	4	4	6	36
others	5	3	4	9
leather, furs & manufactured goods	6	5	9	26
cultural, educational & sports materials	7	17	12	38
metal products	8	19	10	37
timber processing, bamboo, cane, palm fibre	9	9	2	34
plastic manufactured goods	11	13	13	13
printing	12	7	11	29
building materials & other non-metal goods	13	10	8	31
textile manufacture	14	16	14	19
rubber manufactured goods	16	23	20	18
food manufacture	18	12	16	14
beverage manufacture	19	21	22	8
paper making & manufactured goods	20	18	15	17
3. Human capital intensive				
electric equipment & machinery	15	30	24	28
instruments, meters & other measuring equipment	17	39	27	39
machine building	23	32	25	30
medical & pharmaceutical goods	24	35	30	16
electronic & telecommunication equipment	25	40	32	23
transportation equipment	28	36	28	32
4. Physical capital intensive				
animal feed manufacture	21	11	17	11
tobacco manufacture	26	14	33	5
chemical industry	32	28	29	12
smelting & pressing of ferrous metals	34	29	31	15
smelting & pressing of non-ferrous metals	35	31	36	10
chemical fibres	36	34	37	6
production & supply of running water	37	26	34	7
petroleum processing	38	38	38	4
power generation steam & hot water supply	40	37	39	2

Notes: **FK/worker: fixed capital per worker.**
RCVA: Real cost of value added (adjusted) per worker.
RWVA: Real wage bill (adjusted wage bill) on value added.

The classification of the industries is very important in analysing the changes in China's production and trade pattern. As will be seen later in this thesis, the ranking and classification established in this chapter are frequently used in the discussion of the following chapters.

CHAPTER THREE

AN HISTORICAL REVIEW

This chapter provides a background of the structural changes in China's production and trade, on the basis of the industry classification established in the last chapter. This background is necessary since some disturbing variables need to be removed before the theoretical analysis and empirical examinations of the main hypotheses are undertaken in the following chapters. These variables include the changes in world prices, the changes in domestic prices and endowments, supply and demand conditions, as well as the changes of government trade policies.

Section 3.1 presents several elements that could affect China's production and trade pattern in a dynamic sense. Section 3.2 outlines China's production structure in terms of the factor intensity classification established in last chapter. Section 3.3 displays the "revealed" trade pattern and its changes over time. Concluding remarks are reported in the final section.

3.1 A Background of Changes in the 1980s

Several important events occurred not only in China but also in the rest of the world in last decade. These events might be expected to affect China's

production and trade pattern. The increase in protection in industrialised countries over the decade and the collapse of oil prices in 1986 had the most significant impact on China's trade. In the domestic market, the increase in agricultural prices, the emergence of rural enterprises, an unusually high level of consumer spending and a new set of trade policy targets may be the most relevant. An assessment of the importance of these factors is provided in this section.

3.1.1 Protectionism in Industrialised Countries

Since the second half of the 1970s, after a "golden time" of free trade, protectionism came back in the 1980s. The so called neo-protectionism includes non-tariff trade barriers, such as import quotas, voluntary export restraints and import licences, export subsidies in agricultural products, and the regional free trade organisations, etc (Chen Tongchou, 1991).

The neo-protectionism has restricted China's export ability. The best example is in textile and clothing exports, which might be greatly discouraged by the mufti-fibre arrangement (MFA). Since 1980, 3 textile agreements between China and the United States, China's largest industrialised country's market, have been concluded under the umbrella of the MFA. China also signed 3 bilateral textile agreements with the European Community (EC), the last one being in 1988 (Yang Yongzheng, 1991). These agreements, particularly the recent ones, have increased the restrictive effect of the MFA on the further expansion of textile and clothing exports from China. According to Yang Yongzheng (1992), should the MFA be abolished, China's textile and

clothing exports would increase by 1.2 billion in 1986, or by about 3.9 per cent of its total export value in that year.

3.1.2 The Collapse of Oil Prices in 1986

While domestic consumers have suffered from energy shortages, China has been an energy exporter since the inception of the People's Republic in 1949. China's liquid fuel exports (crude oil and petroleum products) increased dramatically after China joined the United Nations in 1971 and the world oil price hikes in the early 1970s. The total share of oil export revenues to China's merchandise export revenues accounted for more than 12 per cent in the second half of the 1970s and reached more than 20 per cent in the first half of 1980s. In the peak year of 1985, this share reached 25 per cent and China became the largest oil exporter in Asia. However, this figure dropped below 10 per cent as the world price collapsed from over US$30 per barrel to below US$10 per barrel in 1986 (Peng Zhaoyang, 1992:63). The shares further declined in the following years and only accounted for less than 7 per cent by 1990.

As will be discussed in next chapter, energy prices in China were seriously under-priced. The changes in China's energy exports provide a good example of the changes in China's trade strategy. Before the reforms, China's international trade strategy was import substitution, and strongly inward looking (World Bank, 1987, Lardy, 1992b). Nevertheless, it had to export something in order to import advanced technology and equipment to procure a heavy industry based development strategy. To fulfil a strict export plan, China must export what it could. Instead of exporting agricultural products, which became more scarce when the population increased greatly during the period of

the 1960s and 1970s, energy products became the scapegoat. However, the collapse of oil price in 1986 ended this approach.

3.1.3 Increases in Prices of Agricultural Products

After a two decade stagnation, China's government had to increase the prices of agricultural products in 1979, when an agricultural-oriented reform started. For example, the procurement price of grain rose by 139 per cent between 1978 and 1987 (Wiemer, 1992:183). The prices of agricultural products increased substantially over the 1980s, though nation-wide inflation would remove some of its real effects.

An increase in the price of agricultural goods does not mean the price gaps between manufacturing goods and agricultural goods have been removed. On the contrary, the gaps might be enlarged since the prices of manufacturing goods might be increased by a larger extent. As will be discussed in next chapter, the restoration of the distorted relative price structure might remove the price increasing effect on agricultural production. Nonetheless, the increase in prices of agricultural goods could affect the profitability of the light industries, especially those which used agricultural products as raw material inputs intensively. As a result, these industries might be discouraged by price reform. If their production contracts, it is likely their exports will also contract.

3.1.4 The Boom of Rural Enterprises

Despite the increased prices of agricultural goods, rural enterprises emerged and achieved a remarkable growth over the decade (more than 25 per cent

annually). The rural enterprises are economic units established by local government in the countryside or by the peasants themselves. In practice, they are often created with the involvement of state enterprises that use them to avoid some dangerous or dirty jobs and production under excessively restrictive regulations. Rural enterprises operate outside the government plan and are subject to "hard budget constraints" in the sense that the owners do not have any guaranteed budget support from the central government. They buy inputs and sell outputs in free markets and do not have to fulfil plan obligations to the state.

Three fundamental origins of the rapid economic growth and international orientation of rural enterprises can be identified:

First, the existence of rural surplus labour provided a cheap labour pool for labour intensive industrial boom. There are more than 100 million surplus labourers in rural China, due to rural-urban migration restrictions (RUMR) which started to take effect in the late 1950s. These surplus labourers have to share the income of people actually working in production. They remained in low social positions and lived in poverty for many years before the reform. They have a high elasticity of supply of labour, and a tendency to save more when they earn more income. This makes it easy for the rural enterprises to obtain its labour.

Second, the rapid accumulation of capital and partial liberalisation of rural capital markets, have accelerated the growth of rural enterprises. Before the reform, restrictions applied not only to the movement of labour but also to the mobility of capital between rural and urban sectors in China. These

restrictions were partially removed in the 1980s. The development of rural manufacturing activities was thus encouraged by permitting access to government bank loans and tolerating the development of informal rural financial sectors since the reform (Tam, 1991). As a result, bank loans to rural enterprises increased by 32-fold in the decade of 1978-88 (ZGXZQYNJ, 1990:71). Over the same period, it is reported that the deposits in the rural credit cooperatives increased 10-fold (ZGTJNJ, 1990:668).

Third, the price distortions in China's current economic regime reinforced industry-based growth. China's price regime is artificially established and characterised by the gaps between agricultural and industrial products; the so-called "industrial-agricultural scissor price gaps". This regime was set up in the early 1950s and completed in the late 1950s when almost all market forces were eliminated. As a result of this price policy most agricultural products, as well as most raw material inputs, are significantly under-priced, while most industrial products, especially manufacturing processing activities are over-priced (see next chapter). These price divergences initiated the push for the rapid growth of rural enterprises, since relatively high profitability existed in those activities. Although the rural enterprises are very labour intensive and largely depend on some agricultural materials, their production cost would not be affected as seriously as those urban industries due to their advantage in lower labour cost, when prices of agricultural goods increased.

3.1.5 Unusually High Consumer Spending

In the so called socialist countries, the absence of a capital market and a labour market may result in a relatively higher consumer demand level than in the

market economies at the same income level. The absence of factor markets will not only eliminate the opportunity to earn more income via investment, but also provide an "iron rice bowl" (job security), or a guarantee for future incomes. Investigations of China's food consumption lead some economists to believe that China's national income per capita may be under-estimated (Garnaut and Ma, 1992). Other analysts argue that there is excess consumption (or "consumption expansion") relative to the country's income levels (see for example, Wang Wuyi, 1990, Wang and Chern, 1992). This unusual consumer behaviour may also be attributable to the rationing system (Wang and Chern, 1992). This excess consumption pattern may shift some non-staple food (e.g., meat, fish, eggs, milk and vegetable oil) and durable consumer goods (e.g., television, refrigerator, washing machine and video recorder) from international markets to domestic markets. These goods are likely to be composed of agricultural products and human capital intensive products (machinery and electronics). Therefore the production of these products might be induced but the exports might be reduced by such an "over-heated" consumer pattern. However, if domestic consumers prefer foreign products, imports of these goods may increase without any decline in exports of these goods. Given the preference of Chinese consumers, the second case might be more likely to happen in China.

3.1.6 International Trade Policy

Since China's reforms started from a command economy (Chapter 1), and the reforms so far are partial rather than comprehensive (see next chapter), its production and trade pattern may be largely affected by government

interventions, especially trade policies. Foreign trade policy affected China's exports by the following ways:

Decentralisation of Foreign Trade. Prior to the reform era, China's foreign trade was monopolised by the central government. This monopoly power was eroded by a growing number of foreign trade corporations and the declining scope of the foreign trade plan after the reforms. As reported by Lardy (1992a), the number of trading companies soared to more than 5000 in the late 1980s and the number of planned export commodities fell from 3000 in the pre-reform era to 112 by 1988. These events contributed to the freedom in choosing exporting goods by criteria such as profitability rather than the centre's preference. Along with this decentralisation, a transformation from command external transactions to an alternative rationalised foreign trade regime became possible.

Devaluation of Domestic Currency. China does not permit market forces to determine and allocate foreign exchange, but allocates it administratively. China devaluated its domestic currency several times over the post-reform era, from Y1.57 per US dollar in 1979 to Y5.73 per US dollar in 1992. The devaluation might have increased the competitiveness of China's exports and at the least lowered the losses in its exporting activities. However, since the export promoting effects of devaluations were evenly distributed among all exports, it is not sufficient to explain the structural changes in China's export pattern.

The Foreign Exchange Retention Scheme. The most significant measure of China's export promotion was the introduction of the foreign

exchange retention scheme. Under this mechanism, 25 per cent of all foreign exchange earned was retained at the provincial level, with equal shares going to the enterprises producing the exports and to the provincial authorities. The shares held by the provincial governments increased to 80 per cent by the end of 1980s (Lardy, 1992a).

The foreign exchange retention rates were different across industries. Some capital intensive industries, for example electric machinery and electronics, and some so-called traditional export industries: garments, handicraft and other light manufactures, had relatively high retention rates (50-100 per cent). Therefore the average retention rate was able to reach 40 per cent by 1988 (Lardy, 1992a).

Compulsory Export Target. China's export targets set by different levels of the government authority were compulsory and the losses from achieving these targets were entirely balanced by the central government before 1988. The contract reform starting from 1988 did not change this compulsory nature and the quantity of foreign exchange earning expressed in terms of foreign exchange is always the priority. "Mandatory plan export commodities must be exported regardless of the cost of earning foreign exchange" (Wu and Zhang, 1987). Therefore most enterprises had to fulfil the export contract regardless whether of this fulfilling would result in losses or not. As a result, as long as a product finds a foreign market, it will be exported, although some exports are still under an export licensing regime (see next chapter).

Tax rebates and others. As a measure of export promotion, the Chinese government started to return indirect tax to exporters in 1985. From

1988, all taxes in exports were rebatable (Huang Xiaoling, 1992;19). Other export incentives included low interest loans for exporting enterprises, performance bonuses, etc. The performance bonus was 3 per cent of under plan target per US dollar of earnings, and 10 per cent for those above plan earnings in 1988. In addition to these bonuses, balancing losses by FTCs rather than enterprises, and preferential access to foreign exchange and fundamental inputs, were all applicable to exporters, especially to the so-called export production bases, prior to 1988 (World Bank, 1988).

The devaluation of RMB may have had an export promotion effect over the post-reform decade but it is not a source of the structural changes in China's export pattern. The pattern was more likely to be affected by decentralisation of foreign trade, different foreign trade retention rights and differentiated tax rebate regulations across different industries, etc. The compulsory nature of China's export plan may have contributed to rapid export growth, but this growth may not be justified given the likely inefficiency induced by such a plan. So far, the reform in foreign trade sector has been focused on improving the operational efficiency within the sector itself and the economic efficiency of the producers while allocative efficiency has not been a target.

3.1.7 Summary

To sum up, the protection in industrialised markets might force China to choose a second best export pattern, i.e., turn to export some other goods that may not represent the country's comparative advantage. But this shift might not necessarily "reverse" its exports to such an extent that they are capital intensive. The increase in prices of agricultural goods might discourage light

industry production and exports in the urban sector, but might not do so in the rural industries, which benefited from their linkage with agriculture and cheap labour costs. For the same reason, the boom of rural industries would encourage their products to be exported. The over-heating of demand for consumer goods was more likely to promote imports of high quality foods and durable consumer goods than discourage the exports of these goods.

Devaluation might encourage all exportables including those of the agriculture and natural resource industries. Therefore it could contribute to the rapid growth of China's exports, but not to the remarkable changes in its export composition. The changes in China's export pattern might
be affected by the discriminatory rates of foreign exchange retention and government balancing the losses in exports, as well as the export licensing regime. Decentralisation of the foreign trade sector provided a necessary condition toward changing the country's export composition, but it is not sufficient to lead to efficiency improvement in this transformation.

3.2 China's Production Pattern

Keeping all the elements mentioned in last section in mind, a production pattern and its changes will be discussed briefly in this section. A production pattern is discussed first since it is believed that production pattern determines export. As point out by Edgeworth (1894:424), international trade should be considered as a rearrangement of internal trade, as the movement of the hand of a clock corresponds to considerable unseen movements of the machinery.

Most of the analysts use China's official data to confirm that China's industrial structure has been adjusted toward encouraging more labour intensive activities after the reforms. A conventional methodology is to use the broad classification of heavy and light industries as the dividing line between capital intensive and labour intensive manufacturing products. Following this approach, Table 3.1 reports the average annual growth rates of gross output value in China's agriculture, and heavy and light industries respectively over the period 1952-91. The table indicates that in the first five periods (1952-75), there are four periods where the heavy industry achieved higher growth rates than that of the light industry, while in the last three periods (1976-90), the record was just the opposite.

The last two rows of the table indicate that the heavy industry grew more quickly than the light industry in the 1953-79 period, but was behind the latter in the period 1979-1991, indicating a structural change over the two periods.

China's agricultural growth, on the other hand, was far behind the industrial growth, especially in the early period. From 1986-90, its annual growth rate was 4.6 per cent (*China Youth Daily*, 14 March, 1991:2). After extremely rapid growth over the period 1981-85 (annual growth rate reached 8.2 per cent), it returned to its long-run stagnant position.[1]

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1 It should be noted that the data used by Chinese officials are distorted planning price data, so the corresponding comparison of the sectors' growth rates will also be affected by such price distortions. If the price distortion effect is considered, the growth rate of industries (agriculture) would not be that high (low) in the 1949-80 period.

Table 3.1 Annual Growth Rates of GOV in Different Sectors, China, 1952-91

Period	Industry & agriculture %	Agriculture %	Industry %	of which light %	heavy %
1952-57	10.90	4.50	18.00	12.90	25.40
1958-62	0.60	-4.40	3.80	1.10	6.60
1963-65	15.70	11.10	17.90	21.20	14.90
1966-70	9.60	2.90	12.00	8.70	15.00
1971-75	7.80	3.40	9.30	7.90	10.30
1976-80	8.10	3.20	9.60	11.50	8.20
1981-85	11.00	8.20	12.00	13.50	10.70
1986-90	11.40	4.80	13.20	14.10	12.20
of which:					
1953-79	8.20	3.40	11.10	9.10	13.40
1979-91	10.70	5.90	12.20	14.30	10.70

Sources: ZGJJNJ, 1981:VI-5. ZGTJNJ, 1992:56.

Table 3.2 tells a similar story in relative terms, i.e., the shares of industries (light and heavy) and agriculture in total gross output value of industries and agriculture. The table shows a trend of increasing shares in both light and heavy industries while the share of agriculture declined over time. While the share of heavy industry dropped slightly during the post-reform period (1979-91), the share of light industry increased by 5 per cent. One unexpected result is that the share of heavy industry actually increased in the second half of the 1980s, due to the decline of the share of agriculture.

Table 3.2 appears to indicate that light industries increased more rapidly in the post-reform era. Nevertheless, the picture may be different if further disaggregation of the industries is introduced. A parallel historical investigation of the production pattern at disaggregated industrial branch levels requires reliable and continued statistical data for the same period. Unfortunately this requirement is not satisfied. The annual industrial branch data were released only after 1980 (1981-84 data are incomplete). Table 3.3 summarises China's production structure in the period of 1980 to 1991 on the basis of the industrial classification established in last chapter. The results are plotted in Figure 3.1 and the structure including all industrial branches is detailed in Table 3.4.

Table 3.2 China's Industrial Structure (%), 1952-9

Year	Agriculture	Industries	of which light	heavy
1952	56.9	43.1	27.8	15.3
1957	43.3	56.7	31.2	25.5
1962	38.8	61.2	28.9	32.3
1965	37.3	62.7	32.3	30.4
1970	32.5	67.5	31.1	36.4
1975	28.2	71.8	31.6	40.2
1978	24.8	75.2	32.4	42.8
1979	26.6	73.4	32.1	41.3
1980	27.2	72.8	34.4	38.5
1981	28.8	71.2	36.7	34.5
1982	29.9	70.1	35.2	34.9
1983	29.9	70.1	34.0	36.1
1984	29.7	70.3	33.3	37.0
1985	27.1	72.9	34.3	38.6
1986	26.4	73.6	35.0	38.6
1987	25.3	74.7	36.0	38.7
1988	24.3	75.7	37.3	38.4
1989	22.9	77.1	37.7	39.4
1990	24.3	75.7	37.4	38.3
1991	22.4	77.6	37.9	39.7

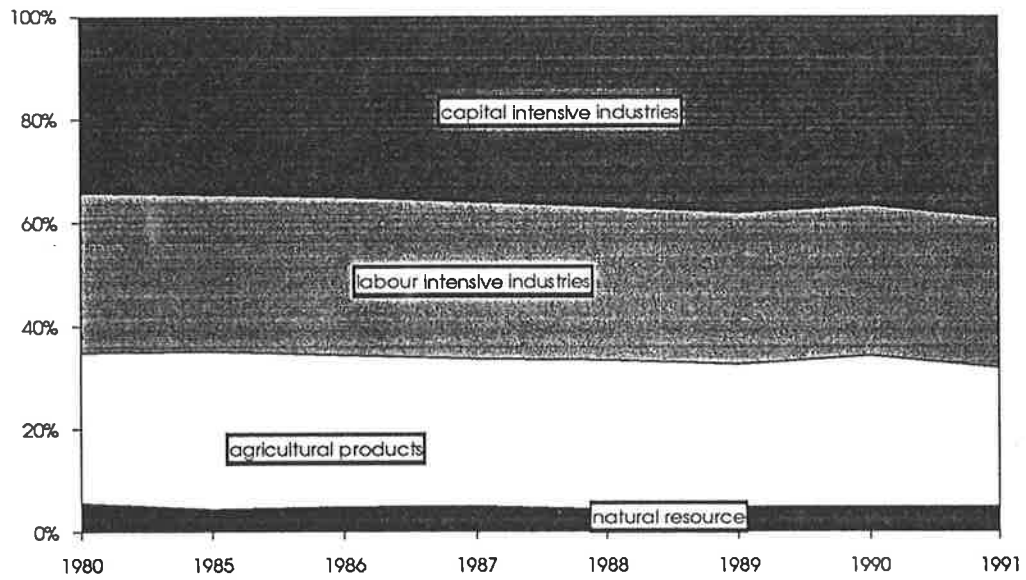
Source: ZGTJNJ: 1992:57.
Note: The shares are calculated on the basis of current prices.

Table 3.3 China's Production Pattern and Its Changes (1980-91), percentage

Year	1980	1985	1986	1987	1988	1989	1990	1991
Industry Groups								
natural resource	5.75.	5.21	5.15	5.08	4.66	4.95	5.01	5.06
labour intensive	30.91	29.02	30.44	30.41	29.60	29.38	29.04	29.24
human capital intensive	14.79	17.56	16.63	17.20	18.06	17.82	16.12	17.42
physical capital intensive	19.49	18.12	18.52	18.80	18.92	20.36	20.67	21.91
agricultural products	29.07	30.10	29.26	28.50	28.76	27.50	29.16	27.11
sub-total								
labour intensive	30.91	29.02	30.44	30.41	29.60	29.38	29.04	29.24
capital intensive	34.28	35.68	35.15	36.00	36.98	38.18	36.79	39.33
agricultural products	29.07	30.10	29.26	28.50	28.76	27.50	29.16	27.11
Total	100	100	100	100	100	100	100	100

Source: ZGTJNJ: 1986-92, various volumes.
Note: The shares are calculated on the basis of current prices.

Figure 3.1 Changes in China's Industrial Structure, 1980-91



Source: Table 3.3

Table 3.4 China's Production Structure at Industrial Branch Level, 1980-9, Percentage

Classification	1980	1985	1986	1987	1988	1989	1990	1991
1. NRI	**5.75**	**5.21**	**5.15**	**5.08**	**4.66**	**4.95**	**5.01**	**5.06**
OTHERMINE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MINBUID	0.30	0.28	0.32	0.32	0.31	0.34	0.34	0.33
TIMBER	0.58	0.47	0.53	0.58	0.51	0.44	0.35	0.34
SALT	0.27	0.15	0.17	0.15	0.15	0.18	0.15	0.14
COAL	2.05	1.85	1.73	1.57	1.52	1.72	1.74	1.72
FERMETAL	0.14	0.14	0.15	0.14	0.13	0.13	0.14	0.16
NONFEMET	0.32	0.31	0.33	0.35	0.35	0.39	0.39	0.38
COKING	0.22	0.21	0.24	0.20	0.21	0.24	0.27	0.28
PETROLUME	1.86	1.79	1.68	1.78	1.48	1.52	1.63	1.71
2. LI	**30.91**	**29.02**	**30.44**	**30.41**	**29.60**	**29.38**	**29.04**	**29.24**
CLOTHING	1.62	1.43	1.42	1.44	1.40	1.48	1.58	1.74
ARTS	0.55	0.66	0.61	0.66	0.68	0.72	0.73	0.73
FURNITURE	0.35	0.39	0.40	0.41	0.38	0.35	0.31	0.30
LEATHER	0.76	0.70	0.74	0.75	0.74	0.74	0.76	0.84
CULTURAL	0.33	0.31	0.35	0.38	0.33	0.32	0.34	0.39
METAL	1.89	1.94	2.09	2.14	2.02	2.08	1.99	2.04
TIMPRO	0.46	0.47	0.54	0.56	0.49	0.45	0.39	0.41
PLASTIC	1.00	1.17	1.22	1.32	1.59	1.11	1.33	1.46
PRINTING	0.71	0.70	0.76	0.76	0.68	0.67	0.66	0.72
BULDMAT	3.04	3.51	3.98	3.84	3.69	3.75	3.39	3.51
TEXTILES	10.57	8.78	8.74	8.60	8.47	8.88	8.72	8.42
RUBBER	1.33	1.15	1.09	1.02	1.02	0.74	1.08	0.84
FOODMA	5.95	5.26	5.88	5.64	5.09	5.06	4.82	4.90
BEVERAGE	1.02	1.25	1.31	1.48	1.50	1.47	1.47	1.54
PAPER	1.33	1.28	1.32	1.43	1.52	1.57	1.48	1.41
3. HKI	**14.79**	**17.56**	**16.63**	**17.20**	**18.06**	**17.82**	**16.12**	**17.42**
ELETRICMA	2.30	2.95	3.01	2.97	3.26	3.58	3.03	3.05
INSTRUME	0.60	0.58	0.53	0.51	0.50	0.48	0.42	0.45
MACHINE	7.07	7.78	7.55	7.67	7.62	7.27	6.37	6.63
MEDICAL	1.06	1.06	1.15	1.29	1.42	1.36	1.36	1.51
ELECTRONIC	1.15	2.03	1.76	2.07	2.44	2.32	2.22	2.54
TRANSPORT	2.61	3.16	2.63	2.69	2.82	2.82	2.72	3.24
4. PKI	**19.49**	**18.12**	**18.52**	**18.80**	**18.92**	**20.36**	**20.67**	**21.17**
ANIMALFD	0.03	0.21	0.27	0.31	0.43	0.48	0.47	0.51
TOBACCO	1.30	1.68	1.65	1.71	1.80	1.90	1.95	1.82
CHEMICAL	5.37	4.70	4.71	5.09	5.35	5.79	5.68	5.40
SMELTFER	4.77	4.51	4.80	4.69	4.57	4.80	4.94	5.11
SMELTNON	1.88	1.64	1.73	1.70	1.73	1.98	1.94	1.91
CHEMIFIB	0.51	0.66	0.74	0.79	0.84	0.98	1.04	1.08
RUNWATER	0.16	0.16	0.16	0.16	0.16	0.16	0.17	0.22
PETROPRO	2.56	2.13	2.18	2.09	1.92	1.92	1.91	2.38
POWER	2.91	2.44	2.28	2.26	2.11	2.34	2.57	2.75
5. AGRCUL	**29.07**	**30.10**	**29.26**	**28.50**	**28.76**	**27.50**	**29.16**	**27.11**
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Sources: ZGGYPCZL, Vol. 3, 88-125. ZGTJNJ, 1988:312-5,1989:166:273. 1990:419-20, 1992:329:411-2.

Note: See Appendix 1, Table A1 for the abbreviations of the industries.

The item of "others" is deleted from the industrial branches since its data are incomplete.

Village enterprises are not included and the shares are calculated based on current prices.

The results of Tables 3.3 and 3.4 appear to show a paradox. According to standard international trade theory, when an economy opens to international trade, its production mix will be shifted to represent this economy's comparative advantage. Since China is likely to have a comparative advantage in labour intensive manufacturing goods, one may expect that its labour intensive industries will extend when the country is more outward oriented. However, Tables 3.3 and 3.4 are neither consistent with this theoretical expectation nor with the conventional impressions. On the contrary, China's labour intensive industries contracted. The share of labour intensive industries on gross output value of industry and agriculture declined from 31 per cent in 1980 to 29 per cent in 1991. Surprisingly, capital intensive industries grew from 34 per cent to 39 per cent over the same period. The share of natural resource intensive industries decreased slightly while the share agriculture declined by more than 2 per cent. Therefore the open door policy appeared to encourage capital intensive production rather than labour intensive production.

3.3 The International Trade Pattern

As discussed in the previous section, China's production pattern is biased to capital intensive products at the expense of agriculture and labour intensive industries. The remaining question is then, how and to what extent did this distorted production structure affect China's trade structure?

Application of the industrial classification to international trade data is difficult in the absence of industry-based data on trade items. Since the available trade data are classified by commodity groups rather than industries, the classification of the factor intensity based on industrial branches needs to be

transformed to match the trade data. An attempt to transform the Standard International Trade Classification (SITC) into China's industrial data is detailed in Appendix 2, in which "agricultural products" as a fifth group, beside the four others shown in Table 2.4, is added to complete the transformation.

3.3.1 Trade Composition and its Changes

Table 3.5 shows China's trade structure over time. The table indicates that China's exports were mainly labour intensive. The share of labour intensive exports on total exports increased from 39.41 per cent in 1965-69 to 57.88 per cent in 1989, accounting for about 46 per cent by average in the whole period of 1965 to 1989. Capital intensive goods (both human and physical) accounted for 19 per cent over the same period. The balance is constituted by agricultural exports (21 per cent) and natural resource intensive exports (13 per cent).

Figure 3.2 plots these changes. The figure has the same gesture as Figure 1.2, but enriches the picture by dividing the manufacturing exports into two groups: labour intensive and capital intensive. The transformation is most clearly evident with this division. When primary export declined, both capital intensive manufactures and labour intensive manufactures soared but labour intensive exports expanded more rapidly. In Chapter 7, a similar graph is provided to show which sector contributed most greatly to this structural change.

Table 3.5 The Structure of China's Foreign Trade

Flow	Year	Commodities Proportions (%)					
		AP	NRI	LI	HKI	PKI	KI
Imports	1965-69	36.27	1.50	10.77	14.11	37.36	51.47
	1970-74	30.81	2.07	8.85	18.20	39.93	58.13
	1975-79	21.18	1.62	12.43	22.89	41.75	64.64
	1980	25.46	2.16	18.04	28.61	25.68	54.29
	1981	24.45	1.74	23.30	28.39	22.09	50.48
	1982	25.23	3.69	22.41	22.29	26.38	48.67
	1983	17.23	3.46	19.33	25.76	34.12	59.88
	1984	9.77	3.02	20.27	35.50	31.41	66.91
	1985	4.78	2.47	18.01	48.35	26.38	74.73
	1986	6.00	2.22	20.95	46.28	24.54	70.82
	1987	8.39	1.88	26.22	42.35	21.14	63.49
	1988	10.06	1.91	27.23	40.33	20.42	60.75
	1989	7.82	1.90	27.47	41.46	21.32	62.78
	Average	17.50	2.28	19.64	31.89	28.66	60.54
Exports	1965-69	43.09	4.12	39.41	3.94	9.34	13.28
	1970-74	39.32	5.57	40.32	4.72	9.74	14.46
	1975-79	28.47	13.60	41.69	5.57	10.14	15.71
	1980	20.16	18.26	41.22	4.86	15.15	20.01
	1981	19.55	18.39	41.00	5.14	15.65	20.79
	1982	18.10	18.97	41.11	5.00	16.56	21.56
	1983	18.21	17.73	43.61	5.37	14.98	20.35
	1984	17.57	18.63	45.10	5.53	13.05	18.58
	1985	17.35	22.45	42.78	5.18	12.16	17.34
	1986	17.24	12.30	52.94	7.33	10.07	17.40
	1987	14.46	9.70	55.48	10.10	9.73	19.83
	1988	13.74	7.95	54.01	13.58	10.59	24.17
	1989	11.00	6.43	57.88	16.68	7.93	24.61
	Average	21.40	13.39	45.89	7.15	11.93	19.08

Source: International Economic Data Bank, 1991, Australian National University

Notes: 1965-69, 1970-74 and 1975-79 data are five year average.
AP: Agricultural products
NRI: Natural resource intensive products
LI: Labour intensive products
HKI: Human capital intensive products
PKI: Physical capital intensive products
KI: Capital intensive products, the sum of HKI and PKI.

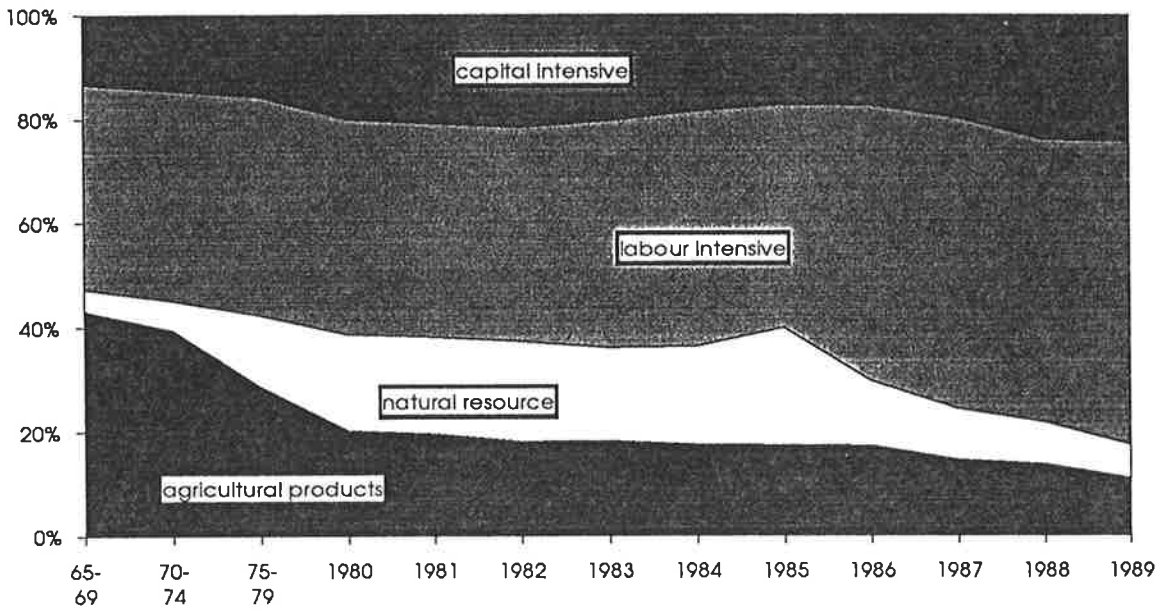


Figure 3.2 Changes in China's Export Pattern, 1965-89

It should be noted that the share of agricultural exports accounted for a relatively large share in the pre-reform period and this share declined dramatically from 43 per cent in the latter half of the 1960s to less than 20 per cent throughout the 1980s. Unlike the early period, the data show the dramatic increase of the share of labour intensive products in total exports. Natural resource intensive exports fluctuated over time varying with the price of oil. For example, there was a very large drop between 1985 and 1989 following the 1986 drop in oil prices. Its share in total exports declined from 22.45 per cent in 1985 to only 6.43 per cent in 1989.

Another distinguishing phenomenon is that when physical capital intensive exports declined over the decade, the human capital intensive exports increased in the late 1980s, which resulted in an increase of the share in capital intensive exports. Table 3.6 shows this trend in value terms. The table reveals

that the group with the fastest growth rates is human capital intensive products (but from the lowest base). Labour intensive products ranked second, followed by physical capital intensive products, agricultural products and natural resource intensive products.[2] However, it should be noted that the growth rate of the aggregate of capital intensive products (KI, the sum of HKI and PKI) has fallen behind the growth rate of labour intensive exports.

The situation on the import side is the opposite. Table 3.5 reveals that China's imports are mainly capital intensive, accounting for about 60 per cent on average in the period of 1965-1989. The physical capital intensive imports declined from 37.36 per cent in 1965-69 on average to 21.32 per cent in 1989 and human capital intensive products increased from 14.11 per cent to 41.46 per cent over the same period. Labour intensive imports only account for around 20 per cent by average for the period of 1965-89. The balance is constituted of agricultural and natural resource intensive imports.

The over-heated demand in domestic consumption appeared to have had some impact on the import pattern, since both the shares of labour intensive imports and human capital intensive imports increased over time. It hardly had any effect on shifting the domestic exports of these products from international markets to domestic markets, since the shares of exports in these goods increased when their shares in production remained stable (Table 3.3). There might be a significant substitution in consumption from domestic goods to imports in the late 1980s.

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2 The same ordering of growth rates has been found in total world exports, but China's growth is much faster than the world in every group.

Table 3.6 Growth of China's Exports by Commodity Groups (1980-89, in million US dollars)

Year	All	AP	LI	NRI	HKI	PKI	KI
1980	17481	3525	7206	3192	849	2648	3497
1981	20662	4040	8471	3800	1063	3233	4296
1982	20623	3732	8477	3913	1031	3417	4448
1983	20356	3707	8876	3610	1093	3049	4142
1984	24583	4319	11088	4579	1360	3208	4568
1985	27048	4754	11725	6152	1420	3333	4753
1986	31860	5494	16866	3919	2335	3207	5542
1987	42376	6338	23511	4111	4280	4122	8402
1988	54617	7505	29500	4340	7415	5786	13201
1989	65152	7166	37711	4186	10866	5167	16033
Index							
1980	100	100	100	100	100	100	100
1981	118	115	118	119	125	122	123
1982	118	106	118	123	121	129	127
1983	116	105	123	113	129	115	118
1984	141	123	154	143	160	121	131
1985	155	135	163	193	167	126	136
1986	182	156	234	123	275	121	158
1987	242	180	326	129	504	156	240
1988	312	213	409	136	873	219	377
1989	373	203	523	131	1280	195	458

Sources: International Economic Date Bank, ANU, and updated from Zhang Xiaohe (1991a).

Notes: LI: Labour intensive
HKI: Human capital intensive
PKI: Physical capital intensive
NRI: Natural resource intensive
AP: Agricultural Products
KI: Capital intensive products, (=HKI+PKI)

3.3.2 Revealed Comparative Advantage

A common indicator of trade specialisation is the "revealed" comparative advantage (Balassa, 1965). It is defined as the share of each commodity group in a country's total exports (imports) divided by that commodity group's share of world exports (imports). The larger the value, the more advantage (disadvantage for imports) the country had in that commodity group. Table 3.7 displays the results in terms of both exports and imports.

The results of Table 3.7 indicate that the indexes of revealed comparative advantage of China's exports in the labour intensive group and agricultural products are higher than in other groups. The table shows that the index in labour intensive exports increased over time while in agricultural products, it declined. This trend indicates the change of the significance of these two exporting groups in China's foreign trade. These results coincide with those of Findlay, Phillips and Tyers (1985), Warr and Zhang 1991), among others.

Human capital intensive products have the lowest index and the physical capital intensive the second lowest in exports. However, when the importance of the physical capital intensive exports declined, the importance of human capital intensive exports increased. More precisely, the indexes show the relative significance of physical capital intensive exports in the early 1980s, indicated by values close to unity in 1982-3 which declined to less than half in 1989. The index of natural resource intensive exports is close to unity on average.

Table 3.7 Revealed Comparative Advantage of China's Products 1965-89

Flow	Year	Revealed Comparative Advantage					
		AP	NRI	LI	HKI	PKI	KI
Imports	1965-69	2.34	0.11	0.42	0.52	2.00	1.26
	1970-74	2.46	0.13	0.37	0.63	2.18	1.41
	1975-79	2.03	0.08	0.54	0.78	2.43	1.61
	1980	2.81	0.09	0.82	1.04	1.44	1.24
	1981	2.60	0.08	1.09	0.99	1.28	1.14
	1982	2.72	0.17	1.04	0.75	1.49	1.12
	1983	1.87	0.18	0.88	0.84	1.89	1.37
	1984	1.07	0.17	0.90	1.12	1.73	1.43
	1985	0.55	0.15	0.79	1.44	1.49	1.47
	1986	0.70	0.19	0.82	1.24	1.51	1.38
	1987	0.99	0.17	0.98	1.12	1.33	1.23
	1988	1.18	0.20	1.03	1.04	1.26	1.15
	1989	0.98	0.19	1.04	1.07	1.30	1.19
Exports	1965-69	2.93	0.36	1.55	0.14	0.49	0.32
	1970-74	3.30	0.37	1.68	0.16	0.52	0.34
	1975-79	2.89	0.71	1.83	0.18	0.58	0.38
	1980	2.35	0.79	1.87	0.17	0.85	0.51
	1981	2.17	0.83	1.90	0.17	0.92	0.55
	1982	2.05	0.94	1.89	0.16	0.93	0.55
	1983	2.05	0.95	1.99	0.17	0.82	0.50
	1984	1.97	1.07	2.02	0.17	0.72	0.45
	1985	2.09	1.40	1.88	0.15	0.67	0.41
	1986	2.13	1.14	2.06	0.19	0.62	0.41
	1987	1.85	0.94	2.07	0.26	0.61	0.44
	1988	1.66	0.88	2.02	0.34	0.66	0.50
	1989	1.41	0.67	2.15	0.42	0.49	0.46

Source: International Economic Data Bank, 1991, Australian National University

Notes: 1965-69, 1970-74 and 1975-79 data are five year average.
AP: Agricultural products
NRI: Natural resource intensive products
LI: Labour intensive products
HKI: Human capital intensive products
PKI: Physical capital intensive products
KI: Capital intensive products, the sum of HKI and PKI.

The indexes of imports illustrate the same story in mirror image. Labour intensive products ranked second lowest after the natural resource intensive ones. The high value in physical capital intensive products reveals that China lacks comparative advantage in this group. The declining trend of the index for agricultural products reflects the shift of China's comparative advantage from agricultural products into manufacturing goods, and also the effect of the partial removal of the factor market distortions.

Table 3.7 appears to suggest that China's international trade pattern was normal in the 1980s. However, given the distortions in the Chinese economy, revealed comparative advantage may be a dubious measure (World Bank, 1988), since this "revealed" trade pattern may be only the result of government policies rather than any comparative advantage. For example, the table suggests that China had a very strong comparative advantage in agricultural goods in the 1970s (a peak value of 3.4 is achieved) and the early 1980s, which is quite unlikely given China's extremely low level of arable land and substantial rationing in most of the domestic food consumption.

3.3.2 Trade Intensity and Net Exports

In order to verify the real comparative advantage in China, a group of indicators of trade specialisation, including a trade intensity index of products and a net export ratio, can be used. The trade intensity index is defined as the share of the exports (imports) of each commodity group in a country's total exports (imports), divided by the commodity group's share of total domestic production. A value greater than unity indicates a comparative advantage in that commodity group (disadvantage if measured for imports). Table 3.8 represents the indexes

of China's commodity groups in terms of both exports and imports in 1985. The shares of production are presented by gross output value, net output value and sales value, respectively.

Table 3.8 Trade Intensity of China, 1985

	AP	NRI	LI	HKI	PKI
in terms of gross GOV					
import intensity	0.16	0.46	0.59	2.79	1.48
export intensity	0.59	4.33	1.41	0.30	0.58
in terms of NOV					
import intensity	0.10	0.41	1.00	3.65	1.72
export intensity	0.37	3.83	2.36	0.39	0.79
in terms of SV					
import intensity	3.21	-	-	-	-
export intensity	0.46	1.71	1.61	0.48	0.38

Sources: ZGGYJJTJZL, 1987:8:24. ZGTJNJ, 1986, 130-5:457:482-3.
ZGGYJJPCZL, Vol.15:122-5. Table 3.3 and 3.5.

Notes: GOV: Gross output value.
NOV: Net output value.
SV: Sales value.
AP: Agricultural products.
NRI: Natural resource intensive products.
LI: Labour intensive products.
HKI: Human capital intensive products.
PKI: Physical capital intensive products.

The results of Table 3.8 coincide with Table 3.7 in confirming that China's revealed comparative advantage in 1985 was in the labour intensive products. The high value of the index of natural resource intensive products in

exports, as mentioned before, is due to the profitability of China's oil exports before the drop of oil prices in 1986. However, Table 3.8 is different from Table 3.7 with the indexes of agricultural products showing almost the lowest value in the table, both in imports and exports. This result allows two conclusions to be drawn: first, in contrast to other products, a large share of agricultural production in China is domestically consumed; second, China lacks comparative advantage in agricultural products.

It should be more appropriate if the export items are shown as "net" rather than the "gross" terms. One commonly used index is the net export ratio. The net export (import if it is negative) ratio is defined as the difference between exports and imports in a particular commodity (or commodity group), divided by the sum of exports and imports of the same group. The higher the positive (negative) value of the index, the larger (lower) the revealed comparative advantage that the country had in that commodity (or commodity groups).

Table 3.9 shows China's net export ratio in all the five commodity groups over the period of 1965-89. The results demolish the importance of agricultural products in China's foreign trade. Though still positive and with only two exceptions (1985-86), agricultural products had the lowest positive net export ratio, after natural resource intensive products and labour intensive products. All capital intensive goods, as expected, had negative signs, indicating a disadvantage that China had in these products.

Table 3.9 China's Net Export Ratio in Different Commodity Groups, 1965-89

Year	all commodities	agriculture products	natural resource intensive	labour intensive	human capital intensive	physical capital intensive	capital intensive
1965-69	0.11	0.19	0.55	0.64	-0.48	-0.53	-0.51
1970-74	0.05	0.17	0.50	0.67	-0.56	-0.58	-0.57
1975-79	0.05	0.20	0.81	0.58	-0.57	-0.58	-0.57
1980	0.01	-0.10	0.79	0.40	-0.70	-0.25	-0.45
1981	0.12	0.01	0.86	0.38	-0.63	-0.06	-0.32
1982	0.18	0.00	0.76	0.44	-0.52	-0.06	-0.23
1983	0.11	0.14	0.73	0.47	-0.59	-0.29	-0.41
1984	0.04	0.32	0.74	0.41	-0.71	-0.38	-0.54
1985	-0.13	0.47	0.75	0.30	-0.85	-0.47	-0.70
1986	-0.02	0.47	0.68	0.41	-0.74	-0.44	-0.62
1987	0.08	0.35	0.72	0.42	-0.56	-0.30	-0.46
1988	0.08	0.23	0.66	0.40	-0.43	-0.24	-0.36
1989	0.18	0.34	0.66	0.50	-0.27	-0.30	-0.28

Sources: **International Economic Data Bank, Australian National University, 1991.**
Zhang Xiaohe, 1991a.

3.4 Summary and Questions

China's production pattern is biased towards heavy industries, and involved more capital intensive activities than expected in a competitive circumstance. Paradoxically, this biased production pattern was consolidated rather than demolished over the period of the open door policy in the 1980s.

In terms of trade pattern, several conclusions can be drawn. First, as expected, China's export composition has shifted from primary products to manufactures. Second, China's labour intensive products accounted for a large proportion of its exports and with a relatively high value in revealed comparative advantage and trade intensity index. These results indicate that China may have comparative advantage in these products. Third, China's strategy of emphasising heavy industry and grain self-sufficiency is likely to induce a relatively smaller share of its agricultural imports (or a relatively large share of its agricultural exports) than expected in other circumstance. However, this biased production and trade pattern experienced a dramatic change towards a more rational structure in terms of comparative advantage over the last decade. Finally, China's exports were composed of a relatively large proportion of capital intensive products, especially human capital intensive products in the 1980s.

Several paradoxical results require more attention. Understanding these results is critical for answering the large questions of this thesis dealing with growth and structural change in China's international trade (see Section 1.1).

The following questions are initiated from the examinations of China's production and international trade pattern:

First, why did China's industrial structure change so little in the manufacturing sector in terms of factor intensity? Specifically, why had its labour intensive manufactures decreased after the country opened itself to the outside world.

Second, does China have a comparative advantage in agricultural goods? If not, why did its agricultural exports play an important role in its export pattern in the 1970s?

Third, what are the origins of the decline in significance of China's agricultural production and exports and the increase of significance of China's labour intensive exports in the 1980s?

Finally, if China lacks comparative advantage in capital intensive productions, why did China's production and exports of these products actually increase after the reforms?

The changes in international market conditions may provide some clues when tackling these questions, but given China's share in world market, this explanation may not be sufficiently powerful. For example, the increase in manufactures' prices was higher than that in foods in the world market in the 1960s and 1970s (Li and Lu, 1990), when China's index of "revealed comparative advantage" in agricultural goods was higher than in labour intensive manufacturing goods (Table 3.4).

Domestic demand conditions may not provide a proper answer either. As explained and examined earlier in this chapter, the over-heated demand pattern neither stopped the expansion of physical capital intensive production, nor shifted labour intensive goods and human capital intensive goods from international markets to domestic markets. In fact, these two groups of exports increased when domestic demand was high in the late 1980s.

Given the features of the Chinese economy, the determination of production and trade pattern may be attributable mainly to its supply conditions. An explanation from the supply side requires an awareness of China's production and trade mechanism. In next chapter, a review of China's market distortions is provided and it will be shown that these distortions and their changes may provide some clues to explain the paradoxes. These possible explanations are provided in the chapters thereafter.

CHAPTER FOUR

CHINA'S MARKET DISTORTIONS

As discussed in the last chapter, some paradoxical events occurred in China's production and trade pattern in the 1980s. In order to find a reasonable explanation of these events, a comprehensive investigation of China's domestic market is desirable.

China's economic regime has been transferred from a Soviet-Union-typed central planned economy to a relatively market oriented economy since the 1978 reforms. Nevertheless, its market operations are far from perfect. Existing markets such as commodity, capital and labour markets are seriously affected by various government interventions. This leads to a great number of distortions, the effects of which puzzled economists for many years.

Though demonstrating a significant degree of success, China's reform has been partial rather than complete. Even after the reforms, China's market conditions are still far from perfect. As will be discussed in the following chapters, a great deal of distortion is still present. Labour markets in the urban sector are still highly regulated. Price distortions are still present in some markets and the foreign trade sector is still monopolised by the government. Government interventions prevail almost everywhere and the policies adopted are usually

inconsistent, if not contradictory. Identifying these distortions and analysing their impact on China's production and foreign trade is a reasonable starting point to analyse the origins of growth and structural change in China's international trade.

China's market distortions, characterised by a urban-rural isolation policy (Guo and Liu, 1990, Zhang Xiaohe, 1992a), prohibition of commercial exchange of land (Lin Justin Yifu, 1991), negative real interest rates (Cao Yong, 1991, Hughes 1991, Lardy 1992b), relative price divergences (Taylor, 1986, Tabata, 1988, Yan, Ruizhen, et al, 1988), rationing of consumer goods (Wang and Chern, 1992) and comprehensive foreign trade control (World Bank 1985, 1988, Hsu, 1989 and Lardy, 1992b), warped China's production and international trade in different ways compared with market-oriented developing countries. Some paradoxical events occurred. For example, as a labour abundant country, China was a net importer of labour in the early 1980s (Reynolds, 1987), and exported capital in the late 1980s (Hughes, 1991). Srinivasan (1987) also demonstrated that China's production might be shrunken within its production possibility frontier, due to various government interventions.

This chapter gives a brief review of distortions that exist in factor markets, commodity markets and the foreign trade regime. China's factor market distortions are reported in section 4.1. The commodity market distortions are reported in section 4.2, and there is a brief discussion of distortions in the foreign trade regime in section 4.3.

4.1 Factor Market Distortions

4.1.1 Labour Market Distortions

China's labour markets are characterised by restrictions on labour mobility between different sectors, the so-called rural-urban migration restriction (RUMR). This policy was established in the late 1950s and it has been maintained for more than 30 years. It was developed as part of China's industrialisation strategy, although its consequences contradict its original objectives. In order to establish a strong industrial base as quickly as possible, political stability in the urban areas was required. Political stability was pursued by the provision of a large amount of welfare services. The labour force involved in manufacturing activities was mainly located within the cities, so the rural labourers, who are basically involved only in agricultural production, were ignored. The differential in the real income levels between urban and rural areas would naturally induce a flood of labour into the cities, so a restriction on migration became necessary in the late 1950s. This de-urbanization policy was enforced by several cases of "reverse migration" of city youth to rural areas when they graduated from the middle schools in the late 1960s and early 1970s.

China's urban rural isolation policy (URIP)[1] is pursued through both the restrictions on rural-urban migration and on the movement of capital between urban and rural areas. The RUMR has the following features:

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1 This concept has been widely accepted by Chinese as well as overseas scholars (see for example, Anderson, 1990a, Ng, 1991 and Zhang Xiaohe, 1992a).

[1] Urban people are given a residential certification as "non-agricultural residents (NARs)". People living in the rural areas are classified as "agricultural residents"(ARs). The ARs are neither allowed to stay permanently in the cities nor to find formal jobs in the urban areas. This policy has been enforced by allocating various coupons for food and fuel (or even clothes before 1984) to NARs and the commercial exchange of these coupons was treated as criminal.

[2] The NARs have access to many welfare facilities that are not open to ARs. These facilities include: a) food subsidies; with grain coupons (*liangpiao*), the NARs can buy food at relatively low prices; b) cheap housing and fuel; accommodation and fuel are allocated to the NARs by the government at low prices relative to the market prices that are faced by ARs; c) preferential access to educational, medical, child care and employment services; these services are free or nearly free for the NARs but they are either absent (such as employment) or provided at low quality (such as education and medical) in rural areas.[2]

ARs dominate China's population and labour forces. In 1963, the share of ARs in the national population was 83 per cent. This share remained almost unchanged for about two decades. In 1979 and 1987 the ARs' share was still 81 per cent and 80.11 per cent respectively (Tian Ming, 1991:146).

After the reforms, following the introduction of a liberal policy in agriculture, a large number of rural migrants flowed to the cities, becoming the so called "floating population". There are reports of a substantial floating population

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2 Guo and Liu (1989) identified 14 different treatments of rural and urban residents.

in Chinese cities of, at most, 80 million in the late 1980s. These "floating people" can buy food and other consumer goods from private retail shops that emerged after 1980, but at relatively high prices. The restrictions on employment have been partially relaxed by permitting temporary employment of rural labourers in urban areas since 1983. But the real wage differential as well as the food quota regime, urban housing subsidies, etc, still exists. According to the "Proposal of National Economic and Social Development in the 1990s and Outline of the Eighth Five-year Plan of PRC" (*People's Daily*, 16 April, 1991), the restrictions on migration are expected to be maintained during the 1990s.

Apart from these "hidden divergences", the difference in nominal income levels is also significant. Table 4.1 displays the divergence in terms of nominal wage rates between industry workers in urban and rural areas in the last decade.

Table 4.1 indicates that when the reforms started in 1978 the wage rate in rural enterprises was less than half of the urban wage rate. However, the rural wage rate grew more rapidly over the decade so the gap has narrowed. Although data on average wage or wage equivalent of rural agricultural labourers are usually not available due to the lack of statistics, it is widely believed that their wage rate is lower than the wage rate of labourers working in the rural enterprises. Nevertheless, the real wage gap between agricultural labour and rural industry labour should be much smaller than the gap between rural industry labour and urban industry labour.

Table 4.1 Wage Differentials between Urban and Rural Enterprises, 1978-91

Year	[1] All Urban Workers		[2] Township and Village Enterprises' workers		[1]/[2]
	RMB Y	Index 1978=100	RMB Y	Index 1978=100	
1978	615	100	296	100	2.08
1979	668	109	367	124	1.82
1980	762	124	398	134	1.91
1981	772	126	440	149	1.75
1982	798	130	492	166	1.62
1983	826	134	543	183	1.52
1984	974	158	622	210	1.57
1985	1148	187	726	245	1.58
1986	1329	216	764	258	1.74
1987	1459	237	909	307	1.61
1988	1747	284	1106	374	1.58
1989	1935	315	1230	416	1.57
1990	2140	348	1321	446	1.62
1991	2340	380	1482	501	1.58

Sources: ZGTJNJ: 1988:287, 1990:141:144-145:394:398, 1991:43:65, 1992:130:389:391.
ZGNYNJ: 1979:20, 1980:23, 1981:27, 1985:44, 1989:286-289

Notes: RMB Y: Reminbi yuan (unit of Chinese currency).
Township enterprises are defined as rural enterprises under township government control;
Village enterprises are defined as rural enterprises under village government control.
Only township and village-run enterprises are included.

These divergences in production conditions and living standards could have been compensated to some extent by the ARs' self sufficiency in producing agricultural raw materials and food, and house building, etc. But under the procurement purchasing regime, the extent of this compensation was limited. This

is because the government had priority in purchasing agricultural raw materials, only allowing peasants to keep the residual. Shortages in food consumption in the rural areas were common before the 1980s, and the peasants' income was so low that they could neither store enough food nor build a comfortable house for themselves. As a result, the divergences in real income levels between urban and rural areas were still significant, especially in that earlier period. For example, in the period 1957-1977, the average income of rural labourers was only one fifth to one eighth of the income of state-owned enterprises' employees and one sixth of the income of urban collective enterprises' employees (Research Project on Rural Surplus Labour Transformation, 1990).

4.1.2 Capital Market Distortions

In capital markets, restrictions on rural-urban capital flow were stricter before the 1980s. Because non-agricultural activities were discouraged, the capital available for those activities was very limited, if any. The rural manufacturing activities were constrained to several industries such as primary product processing and agricultural machinery repairs, as a complementary part of agricultural production. Since 1980, the restrictions on developing non-agricultural activities have been relaxed but rural enterprises still face restricted access to the resource allocation system. Most production resources such as bank loans, raw materials, energy, power and transport, are allocated by the government to the state-owned enterprises at cheap prices (so called "planning prices"). ARs are not entitled to these benefits. A shortage of production resources in rural areas is common. For example, credit loans per hundred yuan of output value in rural enterprises were only one-quarter of that in urban industries in 1985 (Chen, Watson and Findlay, 1992:32). Rural enterprises contributed about one third of China's industrial output

value in 1991, but the total bank loans to these enterprises only accounted for 2.8 per cent in the same year (Li Zhenzhong, 1993)

The differences in capital rewards are even more serious. The interest rate on government loans was extremely low, even negative, when the inflation rate was high in the late 1980s. For instance, the lending rate on one-year working capital loans in 1988 was only 9 per cent, while the rate of inflation soared to 18 per cent for the same year (Lardy, 1992b:137). But this kind of "cheap" capital was not open to the ARs. When formal financial sources were limited, informal sources were developed to fill the gap. Several case studies of the rural informal financial markets in several provinces indicate that the interest rates charged by informal moneylenders were usually between 20 and 50 per cent annually, and the total outstanding informal loans as a percentage of loans from the formal sector varied from 10 per cent in Hunan to 200 per cent in Baoji city (Tam, 1991:547). In the poor areas of Jiangsu province the interest rates were around 60 per cent in 1987-88 (Cheng Anjiang, 1989:218). This contrast with formal sources, such as government banks, where the interest rates on medium and long term loans were only around 6 to 12 per cent annually in 1986 (ZGJRNJ, 1988).

Imperfect capital mobility must induce divergence in marginal productivity of capital, which in turn leads to divergence in rewards to capital in different sectors. Table 4.2 presents the comparison of the ratios of profit (and profit and taxes) to total capital utilisation between the state owned enterprises (SOEs) and the township and village enterprises (TVEs) in the period 1978 to 1991. Several conclusions can be drawn from the comparison.

Table 4.2 Comparison of Returns to Capital between SOEs and TVEs, 1978-91

Year	Profit to total capital			Profit & taxes to total capital		
	[1] SOEs %	[2] REs %	[2]-[1]	[3] SOEs %	[4] REs %	[4]-[3]
1978	15.5	31.8	16.3	24.2	39.8	15.6
1979	16.1	29.1	13.0	24.8	35.4	10.6
1980	16.0	26.7	10.7	24.8	32.5	7.7
1981	15.0	22.3	7.3	23.8	29.1	5.3
1982	14.4	20.2	5.8	23.4	28.0	4.6
1983	14.4	18.5	4.1	23.2	27.8	4.6
1984	14.9	15.2	0.3	24.2	24.6	0.4
1985	13.2	14.5	1.3	23.8	23.7	-0.1
1986	10.6	10.6	0.0	20.7	19.7	-1.0
1987	10.6	9.0	-1.6	20.3	17.0	-3.3
1988	10.4	9.3	-1.1	20.6	17.9	-2.7
1989	7.2	7.1	-0.1	17.2	15.2	-2.0
1990	3.2	5.9	2.7	12.4	13.0	0.6
1991	2.9	5.8	2.9	11.8	12.7	0.9

Sources: ZGTJNJ: 1992:391:431.

Notes: SOEs: State owned enterprises.
TVEs: Township and Village Enterprises.

First, with 3 (5) exceptions, the ratios of profits (profits and taxes) to total capital were higher in the TVEs than that in the SOEs. This result indicates that, by and large, the return to capital is higher in the rural sector than in the urban sector. Second, the figures show a relatively higher profitability in the TVEs than in the SOEs in the late 1970s and early 1980s and this relative profitability declined dramatically in the late 1980s, along with a distinct trend of decline of the ratios in both sectors. Finally, the data show distinct signs of convergence of the profitability. Without exception, the ratio in TVEs for each year in Table 4.2 moves toward the ratio in SOEs and the former was even lower than the latter in the second half of the 1980s. This convergence reflects the proposition in standard economic theory: when factor mobility is allowed, the returns to factor tend to equalise. The sources of this convergence will be discussed in the following chapters.

4.1.3 Under-pricing of Human Capital

Another distinguishing distortion in China's factor market is the under-pricing of human capital. This can be ascertained by comparing the real income of technicians, intellectuals and unskilled labourers. The income levels of these different employees are usually same, even reversed (*shouru daogua*). There is a lot of debate about this reversal in payments between well-educated personnel and less educated workers.

Recent studies on this issue can be found in Chen Bing, (1990), Xie and Chen (1990), among others. According to their investigations, in the early 1980s, the income level of all the employees under 50 years old and with a tertiary education degree was lower than that of unskilled labourers who had only primary

or secondary education. The average proportion of this reversal (defined as the income gaps between the intellectual and unskilled labour as a proportion of the latter) was about 11-20 per cent (Xie and Chen, 1990:39). The returns to education in China thus appeared to be negative.

These divergences in factor rewards between urban and rural areas have distorted China's factor intensities in different activities. Most surplus labourers have to stay in rural areas which in turn increases the labour intensity of China's agricultural production.[3] Using the data of the 1981 World Bank input-output tables, Thompson (1990:8) reported that China's unadjusted labour shares of value added in crops, cotton and animal husbandry were as high as 97-99 per cent. Although Thompson reduced these shares to 59 per cent, as a result of including the returns to capital and land in farmers' income, they are still the highest groups after apparel and paper (64 per cent) and service sectors such as education and health, public administration, and defence (99 per cent).

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3 Defining the surplus labour as the labour force that exceeds the maximum labour requirements in agricultural production for a given output, it was estimated that the surplus labour in China's rural area was 106 million in 1984 and would reach 191 million in 1997 (Meng and Bai, 1988:216). These figures are conservative compared with those reported by Yuan (1990). On the other hand, the adoption of a URIP will naturally increase the capital-labour ratio in the urban sector and decrease it in the rural sector. See Corden and Findlay (1975) and Neary (1981) for an analysis in the style of Harris and Todaro (1970).

4.2 Commodity Market Distortions

4.2.1 A General Review

China's commodity markets, as well as its factor markets, were seriously distorted by an artificially established price regime, the so called "planning price regime". This regime was set up in the early 1950s and completed in the late 1950s when almost all market forces were eliminated.

The most significant feature of China's commodity market is that all commodity prices were artificially decided by the government rather than determined by market forces, prior to 1978. The price structure was set based on its traditional level of the 1950s. But later, as the production level rose and costs fell due to economics of scale and technical improvements, the manufacturing sector did not have to reduce their prices or did so only with a considerable lag (Lardy, 1992b:90). Before the 1978 reforms, China's price was stable but distorted by a sector exploitation regime, the so-called industrial-agricultural scissors price gaps. Due to these scissors price gaps, most of the prices of primary products were under-priced. This price regime was designed to support a heavy industry based development strategy at the expense of agriculture and raw material production. Along with the factor market distortions, the biased prices for most of the agricultural products, as well as the bias of most raw material input prices, dominated China's price structure for decades until 1978 when a market oriented reform started.

After the reforms, a two-tier price regime applied in the economy, so over-quota products could be sold at market prices. Sicular (1988a) and Byrd (1989) discussed the likely consequences of this two-tier price regime. The administrative allocation planning officials would lose their direct control in resource allocation and the economy could achieve a (constrained) Pareto-optimum, provided that this two-tier price rule applies to all commodities.

Nevertheless, China's situation differed from these theoretical models in the following aspects: in the agricultural sector, only several category three and category two agricultural products had access to the market regime while the category one products, namely grain, cotton and edible oil were still tightly under government compulsory procurement.[4] Grain and cotton were not subject to market prices but an over-quota reward (30 per cent higher than the quota price prior to 1985, which became a weighted average of the quota price and over quota prices to all purchases thereafter; see Sicular, 1988b).[5] Though the method of government purchases changed from a procurement setting to the use of a contract since 1985, the prices of agricultural products were still decided by the government and the assignment of the contracts appeared compulsory. Nolan (1991:36) reported that in 1988 about 95 per cent of cotton, 91 per cent of grain and 80 per cent of edible oil were sold through state commercial channels or the

4 China's commodities are classified basically as three kinds, depending on their relative importance in the national economy. The first group (so-called category one) is those fundamentally most relevant to the country's political stability and economic performance, hence they are entirely under the government control. Category one is composed of mainly productive materials, such as iron and steel, machinery, coal and other energy, grain, cotton and edible oil, etc. Category two is those which are less important than category one, hence they are allowed to be commercially exchanged in the market at the margin, when the production quota is completed. The rest are classified as category three, which are permitted to be freely exchanged in the market. Vegetables and fruit, most of the miscellaneous manufacturing products, etc, are classified in this group.

5 The impact of other two "market" prices, namely negotiated price and free market price, appear to be negligible, in contrast to the total volume of goods traded.

quasi-state channel of the "supply and marketing co-operatives". As Sicular and others had already noticed, given this discriminatory treatment of different products, the Pareto-optimum no longer holds. The old price structure remained in the economy after the reforms and this fact has been acknowledged as "the relative price restoration (*bijia huigui)*" (see for example, Tong Ke, 1991, Nolan, 1991:38).

Although the government plan has waned in the rural areas, the reforms so far have not changed the dominant status of central government planning. Even in the agricultural sector, the government has not given up the procurement purchase of the most important agricultural products, namely grain and cotton. There is ample evidence that a large portion of state grain and cotton purchase contracts after the reform retained their compulsory character (Nolan, 1990:19). Market forces were only working in fields other than those of government procurement purchases.[6] However, the opening of rural grain markets in some small townships and increasing urban food prices in late 1992 indicate that the government is attempting to liberalise the economy to a more market oriented mechanism. The state announced a program of urban house commercialisation, agricultural product marketing, decentralisation of the state-owned enterprises and a more outward looking trade policy after Deng Xiaoping's call for further reforms in the spring of 1992 (Jiang Zemin, 1992).

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6 Restoration of procurement purchases occurred when the market price was too high to be followed by the government, for example the case of cotton after 1989 (Zhang Xiaohe1991c).

4.22 Measurements of China's Commodity Price Distortions

The measurement of China's price distortions is extremely difficult, if not impossible. In theory, at least three options can be used for the measurements of price distortions: [1] the comparison between international prices and domestic prices; [2] the comparison between planning prices and market prices (or shadow prices), and [3] the comparison of different profitability of different industries within one country.

None of these measures is perfect. The comparison of domestic prices with international prices will be biased by the exchange rate distortions. The comparison of planning prices and market prices assumes the presence of a perfect competitive domestic market, which is obviously unrealistic in China. The last measure could also be affected by the presence of market power.

The first method has been used by World Bank (1985), Taylor (1986), Yang and Yyers (1989), Yang Yongzheng (1991), Xiong Meihua (1991), Garnaut and Ma (1992) and Lardy (1991b), among others. International prices were represented by transferring the domestic price level by either a purchasing power parity (PPP) rate or by the official exchange rate. Table 4.3 summarises results for the producer price (ex-factory) comparison reported by Taylor (1986), the World Bank (1986), Yang (1991) and Lardy (1992b:92). Although the results were not entirely consistent in every aspect from one to another, the basic result, i.e., the primary products were under-priced and the manufacturing products were over-priced, is common. For example, chemical, foodstuffs, textiles, paper are all have a value index (Taylor and World Bank) larger than 100 (world price=100),

implying that these products were over-priced in China. Agriculture, coal, petroleum, machine building all have a value index less than 100, implying just the opposite. The status of metallurgy, building materials, forest products and other industry is ambiguous from inconsistent results. Yang's results are derived from a market survey that collected the market prices in several commodities in China. The price divergence is defined as the percentage in which domestic prices are higher (or lower) than international prices.

Table 4.3 Comparisons of Domestic Prices and World Prices, 1979-1988

Sector	1979 Taylor	1981 World Bank (world price=100)	1984 Lardy	1984 Yang (price divergences)	1988 Yang
agriculture	91	100	75	-25.7	-20.8
cotton			73	-28.1	-36.2
raw silk			26	-73.6	-75.7
wool				-13.9	-6.3
metallurgy	136	98	53	-46.6	-54.1
coal	47	50	24	-68.2	-72.5
petroleum	77	56	17	-82.1	-66.1
chemicals	189	118	110	9.9	5.6
machine building	50	99			
building materials	61	104	33	-66.8	-58
forest products	96	112		33.2	33.2
foodstuffs	128	127			
textiles	157	112			
cotton print					-60.9
cotton yarns			51	-48.9	-54.5
polyester filament			208		66
polyester staple				97	58
paper	136	112			
other industry	32	112			

Sources: Taylor, 1986:13, Yang, 1991:12, Lardy, 1992:96.
Note: Price divergence is defined as the percentage of domestic prices higher (or lower) than international prices.

Yang's results are consistent with Lardy's, indicating that the products that had higher relative price levels were chemical and chemical fibres. As discussed in Chapter 2, they are both classified as physical capital intensive products.

The price structure biased toward capital intensive industry has not changed remarkably in the first two years of the 1990s, though the price levels between domestic prices and international prices converged in absolute terms over time. For example, Xiong (1991) reported lower domestic price levels in most agricultural products, energy and building materials and higher price levels in most of the chemical products compared with international prices. Nevertheless, exceptions exist in a few agricultural products that had a higher domestic price than abroad, for example wheat (Xiong Meihua, 1991:54, Garnaut and Ma, 1992:119).

China had imposed an import substitution policy for a long time from 1960 to 1980. The price divergences within manufacturing products were also significant. Warr and Zhang (1991:22, Table 4) reported that most capital intensive products were characterised by positive effective rates of protection (ERP) while most of the agricultural and labour intensive manufacturing products were characterised by negative ERP in 1988.

The second method of measuring the price distortion can be undertaken by either collecting reliable market price data from empirical fieldwork,[7] or

7 In the lack of official statistics of China's market prices, direct comparison of market prices and quota prices is impossible. Although China's official source reported some significant higher percentages of the market price of the agricultural consumer goods than the governmental commercial retail prices (ZGTJNJ, 1988:786, 1989:703, 1990, 1991, 1992), the category of agricultural consumer goods is too broad to have any significance for sectoral comparison.

formulating shadow prices and then comparing them with the current official prices. The first measure can be found in Lardy (1983, 1992b) and the second was created by Tabata (1988) and Thompson (1990). Lardy (1983:23) reported that the average rural market price was 80 per cent above the quota price in the early 1980s. For some specific products, such as coal, crude oil, diesel fuel, fuel oil, cement and plate glass, the price divergence extended to 136-607 per cent in 1985-6 (Lardy, 1992b:94). Tabata, on the other hand, calculated a kind of "shadow price" under the assumption of perfect competition in all industries, based on China's 1981 input-output table. Table 4.4 summarises his results. The table shows that all of the sectors related to agriculture except sideline business were undervalued.[8] In the industrial sectors, the price of coal and coke were particularly undervalued, reflecting the excessively low price of coal. Prices of products of the electric power, oil, chemical, and other particularly capital intensive sectors, known as equipment industries, were considerably over-valued. Thompson (1990:5) adjusted the same input-output table by a given group of coefficients for the industries suffering from price distortions. His adjustments, although not entirely consistent with Tabata, were based on empirical fieldwork.

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8 The term "sideline business" referred to rural industries, so it should be classified as industry.

Table 4.4 Comparison of Domestic Current Prices and Shadow Prices, China, 1981

Sector	[1] Value Price (shadow price)	[2] Average Price	[3] Price Divergence [2]-[1]x100%
Agriculture and natural resource products			
agriculture	1.8513	1.1626	-68.87
forestry	1.3850	0.9164	-46.86
livestock	1.9229	1.3935	-52.94
sideline business	0.8720	0.9274	5.54
fisheries	1.5486	1.0800	-46.86
coal and coke	1.3163	1.0632	-25.31
heavy forestry	1.0647	0.8641	-20.06
Capital intensive manufactures			
metallurgy	0.3952	0.9630	56.78
electric power	0.1495	0.5799	43.04
oil	0.1383	0.6258	48.75
heavy chemicals	0.3148	0.8948	58.00
light chemicals	0.2378	0.9294	69.16
heavy machinery	0.6541	0.9988	34.47
transport/communications	1.0022	0.8930	-10.92
Labour intensive manufactures			
building materials	0.8471	0.9436	9.65
light machinery	0.5428	0.9436	40.08
light forestry	0.8354	0.9966	16.12
food	0.1773	1.2196	104.23
spinning	0.2591	1.0510	79.19
sewing and leather	0.5015	1.1645	66.30
paper making & educational materials	0.5679	1.0462	47.83
other industries	0.6020	0.9949	39.29
construction	1.1387	1.2217	8.30
commerce, restaurants, and materials supply	0.9098	0.9151	0.53

Sources: Tabata, 1988:16.

Note: The value price is defined as price adjusted to the profit divergences across different industries (a kind of shadow price). The average price is based on current prices.

The third method was frequently used by Chinese scholars, especially for the purpose of sectoral comparisons, (see Yan Ruizhen *et al*, 1988 and Yu, Liu and Xu, 1991 for examples of these comparisons). It is well recognised that the planning prices neither reflect the value nor the demand conditions of the products (Xu Dianqing, 1988 and Li Huizhong, 1989). Many indicators can be used to reflect divergences in profitability between industries. For example, the profit and tax's ratio to total capital, the profit and tax's ratio to gross (net) output value, etc. But as an index of price distortion between sectors, the profit-tax ratio to total capital (PT/TK) is sufficient. Table 4.5 reports this exercise, based on the industrial classification established in Chapter 2 (see also Zhang Xiaohe, 1991a). The last column displays the result derived by Yu, Liu and Xu (1991).[9] The two results are consistent in indicating that the prices of the natural resource intensive industries were considerably undervalued and capital intensive goods were over-valued. For example, the aggregate PT/TK ratio in natural resource intensive goods was as low as only 10.78 per cent on average, compared to 25.24 per cent in labour intensive industries, and 26.42 per cent for capital intensive industries (22.83 per cent for human capital intensive industries and 29.49 per cent for physical capital intensive industries) in 1985.

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9 Yu, Liu and Xu's result can not be confidently accepted without knowing their method of calculations of the "price distortions", which has not been released yet.. Since the price distortion ratio is more than 800 per cent in tobacco manufacture in their calculation, this industrial branch is removed from the aggregate of capital intensive groups.

Table 4.5 The Comparison of the Profitability of Different Industries, China, 1985 and 1989

Industrial Branches	1. taxes & profit million	2. total capital million	TP/TK [1]/[2] 1985 (%)	Ratio of price distortion 1989 (%)
1. NRI	**9781**	**90774**	**10.78**	**-40.43**
OTHERMINE	542	42299	1.28	-130.00
MINBUID	5593	23101	24.21	-98.61
TIMBER	435	2662	16.34	-27.65
SALT	622	6378	9.75	-9.03
COAL	577	3851	14.98	-1.83
FERMETAL	405	1923	21.06	31.44
NONFEMET	1	4	25.00	
COKING	1264	8265	15.29	-6.78
PETROLUME	342	2291	14.93	-81.01
2. LI	**52861**	**209438**	**25.24**	**-5.72**
CLOTHIN	5524	26922	20.52	-18.58
ARTS	3340	11652	28.66	7.45
FURNITURE	14887	56880	26.17	-6.01
OTHERS	2102	8043	26.13	-1.26
LEATHER	1055	5152	20.48	-101.06
CULTURAL	842	4567	18.44	-40.69
METAL	582	3219	18.08	-38.58
TIMPRO	2785	10099	27.58	21.20
PLASTIC	1587	5684	27.92	11.96
PRINTING	836	1969	42.46	25.14
BULDMAT	951	3417	27.83	1.40
TEXTILES	3387	6162	54.97	81.15
RUBBER	2025	9477	21.37	-18.94
FOODMA	8265	39216	21.08	-15.54
BEVERAG	4067	14194	28.65	5.71
PAPER	626	2785	22.48	-4.88
3. HKI	**41410**	**181271**	**22.84**	**2.15**
ELETRICMA	17974	92491	19.43	-24.55
INSTRUM	7474	35409	21.11	-28.59
MACHINE	7164	20276	35.33	22.76
MEDICAL	4702	18736	25.10	-11.08
ELECTRONIC	1718	7066	24.31	18.81
TRANSPORT	2378	7293	32.61	35.56
4. PKI	**62352**	**211430**	**29.49**	**16.88**
ANIMALFD	11181	5243	213.26	806.88
TOBACCO	213	865	24.62	-14.52
CHEMICAL	10786	62982	17.13	-18.05
SMELTFE	9614	9480	101.41	130.60
SMELTNON	11217	51593	21.74	37.29
CHEMIFIB	2269	8801	25.78	30.12
RUNWATER	13321	51196	26.02	31.94
PETROPR	3077	15598	19.73	5.71
POWER	674	5672	11.88	-68.02
Capital intensive	**103762**	**392701**	**26.42**	**9.52**

Sources: ZGGYJJTJNJ, 1987:22:26. Zhang Xiaohe, 1991a, Yu, Liu and Xu, 1991:40.
Note: Price distortion is derived from Yu, Liu and Xu (1991).
See Appendix 1, Table A1 for abbreviation of the industrial branches.

From the results of these measurements, one can conclude that: [1] the prices of most of China's primary and natural resource intensive manufacturing goods were usually lower than their international counterparts in the early 1980s; [2] the agricultural products as well as the natural resource intensive goods were usually under-valued while the capital intensive manufacturing products were over-valued in terms of the current relative prices and [3] this special price structure was more significant prior to the reform period and has not changed dramatically through the whole 1980s.

China's specific price regime has a significant impact on China's international trade. Specifically, it indicates that the financially profitable exports were more likely to be those commodities whose domestic prices were undervalued. For example, a few agricultural exports, such as soybeans, peanut oil, and frozen pork, as well as most of the natural resource products, like petroleum and coal, were reported as financially profitable, (Lardy, 1992b:25:86). But that might indicate the domestic price distortions rather than any kind of comparative advantage. Given the feature of the partial reforms in the early 1980s, there is no clear relationship between these profits (losses) in financial terms on one hand and the country's comparative advantage (disadvantage) on the other.

4.3 Domestic Distortions and Foreign Trade Policies

China's foreign trade regime, which was borrowed from the Soviet Union in the 1950s, was regarded as an extreme example of import substitution (Lardy, 1992b:16). The government plan played a very important role in China's foreign trade until 1978 when a decentralisation process emerged. After 1978, reforms

were introduced towards a more decentralised planning regime and a more flexible two-tier exchange rate mechanism. Nevertheless, the foreign trade sector is still tightly under the government's control.

Recent studies on China's foreign trade regime can be found by the World Bank (1985, 1988, 1991), Bucknall (1989), Hsu (1989), Lardy (1992a, 1992b) and by a great number of Chinese scholars. Most of the studies, though differing in extent, suggest that a great deal of distortion exists in this sector. The inward looking feature of import substitution policy remained to a great degree in most of the decision making process and in most of the authorities' and economists' thinking. The slogan of "export for importing" (or trade for autarchy) still dominates the country's theoretical debates and policy designs (see Li Yining, 1989). Under these conditions, China's production and trade pattern will not be optimal. It is so, partly because distortions in domestic market are cumbersome to reform, partly because the impact of those distortions is not yet well recognised.

Government interventions do not necessarily lead to distortions. On the contrary, good trade policy may correct some domestic distortions and save the country from this imbalance when its products are exported. In order to clarify whether China's trade policy played such a role, the following discussions focus on the nature of China's trade policy and its changes over time.

4.3.1 Government Interventions in Foreign Trade Sector

(A) Foreign Trade Planning and Management

The government monopolised China's foreign trade prior to 1978. Foreign trade was only a balancing item in the national economic plan that was drawn up annually to set production targets and to coordinate material input required in producing specific outputs. The government purchased export goods from domestic producers monopsonically and sold the imported goods to domestic consumers monopolistically under a specific plan that balanced all the profits and losses in those activities. After 1978, several measures of reforms were introduced in order to increase productive efficiency as well as to improve the market environment. These reforms can be classified as three steps over time and involved three aspects of the management regime.

[1] Reforming foreign trade planning (1979-1987). This reform was characterised by dividing the conventional comprehensive government plan into two parts: the command plan and the guidance plan. In the command plan, specific quantitative targets of exports and imports were assigned to certain sectors, industries and enterprises. Such a plan involved mainly the exports of heavy industrial products and natural resource intensive products such as the imports of raw materials, machinery and equipment. Other tradable goods were controlled by the guidance plan.

[2] Contracting out of the foreign trade sector (1988-90). From 1988, the State Council started a new theme of reforms: contracting out the foreign trade

sector from central government to local and individual agencies. This contract includes three parts: the quantity of foreign exchange earnings expressed in terms of foreign exchange, the quantity of foreign exchange to be remitted to the central government and the level of profits and losses in foreign trade transactions, measured in domestic currency. The contracts were set at the 1987 levels and were maintained for three years until 1991. This decentralisation policy promoted the growth of exports as well as imports over the three year period.

[3] Self-responsibility regime (1991-). Started in 1991, after the experiments in light manufactures (narrowly defined), arts and craft, and the clothing industries, the State Council introduced an agency system and a full self-responsibility system in foreign trade enterprises. The government no longer provides any subsidises to cover the losses in the foreign trade enterprises, since twice depreciating of the domestic currency from 3.72 RMB per US dollar in 1988 to 5.37 RMB per US dollar in 1990.

(B) Foreign Exchange Rate Policy

China does not permit market forces to determine and allocate foreign exchange, but allocates it administratively. Before the double devaluation of Renminbi (RMB) in 1989, it was widely believed that the RMB had been highly over-valued for decades. That was ascertained by observing that the spot exchange rate in the foreign exchange market largely exceeded the official exchange rate (being at least 20 per cent higher than the official rate on average in the middle of the 1980s),[10] or by the fact that the official exchange rate was usually lower than the "domestic

10 However, as Martin (1991:3, Table 1) reported, the divergences between the two rates become smaller after the two devaluations in 1990.

cost of earning foreign exchange" (the RMB cost for earning one US dollar). Lardy (1992b:25) reported that the domestic cost of earning one unit of foreign exchange has been substantially higher than the official exchange rate, and this phenomenon occurred even as early as 1952. This over-valuation reached a peak in 1988 with a domestic currency cost to official exchange rate ratio of 5.80 yuan to 3.72 yuan due to inflation. This domestic currency over-valuation was identified as the main cause of the financial losses from China's exports (Lardy, 1992b:25).

Domestic currency over-valuation means that the domestic cost of earning one unit of foreign exchange is higher than the official exchange rate. Therefore the export sector tends to lose when it transfers export unit values into local currency at the official exchange rate. Exchange rate over-valuation will reduce the competitiveness of the export sector unless this sector is subsidised. In fact, export subsidies in China constitute a heavy burden for the foreign trade sector and sparked a "self-responsibility" reform in early 1991. Given the domestic market distortions, this foreign exchange over-valuation not only discouraged exports, but also depressed the ability to import, via a shortage of foreign exchange (Martin, 1992).

Most foreign exchange was allocated directly by the state, although 25 per cent of foreign exchange earning was returned and shared equally between the province and enterprises that generated them (the so-called foreign exchange retention scheme). As an addition to this foreign exchange retention scheme, enterprises were permitted to sell part of their foreign exchange holdings in foreign exchange markets legally throughout the 1980s, especially after 1988, when most of the regulations on the those exchange rights in the swap markets were removed (Lardy 1992b:57-66, World Bank, 1991).

It is also reported that these retention rights could rise to as high as 70 per cent for above-plan exports, and were also higher than the authorised level in certain provinces, such as Fujian, Guangdong and Inner Mongolia (World Bank, 1988:24). The 14 special economic zones, according to the export promotion policy, were awarded a 100 per cent foreign exchange retention rate (Yang, Chen and Wei, 1991).

The foreign exchange retention rates were also different across industries. For example, garments, handicraft and other light industries had a rate as high as 70 per cent. Electric machinery, a capital intensive industry, had a rate of 50 per cent. Another human capital intensive industry, electronics, had a 100 per cent retention rate (Hsu, 1989:49). The divergences between different provinces have been removed, as a part of the 1991 "self-responsibility" reform. However, it is reported that producers of electrical machinery and other capital goods are allowed to keep more than 80 per cent of foreign exchange; the light industrial products, textiles and crafts sectors retain up to 80 per cent, and for other industries the ratio ranges from 25 to 50 per cent according to the level of processing involved in their export production (Tian Gang, 1992:17).

(C) Import-export Licensing Procedures

China's import-export licensing procedures were established just after the birth of the People's Republic in 1949. The regime has experienced a cycle of establishment in the 1950s, and abortion in the 1960s and 1970s, and restoration in the 1980s (Lardy, 1992b:43). The import licensing regime and the customs tariff have emerged as important economic levers, used to control "excessive" import growth and to protect domestic industry. As of January 1988, there were 53 goods requiring import licences, including most of the natural resource intensive products such as steel, rubber, petroleum, woods, wool, synthetic fibres and synthetic fibre products, which accounted for about 45 per cent of all imports (Yang Yuntian, 1990:3). The export licensing procedures covered 173 goods in 1989, of which 72 were agricultural or resource intensive products, including rice, beans, cotton, cotton clothes, petroleum, coal and metal products.

4.3.2 The Linkage of Trade Policy and Distortions

(A) Factor Market Distortion and Trade Policy

Given China's factor market distortions and the resulting labour surplus in the rural sector and low capital prices in the urban sector, a liberalisation of foreign trade may lead the country to export both labour and capital simultaneously. In 1983, China's labour exports accounted for 3.45 per cent of the world labour exports (Liu Yongqiang, 1990). Total value of labour exports reached more than US$ 12 billion from 1979 to 1989. By the end of 1989, 66,000 labourers had left and were distributed across 125 countries (Wu Guocun, 1990).

Capital exports increased over time. Up to September, 1991, China had about 900 overseas enterprises that were involved in non-trade activities (*feimaoyixing*). Total Chinese investment in these enterprises reached US$ 137 million and covered 101 countries in the world. There were also 773 Chinese enterprises overseas which were involved in trade activities (*maiyixing*), with a total Chinese investment of US$ 186 million (Xia Shen, 1992).

(B) Commodity Market Distortions and Trade Policy

As discussed in the last chapter (Section 3.16), domestic currency devaluation and tax rebates may result in promoting all China's exports, but have had small effect on export composition. Nevertheless, the setting of regional or industrial specific foreign exchange rates (or foreign exchange retention rates) is equivalent to commodity price changes. In other words, the domestic prices of exports in those industries or regions that had a high foreign exchange retention rate were increased when their products were exported and the enterprises transferred their foreign exchange into domestic currency by the market rate, which was about 20 per cent higher than the official rate in the late 1980s.

When domestic prices are higher than international prices, exporting of these highly priced goods will generate losses. However, when the losses from exports were balanced by the state, the exporting enterprises would not care too much about these losses. As a result, the exports of the products in the favoured industries or regions were encouraged. The increase of those exports is induced by both an excess production and a reduced domestic demand, when the domestic prices of those goods are high. The rapid growth of exports in electronics and machinery might be the result of such a discriminating price policy.

Though some capital intensive products might be exported under the government promotion policy, these products would never lead to economic gains since this export growth only reflects the government policy rather than any kind of comparative advantage. Some capital intensive exports generated huge losses in China (Ni Yongping, 1992). For example, it is reported that the loss ratios on chemical and machinery were much higher than in textiles and agriculture, when most natural resource intensive exports were profitable in 1983 (Lardy, 1992b:86, Table 4.1).

The capital intensive biased price policy and trade policy may result in shortages in some resource intensive products such as petroleum and coal in the domestic markets when these products were still exported. Since these exports might be financially profitable when their domestic prices were lower than those in the international market, over-exporting of these primary goods might occur when financial consideration rather than economic efficiency was the dominant concern as in the 1970s and early 1980s. However, shortages in most of the energies might slow down the growth of domestic light industries, therefore controls on the exporting of these energies were necessary. These controls resulted in reducing the exports of these items.

The use of import-export licensing on these primary exports could alleviate the shortages on domestic market, thus benefiting the domestic light industries. However, this policy is neither second-best, nor costless. As the World Bank delegation (1991:78) suggested, export tax and import quota auctions would be preferable to import-export licensing procedures.

On the other hand, government revenues must decrease when more capital intensive exports were subsidised by the government. China's capital intensive exports generated heavy burdens to government expenditure. It is frequently reported that China's foreign sector has generated heavy losses over substantially the whole decade of the 1980s. For example, in 1983 financial losses in domestic currency were sustained on exports in 15 of 17 sectors. The financial losses were a staggering 14.1 billion yuan, fully 3 per cent of China's 1983 national income and one third of the value of exports (Lardy, 1992b:87).[11] However, exports of these products were not frustrated by such financial losses. Even when a self-responsibility regime was imposed in the foreign trade sector in 1991, exports of capital intensive products might still not be reduced since there might be a cross subsidy from profitable domestic sales to exports (Gao Binghuai, 1992), especially when the export targets were compulsory.

Table 4.6 summarises this contradiction between domestic price distortions and trade policies. The impression is that the price policy and trade policies adopted in the 1980s might generate exports but might not necessarily generate economic efficiency or reduce the government budget deficit. The table sheds light on the origins of rapid growth of China's manufacturing exports in a static sense. It reveals that the trade policy adopted by the government in the 1980s actually enforced China's domestic price distortions. Though exports may increase over time, economic efficiency might be reduced, in contrast to a competitive solution.

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11 Part of these losses may be induced by overvalued domestic currency.

Table 4.6 China's Domestic Price Distortion and Trade Policy in the 1980s

Sectoral Effects	Primary products	Labour intensive	Capital intensive
domestic price	low	neutral	high
domestic production	low	neutral	high
domestic producers	losses	neutral	profitable
international sales	profitable	neutral	losses
domestic market	shortage	balanced	exceed
domestic demand	high	balanced	low
trade policy bias	restricted	encouraged	encouraged
government revenues	increase from exporting	neutral	decrease from exporting
impact on exports	decreased by either shortage or export control	increased by cost advantage	increased by export promotion policy

4.4 Summary

This chapter has provided a general review of China's factor market distortions, commodity market distortions and distorted foreign trade policy and their changes over time. These distortions might be identified as effecting the changes of China's export composition, though they do not necessarily reduce the growth of exports. A static demonstration of the relationship between domestic price distortion and export promotion policy reveals that when these distortions exist, China's exports might be shifted from primary products to manufactures. However, this shift may not generate economic gains since some exports (for example, capital intensive machinery and electronics) may not reflect China's comparative advantage.

Furthermore, the trade policies adopted by the Chinese government may be neither efficient nor consistent, in contrast to its initial objectives.

A comparative static or dynamic analysis, combining all factor market distortions, commodity market distortions and trade policy may provide more striking insights. For example, what would happen in its foreign trade when China's factor markets were entirely regulated? How could factor market liberalisation change its export pattern from the supply side? Did price distortions affect China's choice of export goods? In the next chapter, a theoretical framework is developed to highlight some important aspects of these issues.

CHAPTER FIVE

MODELLING THE EFFECTS OF DISTORTIONS

The last chapter identified China's market distortions and their changes over time. All these distortions had impacts on China's production and trade pattern. The critical point is then how can one clarify which one is the most significant and dominant and whether and how its dominance changes over time? These questions will be discussed in this chapter and the chapters hereafter.

This chapter examines the impact of these market distortions on China's production and international trade by using simple economic models. Since different distortions may have different impacts on production and trade, a distinction among them is desirable. Section 5.1 introduces a two sector theoretical framework to identify the impact of China's factor market distortions on its production, employment and international trade. Section 2 extends the basic model to incorporate commodity market distortions and section 3 demonstrates how these distortions affect China's production and trade. Several propositions in reference to the effects of the distortions of both factor and commodity markets are reported in the final section.

5.1 Modelling Factor Market Distortions

5.1.1 The Consequences of the URIP

The economic consequence of adopting the URIP is that factor reward divergences were induced between the two sectors (Putterman, 1992, Zhang, Xiaohe, 1992a, see also Chapter 6). This consequence can be explained by a specific factor model (basic model hereafter). The model includes two sectors (agriculture and manufacturing), and three factors (land, labour and capital); while the rural agricultural sector employs labour and land, the urban manufacturing sector employs labour and capital. Capital and land are immobile between sectors but labour is potentially mobile. Technology is identical across sectors and displays constant return to scale, and utility maximising and cost minimising behaviour prevail in both sectors.

Figure 5.1 explains the labour market in terms of agricultural and manufacturing production and employment. The total quantity of labour in the economy is indicated by the length of the horizontal axis. The quantity in the agricultural sector is read from the origin on the right, and the quantity in the manufacturing sector from the origin on the left. The vertical axes show the marginal products and the wage rate in each sector. Under free trade and assuming that labour is perfectly mobile between the two sectors, the labour market would clear at E. The equilibrium wage rate is W_e, at which the two labour demand curves intersect (MP_{lu} for manufacturing and MP_{la} for agricultural labour, each representing the value of the marginal product of labour in the activities under consideration). Manufacturing employment is the distance L_uL_e, and agricultural employment L_eL_a, at the wage rate W_e.

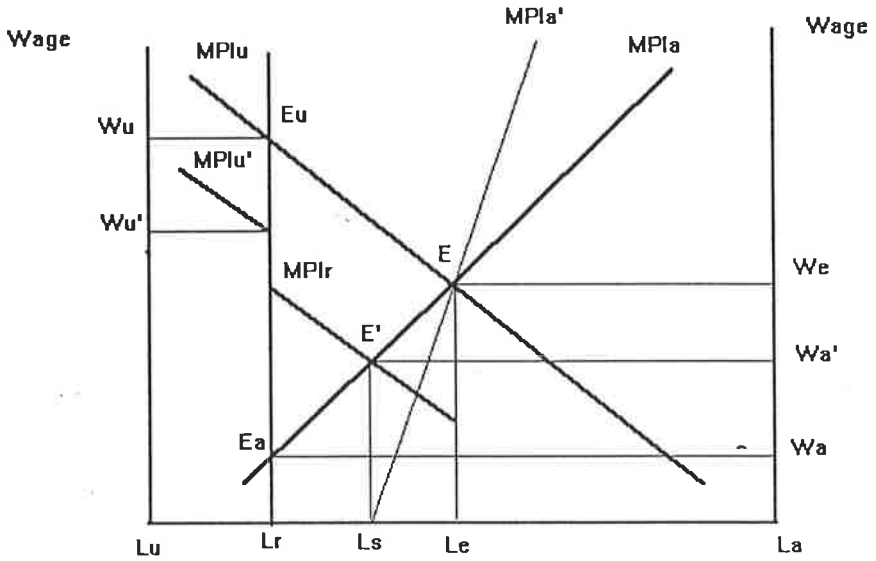

Figure 5.1 China's Labour Market

Now assume a URIP is adopted. As a result, urban employment is fixed, for example by the line E_uL_r in the figure. This would intersect the manufacturing demand curve MPl_u at E_u. Under the URIP, the segment of the MPl_u below this point would no longer apply; nor does the MPl_a apply to the left of E_a.

Since the capital intensity of the urban sector increases and, given the positive relationship between marginal productivity of labour and capital intensity of the industry, the marginal productivity of urban workers (MPl_u) increases as well, which in turn leads to a high urban wage rate W_u. The rural wage rate will be equal to the intersection of MPl_a and E_uL_r, at W_a in Figure 5.1. The corresponding employment levels are L_uL_r and L_rL_a in the urban and rural sectors, respectively. Furthermore, if the country is over-populated and/or its land is scarce, the marginal productivity of agricultural labour could be so low that at

the margin, rural labour could make no positive contribution to output. This is presented by an intersection of the MPla' curve (the slender line) and the horizontal axis. For instance if the marginal productivity of labour is zero at point L_S and beyond this point, increasing labour input would not have any positive effect on the total product. As a result, the total surplus labour will be L_TL_S.

5.1.2 Rural Industrialisation

Incorporating China's rural enterprises into the basic model, and to reflect China's specific political, cultural and economic regimes, further assumptions are required. First, unlike the previous model, China's rural enterprises involve manufacturing activities in the rural area. So the model has to be extended to include three *activities* (urban manufacturing, rural manufacturing and rural agriculture) into a two sector (rural and urban) framework.

Second, another distinction of the current model is that it incorporates a collective ownership and income sharing behaviour in both sectors. Therefore the conventional categories of workers, capitalists and landlords are simply re-classified as two groups: the "urban residents" and the "rural residents". While urban residents are endowed with urban labour and capital, rural residents are endowed with rural labour and land. Urban labour and rural labour are assumed to be identical in their physical terms though they are distinct from one another under an artificially established RUMR.[1]

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1 One may confuse the URIP with the RUMR, since they appear to present the same thing. The distinction between these two is that the URIP includes all of the restrictions on resource allocations (include capital movement) between rural and urban sectors while the RUMR refers to the restrictions on labour mobility only. Before the reforms, the URIP

The third assumption is that the changes in the domestic production mix will be entirely absorbed by the international market. Therefore, the domestic price levels of all goods are exogenously given, i,e., China is assumed to be a small open economy. Demand considerations are hence ignored.[2]

Given the model established above, permitting capital mobility will encourage rural manufacturing production, increase the returns to capital in the urban sector and decrease it in the rural sector, at the expense of the marginal productivities of urban labour and rural land. As a result, the wage rate of urban labour and rental to rural land will decline, along with an increase in rural labour productivities in both manufacturing and agricultural activities, thus increasing the rural wage rate. The returns to capital in the urban sector would rise after some of the capital moves into the rural industries. If perfect mobility were possible, the capital movements would not cease until its returns were equalised in both sectors.

The emergence of rural enterprises adds a new demand curve for rural manufacturing labour, MP_{lr} in Figure 5.1, and consequently, shifts the marginal productivity curve of urban labour down to MP_{lu}', as a result of capital outflow from the urban sector. The capital inflow into the rural sector is assumed to be

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was dominant and it was replaced by the RUMR when capital mobility was permitted in the post-reform era.

2 These assumptions are not always satisfied in China, so the model employing them has limited application. But they do isolate some important influences determining the production and income distribution between the sectors and for present purposes will be adhered to. It will become clear later that relaxing them does not necessarily affect the conclusions of this chapter. For reasons for ignoring demand conditions, see Chapter 3 (and Appendix 3 for the inclusive case).

sufficient to absorb some rural labour and increase the employment in rural enterprises to L_rL_s. Correspondingly, the rural wage rate is increased from W_a to W_a', determined by the intersection of rural manufacturing demand curve MP_{lr} and agricultural demand curve MP_{la} at E'.

Several consequences can be identified. First, if it is assumed that both the urban and rural enterprises are involved in the same manufacturing activities, given the commodity prices a trend of convergence on wage rates between the two sectors will result when the capital mobility is possible.[3] The reason is simple: if the rural wage rate is lower than that in the urban sector, the profit in rural enterprises will be higher than that in the urban sector. Thus the rural enterprises will employ more labour to extend the production. This in turn will raise the marginal product of capital. This will bid up the price of capital and it in turn will attract more capital from the urban sector until a new equilibrium is reached.[4]

If more than one manufacturing product can be produced by different sectors, product specialisation will likely result unless the capital-labour ratio is identical between urban and rural manufacturing activities when the returns to capital are equalised in the final equilibrium. Should the capital-labour ratios differ, the sector with relatively abundant factor will produce the abundant factor

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3 The model will thus tend to become Jones (1971a) 2x3 model.

4 When the increase of capital marginal productivity induced by adding more rural labour in the rural sector is equal to the decrease of marginal productivity induced by capital outflow from the urban sector, and when the capital prices are equalised, the capital movement ceases. However, at this point, if the technology used in production allows flexibility of substitutions between factors, labour prices may not be equal in the two sectors.

intensive product and leave the other sector to produce the other.[5] In the case of China, because the urban sector is likely to be relatively capital abundant, it tends to produce the relatively more capital intensive manufacturing product and the rural sector, assumed to be labour intensive, specialises in producing labour intensive manufacturing goods. In the presence of a wage differential between the two sectors, urban manufacturing activities will become more capital intensive while rural manufacturing activities will be more labour intensive than the free market equilibrium. A liberal policy of rural industrialisation and an opening of foreign trade would not necessarily change this difference.

5.1.3 Comparative Advantage

The production and trade pattern that is rooted in cost minimisation behaviour can be described by Figure 5.2 (based on a diagram used by Deardorff, 1979). Given the commodity and factor prices, the unit value isoquants of the manufacturing goods X_w, X_u, X_r are ranked by capital intensity in a descending order. The curve aa is capital abundant foreign country's unit value iso-cost curve. Its slope reflects the country's factor price ratio w/r. China, as discussed previously, has two iso-cost curves due to the RUMR and the differences in factor prices. The iso-cost line of urban manufacturing sector bb is steeper than that of the rural manufacturing sector's dd because the urban wage rate is likely to be higher than the rural wage rate. In this case, the capital abundant foreign country, with a relatively high wage

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5 This is valid only when the commodity prices are given by the international market at a certain range. Whether the sectors specialise or not will depend on the relative prices between the two manufacturing goods X_u and X_r and the resulting returns to capital (Jones, 1979:207). If the prices are relatively low or sufficiently high, complete specialisation is justified. Otherwise, incomplete specialisation is also possible.

rate, here aa in the figure, will produce and export X_W, the most capital intensive product. The rural manufacturing sector of a labour abundant developing country, here the rural enterprises of China, specialises in and exports the most labour intensive manufacturing goods X_r with the lowest wage rate dd, while China's urban industrial sector, produces and perhaps exports the medium capital intensive product X_u. If there is an extremely labour intensive product, for example X_r' in the figure, the rural enterprises must have cost advantage in producing this product.

The urban sector could adjust its technology by using more capital when the urban wage rate is relatively high. In this case the urban sector could substitute out of labour and use more capital while holding production costs unchanged. This is illustrated in Figure 5.2 by the tangency of X_r to bb. Thus the urban and rural sectors could be involved in some of the same activities. However in that case rural production will still be more labour intensive than urban production.

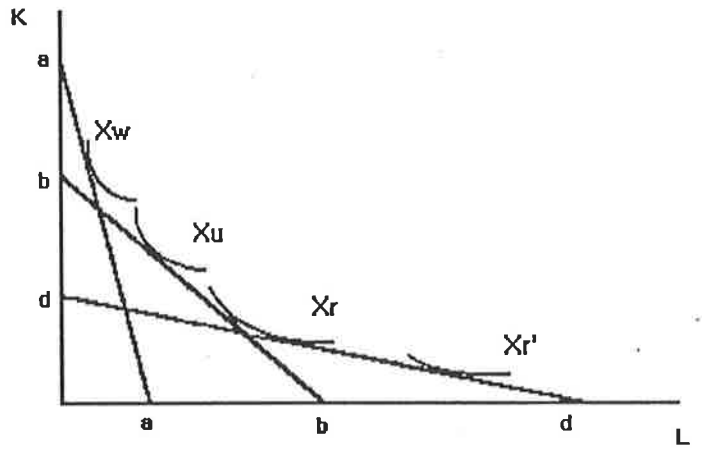

Figure 5.2 Sector Specialisation Pattern

5.2 Modelling Commodity Market Distortions

5.2.1 A 4x4 Model

The analysis of the last section assumes that the commodity price distortions are absent. However, as discussed in the last chapter, commodity price distortions do exist in China's domestic market. Following the previous model, the simplest way of modelling China's price distortions is to add positive tariffs to some goods and let their domestic prices differ from the international market, i.e., to introduce price gaps. These gaps can be presented by changing the relative price levels disproportionately between the urban manufacturing products and rural manufacturing products, or letting the prices of manufacturing products as a whole increase by a larger proportion than that of the agricultural products. The question is then, if positive tariff rates are imposed equally or unequally on the two manufacturing products and the prices of agricultural goods remain at the free trade level, what will happen to the economy's production and international trade?

The basic model displayed in Section 5.1 is not sufficient to predict the impact of changes in commodity prices due to the so-called price scissors gaps and import substitution policy. In order to enrich the analysis, a further extension of the model is required.

Leamer (1987:962) has argued that the 3 factor model is the smallest that an economist can comfortably maintain at an empirical level since a minimal model ought to distinguish the three factors, land, labour and capital. Nevertheless, where

China's RUMR is concerned, a fourth factor, the urban labour force, should be added in a short or medium run model of structural changes. Furthermore, since agricultural products are far from homogeneous, a distinction should be made to differentiate those products. For example, cotton production in China involves more labour intensive activities than does grain production (Shen E *at al*, 1989). On the basis of these considerations, a four factor model is developed in a four commodity framework.

It is assumed that two different manufactured goods are produced. X_u is the capital intensive urban manufactured product and it employs the specific urban labour and capital, X_r is the labour intensive rural manufactured product and it employs rural labour and capital. Capital is thus mobile between these two manufacturing activities. Therefore the distortion in the factor market is modelled by assuming that labour is immobile between the rural and urban sectors, although these two sectors compete for the available capital stock in their manufacturing activities. Furthermore, a labour intensive agricultural product (X_c) is produced in addition to a land intensive agricultural product (X_a). These assumptions in factor mobility are summarised by Figure 5.3. The shaded area implies that the factors are allowed to mobilise perfectly.

Products	Urban Labour	Capital	Land	Rural Labour
Urban Manufacture				
Rural Manufacture				
Agriculture 1				
Agriculture 2				

Figure 5.3 Summary of the Factor Mobility Assumptions

Now assuming capital is specific to manufacturing production and land is specific to agricultural production, the full employment and competitive equilibrium conditions can be written as following:

1 $l_u X_u = L_u$

2 $h_a X_a + h_c X_c = H$

3 $k_u X_u + k_r X_r = K$

4 $l_a X_a + l_c X_c + l_r X_r = L$

5 $l_u W_u + k_u R = P_u$

6 $l_r W + k_r R = P_r$

7 $l_a W + h_a N = P_a$

8 $l_c W + h_c N = P_c$

where l_i, k_i, and h_i describe the technology in the production of the four commodities. Specifically, l_i (i = u, r, a and c) is the quantity of factor l (labour)

required for the production of a unit of X_i. It represents the inverse of the average product of each factor in the production function of each commodity. In the case of variable proportions, l_i (as well as k_i and h_i, the capital and land input of producing one unit of commodity i) depends only on the ratio of factor returns. W_u, R, W and N denotes the four factor rewards, i.e., urban wage, rent to capital, rural wage, and rent to land, respectively, to the four respective factors: urban labour (L_u), capital (K), rural labour (L) and land (H).

Equations 1-4 stipulate that the supply of all factors, namely urban labour L_u, land H, capital K and rural labour L, is exhausted by the demand for these factors in the production of the four commodities. The other four equations indicate that the price of each commodity is determined by unit costs in a competitive equilibrium with constant returns to scale.

Denoting the proportional change by a bold-letter format on the relevant variable (e.g. $\mathbf{X_u} = dX_u/X_u$), and using the cost minimisation relationships (Jones, 1965)

$$Q_{lj}\mathbf{l_j} + Q_{kj}\mathbf{k_j} = 0 \qquad j=u,r$$

and

$$Q_{lj}\mathbf{l_j} + Q_{hj}\mathbf{h_j} = 0 \qquad j=a,c$$

the proportional change can be derived by totally differentiating 1 to 8.

9 $$\mathbf{X_u} = \mathbf{L_u} - \mathbf{l_u}$$

10 $$Y_{ha}\mathbf{X_a} + Y_{hc}\mathbf{X_c} = \mathbf{H} - (Y_{ha}\mathbf{h_a} + Y_{hc}\mathbf{h_c})$$

11 $$Y_{ku}\mathbf{X_u} + Y_{kr}\mathbf{X_r} = \mathbf{K} - (Y_{ku}\mathbf{k_u} + Y_{kr}\mathbf{k_r})$$

12 $$Y_{lr}X_r+Y_{la}X_a+Y_{lc}X_c = L-(Y_{lr}l_r+Y_{la}l_a+Y_{lc}l_c)$$

13 $$P_u = Q_{lu}W_u + Q_{ku}R$$

14 $$P_r = Q_{lr}W + Q_{kr}R$$

15 $$P_a = Q_{la}W + Q_{ha}N$$

16 $$P_c = Q_{lc}W + Q_{hc}N$$

where the Ys and Qs are transforms of the ls, ks and hs. Specifically $Y_{lr}=l_rX_r/L$ is the fraction of the total labour force employed in the labour intensive X_r and $Q_{lr}=l_rW/P_r$ is the labour's distribution share in this industry.

Defining the elasticity of substitution as

$$E_j = (k_j-l_j)/(W_j-R) \quad j=u,r,$$

and

$$E_j = (h_j-l_j)/(W-N) \quad j=a,c,$$

the ls, ks and hs can be solved for and substituted into 9-16 to express proportional changes of the eight endogenous variables, X_u, X_r, X_a, X_c, W_u, R, W and N in terms of the exogenous variables (the proportional changes in prices and endowments) and the parameters (factor distribution shares and the elasticities of substitution). The model is now complete. It includes 8 endogenous variables as well as equations.

The solutions, however, are tedious (see Appendix 3 for details). Table 5.1 summarises the signs of the partial derivatives of each endogenous variable with respect to each exogenous variable (the proportional change in factor rewards and

outputs as a result of changes in prices or endowments). Several propositions can be derived from the table.

Table 5.1 Partial Responses of the Endogenous Variables in a 4x4 Model

					Urban		Rural	
					labour	Capital	labour	Land
	P_u	P_r	P_a	P_c	(L_u)	(L_r)	(L)	(H)
Urban wage (W_u)	+	-	-	+				
Rent to capital (R)		+	+	-				
Rural wage (W)			-	+				
Rent to land (N)			+	-				
Urban output (X_u)	+	-	-	+	+			
Rural Industry (X_r)	-	+	+	-	-	+		
Agriculture 1 (X_a)	-	+	+	-	-	+	-	+
Agriculture 2 (X_c)	+	-	-	+	+	-	+	-

Notes: The signs are derived from the partial derivatives of an endogenous variable with respect to an exogenous variable.
X_u is capital intensive, X_a is land intensive, X_r and X_c are labour intensive, defined by $Q_{ku}/Q_{lu}>Q_{kr}/Q_{lr}$ and $Q_{ha}/Q_{la}>Q_{hc}/Q_{hc}$.

Proposition 1: Increasing the urban labour force L_u exogenously will increase urban capital intensive manufacturing goods X_u and labour intensive agricultural goods X_c, at the expense of rural manufacturing goods X_r and land intensive agricultural goods X_a. This is because when urban labour increases, more capital is attracted by the urban sector. Urban output increases. When capital moves to the urban sector, rural enterprises contract and in turn release more labour to increase labour intensive agricultural production. As a result, when land endowment is fixed, land intensive agricultural production contracts.

Proposition 2: Increasing the stock of capital will increase rural labour intensive manufacturing goods X_r and land intensive agricultural goods X_a at the expense of labour intensive agricultural output X_c. Since more labour will be absorbed by extending rural industry, labour intensive agricultural production contracts and land intensive production expands.

Proposition 3: Increasing the rural labour force will increase labour intensive agricultural goods X_c and decrease land intensive agricultural goods X_a, while increasing the land endowment has the opposite effects. This is consistent with the Rybczynski theorem in standard international trade theory.

Proposition 4: Own price effects are positive. This means that the output response is normal in the sense that when price increases, output will also increase in this model.

Proposition 5: Rural labour intensive agricultural output X_c is positively related to the price changes in urban capital intensive manufacturing goods P_u while rural labour intensive manufacturing output X_r and land intensive agricultural output X_a are negatively related to this price change. Since more capital will be attracted by the increase of prices of urban manufacturing goods X_u, rural enterprises X_r must contract. As a result, labour is released to encourage the labour intensive agricultural output X_c and discourage land intensive agricultural output X_a. By the same token, the output response of urban manufacturing goods X_u has the same relationship with the price changes in labour intensive agricultural goods P_c.

Proposition 6: Rural land intensive agricultural output X_a is positively related to the price change in rural manufacturing goods P_r, while urban manufacturing output X_u and labour intensive agricultural output X_c are negatively related to this price change. This is because when the price of rural manufacturing goods increases, more capital and labour will be attracted by the extension of rural enterprises, which discourages the urban manufacturing output X_u and rural labour intensive goods X_c. When more labour is absorbed by the rural enterprises, labour intensive agricultural output X_c declines and land intensive agricultural output X_a increases. By the same token, the response of rural manufacturing output has the same relationships with the price changes of land intensive agricultural goods P_a.

5.2.2 Evaluation of Price Distortions

Industrial-agricultural Price Gaps. A possible method of evaluating the industrial-agriculture price distortion is to assume that at some stage an equilibrium is achieved but then it is disturbed by price distortions. For example, if a simulation is imposed as $\mathbf{P_u=P_r=P_m>P_a=P_c=0}$, then the output responses of the commodities are:

$$\mathbf{X_u} = -Q_{ku}Q_{lr}E_u\mathbf{P_m}/Q_{lu}Q_{kr}<0$$

$$\mathbf{X_r} = Q_{lr}(Y_{ku}E_u+Y_{kr}Q_{lu}E_r)\mathbf{P_m}/Y_{kr}Q_{lu}Q_{kr}>0$$

$$\mathbf{X_a} = - \frac{Y_{hc}Y_{lr}(Y_{ku}Q_{lr}E_u+Y_{kr}Q_{lu}E_r)\mathbf{P_m}}{Y_{kr}Q_{lu}Q_{kr}(Y_{la}Y_{hc}-Y_{lc}Y_{ha})} >0$$

$$\mathbf{X_c} = \frac{Y_{ha}Y_{lr}(Y_{ku}Q_{lr}E_u+Y_{kr}Q_{lu}E_r)\mathbf{P_m}}{Y_{kr}Q_{lu}Q_{kr}(Y_{la}Y_{hc}-Y_{lc}Y_{ha})} <0$$

The output of labour intensive manufacturing goods X_r and land intensive agricultural goods X_a increases while the output of the capital intensive manufacturing goods X_u and labour intensive agricultural goods X_c falls. The reason is that when the prices of the two manufacturing goods increase by the same proportion, the urban wage falls while the rental to capital increases. Since the urban labour force has become specific due to the RUMR, urban production cannot be extended by substituting more labour for capital. As a result, capital moves into the rural sector and encourages the rural enterprises X_r. The boom of X_r absorbs more labour into this activity thus labour intensive agricultural production (X_c) has to contract while land intensive agricultural production (X_a) increases.

Price distortions within manufacturing activities. Price distortions within manufacturing activities can be modelled by setting the tariff rates in importable capital intensive products higher than those of the other goods (the so-called import substitution policy). If only the price of X_u is allowed to increase, leaving all other prices and endowments unchanged ($\mathbf{P_u}>\mathbf{P_r}=\mathbf{P_a}=\mathbf{P_c}=0$), the following results can be derived:

$$\mathbf{X_u} = Q_{ku}E_u\mathbf{P_u}/Q_{lu}>0$$

$$X_r = -Y_{ku}E_uP_u/Y_{kr}Q_{lu}<0$$

$$X_a = \frac{Y_{hc}Y_{ku}Q_{lr}E_uP_u}{Y_{kr}Q_{lu}(Y_{la}Y_{hc}-Y_{lc}Y_{ha})}<0$$

$$X_c = -\frac{Y_{ha}Y_{ku}Q_{lr}E_uP_u}{Y_{kr}Q_{lu}(Y_{la}Y_{hc}-Y_{lc}Y_{ha})}>0$$

The increase in price of capital intensive products X_u will draw capital out of rural manufacturing into urban manufacturing and results in a contraction of labour intensive rural industry X_r. As a consequence labour is released back into the agricultural sector and the labour intensive agricultural output X_c is encouraged at the expense of land intensive agricultural output X_a.

Tariff cut on capital intensive manufacturing goods. This change (the reverse of the previous section) can be simulated by a tariff cut on X_u and leaving the prices of all other products unchanged ($P_u<P_r=P_a=P_c=0$). In this case, output of rural manufacturing goods and land intensive agricultural goods (X_r+X_a) increase at the expense of urban manufacturing goods and labour intensive agricultural goods (X_u+X_c). This case is approximately the situation of China in the late 1980s, and may continue to occur in the process of restoring China's GATT membership. If China is assumed to be a net exporter of manufacturing goods, the tariff cut on capital intensive goods will tend to shift China's exports to be more labour intensive.

5.3 Production and International Trade

The effect of market liberalisation on international trade is ascertained when demand conditions are assumed constant. Two reasons can be used to explain these assumptions. First, China is assumed to be a small country thus the changes in its domestic production will not change the terms of trade in the international market. Therefore price changes will only reflect the changes in domestic economic policies. Second, the changes in domestic consumption will hardly have significant effects since the international transactions are monopolised by the government and domestic assumptions were rationed in the 1980s (Chapter 4). Given these assumptions, the following corollaries can be derived.

Corollary 1: when China's factor markets are regulated, the country's production and exports tend to be agriculturally biased, i.e., the agricultural goods are likely to be over-produced and exported. This bias will not be affected by price changes since price signals have lost their functions in such an economy.

This outcome can be displayed easily by a simple diagram. Figure 5.4 is based on a two commodity case, i.e., manufacturing goods (X_m) and agricultural goods (X_a). A bowed-out production possibility curve (PPC) is displayed in quadrant I in Figure 5.4, using the relationships drawn in quadrants II, III and IV.

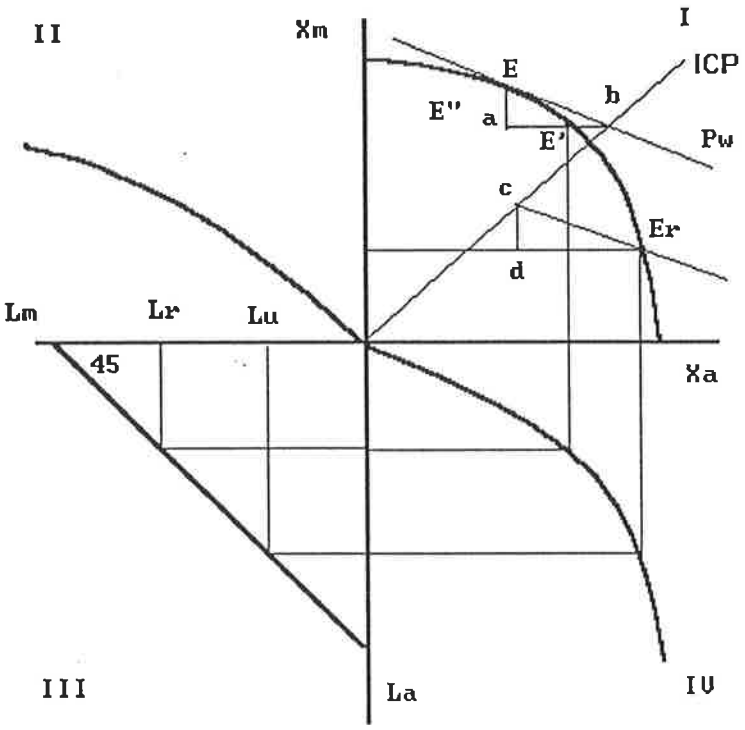

Figure 5.4 International Trade Reversal

Quadrant III shows a downward-sloping 45^0 line to illustrate the full employment of the economy's total fixed labour force, either to produce manufacturing goods X_m (measured leftward from the origin) or to produce agricultural goods X_a (measured downward from the origin). The curves showing total labour productivity for the two *activities* (quadrants II and IV) illustrate diminishing returns to labour as more is employed alongside the fixed amount of the cooperating factor (land for agricultural goods and capital for manufacturing goods). Given the relative international price line P_W, if the country's consumption is given as the ray ICP, which indicates the income consumption path, the country will export manufacturing products and import agricultural goods. The trade triangle will be Eab. Now assume a rural urban migration restriction is imposed so

that the total available urban labour force is fixed at L_u in quadrant III, the national production mix will be set at E_r in quadrant I. In the distorted case the relevant trade triangle is cdE_r. The trade pattern is reversed. Therefore the factor market distortion can have a highly distorting impact on trade patterns.

Note that in this model the output mix is completely determined by the regulation of the labour supply. In the absence of rural industrialisation, the output mix will not change with a change in international or domestic prices, though income will be redistributed by such price changes. This situation is applicable to China's pre-reform era and the tendency of over-producing and over-exporting of agricultural goods would be enforced by a grain first policy, adopted since the birth of the People's Republic. The profitability of China's primary exports in the foreign trade sector might also encourage this situation (Table 4.6).

By the same token, trade reversal between capital intensive manufacturing products and labour intensive manufacturing products is also possible. In order to understand this, one may assume that human capital is critical in the capital intensive manufacturing production thus it becomes a specific factor to a particular product. This factor of human capital, for example mechanical engineers in automobile production, can not be increased by merely releasing labour mobility. A qualified engineer in developing countries may need more than 15 years formal training. On the other hand, some physical capitals may have relatively high mobility. For example, a motor vehicle may be used in either a capital intensive chemical industry, or a labour intensive textile industry. An electric engine may be used to operate either a capital intensive metal smelting factory, or a labour intensive cotton mill. The mobility of monetary capital may be many times faster than the mobility of labour. Therefore one can simply duplicate the basic model by

assuming that engineers and unskilled labourers are immobile between capital intensive manufacturing industry and labour intensive manufacturing industry, while physical capitals are mobile between them. When physical capital mobility is restricted, a capital intensive production pattern may prevail (parallel to E_r in Figure 5.4). The country under consideration may export capital intensive manufacturing products in exchange for labour intensive products given its demand pattern. Reynolds (1987) has reported that China imported labour in 1981. Since China's capital intensive industries might be protected by extensively using the cheap human capital in the urban sector (Chapter 4), its human capital exports may have some degrees of competitiveness. However, when physical capital mobility is released, other things being equal, a shift of production and export pattern from capital intensive goods to labour intensive goods in the *manufacturing* sector may occur as well. This situation, as will be shown in the following chapters, is more applicable to the post-reform China and the labour intensive exports were mainly created by rural enterprises.

Corollary 2: Given constant domestic relative prices, a liberalisation of factor mobility (the emergence of rural enterprises) may shift the country's production mix toward the optimal mix and change exports from agricultural products to manufactures. However, price distortions may lead to shrinkage effect.

The emergence of rural enterprises can be demonstrated by adding L_r-L_u in quadrant III to the manufacturing activities X_m (ignore its geographical location) in Figure 5.4. This will lead to a corresponding shift in the production mix from E_r to E'. As demonstrated in quadrant I, the efficient trade pattern might be partially restored by such a rural industrialisation. Efficiency improves in terms of world prices, measured by the parallel of the world price lines via E' (not drawn).

However, given that the country's comparative advantage lies in labour intensive manufacturing products, the RUMR restricts its exploitation.[6] This is reflected in the diagram where E' is at a lower utility level than E, (measured at international prices), indicating under-production of labour intensive manufacturing goods.

Price distortion with a character of the "price scissors gaps" between industrial and agricultural products will enforce the shift of the production mix from agriculture to manufactures. In the two goods model, this price distortion may lead a production mix parallel to point E, but inside the PPC, say E" in the figure. Though this movement must reduce national welfare, it does not necessarily decrease manufacturing exports, provided that: [1] domestic demand is unchanged, i.e., the ICP curve is unchanged; [2] the producers of the manufactures do not afford the losses in foreign trade transaction;[7] and/or [3] the export targets are compulsory but the enterprises can compensate their export losses from domestic sales, and the latter is profitable since the domestic prices are more favourable to these manufactures. As discussed in Section 4.3, all these conditions were met in China in the 1980s, therefore a shrinkage change of the export pattern,

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6 When urban labour becomes a "specific" factor, the wage rate in rural and urban sectors would not necessarily be equalised by permitting capital mobility (Dixit and Norman, 1980:124). Therefore urban industry could be more capital intensive than the rural industry, and the resource allocation differs from the perfectly competitive case without the RUMR (Zhang Xiaohe 1992d). A shrinkage effect may occur and this certainly will reduce national welfare.

7 When domestic costs are higher than international prices, external selling must generate losses. However, relative price divergences do not necessarily mean that domestic costs are higher than overseas and must lead to losses in its financial terms. This is because that domestic decisions making and resource allocations are subject to *relative* prices (or opportunity cost), while international transactions are subject to *absolute* price divergences, i.e., given the exchange rate, so long as the absolute domestic cost is lower than international price, external sales are profitable.

i.e., a rapid growth of manufacturing export without improvement in domestic efficiency might happen.

Corollary 3: Price changes are more likely to affect production and the trade pattern when factor market distortions are (even partially) removed. The extent of the effect depends on the nature of the price changes. For each of these commodities, the own price effects will be positive (Table 5.1). Export items should respond positively to their own price changes.

Now assuming that the urban capital intensive products (X_u) and rural land intensive products (X_a) are importables while rural manufacturing products (X_r) and rural labour intensive agricultural products (X_c) are exportables, the following consequences are identified by reviewing Table 5.1.

[1] Increases in the price of urban capital intensive products (P_u) will increase both X_u and X_a at the expense of X_r and X_c, thus reduce imports and discourage exports. As a result, total trade volume will be decreased. This is a standard consequence of import substitution policy and it appears applicable to China's situation prior to the reform period. A tariff cut on capital intensive products in the second half of the 1980s in China is likely to encourage labour intensive rural manufacturing exports.

[2] Increases in the price of rural manufacturing products (P_r) will encourage labour intensive manufacturing exports, reduce land intensive agricultural imports (since X_a is encouraged) and labour intensive agricultural exports (X_c is discouraged), but increase capital intensive manufacturing imports (X_u is contracted). As a result the trade volume could expand and the export

pattern could shift from agricultural goods to manufacturing goods. This is a consequence of an export promotion policy.

[3] The increases in prices of land intensive agricultural products (P_a) have the same effect as the increase of P_r, and the increases in prices of labour intensive agricultural products (P_c) have the same effects as the increase of P_u. China's relative price of grain (land intensive) was higher relative to cotton (labour intensive) during 1985-91, the effect would have been to promote to rural manufacturing production and exports (see Zhang Xiaohe, 1991c).

In summary, in terms of the model, most of the relative price changes in the 1980s are likely to encourage the production and exports in China's rural enterprises. However, since the response of each output in simultaneous changes in all prices is not that clear-cut, the synthesis and quantitative impact on international trade is ambiguous without further specification of the parameters.

5.4 Complexity and Extensions

The outcome of the model becomes more complicated when more realistic economic phenomena are introduced into the model. For example, introducing imperfect factor mobility, rural surplus labour and factor reward divergences into the model will result in a shrinkage effect (Johnson, 1965, Srinivasan, 1987), i.e., shrinking the production mix within a country's PPC. As a result, some of the propositions stated in the last section may be qualified. Here two more relevant cases are discussed.

5.4.1 Surplus labour

When there is surplus labour, the economic wage of rural labour is zero. Since the income is shared among all members of the rural residents, the average income level equals total agricultural revenue divided by total rural labour force. When rural enterprises emerge, the demand for labour will not affect the total agricultural output until it is capable of providing a positive economic wage rate for the whole rural sector. In other words, the rural labour supply is unlimited before this point is reached (Lewis, 1954, Ranis and Fei, 1961).

In the presence of rural surplus labour, all agricultural production becomes more labour intensive. Therefore the output response of agricultural goods (X_a and X_c) to other price changes (e,g, P_u and P_r) may not be clear-cut. However, as discussed in Section 5.1, the existence of rural surplus labour will accelerate rather than dampen the growth of rural enterprises. The boom of rural enterprises will also encourage by the price scissors gaps between agricultural and manufacturing products. So long as capital is available, the rural enterprises will grow more rapidly. This will consolidate Corollary 2 concerning the changes in export composition.

3.4.2 Imperfect Capital Mobility

Another distinction is imperfect factor mobility. Imperfect factor mobility reduces the possibility of factor price equalisation and is likely to encourage over-exploitation of the under-priced factor in the urban sector and discourage the development of rural enterprises. Several investigations reveal that one of the

greatest constraints on the development of rural enterprises is the shortage of capital, which is due to imperfect capital mobility (Chen, Watson and Findlay, 1991 and Chapter 4). This will prevent the end of the dualism and dampen the full exploitation of China's comparative advantage. If the trade reversal between capital intensive goods and labour intensive goods in the manufacturing sector existed in the pre-reform period, imperfect capital mobility might not be strong enough to remove this reversal.

On the other hand, imperfect capital mobility will spark economic disasters in the urban sector such as "investment hungers" (Hsu, 1989). As a result, the urban industry becomes more capital intensive, and the urban products may also have some cost advantages since capital prices are relatively low by international standard (Lin Shujuan, 1991a). In other words, the under-pricing of capital (both physical and human) may be sufficient to encourage China's capital intensive exports. This may explain why China also exported several capital intensive goods in the 1980s.

To sum up, these imperfections will result in reducing national production and welfare, since the resources may be used more efficiently under a perfect competitive circumstance. Nevertheless, since these imperfections may only affect the mix of manufacturing production, and induce dualism in the manufacturing exports, the general proposition that reform will lead to changes in the export pattern from agricultural goods toward manufacturing goods would not be affected significantly by such shrinkage effects.

5.5 Summary and Conclusions

This chapter attempts to distinguish the effects of factor market distortions from those of the commodity market distortions and to answer the questions of [1] the most likely "revealed" production and trade pattern when China's factor markets were seriously distorted; [2] the direction of changes in production and international trade if some of the distortions (e.g., capital mobility restrictions) are removed while others (e.g., the RUMR and price distortions) remain unchanged and [3] the likely export pattern when different policies are imposed, e.g., import substitution versus export promotion, etc.

In terms of the model, the URIP is modelled by assuming capital is specific to manufacturing activities and initially only the urban sector is endowed with capital (a parallel model is that the urban sector is endowed with human capital and the rural sector is endowed with unskilled labour, while physical capital is immobile). Assuming the flow of labour (capital) out of agriculture (industry) is completely regulated, then it is found that:

* trade reversals are possible;

* welfare is reduced and

* price distortions have only redistributive effects.

Notice that this consequence is closer to the pre-reform era in China. One may expect that the factor market distortions were dominant determinants of its production and trade pattern in this period. However, when capital mobility

restrictions were partially removed, the production mix might move towards the optimum and this movement might have significant impact on the changes in production and trade pattern, for example from agriculture to manufactures, or from capital intensive goods to labour intensive goods.

The commodity price distortions become significant when factor market distortions are partially removed. An explicit distinction is thus made between rural and urban manufactured products. This is modelled by assuming capital is mobile between rural and urban manufacturing but that labour is not (due to the RUMR). Also the assumption of a regulated supply of labour to rural manufacturing is dropped and instead a rural labour market is permitted. The results are that:

* the improvements in efficiency induced by capital mobility can be dampened by price distortions such as an import substitution policy;

* price distortion is likely to shrink the economy's production potential and lead to the situation of "growth without efficiency improvement";

* industry-agriculture price gaps have positive effects on the rural industry output but negative effects on urban industry output, if protection rates of these two manufacturing goods are identical;

* protection of urban capital intensive manufacturing products is likely to result in reducing total trade volume via its import substitution effects;

* protection of rural labour intensive manufacturing products is likely to result in export promotion, along with a shifting in export composition from agricultural products to labour intensive manufacturing goods;

* these conclusions may not be affected by the existence of rural surplus labour, but will be dampened by imperfect capital mobility;

* imperfect capital mobility may lead to a dualism in China's manufacturing exports, i.e., capital intensive manufacturing goods may be not only produced but also exported, though labour intensive exports will be also created by rural enterprises.

The second case is closer to the post-reform China. In other words, when capital mobility restrictions were removed, the commodity price distortions turned to dominate the production and trade pattern.

In conclusion, three groups of hypotheses are suggested:

First, when China's factor markets were regulated in the 1960s and 1970s, the country's production and exports tended to be agriculturally biased, i.e., agricultural goods were likely to be over-produced and exported. This bias might not be affected by price changes since price signals lost their allocation functions in that period. This tendency will be accelerated by a "grain-first" policy adopted since the birth of the People's Republic and the profitability of agricultural exports in the foreign trade sector.

Second, as a result of factor market regulations, China's urban industry became more capital intensive and its agricultural production became more labour abundant than expected in a competitive circumstance. An extreme case such as the trade reversal between capital intensive goods and labour intensive goods in the manufacturing sector might occur, given a specific demand pattern. For the same reason, when rural enterprises emerged, they were very labour intensive and thus had a comparative cost advantage in labour intensive products. Therefore the increase in exports from rural enterprises will increase the labour intensity of China's exports. On the other hand, the low level of return to human capital in the urban sector will encourage the activities using this kind of capital intensively to expend and a low interest rate of domestic capital will also encourage this resource to be exported. In other words, a dualism of trade could occur, due to the dualism in its production pattern.

Third, when the domestic markets are (even partially) liberalised in the sense of relaxing the regulations on factor mobility, a radical change in production and trade structure will emerge. Given the special features of China's reforms, a shift toward more manufacturing production and exports and less agricultural production and exports on one hand, and more labour intensive manufacturing production and exports and less capital intensive manufacturing exports on the other, might result. The industrial-agricultural price gaps and tariff cuts on urban capital intensive manufacturing goods will encourage both production and exports of rural enterprises. As a consequence, the importance of agricultural production and exports will decline as the liberalisation proceeds.

Not all of these hypotheses are testable. In the following chapters, two distinct hypotheses are examined. The first refers to the so-called "trade reversals".

When factor market distortions were dominant prior to the reforms, China exported more agricultural goods than it should in a competitive circumstance. Trade reversal between labour intensive manufactures and capital intensive manufactures might also emerge when domestic prices are in favour of several capital intensive manufacturing products, for example machinery and electronics. The second one may be called "dualism". When this distorted economy is liberalised in a particular way, i.e., keeping the RUMR unchanged yet promoting the development of rural enterprises by partially releasing the capital mobility restrictions, the dualism may remain in the economy and it will also affect the export pattern of the country. As a result, both capital intensive and labour intensive manufacturing production and exports will be encouraged when agricultural exports decline.

These two hypotheses will be examined in Chapter 6 and Chapter 7 respectively, followed by Chapter 8 which reports a case study of the specific labour intensive textile and clothing industry.

CHAPTER SIX

TRADE REVERSALS

Two basic hypotheses derived from the last chapter need to be examined. The first is whether China's production pattern differed from that predicted by standard development theory? The question is whether its agricultural products and capital intensive manufactures were over-produced and over-exported and labour intensive manufacturing goods were under-produced and under-exported compared to a perfectly competitive circumstance? Second, was there still a dualism in China's production pattern in the 1980s and correspondingly, was the dualism in China's production also reflected in China's export pattern? This chapter and the next chapter attempt to answer these questions.

Answering the first question is difficult without reference to a scenario of the "competitive circumstance", since both theory and observation suggested that most of the LDCs export agricultural products at an early stage of their economic development when their capital is too scarce to operate manufacturing activities. In order to distinguish the production and international trade pattern at different stages of development from those affected by domestic distortions, an international comparison in production and trade pattern is required.[1]

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1 One critical implication of this comparison is the assumption that all countries other than China have no distortions in their domestic market. Certainly this assumption is unrealistic given the presence of distortions in these countries. However,

This chapter provides an empirical investigation of China's production and trade pattern in both pre-reform and post-reform periods, in order to examine the trade reversal hypothesis explained in Chapter 5. Section 6.1 provides the background of China's factor endowments, and argues that China has neither comparative advantage in land intensive agricultural products nor capital intensive manufacturing goods, when international trade is free and domestic distortions are absent. Sections 6.2 and 6.3 validate the predictions that China's agricultural products and capital intensive manufacturing goods were over-produced and over-exported, by comparing its production and export pattern with other developing countries at the similar income level. Concluding remarks are summarised in the final section.

6.1 China's Factor Endowments from a Global Prospect

It is well known that China is the largest developing country in the world in terms of population and land area. However, its natural resource endowments are poor when they are measured in per capita terms. Its 22 per cent of the world's population is squeezed onto just 7 per cent of the world's land area, and of this 7 per cent, 90 per cent is not suitable for agricultural farming. Therefore, the share of China's arable land area in world arable land area is only slightly above 6 per cent.

Denoting land area as a rough indicator of resources and population as a rough indicator of labour force, then GDP per capita can be used as an

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in contrast to the case of China, a developing country after 40 years central planning, the distortions existing in other countries appear not as serious as in China.

approximate indicator of the capital-labour ratio and land per capita can be used as an approximate indicator of resource-labour ratio. Tables 6.1 and 6.2 give a brief comparison of China's factor endowments in contrast to other large countries in 1980 and 1990, respectively. In order to increase the comparability among different countries, several countries that had a population size over 10 million people in 1980 are considered.[2] The countries are further divided into 3 groups. The first group is low income LDCs (including China) with an income level (GNP per capita) lower than US$ 300 in 1980 and US$ 500 in 1990.[3] The second group is consisted of four lower-middle-income countries that had a GNP per capita above US$ 300 in 1980 and above US$ 600 in 1990. The last group is composed of advanced countries with high income levels. This group includes not only typical industrialised countries like the United States and Japan, but also natural resource abundant countries like Canada and Australia.

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2 China was frequently compared with the East Asian NIEs (see for example, Anderson, 1990c). Since all these East Asian countries have similar relative land endowment (in per capita terms), China may have the same comparative advantage as the NIEs at their early stages of development. Nevertheless, since the NIEs are relatively small in terms of country size, they are excluded from the comparison used in this chapter.

3 As argued by many analysts recently (see Summers and Heston, 1991, Lardy, 1992b, Garnaut and Ma, 1992), The World Bank data may under-estimate China's GNP per capita. If it is true, the hypothesis referring to the reversal between over-produced and over-exported capital intensive manufacturing goods and under-produced and under-exported labour intensive manufacturing goods in China may be somewhat qualified. However, this under-estimation of China's GNP per capital does not affect the hypothesis referring to the reversal between over-produced and over-exported agricultural goods and under-produced and under-exported labour intensive manufacturing goods, since the principle is that the higher the income level, the higher the share of manufacturing production and exports and the lower the share of agricultural production and exports (Anderson and Tyers, 1987).

Table 6.1 International Comparison of Factor Endowments, 1980

	land area million ha	arable land million ha	cereal output MMT	population million	land/head ha/head	GNP/head US $	ranking	arable land per head million ha	ranking	cereal/head MT/head	ranking	agricultural labour to total labour %	ranking
World	13075	1452	1561	4513	2.90	2681		0.32		0.35		50.80	
China	931	99	321	976.7	0.95	290	10	0.10	10	0.33	6	74.20	2
India	297	169	140	673.2	0.44	240	12	0.25	7	0.21	12	69.70	4
Bangladesh	13	9	22	88.5	0.15	130	13	0.10	11	0.25	8	74.80	1
Pakistan	78	20	17	82.2	0.95	300	9	0.24	8	0.21	11	54.60	7
Sri Lanka	6.5	1	2.2	14.8	0.44	270	11	0.07	12	0.15	10	53.40	8
Thailand	51	18	21	47	1.09	670	7	0.38	6	0.45	5	70.90	3
Indonesia	181	17	34	146.6	1.23	430	8	0.12	9	0.23	9	57.20	6
Brazil	846	62	33	118.7	7.13	2050	5	0.52	5	0.28	7	31.20	9
Turkey	77	29	24	44.9	1.71	1470	6	0.65	4	0.53	4	58.90	5
USA	913	191	270	227.7	4.01	11360	1	0.84	3	1.19	2	3.50	13
Japan	37	5	13	116.8	0.32	9890	3	0.04	13	0.11	13	11.20	10
Canada	921	44	41	23.9	38.54	10130	2	1.84	2	1.72	1	5.30	12
Australia	762	44	16	14.5	52.55	9820	4	3.03	1	1.10	3	6.90	11

Sources: **Abstract of World Economic Statistics, Fan Muhan (ed.), 1985:82-83, 84-85, 104-105**
United Nations, Handbook of International Trade and Development Statistics, 1984:380-385.
World Bank, World Development Report, 1982:110-111
FAO Production Yearbook, 1981, 1990.

Note: **World population is 1981 data.**

Table 6.2 International Comparison of Factor Endowments, 1990

	land area million ha	arable land million ha	cereal output MMT	population million	land/head ha/head	GNP/head US $	ranking	arable land per head million ha	ranking	cereal/head MT/head	ranking	agricultural labour to total labour %	ranking
World	13076	1373	1955	5284	2.47			0.26		0.37		50.80	
China	933	93	389	1133.7	0.82	370	11	0.08	10	0.34	6	74.20	2
India	297	165	197	849.5	0.35	350	12	0.19	7	0.23	9	69.70	3
Bangladesh	13	9	29	106.7	0.12	210	13	0.08	11	0.27	8	74.80	1
Pakistan	77	20	21	112.4	0.69	380	10	0.18	8	0.19	11	54.60	6
Sri Lanka	7	1	2	17	0.41	470	9	0.06	12	0.12	12	53.40	5
Thailand	51	19	23	55.8	0.91	1420	7	0.34	6	0.41	5	70.90	4
Indonesia	181	16	51	178.2	1.02	570	8	0.09	9	0.29	7	57.20	7
Brazil	846	67	33	150.4	5.63	2680	5	0.45	5	0.22	10	31.20	9
Turkey	77	25	30	56.1	1.37	1630	6	0.45	4	0.53	4	58.90	8
USA	913	188	313	250	3.65	21790	2	0.75	3	1.25	3	3.50	13
Japan	37	4	14	123.5	0.30	25430	1	0.03	13	0.11	13	11.20	10
Canada	921	46	58	26.5	34.75	20470	3	1.74	2	2.19	1	5.30	12
Australia	762	49	24	17.1	44.56	17000	4	2.87	1	1.40	2	6.90	11

Sources: **World Development Report, 1992:218-219**
FAO Production Yearbook, Vol.44, 1990.

Note: **Data in land use are 1989 figure. Estimated data are included in cereal production.**

A crude picture of factor endowments and agricultural production pattern can be seen from Tables 6.1 and 6.2. Although China had a relatively larger land per capita figure than India, Sri Lanka, Japan and Bangladesh, its arable land was so scarce that its arable land/population ratio was the lowest in the three groups of large countries with only two exceptions of Japan and Sri Lanka. China was ranked as the 10th place in terms of both GNP and arable land per capita but the 6th place in terms of cereal output per head and the 2ed in the share of agricultural labour force to total labour force.[4] This situation has not changed remarkably through the 1980s, despite China's experience of economic reforms. As revealed by Table 6.2, China's rankings in all indicators in 1990 remained at exactly the 1980 level except its ranking on GNP per capita was overtaken by Sri Lanka.

A clear illustration of factor endowments is presented by the so-called Leamer triangle in Figure 6.1 (compiled by Anderson, 1992), in the spirit of Leamer's three factor model. The Leamer triangle suggests that China as well as the other East and South Asian countries, except the NIEs (Korea, Taiwan, Hong Kong and Singapore) and Japan, are all located in the space LWA, a low income, densely populated group. This group tends to have comparative advantage in unskilled labour intensive manufactures and not in natural resource (or land) intensive nor capital intensive manufactures. These densely

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4 China's arable land area may be under estimated and so the comparison of land endowments using official figures could be misleading. However, adjusting China's land area by increasing it from 99 hectares to 126 hectares would not significantly change the ranking (China overtakes Indonesia to become the 9th largest arable land abundant country in per capita terms). However, China's population size could be also under estimated. Therefore the comparison of relative land endowments by the ratio of land per person may not be affected.

populated and land scarce countries, when there is free international trade and when the internal as well as external distortions are absent, are likely to export labour intensive manufacturing products at a relatively earlier stage of development than other LDCs who are endowed with relatively more abundant resources (land), for example Latin American and Sub-Sahara African countries.

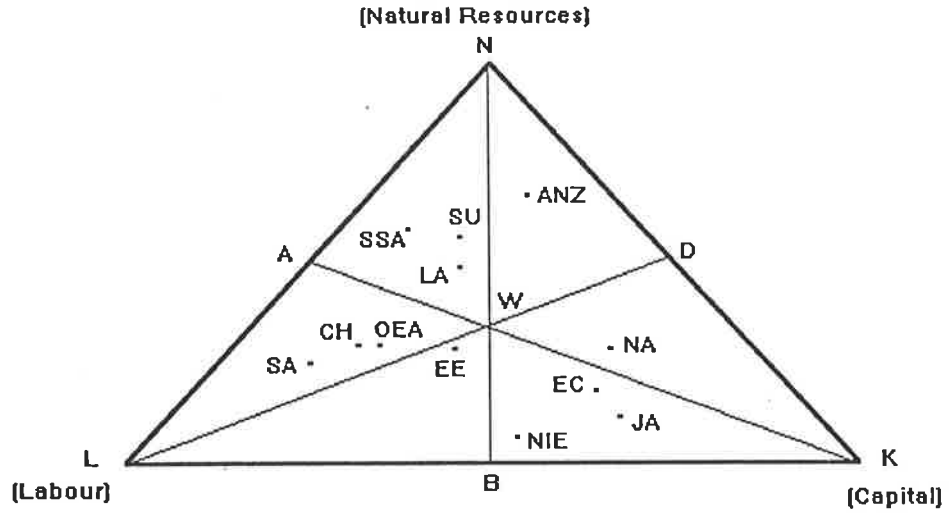


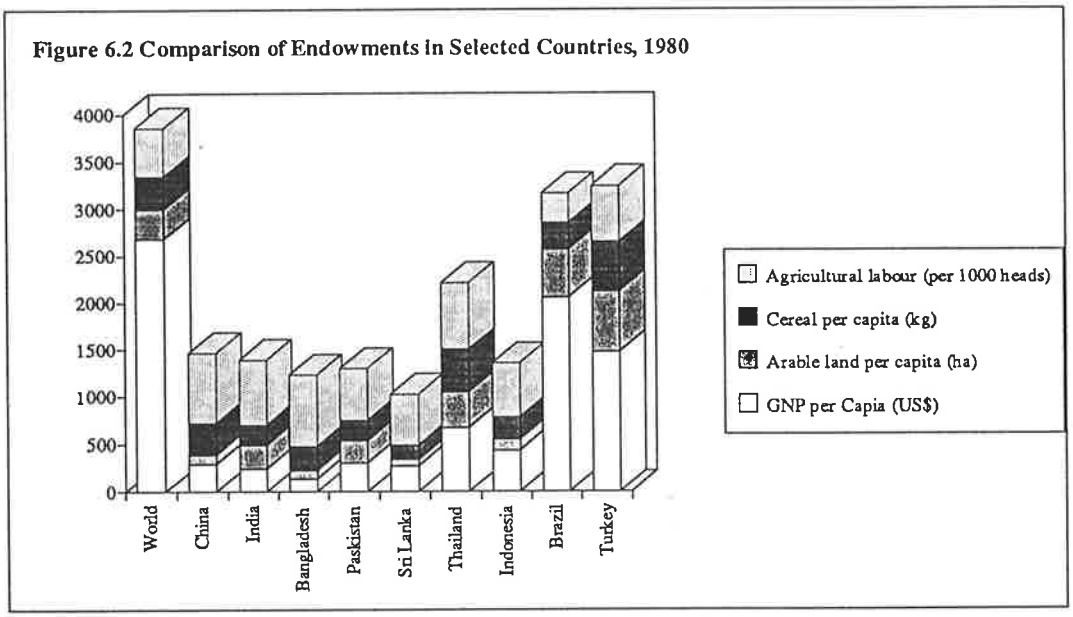
Figure 6.1 Leamer Triangle: Relative Endowments of Selected Countries (1989)

Source: Anderson (1992)

Notes: The distance along NL measures the population density as a ratio of the world average (0.39 people per hectare). The distance along LK from L measures national product per capita as a ratio of population density (US$3980). Both scales are in logs. Along any rays from K to NL line the population density is constant, and similarly for rays from the other two corners of the triangle. Countries are represented as follows: ANZ: Australia and New Zealand, CH: China, EC: the twelve EC member countries, EE: the East European Economies, JA: Japan, LA: Latin America; NA: the United States and Canada; NIE: East Asian four newly industrialised economies, OEA: other East Asian market economies, SA: South Asia, SSA: Sub-Saharan Africa, SU: the Soviet Union. The estimates used for per capita income for Eastern Europe and the Soviet Union are US$2350 and US$1780 respectively.

A limitation of Figure 6.1 is that it uses population density (people per hectare land area) rather than *arable land* per head, thus the figure could disguise the scarcity of arable land in China. For example, the figure indicates that China is more resource abundant than other South Asian countries. However, this impression is inconsistent with the situation reported in Tables 6.1 and 6.2. Therefore if arable land per capita rather than population density is used to measure the relative resource abundance, the situation will be different. Figure 6.2, based on Table 6.1, plots some indicators in per capita terms. The figure shows that China, although it had a relatively higher ratio of cereal output per capita than other Asian countries, was endowed with almost the lowest arable land per head in the figure.

Figure 6.2 Comparison of Endowments in Selected Countries, 1980



Source: Table 6.1

From these comparisons, one may conclude that China lacks both arable land for agricultural production and capital for establishing capital intensive heavy industries. However, as has been shown in Chapter 3, China did export agricultural products and established a capital intensive industrial structure. This development strategy was imposed at the expense of labour intensive light industries. In the following discussions, the hypotheses referring to the reversals between agricultural and manufacturing production and exports on one hand, and between capital intensive manufacturing and labour intensive manufacturing production and exports on the other, are examined. Data are reported to show whether these reversals existed and if the reforms had corrected them.

6.2 Did China's Production Pattern Differ?

According to standard development and international trade theory, LDCs' export pattern will shift from agricultural products to manufactures when their capital accumulated and industries developed. However, the development will follow a path or several paths in terms of capital intensity and land intensity (Krueger, 1977, Leamer, 1987). According to Leamer, if a country's land endowment is abundant, the country may shift to a relatively high level of manufacturing production and export pattern when its income growth is faster than the rest of the world. Conversely, if a country's land endowment and capital stock are relatively scarce, it will be involved in mainly labour intensive manufacturing activities and exports those products at an early stage of its industrialisation. No matter how rapid this economy's growth, it is unlikely that the country's production and export can be both agriculture dominant and capital intensive. Nevertheless, as discussed in the following sections, evidence

shows that this unusual production and export pattern did occur in China and has been maintained in the post-reform era.

As revealed by Tables 6.1 and 6.2, despite China's limited agricultural resources in comparison to the world average and other countries at the similar income level, China's agricultural production was rather robust. Being the most populated country in the world, China's food production per capita was rather high. Its cereal output per capita was close to the world average and was the highest in the five low income large countries in the group in 1980 and 1990. The ratio was even higher than Brazil and Indonesia, countries which had much higher GDP per capita and more arable land per capita than China. This situation was not seriously affected by an "open door" policy in the reform era of the 1980s and China actually increased its cereal production per capita in 1990 (Table 6.2).

On the other hand, China's manufacturing production structure was more capital intensive than other countries at the similar income level. In 1972 China's share of heavy manufacturing far exceeded that of India, Indonesia, or even Spain. In 1980 it was in fact comparable to that of the Republic of Korea and of Brazil, countries with income levels five times as high as China. Even more striking is that the machinery industry, which was classified as human capital intensive, had a share of 10.8 per cent of GDP.[5] This share surpassed

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5 In order to examine the reversal between capital intensive and labour intensive manufacturing goods, capital intensity in China is required to compare with other countries at the similar income level. In the absence of a world wide classification of the industries, the industry classification established in Chapter 2 can be used as a reference. This classification is consistent with the commodity classification used by Krause (1982), and Leamer (1984), among others. For example, machinery is classified

that of Republic of Korea and Brazil, and was at about the same level as Japan in 1965 (World Bank, 1985:19-23).

Table 6.3 compares the output of four products (cereal, cotton, crude steel and cotton yarn) among a group of large countries: China, India, Japan and the United States. Among these four products, grain and cotton are typical agricultural goods, steel is likely to be a capital intensive manufacturing product (Table 2.4, Krause, 1982, Leamer, 1984) and cotton yarn is a traditional labour intensive manufacturing product. In contrast to India, a country which also adopted a strong inward looking trade strategy (World Bank, 1987, Srinivasan, 1987, 1990), China's shares of world cereal and crude steel production were relatively high throughout 1960 to 1980. Its crude steel share of world production in 1960 was comparable to that of Japan. The same share dropped to 3 per cent in 1970 and then shifted back to 5.69 per cent in 1980, and reached a high level of more than 9 per cent in 1990. At the end of November 1992, China's crude steel annual output was 80 million tonnes, which broke the country's production record (*People's Daily*, 7 January, 1992:1). The production share in India remained stable at 1 per cent on the world output over the long period of 1940-80 until 1990 when it had increased to 1.9 per cent. China doubled India in terms of both the shares of cereal and cotton yarn in 1980 and 1990, but its share in crude steel production was more than five times higher than India on average in 1960, 1980 and 1990. These results undoubtedly reflected the effects of China's heavy industry-biased development policy in the early period (see Chapter 3). China's share of cotton

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as human capital intensive in our classification, and is classified as technology intensive goods by Krause and as a particular capital intensive item by Leamer.

yarn had not been very high until 1990 when it reached about 30 per cent, treble the same item in India.

Table 6.3 Main Agricultural and Industrial Outputs in Selected Countries (1960-80)

Country	cereal 1000 MT	% of the world	cotton 1000 MT	% of the world	crude steel 1000 MT	% of the world	cotton yarn 1000 MT	% of the world
China								
1940			510	8.53	602	0.48		
1950			693	12.81	610	0.38	437	
1960	143500	14.92	1063	10.38	18660	5.69	1093	13.02
1970	210970	17.62	2277	19.28	17790	3.00	2052	17.05
1980	320560	20.54	2707	19.43	37121	5.25	2926	22.99
1990	388763	19.89	4470	24.22	66350	9.08	4657	29.89
India								
1940			1104	18.46	1439	1.15	612	
1950			593	10.96	1461	0.91	527	
1960	84520	8.79	971	9.48	3286	1.00	788	9.39
1970	111210	9.29	954	8.08	6286	1.06	965	8.02
1980	140150	8.98	1300	9.33	9384	1.33	1058	8.31
1990	197121	10.08	1802	9.76	13650	1.87	1473	9.46
United States								
1940			2725	45.57	60765	48.42	1424	
1950			2171	40.13	87848	54.46		
1960	181420	18.86	3107	30.34	90067	27.48	1628	19.40
1970	186610	15.58	2219	18.79	119309	20.09	1525	12.67
1980	269950	17.29	2422	17.39	100801	14.27	1120	8.80
1990	312708	16.00	3399	18.42	90631	12.41	1227	7.88
Japan								
1940					6856	5.46	415	
1950					4839	3.00	238	
1960	20260	2.11			22138	6.76	536	6.39
1970	17770	1.48			93322	15.72	496	4.12
1980	13190	0.84			111414	15.77	504	3.96
1990	14452	0.74			104962	14.37	464	2.98

Sources: Fan Muhan, 1985:104-105:170-173:334-337:460-463. SSB, 1992.
FAO Production Yearbook, Vol.41, 1990. UN: Statistical Yearbook, June 1990.
UN: Industrial Statistical Yearbook, 1990:231-2, 565-6.

Notes: US cotton yarn 1940 is 1939 figure. Crude steel and cotton yarn in all countries are 1988 data, based on UN sources.

Table 6.4 provides a more detailed picture on the same issue. Manufacturing structure is shown by four groups of the commodity aggregations. The first two groups, namely food and agricultural manufactures, and textiles and clothing, can be seen as the so-called traditional labour intensive manufacturing products, while the other two groups, namely machinery and transport equipment, and chemicals, are usually capital intensive (Table 2.4, Krause, 1982, Leamer, 1984). The last column of the table displays ratios of the sum of the shares in the two labour intensive manufacturing outputs to the sum of the shares in the two capital intensive groups in each country. The lower the ratio, the more capital intensive is the economy's industrial structure. The ratios indicate that China, an extremely labour abundant country, had lower ratios than all of the other low income developing countries in 1980 and 1989 with only one exception (India in 1989). China's ratio in 1989 was lower than that in Thailand, Indonesia, the Philippines and Turkey, all countries having a higher GDP per capita than China. China's ratio in that year was quite close to Brazil, a country with a GDP per capita almost six times as high as that in China. According to the latest news from China, several main chemical productions in China had attained top levels in the world by 1992. Its calcium carbide production ranked first, synthetic ammonia, chemical fertiliser, pesticide, dyestuff and soda ranked the second and sulphuric acid ranked the third in the world. Another capital intensive industry, electronics, reached an output of Y 100 billion in 1992, and increased by 20 per cent from the previous year (*People's Daily*, 18 December, 1992). This evidence confirms the prediction made in Chapter 5 of the upgrading of China's urban industrial structure in terms of capital intensity when domestic factor markets were absent or incomplete.

Table 6.4 Structure of Manufactures in Selected Countries (%), 1980 and 1989

Country	value added in manufactures ($USm)	%	[1] food & agriculture %	[2] textiles & clothing %	[3] machinery transport %	[4] chemicals %	[5] other manufactures %	[1]+[2] / [3]+[4]
China								
1980		100	16	20	32	15	19	0.77
1989	145646	100	12	14	26	12	36	0.68
Bangladesh								
1980	1197	100	26	40	4	16	14	3.30
1989	1730	100	23	36	5	18	18	2.57
India								
1980	15909	100	13	19	20	13	35	0.97
1989	44445	100	11	12	26	17	33	0.53
Philippines								
1980	5519	100	39	11	10	8	32	2.78
1989	10728	100	41	8	9	10	32	2.58
Thailand								
1979	4154	100	37	24	10	3	26	4.69
1989	17635	100	29	18	13	7	33	2.35
Indonesia								
1980	5546	100	29	8	7	11	45	2.06
1987	12876	100	22	13	8	9	48	2.06
Brazil								
1980	44733	100	14	10	28	10	38	0.63
1989	120845	100	12	12	24	12	40	0.67
Turkey								
1980	6056	100	24	12	13	12	39	1.44
1989	18030	100	17	15	14	14	41	1.14
Japan								
1980	234036	100	8	6	33	8	45	0.34
1989	829238	100	9	5	39	10	37	0.29
United States								
1980	436990	100	11	6	32	12	39	0.39
1989		100	12	5	32	11	40	0.40

Sources: World Development Report, various volumes in 1978-92, especially, 1983:160 and 1992:228. ZGGYJJTJZL, 1986.

Note: China 1980 data are estimated from ZGGYTJZL 1986:192.

6.3 Are There Trade Reversals?

Comparisons of China's international trade pattern with other countries have been made recently by many scholars (for example, see Zhang Xiaohe, 1992b and Song, Ligang, 1992). These comparisons all suggest that China's trade pattern was more capital intensive than expected in the 1960s and 1970s but it has moved toward China's comparative advantage since the 1980s. However, no one has identified whether China over-produced and over-exported its agricultural goods or even capital intensive goods. The following discussions attempt to update the data and clarify these issues.

Table 6.5 compares China's export composition with the world as a whole in the period 1965-90. The figures indicate that an extremely land scarce country (Figure 6.2), China, had a relatively higher proportion of exports in agricultural products (including foods), and a lower proportion of manufacturing exports than the world average until 1989. In spite of the fact that the country's export share in agricultural exports (including food) declined over time, it was still well above the world average by 5-10 per cent in the early 1980s. Though China's textiles and clothing (TC) exports, an item of typical labour intensive manufacturing production in developing countries, were more important than the world average, as indicated in Table 6.6, it had been below most of the LDCs at a similar level of national income until the second half of the 1980s.

Table 6.5 The Comparison of Export Pattern, China and the World, 1965-90

		1965-69	1970-74	1975-79	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
China total exports	million $	1767	3350	8337	17480	20662	20631	20858	24626	27603	31864	42386	55111	66207	80100
World total exports	billion $	207	472	1127	1941	1888	1752	1692	1811	1795	1979	2315	2626	2841	3232
Agricultural exports															
China	million $	902	1544	2887	4422	4921	4644	4803	5440	5864	7018	7933	9634	9100	8955
	%	51.05	46.09	34.63	25.30	23.82	22.51	23.03	22.09	21.24	22.02	18.72	17.48	13.74	11.18
World	billion $	50	94	189	285	275	250	247	262	246	276	315	361	372	401
	%	24.15	19.92	16.77	14.68	14.57	14.27	14.60	14.47	13.70	13.95	13.61	13.75	13.09	12.41
of which: foods															
China	million $	699	1174	2155	3255	3850	3544	3558	3800	4056	5155	5455	6826	6416	6771
	%	39.56	35.04	25.85	18.62	18.63	17.18	17.06	15.43	14.69	16.18	12.87	12.39	9.69	8.45
World	billion $	35	68	142	214	212	194	190	200	187	211	234	265	274	305
	%	16.91	14.41	12.60	11.03	11.23	11.07	11.23	11.04	10.42	10.66	10.11	10.09	9.64	9.44
Manufacturing exports															
China	million $	769	1572	4020	8516	10435	10328	10869	12928	13817	19927	29056	39611	51598	64387
	%	43.52	46.93	48.22	48.72	50.50	50.06	52.11	52.50	50.06	62.54	68.55	71.87	77.93	80.38
World	billion $	123	286	673	1096	1088	1035	1044	1118	1154	1406	1674	1941	2101	2391
	%	59.42	60.59	59.72	56.47	57.63	59.08	61.70	61.73	64.29	71.05	72.31	73.91	73.95	73.98
of which: textiles and clothing															
China	million $	366	707	1904	4258	5238	5252	5922	7304	7554	10944	14764	17598	22451	26702
	%	20.71	21.10	22.84	24.36	25.35	25.46	28.39	29.66	27.37	34.35	34.83	31.93	33.91	33.34
World	billion $	14	31	66	105	104	98	113	110	112	143	176	189	206	239
	%	6.76	6.57	5.86	5.41	5.51	5.59	6.68	6.07	6.24	7.23	7.60	7.20	7.25	7.39

Sources: International Economic Data Bank, Australian National University, 1992.

Notes: The aggregations are defined as: agriculture (SITC 0+1+2-27-28+4), food: (STIC 0+1+22+4) manufactures (STIC 5+6-68+7+8+9), textiles and clothing: (STIC 64+84+85, including footwear).

Table 6.6 compares China's trade pattern with other large countries over a relatively long period from 1965 to 1990. Data are aggregated by five year average to remove annual fluctuations. Among the countries with similar income level, China appeared to have a relatively high proportion of agricultural exports in the early period (1965-84), relative to its natural endowment (Tables 6.1 and 6.2 and figure 6.2), and a relatively low proportion of labour intensive manufacturing exports such as TC, in contrast to Bangladesh, Pakistan and India but not Sri Lanka. For instance, China's share of agricultural exports in the first half of the 1970s was well above that in India, Bangladesh (by 10 per cent) and Pakistan (by 5 per cent). A similar trend can be found in the data of food. Note that China had a relatively larger share of fuels and mineral exports than other low income countries in the 1970s and the 1980s, therefore the importance of agricultural exports in China might be also more significant than in other countries, even when their shares of agricultural exports were similar.

In contrast to agriculture and food, the share of China's textile and clothing (include footwear) exports in the 1960s and the 1970s was well below that of Bangladesh, India and Pakistan, but not Sri Lanka's. TC share was more important in Bangladesh and Pakistan than in China for the whole period of 1965-90. India's share of TC export was higher than China in the period of 1965-74, but lower than China since the late 1970s.

Table 6.6 Export Patterns in Selected Countries (1965-90, US$m)

	Total Export		Agriculture		of which: food		Manufacture		of which TC	
	US$m	%	US$m	%	US$m	%	US$m	%	US$m	%
China										
1965-69	1767	100	902	51	699	40	769	44	366	21
1970-74	3350	100	1544	46	1174	35	1571	47	707	21
1975-79	8337	100	2887	35	2155	26	4020	48	1904	23
1980-84	20852	100	4846	23	2180	10	10615	51	5595	27
1985-89	44634	100	2712	6	2871	6	30802	69	14262	32
1990-	80110	100	8955	11	6771	8	64387	80	26702	33
Bangladesh										
1965-69										
1970-74	152	100	64	42	9	6	88	58	77	51
1975-79	455	100	165	36	53	12	287	63	225	49
1980-84	759	100	253	33	130	17	493	65	397	52
1985-89	1131	100	253	22	209	19	814	72	655	58
1990-	1528	100	231	15	198	13	1265	83	1094	72
India										
1965-69	1688	100	648	38	536	32	852	50	533	32
1970-74	2665	100	987	37	838	31	1414	53	725	27
1975-79	5764	100	2035	35	1833	32	3190	55	1192	21
1980-84	8620	100	2577	30	2339	27	4660	54	1781	21
1985-89	11623	100	2561	22	2256	19	7883	68	2903	25
1990-	14712	100	2303	16	1759	12	10894	74	4473	30
Pakistan										
1965-69	628	100	323	51	61	10	295	47	231	37
1970-74	815	100	334	41	171	21	463	57	360	44
1975-79	1362	100	525	39	391	29	776	57	579	43
1980-84	2658	100	1014	38	784	29	1560	59	1032	39
1985-89	3860	100	1187	31	544	14	3575	93	2128	55
1990-	4292	100	743	17	264	6	3498	82	2907	68
Sri Lanka										
1965-69	347	100	342	99	268	77	4	1	1	0
1970-74	381	100	343	90	253	66	21	6	3	1
1975-79	741	100	590	80	450	61	85	11	38	5
1980-84	1107	100	342	31	316	29	272	25	192	17
1985-89	1341	100	588	44	469	35	677	51	478	36
1990-	1640	100	408	25	321	20	1195	73	308	19

Sources: International Economic Data Bank, Australian National University

Notes: The classifications of each commodity groups are defined as:
Agriculture: SITC 0+1+21-27-28+4.
Food: STIC 0+1+22+4.
Manufactures: STIC 5+6+7+8+9-68.
TC: Textiles and Clothing: STIC 65+84+85, include footwear.

A similar result can be found in Table 6.7, where the indexes of revealed comparative advantages (RCA) in exports are reported in each commodity group. China's RCA appears to be higher in food production and lower in manufactures especially textile and clothing in the early period (1965-79), in comparison with other countries at a similar income level. On the other hand, China's RCA in TC exports was well below that of Bangladesh, India and Pakistan in the same period. The only exception is Sri Lanka, a country that was endowed with a similar arable land per head as China, but had a relatively high ratio of agricultural exports, especially food.[6] Nevertheless, both China and Sri Lanka experienced a radical change in their revealed comparative advantages. A clear trend of shift from the land intensive agricultural and food products to labour intensive textile and clothing products is easily found in the table. The question then is if, and how and to what extent China's international trade became rationalised after the reforms?

The comparison in export pattern between China and other large countries in the 1980s is shown in Table 6.8. Export data are further dis-aggregated to differentiate a capital intensive category, i.e., machinery and transport equipment, from other manufacturing products and labour intensive textiles and clothing. Both 1985 and 1990 data are reported. China as expected, had a larger share of the machinery and transport equipment in total national exports (6 % in 1985 but jumped to 17 % in 1990) than all the other low income Asian countries. China's share in 1985 was one and half of that in India, three times higher than in Pakistan and six times higher than in Sri Lanka. In

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6 As a tropical country, Sri Lanka had a tradition of exporting tropical food, which is not necessarily arable land intensive.

1990, the difference between China and other countries was further enlarged. In fact, China's export share in machinery and transport equipment was even higher than in Indonesia and Turkey and close to those of Thailand and Brazil, countries which had much higher levels of GNP per capita than China. However, China's export share of textiles and clothing was rather low, in contrast to Bangladesh and Pakistan in 1985 and 1990.

Table 6.8 includes two NIEs, South Korea and Taiwan, to show how rapid the changes were in China's capital intensive machinery and transport equipment exports. South Korea and Taiwan, economies with income levels more than ten times as high as in China, increased their shares of machinery and transport equipment exports by only 5 and 7 percentage points respectively over the period of 1985 to 1990 (Taiwan is from 1986 to 1990). In contrast the increase of the percentage points in the same item of exports in China was over 11 percentage points during the space of five years. Overall, there is only one country, Thailand, which was comparable to China's experience. [7]

It would be more appropriate if the export items are shown as "net" rather than "gross" terms. Song (1992), after comparing the net export pattern of 62 economies from the 1960s to 1980s by the so-called Leamer classification of the commodity groups, concluded that China and India ranked relatively high on a ladder of capital intensity by exporting both labour and capital intensive products (Leamer's classification) in 1965 and 1971, but China was a net exporter of labour intensive products in 1980 and 1988. The reversal of China's export pattern from exporting capital intensive goods to labour

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7 Thailand also used a very strong export promotion policy in the 1980s.

intensive goods, could be considered as rational when the vast market distortion in the pre-reform period is recognised.

Table 6.7 Revealed Comparative Advantage in Selected Countries (1965-90)

	Agriculture	of which: food	Manufacture	of which textiles & clothing
China				
1965-69	2.10	2.32	0.73	3.06
1970-74	2.31	2.42	0.77	3.22
1975-79	2.06	2.04	0.95	3.91
1980-84	1.60	1.63	0.84	4.60
1985-89	1.30	0.63	0.96	4.47
1990-	0.90	0.90	1.09	4.52
Bangladesh				
1965-69	2.88	...	1.35	11.83
1970-74	2.11	0.41	0.96	7.72
1975-79	2.16	0.92	1.24	8.46
1980-84	2.30	2.66	1.08	8.97
1985-89	1.65	1.83	1.00	8.10
1990-	1.22	1.37	1.12	9.70
India				
1965-69	1.58	1.86	0.85	4.67
1970-74	1.86	2.17	0.88	4.15
1975-79	2.10	2.51	1.09	3.54
1980-84	2.06	4.22	0.90	3.54
1985-89	1.62	1.92	0.95	3.49
1990-	1.26	1.27	1.00	4.12
Pakistan				
1965-69	2.12	0.57	0.79	5.44
1970-74	2.06	1.45	0.94	6.73
1975-79	2.29	2.26	1.12	7.27
1980-84	2.63	4.59	0.97	7.75
1985-89	2.26	1.39	1.29	7.71
1990-	1.39	0.65	1.10	9.18
Sri Lanka				
1965-69	4.05	4.53	0.02	0.02
1970-74	4.52	4.59	0.09	0.12
1975-79	4.74	4.79	0.23	0.88
1980-84	4.33	4.44	0.41	2.98
1985-89	3.23	3.45	0.71	4.99
1990-	2.00	2.08	0.98	2.54

Sources: International Economic Data Bank, Australian National University
Notes: The classifications of each commodity groups are defined as:
Agriculture: SITC 0+1+21-27-28+4.
Food: STIC 0+1+22+4.
Manufactures: STIC 5+6+7+8+9-68.
TC: Textile and Clothing: STIC 65+84+85, include footwear.

Table 6.8 The International Comparison of Export Patterns, 1985 & 1990

	Percentage share of merchandise exports (%)											
	fuels, minerals & metals		other primary commodities		machinery & transport equipment		other manufactures		of which: textile & clothing		GNP per capita	
	1985	1990	1985	1990	1985	1990	1985	1990	1985	1990	1985	1990
China	25	10	21	16	6	17	48	56	24	27	310	370
India	25	8	26	19	4	7	45	66	18	23	270	350
Bangladesh	3	1	32	25	0	1	65	72	55	60	150	210
Pakistan	2	1	35	29	2	0	61	70	45	58	380	380
Sri Lanka	10	6	63	47	1	1	26	47	21	34	380	470
Thailand	5	2	60	34	7	20	28	44	13	16	800	1420
Indonesia	75	48	14	16	1	1	10	34	2	11	530	570
Brazil	15	16	44	31	14	18	27	35	3	3	1640	2680
Turkey	10	7	36	25	5	7	49	61	32	37	1080	1630
South Korea	4	2	5	5	32	37	55	57	23	22	2150	5400
Taiwan	2	2	7	4	29	36	62	57	18	15	3993	7954
USA	8	6	17	16	48	47	27	31	2	2	16690	21790
Japan	1	1	1	1	62	66	36	32	3	2	11300	25430
Canada	22	19	17	18	40	37	21	26	1	1	13680	20470
Australia	44	34	36	29	5	6	15	30	1	1	10830	17000

Sources: World Bank: World Development Report, 1987:202:222-225, 1988:244. 1992:218-219:248-249. ZGTJNJ: 1992:831.
Note: Taiwan's data refer to 1986 and 1990, respectively.

Table 6.9 compares the changes in net export pattern among the group of low income Asian developing countries in the period of 1965-90, by using the net export ratios (NERs), defined as the ratio of net export of a commodity group, divided by the sum of trade (exports plus imports) in this group. Among the five countries of the low income group, China was the only one that kept a substantial positive trade balance and became a net exporter of manufactures in the later 1980s and 1990. For most of the years, China's NERs were higher in agricultural and food exports than those in Bangladesh, India and Pakistan but similar to Sri Lanka. When Bangladesh and Pakistan had a substantial deficit in agricultural and food trade, China was a net exporter of those products. In contrast, India and Pakistan had relatively higher NERs in textile and clothing exports than those in China, especially in the 1980s.

As indicated by the table, China as well as Sri Lanka, has been a net exporter of agricultural products for decades. However, the importance of net exports in agricultural products declined in Sri Lanka, as the values of their NERs dropped sharply over time. In the case of China, the NERs in both agricultural goods and foods fluctuated over time, but remained at more than a value of 0.15 over time with only the one exception of 1980-84 in agricultural exports.

Table 6.9 Net Export Pattern in Selected Countries (1965-90)

	Agriculture	of which: food	Manufacture	of which textiles & clothing
China				
1965-69	0.20	0.31	0.05	0.82
1970-74	0.19	0.32	-0.04	0.82
1975-79	0.16	0.26	-0.11	0.84
1980-84	0.00	0.24	-0.02	0.64
1985-89	0.30	0.22	0.01	0.65
1990-	0.24	0.33	0.27	0.66
Bangladesh				
1965-69		...		
1970-74	-0.55	-0.94	-0.25	0.57
1975-79	-0.45	-0.78	-0.31	0.64
1980-84	-0.37	-0.54	-0.35	0.62
1985-89	-0.43	-0.48	-0.23	0.47
1990-	-0.34	-0.34	-0.13	0.50
India				
1965-69	-0.16	-0.14	-0.24	0.95
1970-74	0.17	0.23	-0.05	0.97
1975-79	0.14	0.21	0.01	0.95
1980-84	0.20	0.24	-0.18	0.89
1985-89	0.16	0.22	-0.18	0.89
1990-	0.40	0.56	-0.12	0.91
Pakistan				
1965-69	0.23	-0.48	-0.42	0.86
1970-74	0.05	-0.20	-0.17	0.87
1975-79	-0.12	-0.18	-0.34	0.69
1980-84	-0.02	-0.10	-0.28	0.75
1985-89	-0.05	-0.32	-0.13	0.83
1990-	-0.40	-0.40	-0.09	0.91
Sri Lanka				
1965-69	0.33	0.24	-0.95	-0.97
1970-74	0.22	0.10	-0.78	-0.77
1975-79	0.30	0.21	-0.64	-0.25
1980-84	0.38	0.26	-0.57	0.13
1985-89	0.24	0.17	-0.29	0.25
1990-	0.13	0.04	-0.07	0.42

Sources: International Economic Data Bank, Australian National University

Notes: The classifications of each commodity groups are defined as:
Agriculture: SITC 0+1+21-27-28+4.
Food: STIC 0+1+22+4.
Manufactures: STIC 5+6+7+8+9-68.
TC: Textile and Clothing: STIC 65+84+85, include footwear.

6.4 Summary

In summary, several conclusions can be drawn from the comparisons:

First, China's manufacturing production appears to be relatively capital intensive when both factor markets and commodity markets were distorted. In this circumstance, China had to exploit all the potential of its agricultural production and export its disadvantaged agricultural products in order to import capital intensive machinery and equipment (producing materials) to procure a heavy industrialised development strategy.

Second, as a result China's export pattern was biased toward agricultural products, in comparison to other developing countries at the similar income level. If the export pattern of other developing countries was rational, China's agricultural goods were over-produced and over-exported.

Third, when the economy was eventually liberalised and internationally integrated, labour intensive exports overtook agricultural exports to be the most significant national export items, and this induced a radical change in the industrial structure and the composition of production and trade. However, the dual feature in China's production and employment (Chapter 5) also applied in its international trade. While China shared some characteristics of the standard export pattern of LDCs at their early stage of development (e.g., exporting traditional labour intensive products such as textiles and clothing), it was also distinct from these LDCs in producing and exporting a relatively large share of its capital intensive exports such as machinery and transport equipment. These events indicate that trade reversals may exist in China.

The reversal between capital intensive manufactures and labour intensive manufactures is generally confirmed by comparing the relative importance of the typical capital intensive products such as machinery and transport equipment and typical labour intensive products such as textiles and clothing. This conclusion is qualified when one of the following rebuttable arguments is held: [1] China's GDP per capita is under-estimated by 5-10 times in 1990; [2] machinery and transport equipment are not capital intensive products; and/or [3] factor intensity reversals broadly exist in most of the manufactures, include machinery and transport equipment.

CHAPTER SEVEN

DUALISM

The dualism of China's international trade may be attributable to the dualism of China's production. This in turn is determined by China's specific features of reform (partial and evolutionary) and its market distortions such as the RUMR and the price scissors (Chapter 4). As suggested in the theoretical analysis in Chapter 5, the urban enterprises will be more capital intensive and rural industry more labour intensive, therefore they may produce and export different products in terms of factor intensities. This chapter is used to confirm these hypotheses.

Identifying the factor intensity of exports in each sector is critical to explain the changes in China's export pattern in the 1980s. As shown by Figures 1.2 and 3.2, China's manufacturing exports increased dramatically and this change was mainly created by the increases in labour intensive exports. Paradoxically, it is also shown in Chapter 3 that China's industrial structure of above the village level has become more capital intensive over the decade. These events seem to suggest that when China's industries were upgraded by capital intensity, more labour intensive products were exported. This paradox can neither be explained by a huge increase of domestic demand (could China

demand more domestically produced capital intensive goods rather than labour intensive goods in the post-reform era?), nor merely by the changes in foreign trade policy. This is because the foreign trade policy may affect export pattern by first changing domestic production structure, it is then possible to convert those tradeables into exports. A product should be produced before it is exported, therefore the production conditions, rather than trade policies, determine an economy's changes of export pattern. In other words, strategic change in foreign trade policy from import substitution to export promotion provides a necessary condition for change in China's industrialisation path and trade pattern, but it is not a sufficient condition for this change.

However, a structural change might occur outside the region of the government planing and official statistics. A quiet, peaceful and dramatic industrial revolution was evolved in the countryside. This revolution had been ignored till the second half of the 1980s. By then the rural enterprises accounted for more than half of the output value in rural society and about one third of the national industrial gross outputs. The outward orientation of rural enterprises surprised not only the government bureaucrats but also foreign observers. One fourth of the national exports was coming from the rural enterprises in the late 1980s. These so-called "peasant entrepreneurs', who had not much knowledge of international markets, lacked productive capital, had no financial support from above and sometimes had to pay extra money to the government bureaucracy in order to sell their products, had beaten the well-equipped and well-organised cadres in the state-owned enterprises. This chapter shows how these peasant entrepreneurs could make such a success and the consequential contribution they made to China's industrial structure and export pattern.

Section 7.1 discusses the divergences in factor marginal productivity between state owned enterprises (SOEs) and rural township and village enterprises (TVEs). Section 7.2 attempts to validate the divergence in factor intensity between the SOEs and the TVEs. Section 7.3 compares the industrial structure in the two sectors, on the basis of the industry classification introduced in Chapter 2. Section 7.4 discusses the importance of the emergence of rural enterprises in China's foreign trade and Section 7.5 identifies the dualism in China's manufacturing exports in terms of factor intensity divergence by comparing the export composition of the urban and rural sector. The origins of rapid manufacturing export growth are also discussed.

7.1 Divergence in Factor Productivity

A fundamental prediction of the basic model is that given the RUMR and the imperfection of China's capital mobility, divergences in marginal productivity of the factors (labour and capital) between the urban and rural manufacturing sectors exist, regardless of the average productivity level in each sector. This hypothesis can be tested by the regression of a simple production model, based on the methodology of Jefferson (1989).

The production technology is assumed to be Cobb-Douglas and displays constant return to scale. In log-linear form:

$$[1] \qquad \ln Q_{it} = \ln a_{it} + e_k \ln K_{it} + e_l \ln L_{it} + U_{it} \qquad i=u,r$$

where Q_{it}, K_{it} and L_{it} denote the quantity of net output (value added in our case), net fixed capital stock and labour inputs in sector i (i=u, r, represents urban and rural sector, respectively) at year t, respectively, e_k is the output elasticity of capital and e_l is the output elasticity of labour. Constant return to scale ensures that $e_k + e_l = 1$. If other factors such as economies of scale and agglomeration also affect the economic efficiencies between sectors, they appear in the efficiency variable, a_{it}, which is in turn equal to

$$[2] \quad \ln a_{it} = \ln a_{it0} + e_q Q_{it}, + e_n KN_{it} + V_{it}$$

Equation [2] specifies that the level of efficiency or multi-factor productivity of each sector, $\ln a_{it}$, depends on the scale of its own net output, Q_{it}, and upon the average size of the capital agglomeration, KN_{it}, represented by the average fixed capital stock per enterprise, and that e_q and e_n is the elasticity of each factor, respectively.

Rearranged to solve Q/L, the labour productivity variable, gives

$$[3] \quad \ln(Q/L)_{it} = \ln a_{it0} + e_k(K/L)_{it} + e_q Q_{it}, + e_n KN_{it} + Z$$

where Z is the error term.

Estimating [3] to get e_k and hence e_l, the values of the marginal product of capital (VMP_k) and labour (VMP_l) can be calculated from the expressions:

$$[4] \quad VMP_k = e_k (Q/K)$$

$$[5] \quad VMP_l = e_l (Q/L)$$

where $e_l = 1 - e_k$

Using China's official data of the state-owned enterprises (SOEs) and township and village enterprises (TVEs) over the period of 1978-1989, the following results were obtained from the ordinary least square (OLS) regressions of [3] and by calculations [4] and [5] and are summarised in Table 7.1. The average fixed capital stock per rural enterprise, KN_{rt}, was negligible in the 1980s, hence it was omitted from the regression of the TVEs.

Table 7.1 The Comparison of Factor Productivities between SOEs and TVEs

	State-owned Enterprises	Township and Village Enterprises
$\ln a_{i0}$	-1.786 (-2.0441)	0.5404 (3.705)
e_k	0.4439 (2.31)	0.2918 (4.783)
e_l	0.5561	0.7082
e_q	0.7041 (10.22)	0.4168 (8.553)
e_n	-0.3924 (-2.116)	
VMP_k	21.06	25.50
VMP_l	24.37	9.20
R^2	0.9949	0.9968
DW	1.7222	2.0040

Source: ZGTJNJ, 1981-91, Zhang Xiaohe (1992a:92)
Note: T-ratios are reported in the brackets.

The table shows that the VMP_k in TVEs is higher than that in the SOEs, while the VMP_l in TVEs is just the opposite, only 38 per cent of that in the SOEs. The economic efficiency indicator, lna_{i0}, is also higher in TVEs than in the SOEs. The prediction is thus confirmed. This is consistent with Jefferson's (1989) comparison between state-owned enterprises and all collective enterprises in 1984, using a similar cross section regression model. The results also imply that the capital share (e_k) in the SOEs is higher than that in the TVEs.

7.2 The Divergence in Factor Intensity

When factor marginal productivity differs between sectors, factor reward may also differ, since profit maximising behaviour requires that the factor reward equals factor marginal productivity. As discussed in Chapter 5, when factor reward differs, each sector uses its relatively abundant factor (cheaper factor) more intensively. Given that China's urban sector is more capital abundant and the rural sector is more labour abundant, one may expect that the urban industries tend to be more capital intensive than the rural enterprises.

As discussed in Chapter 2, factor intensity can be represented by many indicators. Here four of them have been used, namely, fixed capital per worker (FK/worker), a skill ratio, value added per worker (VA/worker) and the ratio of the wage bill to value added (WB/VA). Table 7.2 shows the comparison between SOEs and the TVEs over the period 1978-1990. The last three columns of the table indicate that the TVEs, though growing relatively more

rapidly than the state enterprises in these three indicators of capital intensity, were largely less capital intensive than the SOEs.[1]

The branch level of each industry in the rural sector is also expected to be more labour intensive than that of the urban sector. Here the six largest of 37 rural industrial branches are chosen as the sample. According to the 1985 industrial census, these six branches accounted for about 60 per cent of the total output value and employment of township enterprises in 1985, so they are representative. Table 7.3 shows the comparison of these branches between urban industries and township enterprises in 1985.[2]

The results of Tables 7.2 and 7.3 are consistent with the predictions. For example, almost all indicators show that the rural industries are more labour intensive than their urban counterparts.

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1 The data of total employees in the state owned enterprises in figure 7.2 include all staff in the state sector. This data obviously disguised the capital intensity of the sector since a large part of the employee total is in government administration, education and scientific research institutions. These activities are very labour intensive but they are also non-productive by Chinese standards.

2 Due to the lack of statistics in village-run and private enterprises, only township enterprises are reported in Table 7.3. It is obvious that if the village and private enterprises are included, the rural enterprises could be more labour intensive than displayed in these tables.

Table 7.2 Factor Intensities in SOEs and REs in Industry Sector, 1978-91

1. State Owned Enterprises

	FK billion Y	employees Million Y	total wage Million Y	value added Million Y	FK/worker RMB Y	VA/worker RMB Y	WB/VA %
1978	449	74.51	46870	153345	6026	2058	30.57
1979	489	76.93	52950	159381	6356	2072	33.22
1980	531	80.19	62790	167946	6622	2094	37.39
1981	577	83.92	66040	171119	6876	2039	38.59
1982	626	96.30	70890	177918	6501	1848	39.84
1983	683	87.71	74810	189920	7787	2165	39.39
1984	737	96.37	87580		7648		
1985	800	89.90	106480		8899		
1986	904	93.33	128850		9686		
1987	1020	96.54	145930		10566		
1988	1179	99.84	180710		11809		
1989	1339	101.08	205020		13247		
1990	1535	103.46	232410		14837		
1991		106.64	259490				

2. Township and Village Enterprises

1978	23	28.26	8600	19670	814	696	43.72
1979	28	29.09	10380	23090	963	794	44.95
1980	33	30.00	11940	26350	1100	878	45.31
1981	38	29.70	13060	27770	1279	935	47.03
1982	38	31.13	15330	31350	1221	1007	48.90
1983	43	32.34	17580	35250	1330	1090	49.87
1984	48	38.48	23930	44710	1247	1162	53.52
1985	58	41.52	30140	58130	1397	1400	51.85
1986	75	43.92	35551	65428	1708	1490	54.34
1987	123	47.02	42768	78351	2616	1666	54.59
1988	158	48.93	54120	103690	3229	2119	52.19
1989	192	47.20	58070	109330	4068	2316	53.11
1990	220	45.92	60680	111500	4791	2428	54.42
1991	263	47.67	70650	132500	5517	2780	53.32

Sources: ZGTJNJ, various volumes and years, mainly, 1992:27:107:124:389:391.
Editorial Board of Research Materials for Economists, 1986:973..

Notes: FK: Fixed Assets, original value.
FK/worker: Fixed assets per worker.
VA/worker: Value added per worker.
Value added is defined as the sum of profit, taxes and total wage bill.
WB/VA: The ratio of wage bill to value added.

Table 7.3 Relative Rural-Urban Factor Intensities by Industrial Branches, China, 1985

Branches	Factor Intensity Classification	FK/worker RMB Y	Skill Ratio per 100	TK/worker RMB Y	VA/worker RMB Y	WB/VA %
Rural total		3099	0.64	5010	2267	34.69
building materials & others	L	3106	0.51	4200	1914	40.93
machine building	H	3787	1.17	6709	3109	29.42
textile manufacture	L	2724	0.39	5269	2331	29.25
metal products	L	3204	0.85	5409	2436	33.85
coal mining & preparation	N	2385	0.65	3023	2189	50.77
clothing	L	1148	0.45	3076	1658	42.23
Urban total		12352	2.84	14040	5321	21.27
building materials & others	L	8130	1.15	2980	3388	30.21
machine building	H	9891	4.80	12730	4158	27.44
textile manufacture	L	6761	1.48	3437	4297	23.74
metal products	L	4916	1.56	7624	3516	29.71
coal mining & preparation	N	12600	1.62	19099	2436	56.65
clothing	L	2465	0.47	5947	2997	29.94
Rural/urban Ratio (%)						
Rural/urban in all industries		25.09	22.54	35.68	42.60	163.09
building materials & others	L	38.20	44.35	140.94	56.49	135.48
machine building	H	38.29	24.38	52.70	74.77	107.22
textile manufacture	L	40.29	26.35	153.30	54.25	123.21
metal products	L	65.17	54.49	70.95	69.28	113.93
coal mining & preparation	N	18.93	40.12	15.83	89.86	89.62
clothing	L	46.57	95.74	51.72	55.32	141.05

Sources: ZGTJNJ, various volumes and years. ZGGYPCZL, 1988, ZGGYPCZL, 1988, Vol.3:164:1132, Vol.7:118:174:178, Vol.8:2:428:954. ZGGYJJTJZL, 1986:77, 1987:2265:124.

Notes: VA/worker: Value added per worker. Value added is defined as the sum of profit, taxes and total wage bill in township enterprises. TK/worker: Total capital per worker. FK/worker: original fixed assets per worker. WB/VA: The ratio of wage bill to value added. Rural: township enterprises. Urban: derived from the national total minus township enterprises. The branches are classified as: labour intensive (L), human capital intensive (H) and natural resource intensive (N). See Chapter 2.

7.3 The Divergence in Industrial Structure

The divergence in factor intensity between sectors will create different industrial structures in the two sectors. Using the industry classification established in Chapter 2, a comparison of the industrial structures in gross output value (GOV) between the urban sector and the TVEs in terms of different factor intensity groups for the period of 1985-91 is presented in Table 7.4. and Figures 7.1 and 7.2.

Table 7.4 Industrial Structure between Urban and Rural Industries (1980-91)

Year	1980	1985	1986	1987	1988	1989	1990	1991
Urban Sector								
natural resource	8.61	7.47	7.34	7.26	6.70	6.93	7.23	7.19
labour intensive	42.73	39.70	40.87	40.17	38.51	37.31	37.69	36.54
human capital intensive	20.79	25.37	23.83	24.40	26.09	25.37	23.43	24.61
physical capital intensive	28.47	27.46	27.95	28.17	28.70	30.40	31.64	31.66
sub-total								
labour intensive	42.73	39.70	40.87	40.17	38.51	37.31	37.69	36.54
capital intensive	49.26	52.82	51.78	52.57	54.79	55.76	55.08	56.27
Rural Sector								
natural resource	9.95	7.16	7.30	6.59	6.26	7.18	6.86	6.39
labour intensive	61.35	61.90	65.68	65.29	63.81	62.17	63.68	62.76
human capital intensive	21.90	22.31	18.77	19.22	19.10	19.03	17.56	18.68
physical capital intensive	6.80	8.63	8.25	8.90	10.82	11.62	11.91	12.18
sub-total								
labour intensive	61.35	61.90	65.68	65.29	63.81	62.17	63.68	62.76
capital intensive	28.70	30.94	27.02	28.11	29.92	30.65	29.47	30.85

Sources: ZGTJNJ, 1986-91, ZGGYJJTJZL, 1986-87, ZGGYJJTJNJ, 1988-91.
Notes: Rural industries include TVEs only. 1980 data are township enterprises only.
Data of urban industry are derived by netting out township industries from the national data.

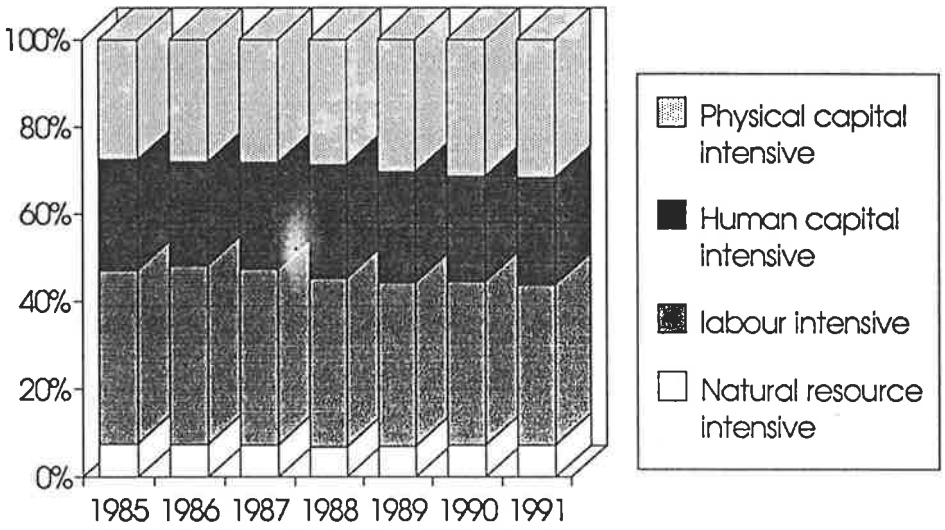

Figure 7.1 China's Urban Industrial Structure (1985-91)

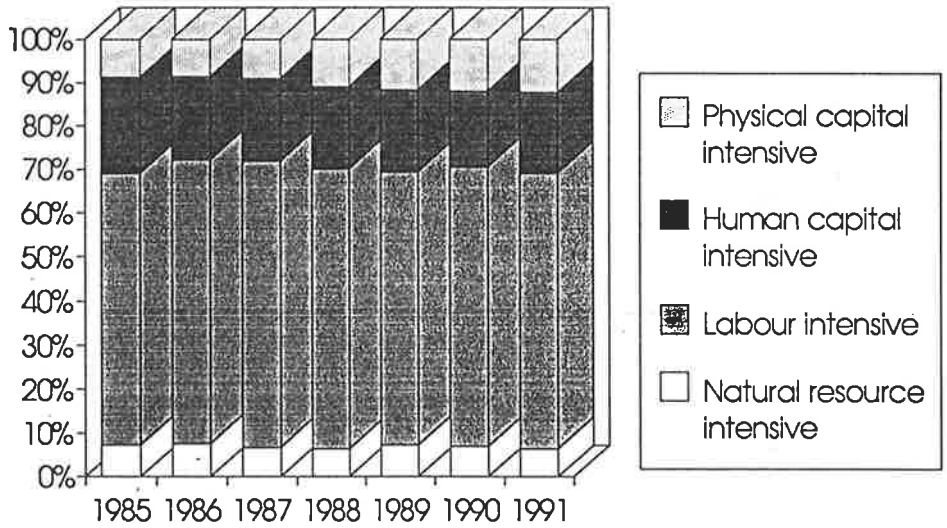

Figure 7.2 China's TVEs Industrial Structure (1985-91)

Table 7.4 indicates that the industrial structure of TVEs is more labour intensive than that of the urban sector. For example, the ratio of labour intensive products to capital intensive products was 63:31 for TVEs in 1991, while the same ratio was approximately the opposite (37:56) for urban industries. Similar results can be found in the data of other years as well.

Another point of Table 7.4 that needs to be noted is that only the TVEs are included in the figures of rural enterprises. According to Chinese statistics, TVEs only accounted for 8 per cent of the number of enterprises, 50 per cent of employment, and 65 per cent of GOV in total rural enterprises in 1989 (ZGXZQYNJ, 1990:121). Owing to lack of access to a formal capital allocation regime, the rural private enterprises were usually constrained with only limited capital stock and production scale. Should these enterprises be included, the rural share will be more labour intensive.

The two sectors are not only distinct in structure, but also different in the changes of this structure over time. Careful examination of the data reveals that the share of the capital intensive (the sum of physical capital intensive and human capital intensive industries) industries was relatively stable in the rural sector (around 30 per cent) while it expanded by 7 per cent in the urban sector over the decade. A clear trend of a declining share in labour intensive industries and an increasing share in capital intensive industries in the urban sector is evident through the period of 1980 to 1991. The share of capital intensive industries increased from 49 per cent in 1980 to 56 per cent in 1991, while the share of labour intensive industries declined from 43 per cent to 37 per cent. As revealed by a detailed examination of industrial branches data in Table 7.5, the expansion of capital intensive industries was created by increasing the share of

electrical equipment and machinery, medical and pharmaceutical goods, electronic and telecommunication equipment, transportation equipment, animal feed, chemical fibre and tobacco industries in the urban sector. In labour intensive industries, the decline of the clothing, furniture, textiles, rubber and food manufacture industries was the most significant.

The structure in the rural enterprises was relatively stable. Table 7.6, parallel to Table 7.5, shows the GOV of each industrial branch in the rural sector. While labour intensive industries as a whole remained quite stable, the most labour intensive one, clothing, expanded rapidly. In contrast to the urban sector, the shares of human capital intensive industries in the rural sector declined in the second half of the 1980s. This may reflect the extreme shortage of the human capital stocks in this sector. The industry which contracted most sharply in its share is the machine building industry. Its share declined from 12.5 per cent in 1985 to only 10 per cent in 1991. However, physical capital intensive industries expanded in the rural sector by more than 3 per cent from 1985 to 1991. In this expanding group the chemical industry in rural sector increased from 3.89 to 5.92 per cent between 1985 and 1991.

Table 7.5 China's Urban Industrial Structure, 1980-91

Classification	1980	1985	1986	1987	1988	1989	1990	1991
1. NRI	**8.01**	**7.47**	**7.34**	**7.26**	**6.70**	**6.93**	**7.23**	**7.19**
OTHERMINE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MINBUID	0.27	0.24	0.25	0.26	0.24	0.27	0.28	0.26
TIMBER	0.86	0.72	0.83	0.90	0.81	0.68	0.56	0.52
SALT	0.38	0.23	0.25	0.22	0.22	0.25	0.21	0.20
COAL	2.80	2.55	2.37	2.15	2.12	2.31	2.44	2.38
FERMETAL	0.18	0.20	0.19	0.18	0.16	0.15	0.17	0.18
NONFEMET	0.45	0.44	0.47	0.49	0.47	0.52	0.54	0.51
COKING	0.32	0.32	0.35	0.29	0.30	0.33	0.38	0.39
PETROLUME	2.75	2.79	2.63	2.77	2.39	2.42	2.65	2.74
2. LI	**42.73**	**39.70**	**40.87**	**40.17**	**38.51**	**37.31**	**37.69**	**36.54**
CLOTHING	2.27	1.97	1.86	1.82	1.72	1.75	1.86	1.95
ARTS	0.72	0.88	0.75	0.78	0.81	0.84	0.84	0.81
FURNITURE	0.45	0.50	0.49	0.50	0.46	0.41	0.37	0.34
LEATHER	1.06	0.97	1.00	0.97	0.93	0.91	0.91	0.98
CULTURAL	0.47	0.44	0.47	0.50	0.43	0.40	0.43	0.47
METAL	2.38	2.42	2.57	2.57	2.34	2.39	2.31	2.29
TIMPRO	0.61	0.63	0.71	0.75	0.62	0.54	0.46	0.46
PLASTIC	1.35	1.54	1.57	1.65	2.02	1.26	1.64	1.76
PRINTING	1.02	1.02	1.11	1.10	0.99	0.95	0.97	1.03
BULDMAT	3.53	3.93	4.65	4.49	3.91	3.97	3.70	3.75
TEXTILES	15.15	12.41	11.87	11.40	11.27	11.65	11.55	10.69
RUBBER	1.94	1.72	1.61	1.48	1.48	1.00	1.59	1.15
FOODMA	8.52	7.72	8.58	8.16	7.34	7.16	6.93	6.85
BEVERAGE	1.42	1.75	1.83	2.07	2.11	1.96	2.11	2.17
PAPER	1.85	1.80	1.81	1.94	2.09	2.10	2.01	1.84
3. HKI	**20.79**	**25.37**	**23.83**	**24.40**	**26.09**	**25.37**	**23.43**	**24.61**
ELETRICMA	3.24	4.15	4.19	4.07	4.55	4.91	4.19	4.04
INSTRUME	0.87	0.86	0.79	0.74	0.74	0.70	0.63	0.59
MACHINE	9.71	11.00	10.54	10.62	10.67	10.03	8.94	9.06
MEDICAL	1.53	1.61	1.76	1.94	2.19	2.06	2.11	2.25
ELECTRONIC	1.67	3.06	2.62	3.05	3.71	3.48	3.43	3.85
TRANSPORT	3.76	4.70	3.93	3.98	4.24	4.19	4.14	4.84
4. PKI	**28.47**	**27.46**	**27.95**	**28.17**	**28.70**	**30.40**	**31.64**	**31.66**
ANIMALFD	0.04	0.30	0.39	0.45	0.63	0.70	0.69	0.73
TOBACCO	1.92	2.62	2.57	2.66	2.90	3.00	3.18	2.91
CHEMICAL	7.73	6.97	6.91	7.41	7.81	8.34	8.32	7.58
SMELTFER	6.99	6.82	7.29	7.08	6.95	7.18	7.59	7.71
SMELTNON	2.75	2.45	2.55	2.47	2.48	2.82	2.84	2.72
CHEMIFIB	0.75	1.00	1.09	1.17	1.28	1.47	1.57	1.59
RUNWATER	0.24	0.25	0.25	0.24	0.24	0.23	0.27	0.33
PETROPRO	3.77	3.30	3.39	3.23	3.06	3.01	3.07	3.76
POWER	4.27	3.75	3.52	3.48	3.34	3.64	4.12	4.33
TOTAL	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Sources: Zhang (1991a), ZGGYJJTJZL, 1986:97, ZGGYJJTJNJ, 1988:327, 1990:403, 1991:397.1992:435-6.
Notes: See Appendix 1, Table A1 for the abbreviations of the industries. The item of "other industry" is not included due to incomplete data and the shares are calculated based on current prices.

Table 7.6 China's Township and Village Industrial Structure, 1980-91

Classification	1980	1985	1986	1987	1988	1989	1990	1991
1. NRI	**9.95**	**7.16**	**7.30**	**6.59**	**6.26**	**7.18**	**6.86**	**6.39**
OTHERMINE	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.03
MINBUID	3.55	2.21	3.05	2.85	2.60	2.71	2.63	2.44
TIMBER	0.08	0.10	0.00	0.16	0.17	0.14	0.13	0.13
SALT	0.42	0.15	0.14	0.09	0.12	0.14	0.12	0.13
COAL	4.78	3.76	3.17	2.46	2.25	2.85	2.60	2.34
FERMETAL	0.34	0.30	0.34	0.35	0.34	0.32	0.37	0.42
NONFEMET	0.57	0.47	0.40	0.44	0.50	0.58	0.53	0.48
COKING	0.20	0.16	0.19	0.23	0.28	0.41	0.47	0.43
PETROLUME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. LI	**61.35**	**61.90**	**65.68**	**65.29**	**63.81**	**62.17**	**63.68**	**62.76**
CLOTHING	2.52	2.91	3.48	3.58	3.47	3.91	4.33	4.59
ARTS	1.85	1.65	1.98	2.14	2.02	2.08	2.19	2.19
FURNITURE	1.36	1.32	1.22	1.25	1.18	1.11	1.04	1.01
LEATHER	1.18	1.34	1.76	1.83	1.81	1.81	1.99	2.13
CULTURAL	0.39	0.48	0.67	0.79	0.70	0.72	0.78	0.87
METAL	8.60	6.87	6.98	7.27	6.83	7.03	6.77	6.75
TIMPRO	1.56	1.13	1.46	1.37	1.35	1.37	1.34	1.31
PLASTIC	2.70	3.21	3.76	3.88	4.10	3.88	3.79	3.86
PRINTING	0.71	0.72	1.00	0.99	0.93	0.93	0.95	1.02
BULDMAT	20.11	17.40	17.28	16.00	15.75	15.92	13.97	13.02
TEXTILES	9.83	14.36	14.08	14.03	13.35	10.56	13.88	13.52
RUBBER	0.74	0.81	0.89	0.92	1.00	1.07	1.05	1.07
FOODMA	5.70	5.33	6.70	6.67	6.77	6.92	7.12	7.03
BEVERAGE	1.80	2.16	1.82	1.85	1.84	1.97	1.57	1.52
PAPER	2.30	2.22	2.61	2.72	2.72	2.90	2.90	2.85
3. HKI	**21.90**	**22.31**	**18.77**	**19.22**	**19.10**	**19.03**	**17.56**	**18.68**
ELETRICMA	3.33	5.10	4.01	4.04	4.10	4.50	4.05	4.26
INSTRUME	0.47	0.50	0.41	0.42	0.39	0.39	0.35	0.60
MACHINE	15.16	12.50	11.69	11.53	11.23	10.79	9.89	10.01
MEDICAL	0.50	0.47	0.18	0.41	0.49	0.49	0.51	0.73
ELECTRONIC	0.51	1.17	1.07	1.29	1.26	1.20	1.18	1.22
TRANSPORT	1.94	2.57	1.41	1.54	1.63	1.66	1.58	1.85
4. PKI	**6.80**	**8.63**	**8.25**	**8.90**	**10.82**	**11.62**	**11.91**	**12.18**
ANIMALFD	0.07	0.20	0.46	0.38	0.51	0.49	0.53	0.57
TOBACCO	0.05	0.02	0.02	0.02	0.01	0.01	0.01	0.01
CHEMICAL	4.17	3.89	3.92	4.31	5.19	5.51	5.70	5.92
SMELTFER	1.07	2.35	1.88	1.92	2.48	2.72	2.67	2.65
SMELTNON	0.52	1.12	1.29	1.37	1.73	1.88	1.83	1.80
CHEMIFIB	0.10	0.36	0.37	0.37	0.36	0.39	0.48	0.57
RUNWATER	0.01	0.04	0.01	0.04	0.05	0.05	0.06	0.07
PETROPRO	0.14	0.14	0.06	0.22	0.21	0.24	0.28	0.26
POWER	0.66	0.51	0.24	0.27	0.28	0.33	0.36	0.32
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Sources: Zhang (1991a), ZGGYJJTJZL, 1986:97, ZGGYJJTJNJ, 1988:327, 1990:403, 1991:397.1992:435-6.
Notes: See Appendix 1, Table A1 for the abbreviations of the industries. The item of "other industry" is not included due to incomplete data and the shares are calculated based on current prices.

These events may reflect two simultaneously developed forces: [1] rapid capital accumulation resulting from economic growth may permit each sector to upgrade their capital intensity over time; [2] as explained in Chapter 5, price distortions became effective and dominant in the late 1980s. Recalling that China's chemical industry is protected (Chapter 4), then this adjustment is likely the result of price distortions. Other expanding capital intensive industrial branches include chemical fibres, smelting and pressing of metals, and animal feed industries in both sectors.

In Chapter 3 a paradox in China's production (Table 3.3) is shown in terms of the increase in capital intensive industries. However, since the data in Table 3.3 excluded the village enterprises, that result may be biased. A proper evaluation of the national industrial structure should include all industries in the country. Table 7.7 is created by adding the data in village industries into Table 3.3 to show a more comprehensive picture of the industrial structure for the period of 1985-91. The table reveals that when the data of village enterprises are included, the bias toward capital intensive industries is removed and industrial structure becomes very stable over time. This indicates that the development of rural enterprises alleviated the bias and improved the country industrial structure in terms of allocative efficiency.

Table 7.7 China's National Industrial Structure, 1985-91

Industries	1985	1986	1987	1988	1989	1990	1991
1. NRI	7.41	7.29	7.03	6.49	6.90	7.03	6.82
2. LI	44.38	46.40	46.25	45.81	44.67	45.61	44.92
3. HKI	24.72	22.80	23.27	24.15	23.51	21.70	22.79
4. PKI	23.49	23.51	23.45	23.55	24.92	25.66	25.46
sub-total							
KI	48.21	46.31	46.72	47.70	48.43	47.36	48.25
LI	44.38	46.40	46.25	45.81	44.67	45.61	44.92
TOTAL	100	100	100	100	100	100	100

Sources: Zhang (1991a), ZGGYJJTJZL, 1986:97, 1988:327, 1990:403, 1991:397.1992:435-6.

Notes:
NRI: Natural resource intensive products
LI: Labour intensive products
HKI: Human capital intensive products
PKI: Physical capital intensive products
KI: Capital intensive products, the sum of HKI and PKI.

7.4 International Orientation and Growth

One of the predictions in Chapter 5 refers to the potential competitiveness of rural enterprises and hence their strong international trade orientation in labour intensive products. The dramatic increase of the importance of rural enterprises in foreign trade gives us a hint as to the competitiveness of rural enterprises. The export volume of China's rural enterprises has expanded from US$ 1.3 billion accounting for 4.8 per cent of China's total exports in 1985 to US$20 billion in 1992, which accounted for 24 per cent of China's total (*People's Daily*, 13 January 1993:2). The three top exported commodities were clothing, arts and crafts, and light manufactures, which accounted for 72 per cent, 45 per

cent and 28 per cent of China's total, respectively in 1990 (*People's Daily*, 15 May, 1991, P.2).

Thanks to low labour costs, rural enterprises can compete internationally with the SOEs. It is reported that the foreign exchange earnings for each unit of RMB yuan expenditure in the rural enterprises were US$0.81, which were much higher than those in the SOEs (US$0.5-0.6). The cost of earning foreign exchange in rural enterprises was 5-30% lower than that in the SOEs. The recycling period of investment for rural exporting enterprises was 6-12 months shorter than that in the SOEs in 1988 (*People's Daily*, 1 December, 1988). These figures indicate that the rural enterprises are more competitive than the SOEs.

It is reported that during the period 1986-1990 (the so called Seventh Five-year Plan), China's rural industries occupied 31.5 per cent of the increase in social output value, 37.7 per cent of the increase in industrial output, 67 per cent of the increase in rural social output value, 57 per cent of the increase in employment and 28 per cent of the increase in foreign exchange earnings (*People's Daily*, 13 January, 1991). The industrial output value of China's rural enterprises accounts for about one third of the country's total industrial output. During the decade of the 1980s, the annual growth rate of rural enterprises' output value was no less than 25 per cent in constant prices. Table 7.8 shows the growth of rural industries in terms of gross output value, employment and the ratios of the TVEs to the SOEs from 1978 to 1991 in the industry sector.[3]

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3 Since consistent and comparable statistics between rural enterprises and SOEs are limited due to different accounting regimes used in the two sectors, the direct comparison of GOV, NOV (or VA) or even number of enterprises between the two

The figures indicate that the growth of the TVEs was so remarkable that the ratio increased rapidly over time. For example, the ratio of TVEs to SOEs in gross output value (GOV) was only 12 per cent in 1978 yet this ratio became 58 per cent in 1991. Even as early as 1984, employment in the rural enterprises of the industry sector surpassed that in the SOEs, and the rural urban ratio further increased to 1.3 in 1991.

Table 7.8 Growth of SOEs and REs in Industry Sector (1978-1991)

	Gross Output Value			No of Employees		
	million SOEs	Index REs	REs/SOEs	1000 SOEs	Index REs	REs/SOEs
1978	328918	38526	0.12	31390	17345	0.55
1979	367360	42352	0.12	32080	18144	0.57
1980	391560	50941	0.13	33340	19423	0.58
1981	403710	57934	0.14	34880	19801	0.57
1982	432600	64602	0.15	35820	20728	0.58
1983	473940	75709	0.16	36320	21681	0.60
1984	526270	124535	0.24	36690	36561	1.00
1985	630212	182719	0.29	38150	41367	1.08
1986	697172	241340	0.35	39550	47620	1.20
1987	825009	324388	0.39	40860	52667	1.29
1988	1035128	452938	0.44	42290	57034	1.35
1989	1234291	524411	0.42	42730	56241	1.32
1990	1306375	605025	0.46	43640	55717	1.28
1991	1495458	870861	0.58	44720	58136	1.30

Sources: ZGTJNJ, various volumes, mainly, 1992:107:389-390:403-406.

Notes: Rural industries refer to township and village-run before 1984.
SOEs: State-owned enterprises.
REs: Rural enterprises

sectors is impossible. Therefore only the data in the *industry* sector, not including construction, transport, commerce and service sector are displayed in the table.

Notice that the statistics in rural industry before 1984 are incomplete due to the lack of data on private firms (though these firms were limited before 1984). After 1984, these private firms were counted into the rural industry category. This induced a big jump in the figures of rural industries after 1984, especially in the figures of number of enterprises. Nevertheless, the figures after 1984 still show remarkable increases. For example, the ratio between rural industry and state owned industry increased considerably from 0.24 and 1.00 in 1984 to 0.58 and 1.30 in 1991, in terms of GOV and employment, respectively.

7.5 Dualism in Export Pattern

The dualism in production may lead to a dualism in international trade, especially when rural enterprises grew very rapidly and had a very strong international orientation. An opening of a country to the world will result in the country's production and trade pattern shifting towards its comparative advantage. Since China's most abundant endowment is unskilled labour, which is restricted to the rural areas, one can predict that China's rural manufacturing enterprises will tend to grow more rapidly after they become more involved in international trade. A comparison of the growth rates of exports of the national total and of rural enterprises in the period 1985-90 is shown in Table 7.9. It is clear from the table that rural enterprise exports achieved a much higher average annual growth rate than national exports. As a result, the share of rural industrial exports in total exports increased dramatically, as noted above, from 4.8 per cent in 1985 to 25 in 1991, calculated in current prices.[4]

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4 There is an inconsistency in the share of rural industrial exports over national exports among different sources. Several causes may be identified for this

Another distinguishing feature of rural industrial exports is its concentration on labour intensive products. In the clothing industry, for example, which is classified as the most labour intensive industry, the rural enterperises accounted for more than 70 per cent of total national output and more than 72 per cent of total exports since 1990 (*Textile Asia*, April, 1991:70, *People'a Daily*, 5 May, 1991:2). As a result of the rapid growth of rural enterprise exports, the national export composition will tend to be more labour intensive. However the urban sector has become a medium capital intensive economy, relative to the rural economy. Under the export promotion policy, urban exports may be encouraged as well and they will, in contrast to rural exports, be more capital intensive.

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inconsistency. The three basic statistical channels in China: State Statistical Bureau (SSB), Ministry of Finance and the Ministries for particular industries, often report differently on the basis of their different methods of data collection. The rural industrial exports reported by the Ministry of Agriculture count as rural export products made by rural enterprises on sub-contracts with urban enterprises, where the SSB may attribute the same products to the prime contractor. According to Zweig (1991:717), the higher share (25 per cent) of rural enterprises' exports is due to the inclusion of some enterprises at the county level and those exports processed in the TVEs but eventually exported by the SOEs. The same problem could occur in the counting of joint venture and other co-operative enterprises as well.

Table 7.9 Growth of Rural Industrial Exports, 1985-91

Year	National exports [1] million Y	Annual growth (%)	Rural industry exports [2] million Y	Annual growth (%)	Share of rural industry exports [2]/[1] %	Official reports %
1985	80890	4.9	3900		4.8	4.8
1986	108210	33.8	9949	155.1	9.2	
1987	147000	35.8	16196	62.8	11.0	
1988	176670	20.2	29871	84.4	16.9	
1989	195600	10.7	37144	24.3	19.0	21.9
1990	298580	52.6	46230	24.5	15.5	23.7
1991	383060	28.3	95884	107.4	25.0	
Average annual growth (1986-91)		24.9		58.0		

Sources: ZGTJZY, 1991:65:97:10. ZGTJNJ, 1992:627.
ZGXZQYNJ,. 1990:174. People's Daily, 12 November, 1992:1.

Notes: Y: Reminbi (RMB) yuan, unit of Chinese currency.
The values of rural enterprise exports in 1989 and 1990 reported by ZGTJZY (1991) are not consistent with its reports of the shares (1991:65:97), possibly due to different definition of the rural enterprises, price deflators and exchange rates., etc. See footnote 4.
National exports are based on ZGTJNJ,1992:627.
Growth rate is defined as annual growth over the previous year.
Average annual growth rate is defined as Exp(Ln(Yt/Yo)/t)-1, where Yo is base year value, Yt is report year (1991) value and t is the total years under calculation.

In order to verify the prediction that the comparative advantage of rural enterprises lies in labour intensive manufacturing products, a comparison of export compositions between the two sectors is called for. Distinguishing the exports from different sectors is difficult in China in the absence of separate statistics of the relevant export data in the two sectors. However, approximate estimations are still available. For example, Findlay and Watson (1991) reported that the labour intensive group accounted for nearly 75 per cent of total rural exports, compared to about 62 per cent of the national manufactured exports in 1989. Table 7.10 shows estimates from the same source indicating that the labour intensive export share of total rural enterprise exports is 80 per cent, as a result of a different classification of the industrial branches. Furthermore, if we take into account labour intensive activities that are included in rural capital intensive industries, the proportion will be even higher than 80 per cent.[5]

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5 There are many stages of a production process in each industry and the different stages could involve quite different factor intensive activities. In this case the broad division of the industries may be misleading. For example, the machine building industry in China is classified so broadly that it includes some extremely capital intensive sub-industries such as mineral equipment and some other extremely labour intensive sub-industries such as bicycle making. It should be classified as a labour intensive industry in the rural sector.

Table 7.10 Export Composition of Rural Enterprises, 1989

1. Industrial branches		Total export value	Total turnover value			SLYB
			sub-total	direct	indirect	
		Y million	Y million	Y million	Y million	Y million
total exports		46395	37144	27162	9843	5115
chemical	P	2553	2076	1629	433	86
machinery	H	2141	1782	1359	419	34
mineral	N	2179	1915	1264	584	15
light industrial	L	6350	3846	2686	1158	1849
foods	L	3996	3492	2848	624	42
native products	N	719	685	546	138	5
animal products	N	1688	1472	1175	297	54
textiles	L	7389	6114	4486	1629	625
silk products	L	1844	1955	1598	355	6
clothing	L	6322	4894	3312	1581	1301
arts & crafts	L	5766	4826	3255	1561	406
others	L	5448	4087	3005	1064	692

2. Factor intensity groups	Total export value		Total turnover value	
	%	Y million	%	Y million
natural resource intensive (N)	10	4586	11	4072
labour intensive exports (L)	80	37115	79	29214
human capital intensive (H)	5	2141	5	1782
physical capital intensive (P)	6	2553	6	2076
total exports	100	46395	100	37144

Source: ZGXZQYNJ, 1990:13

Notes: Y million: Million Reminbi yuan (unit of Chinese currency).
Direct exports include those which are directly sold to foreign markets or sold via an official intermediary.
Indirect exports include those which were sold by urban enterprises but the goods or parts of the goods actually were processed in rural enterprises.
SLYB: Processing of foreign goods and countertrade. *Sanlai yibu* in Chinese.

A combination of China's export pattern in terms of agricultural, natural resource, urban and rural sectors is shown in Figure 7.3. The urban and rural manufacturing export shares are derived from netting out agricultural exports from the total national export data, and minus the share of natural resource exports (weighted by national average) in both urban and rural manufacturing exports. The result is very interesting when one compares it with Figure 1.2 and Figure 3.2. Figure 1.2 shows China's manufacturing exports increased by more than 30 per cent during the five years of 1985-90. Figure 3.2 further divides the manufacturing exports into capital intensive goods and labour intensive goods and shows that the increase of labour intensive goods in exports is the main cause of the increases in China's manufacturing exports. Figure 7.3 shows that when the urban manufacturing exports increased slightly after 1985, rural exports increased dramatically. If rural exports are labour intensive, the increases of China's manufacturing exports may be mainly attributable to the increases of rural manufacturing exports. Therefore one can conclude that the rapid growth of China's exports and radical changes of its export composition are mainly due to the rapid growth of China's rural labour intensive manufacturing exports.

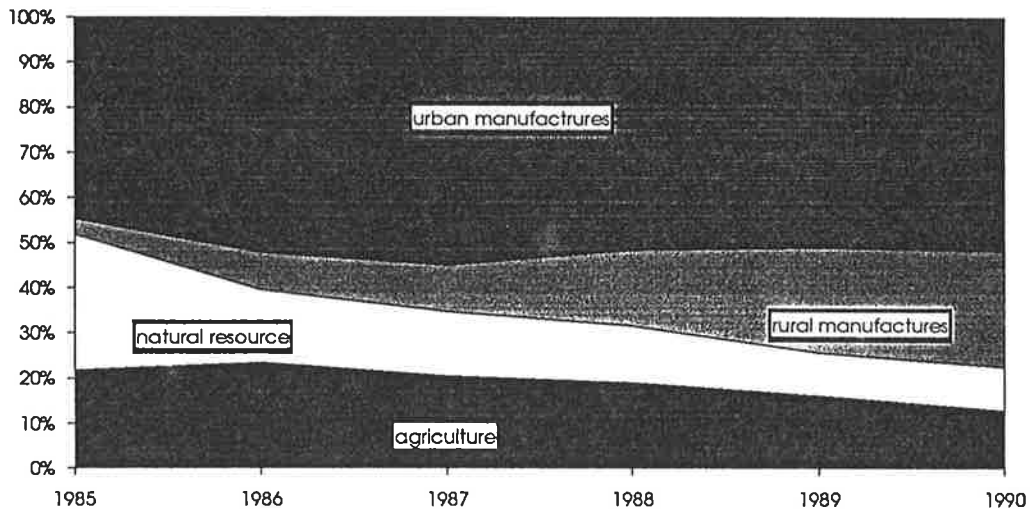

Figure 7.3 Changes in China's Export Pattern, 1985-90

7.6 Summary and Conclusions

This chapter examines some of the predictions derived from the theoretical model introduced in Chapter 5. These predictions included the upgrading of China's urban production and export pattern in terms of capital intensity, the greater labour intensity of rural manufacturing enterprises hence potential competitiveness and the higher growth rate of their exports when the country is more outward oriented. The industry classification established in Chapter 2 is used to shed light on the main issues of China's production and export pattern at an aggregate level. These predictions are basically confirmed by using the data of the 1980s, after China had opened its door to the world and adopted a more liberal policy in the rural sector.

The expansion of capital intensive exports can be partially explained by the impact of the RUMR and the corresponding import substitution policy which led the urban sector to be more capital intensive, and the distortions that were so serious that those products were not only being substituted, but also being exported. One reason for the extension of the chemical industry in both sectors is the high protection rate in this industry.

This chapter identified a dualism in both China's production structure and export pattern. This dualism not only explains why China's export pattern shifted so rapidly from agricultural products to labour intensive manufactures (via the growth of rural industry exports), but also provides an answer to the question of why China's capital intensive production and exports were also promoted (via the increase of urban industry production and exports). However, since the rural manufacturing exports are mainly labour intensive, the main sources of the changes in China's export composition from primary products to manufactures were contributed by them.

A dualism in production and exports implies that should this dualism be removed further economic gains are available by encouraging factor mobility and abolishing price distortions. If the reforms proceed in these directions, the share of China's agricultural exports may decline more rapidly and exports will become even more labour intensive. This in turn, will generate economic growth as well as allocative efficiency in the future.

CHAPTER EIGHT

A CASE STUDY OF CHINA'S TEXTILES AND CLOTHING INDUSTRIES

The evidence provided in the previous chapters shows that when the domestic market is partially liberalised in terms of encouraging factor mobility: exports shifted from agricultural goods to manufactures; the country's production pattern became more labour intensive, and the labour intensive exports increased over time. However, since China's market was only partially liberalised, dualism continued and the two parts of the economy played a quite different role in changing its export composition. Furthermore, price distortions continue to affect the changes in production and export pattern so the capital intensive industries expanded in the urban sector and some of the rural industrial branches (Chapter 7). In spite of this, the rural enterprises may expand their production in the most labour intensive industries while the urban industries may just do the opposite. Exports would show a similar pattern. This chapter is designed to examine these hypotheses and the textiles and clothing (TC) industries are chosen as a special case.

TC industries are important in many less developed countries' (LDCs) production and trade. For example, Keesing and Wolf (1980) calculated that

some 28 per cent of factory employment and 15 per cent of manufacturing output were in the TC industries in LDCs while the same ratio was 14 and 7 per cent in more developed countries (MDCs) respectively in 1976. TC comprised more than one third (34 per cent) of the LDCs' manufactured exports and 13.4 per cent of their total merchandise exports (fuel excluded) for the same year. The value of LDCs TC exports to all markets was US$ 14 billion in 1976. The value was nearly doubled to US$ 25.7 billion in 1985. The share of total LDCs' TC exports in world TC exports reached 42.1 per cent in 1985, more than twice their share in 1970.

The UNIDO secretariat (1989) has examined the changing patterns of world TC trade. They described a four phase development path that indicated that the LDCs were usually net importers of TC products before they became net exporters. Anderson and Park (1988), Park and Anderson (1988), and Anderson (1989) presented a hill-shaped export pattern of TC with reference to the growth of per capita income. Since many TC processing activities tend to use unskilled labour intensively, they would be among the items initially exported by a newly industrialising, densely populated country. And as the demands for textile raw materials by that country's expanding textile industry grow, so the country's net exports of natural fibre would diminish, or net imports of natural fibre would increase, *ceteris paribus*. The greater the density of its population, the longer the TC exports would dominate the country's trade.

According to the industrial classification established in Chapter 2, China's TC industries are labour intensive, with the clothing industry ranked first place and the textile industry ranked 14th place out of 40 industries in terms of a group of labour-intensity ratios. However, the intermediate input

used in these industries, can be either land intensive (i.e., natural fibres) or capital intensive (i.e., chemical fibres). Incorporating these intermediate inputs into the analysis may gain some additional insights without losing the generality of the basic propositions.

Two intermediate inputs of textile production are incorporated to illustrate several propositions of the theoretical analysis made in the previous chapters. Cotton as an agricultural product (natural fibre), is used, on the one hand, to show that when it was under-priced a shortage in domestic supply occurred though cotton was also exported simultaneously. On the other hand, the chemical fibre industry, in spite of its high capital intensity, expanded over the decade in both sectors due to price protection.

This chapter verifies some special issues discussed in the previous chapters at industrial level while taking China's TC industries as a special case. Section 8.1 summarises the basic features of China's TC industry, and demonstrates its export pattern. Section 8.2 examines the shortage of cotton in the late 1980s after a good harvest of cotton in 1984. Section 8.3 turns to examine the factor intensity of the industry at each branch and demonstrates the structural changes over time. Section 8.4 reports data on TC exports to show the pattern of specialisation between rural and urban industries. Conclusions are reported in the final section.

8.1 General Features of the Industries

8.1.1 Factor Intensity and Industrial Structure

Using the industry classification method introduced in Chapter 2, each TC industrial branch can be further classified by factor intensity. Table 8.1 shows the capital intensity ranking of China's seven main sub-branches of TC industries in 1985. Chemical fibre ranked first, wool textiles ranked second, cotton textiles ranked fourth and the clothing industry is the least capital intensive of seven sub-industries in 1985,[1] in terms of the four factor intensity indicators, i.e., fixed capital per worker, skill ratio, net output value (NOV) per worker and the ratio of wage bill to NOV.[2] This ranking is consistent with the industry classification of Chapter 2.

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1 This classification is consistent with those found by Anderson (1989) and Park and Anderson (1988) in the case of South Korea and Japan. This ranking is also consistent with the hypothesis of Dixit and Grossman (1982), where they established a specific factor model that the earlier stages of production require more capital intensive technology, and so are more suitable for the developed countries, whereas as production processing moves closer to the final stages, more labour intensive production will be involved and the developing countries may find such activities are to their comparative advantage.

2 The net output value is defined as the sum of wage bill and gross profits, therefore it is approximately equal to value added.

Table 8.1 The Ranking of TC Industrial Branches by Factor Intensity, 1985

Branches	NVFAW yuan	Skill ratio %	NOVW yuan	Wage bill to NOV %	Ranking by Capital Intensity
Total textiles	4443	1.40	3668	26.31	
Chemical fibres	27510	4.97	10405	11.91	1
Wool textiles	6377	1.83	5772	18.10	2
Bast fibre	4842	1.09	3126	29.02	3
Cotton textiles	4621	1.58	3743	26.55	4
Knitting	3648	1.10	3092	28.95	5
Silk & spun silk	3517	1.14	2938	31.48	6
Clothing	1532	0.47	2452	34.84	7

Sources: ZGGYPCZL, (1985), 1988, Vol.3:172-181, Vol.8:18-51,

Notes:
Cotton textile includes all cotton spinning, weaving, dyeing and printing process.
Wool textile includes all wool spinning, weaving, dyeing and printing process.
Bast fibre textile includes bast fibre spinning and weaving.
Apparel and chemical fibres are not included in total textile item.
The data include all enterprises that are above the village level.
NVFAW: net value of fixed assets per worker.
NOVW: net output value per worker.
Skill ratio is defined as the share of technicians to total employees.
Capital Intensity is ranked ascending for NVFAW, NVOW and skill ratio but descendingly for wage bill to NOV.
yuan: Renminbi yuan, unit of Chinese currency.

According to 1990 Chinese data, the gross output value of TC industries (including textile machinery and equipment sectors) accounted for 14.1 per cent of the total industrial output value. The total turnover value of TC was 13.3 per cent of China's total. Employees in the TC industries accounted for 16.6 per cent of the total employees in the manufacturing sector (ZGTJNJ, 1990:409). The export value of TC industries reached US$ 13.6 billion in 1990, accounting for more than one quarter of China's total. China overtook South

Korea to become the fourth largest TC exporter in the world after Hong Kong, Germany and Italy in 1990 and further overtook Italy to be the third largest in 1991 (*People's Daily*, 28 November, 1992:2). In the global textile trade, China's share rose from 4.3 per cent in 1980 to 8.4 per cent in 1990 (*Textile Asia*, April, 1991:59). Notice that these figures are not that remarkable where China's population and country size are concerned. In fact, both the shares of TC employment and output value in China in 1990 were lower than the shares in other LDCs in 1976 (see Keesing and Wolf, 1980).

China is the second largest fibre producing country after the US, with its cotton production ranked first and chemical fibre third in the world (*People's Daily*, 28 November, 1992:2). China's annual production of synthetic fibres trebled between 1977 and 1983, so too did the volume of its synthetic fibre imports (Park, 1988). Table 8.2 shows the TC industrial structure (including chemical fibres) and its changes over time. The table indicates that the textile industry accounted for about four fifths of the total TC production in China, while the clothing industry accounted for only 15 per cent, and chemical fibre 6 per cent in 1980. The share of textiles declined to about 75 per cent in 1991. The share of clothing actually declined over the decade until 1991. The share of the chemical fibre industry increased substantially, accounting for about 10 per cent in 1991. The increase of the share in chemical fibre industry matched the decline in the share of the textile industry. Given that the clothing industry is the most labour intensive one, and chemical fibre is one of the most capital intensive (Chapter 2), this result appears paradoxical. Two factors can be used to explain this paradox: first, China's chemical fibre industry is highly protected and the prices of chemical fibres have been set at relatively high level (Chapter 4, Table 4.3). Second, the output value of village enterprises was not included

into the table, therefore the results may be biased. As will be clarified later, the labour intensive clothing industries expanded in the rural enterprise sector.

Table 8.2 China's TC industrial Structure, GOV, Y billion, 1980-91

Year	1980	1985	1986	1987	1989	1990	1991
clothing	13.47	19.93	19.44	23.59	35.27	41.46	52.30
	(15.48)	(13.67)	(13.01)	(13.28)	(13.08)	(13.92)	(15.46)
textiles	68.19	115.54	119.85	147.07	210.96	229.11	253.33
	(78.37)	(79.25)	(80.20)	(79.41)	(78.25)	(76.93)	(74.91)
chemical	5.35	10.33	10.16	12.98	23.38	27.24	32.54
fibres	(6.15)	(7.09)	(6.80)	(7.31)	(8.67)	(9.15)	(9.62)
TOTAL	87.02	145.78	149.45	177.64	269.61	297.81	338.16

Sources: ZGTJNJ, 1981-92.
Note: Data in the table include all financially independent enterprises including township enterprises but not below.

8.1.2 Export Pattern and Specialisation

Because the chemical fibre industry was protected, China's whole TC industry may be more capital intensive than it would be in a competitive circumstance. However, this protection may not be strong enough to reverse China's comparative advantage, for example to export fibres. Since fibre production can be either land intensive (e.g., natural fibres) or capital intensive (e.g., chemical fibres), China will not have comparative advantage in these goods, given its limited land and capital endowments (Chapter 6).

Table 8.3 shows China's TC production and trade over the decade of the 1980s. As expected, China's TC trade is characterised by its intra-industry trade pattern: China imports both fibres and textiles and exports mainly textiles and clothing. These data are converted to net trade figures and plotted in Figure 8.1 in value terms and Figure 8.2 in terms of the net export ratios. The figures are consistent with the conventional theory of comparative advantage: China is a net importer of fibres but a net exporter of both textiles and clothing, since its capital and land are scarce but labour is abundant. This position was disturbed by good harvests in 1984, but returned to the long run trend after 1987. As will be discussed below, price distortions also played a role in the exports of China's natural fibres. The NERs of clothing industry were close to unity, indicating the strong comparative advantage China had in this industry. Net exports of clothing have increased dramatically, most likely as a result of China's outward looking trade policy and development of rural industries. For example, China's rural TC exports reached to Y 12963 million in 1989, a 50 per cent increase over 1988. Rural industry textile exports increased by 42.6 per cent, and rural industry clothing exports increased by 62.2 per cent in the same year (ZGFZGYNJ, 1990).

Table 8.3 China's TC Production and Trade, 1970-90

Year	1. Gross Output (million Y)	2. Total TC Exports Value (million $)	Average annual growth %	Of which: Fibres (million $)	Textiles (million $)	Clothing (million $)	Share of China's total export %	Share of World total export %
1970		596		100	340	155	26.37	
1975	34022	1631		245	1033	353	22.48	
1978	67320	2832		401	1723	708	29.06	
1980	87015	4953	22.25	544	2756	1653	27.11	4.30
1981	102168	4998	0.91	454	2680	1864	22.71	4.35
1982		5034	0.72	589	2496	1949	22.55	4.66
1983	110950	5638	12.00	672	2906	2060	25.37	5.20
1984	126161	7275	29.04	930	3692	2653	27.83	6.24
1985	147250	6438	-11.51	1145	3243	2050	23.54	5.37
1986	152160	8283	28.66	1148	4220	2915	26.77	[5.7]
1987	171030	11073	33.68	1508	5790	3749	28.08	[6.7]
1988	193870	13003	17.42	1672	6458	3872	27.35	
1989	213736	14670	12.82	1546	6994	6130	27.95	
1990		14693	0.16	1095	6999	6848	23.66	8.40

Sources: ZGFZGYNJ, 1988:361, 1989:27:424, 1991:315.
Textile Asia, Febraury,1991:56, April, 1991:59
ZGTJNJ, . 1981:209, 1985:315, 1986:276, 1988:315, 1990:419-420.

Notes: Million Y: Million Reminbi yuan (unit of Chinese currency).
Million $: Million US dollars.
The figures in brackets do not include fibre.
1990 export data are estimated figures.
1975 and 1978 gross output value includes urban enterprises only.

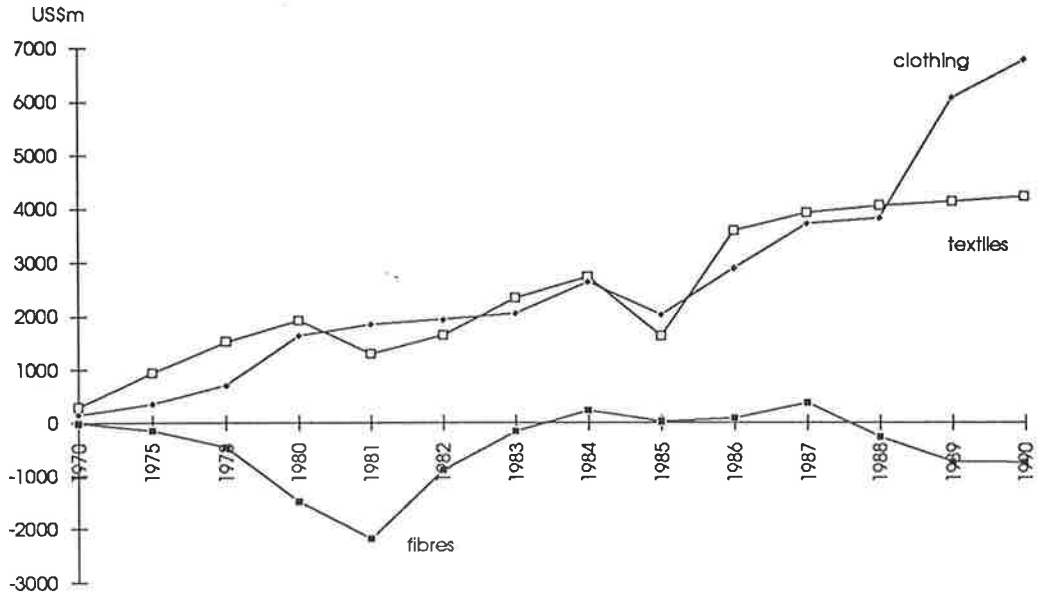

Figure 8.1 Net Export of China's Fibres, Textiles and Clothing, 1970-90

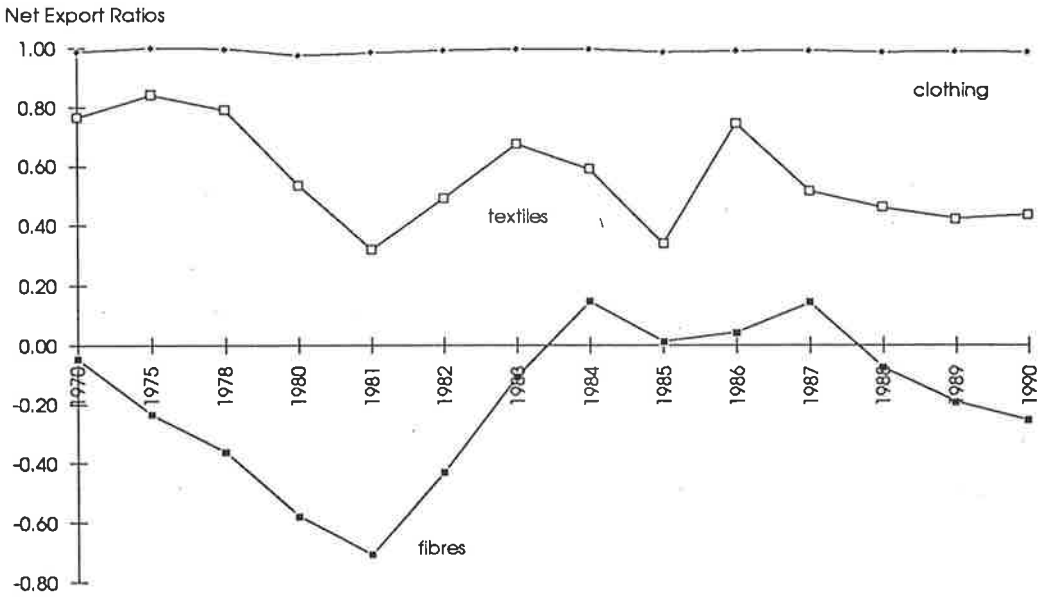

Figure 8.2 Net Export Ratios of China's Fibres, Textiles and Clothing, 1970-90

8.2 "Shortage" of Cotton and Cotton Exports

Cotton alone accounted for 70 per cent of the total raw materials consumed in textile production (*Textile Asia*, September, 1989:145). China's cotton production broke its own record in 1984. However, since 1986, cotton supply has fallen short of demand in China's TC industries. It is frequently reported by Paul Leung in *Textile Asia* that many textiles manufacturing enterprises in China have suffered from a shortage of raw materials, especially cotton. The shortfall in cotton in 1989 amounted to some 500,000 tonnes. The industry was capable of consuming 5 million tonnes annually, but since 1986 only 4 million tonnes have been produced each year. So the shortfall was about 20 per cent of capacity in 1989. The situation was getting worse in 1991, when 10 million spindles were surplus, out of 40 million (*Economic Daily*, 20 March 1991:1).

Surprisingly, China had been a net cotton exporter since 1983. The value of China's total net cotton exports reached a peak at US$ 745 million in 1986. Cotton exports continued until 1989, when a nation wide "shortage" occurred. From 1989 China began to be a net cotton importer again.

Table 8.4 shows the production, industrial consumption and international trade of cotton. The table shows a hill-shaped change in cotton production and industrial consumption, as well as government purchases and exports. Cotton production and net export reached their peaks in 1984 and 1987, respectively. But after 1988 cotton imports increased rapidly. The overall performance of the textile industry in 1990 was unimpressive, with only 1 per

cent growth rate. The total export of TC at US$ 13.6 billion showed a 4 per cent increase over 1989 but the generated profits, of only about Y 10 billion, fell 42.9 per cent (*Textile Asia*, March, 1991:79).

Table 8.4 China's Cotton and Trade, 1980-1991

Year	Production 1000 MT	Purchase 1000 MT	Consumption 1000 MT	Exports 1000 MT	Exports 1000 US$	Imports 1000 MT	Imports 1000 US$
1980	2707	2610	3176			898.00	
1981	2968	2872	3424	10	2060	801.00	1534330
1982	3598	3416	3569	4	6430	473.00	714330
1983	4637	4586	3555	58	74010	230.00	331280
1984	6258	5212	3502	189	276090	40.00	79640
1985	4147	4319	4080	347	433070	0.16	130
1986	3540	3794	4570	527	745320	0.16	480
1987	4245	4071	4390	761	499920	8.78	15460
1988	4149	3778	4310	468	718850	34.80	58850
1989	3788	3306	4600	273	431160	519.00	708700
1990	4508	4091	4700	167	300540	417.00	710790
1991	5675	5290	5461	200	360960	371.00	630560

Sources: ZGFZGYNJ, (86-87),1988:379,(88-89),1989:535, 1990:390
ZGTJNJ, 1990:364:453:618:647:650, 1992:359:600:635:638.
ZGNYJJBKQS, (1949-1986), 1989:479-491:535,
ZGDWJJHMYNJ (1988), 1988:394:462
ZGTJZY, 1991:61:95:99.
People's Daily, 14/1/91, p1. Economy Daily, 11/2/91.
China's Customs Statistics, January, 1991:24

Notes: Self-sufficiency is defined as the ratio of domestic purchases to domestic consumption. (domestic purchases plus imports).
Trade balance is defined as exports minus imports in value terms.
The export and import values after 1985 in terms of US dollars are derived from the exchange rates in each year.
Consumption data after 1988 are estimated from domestic purchases minus exports and plus imports.

The fluctuations of cotton exports provide an example of the contraction between China's price policy and reform in its foreign trade sector. As an important agricultural product and industry input, cotton was under-priced, especially after 1985. The author in Zhang Xiaohe (1991c) identified a number of forces affecting cotton supply in China.

Cause 1: Relative Price Changes. The prices of agricultural products in China were determined by the government authorities administratively rather than by the market force, therefore it is likely that the prices of agricultural goods tended to be substantially lower than their market level, given the specific strategy of China's industrialisation. Because this price determination regime is arbitrary, divergences in the relative prices of all agricultural products could emerge as well. Divergences in relative prices can be revealed by the relative price level between grain and cotton.[3] For example, in 1978 the price ratio of cotton to grain was 1:10.68, i.e., one unit of ginned cotton equalling 10.68 units of grain in terms of selling price. In 1983 a peak ratio of 1:11.34 was reached, to be followed by a steady decline to 1:6.4 in 1986 and 1987 and 1:5.5 in 1988 (*Textile Asia*, February, 1990:80).

Cause 2: The Elimination of Non-monetary Incentives. The incentives to agricultural production are not merely a matter of prices in China. The

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3 A number of authors have argued that the falling relative price of cotton was the main reason for the drops in output after 1985 (see Li Zuoyan, 1989, Shen E. et al, 1989, Kong and Shi, 1989, Song, Q. 1990, and Liu, X. 1990 for details). However, the peasants' description is more vivid: they called these price divergences "hot manufacture, cold agriculture, while cotton is in the freezer".

supply coupons of low priced foods, subsidised chemical fertilisers and insecticides, and the different price margins of different proportions of the products, are all relevant to the decision making of agricultural producers. So a lower priced product would be preferred if, for example, its inputs were subsidised, *ceteris paribus*. Several investigations of the impact of the non-price factors in cotton supply indicate that it is significant, especially the elimination of access to subsidised foods and discounted industrial inputs for cotton growers.[4] In addition to this, the changing of the purchase price premium from a basic quota to proportional price margin, resulted in a decrease of the average cotton price (Hu Changai, 1988:7). The frequently used "white receipts" (IOU) after 1985, also reduced the real income level of the cotton farmers. This makes them reluctant to sell their stored crops. (*Textile Asia,* July, 1989:100). Among these factors, the increase of the prices of agricultural capital inputs after 1985 is dramatic, as a result of a nation wide inflation. For example, in 1987 each bag of fertiliser cost 21.8 yuan, agricultural grade diesel oil 0.7 yuan per kg, and insecticide 5.7 yuan a bottle. But in 1988, fertiliser rose to 40 yuan a bag, diesel oil to 2.2 yuan per kg, and insecticide to 20 yuan a bottle (*Textile Asia*, February, 1990:80). The peasants describe this price movement saying "the price of agricultural inputs is flying, the price of manufacturing goods is running and the price of agricultural goods is just crawling." The inflation race was unfavourable to agricultural products, especially cotton, therefore the cotton growers sought to change their productive activities. In 1989, Chinese State Council had requested that when the new cotton was reaped all of the raw cotton should be sold only to the state (ZGFZGYNJ, 1990:119). This monopolistic purchase was maintained from

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4 Again see Li Zuoyan, 1989, Shen E. et al, 1989, Kong and Shi, 1989, Song, Q. 1990, and Liu, X. 1990 for details. .

then until the end of 1992 when the over-quota output was allowed to be sold on the market (*Economic Daily*, 23 November, 1992:3). This measure undoubtedly restored the government procurement purchasing regime, which had been abolished in 1985. Classified as Commodity one,[5] cotton price was likely to be under-valued and an alternative market was not available before the end of 1992. Therefore the only choice left to the peasants was reducing cotton production (if quitting was not allowed).

Cause 3: Increasing Demand for Cotton. While cotton production was discouraged by its low price, the demand for cotton increased. Due to the profitability of cotton processing, a large number of cotton textile enterprises, especially rural enterprises, emerged. According to the available statistics, spindles installed rose from 15.62 million in 1978 to 38.62 million by 1990. Table 8.5 shows the output, employment and the number of cotton textile enterprises in both sectors over the period 1984-1989. Over these five years the number of enterprises and employees increased by 151 per cent and 100 per cent in rural cotton textile industries, respectively. In contrast, the same items increased only 29 and 23 per cent in the urban sector over the same period. However, the growth of rural textile enterprises has been greatly discouraged by government regulations,[6] otherwise their growth would have been much higher than the table indicates.

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5 See footnote 4 on page 86.

6 The squeezes include restricting installation of additional spindles in cotton mills with sub-standard facilities; forbidding establishment of new mini mills; refusing bank loans to such mills and tightening inspection and forcing mills to shut down if their operations are found to be below the required standard (*Textile Asia*, 1992)

Table 8.5 The Growth of the Cotton Textile Industry between Sectors, China, 1984-1989

Year	GOV Million Y	Employee Thousand	No. of enterprises
1. Urban Industry			
1984	54453	2892	2917
1985	59031	3069	3007
1986	62105	3252	3065
1987	65060	3428	3192
1988	68690	3644	3369
1989	69520	3724	3574
2. Rural Enterprises			
1984	3583	489	5114
1985	5850	622	5792
1986	8496	789	6867
1987	11678	953	8488
1988	17715	1172	9837
1989	20786	1229	10223
3. The Ratio of [2]/[1]			
1984	7	17	175
1985	10	20	193
1986	14	24	224
1987	18	30	266
1988	26	32	292
1989	30	33	286

Sources: ZGFZGYNJ, 1989:423:424:502, 1990:317-8, 355-6.
ZGXZQYTJZL, 1989:35.
ZGXZQYNJ, 1989, 1990.

Notes: Urban industries are the enterprises under the control of the Ministry of Textile only.
Million Y: million Renminbi Yuan (unit of Chinese currency).
GOV: Gross output value.
Rural enterprises include township and village-run enterprises only.
The data on the number of urban enterprises are estimated.

This growth demand exaggerated the cotton "shortage". When cotton textile is more profitable than cotton cropping, more economic resources will shift from cotton to textile production. The rural enterprise owners might get raw materials more easily than state-owned enterprises do, because the cotton growers and rural textile enterprise owners are all rural residents. When the cotton market was partially liberalised, the price of cotton was bid up and the "cotton war" was in a state of "white heat" in 1988. This led the government to restore the compulsory procurement purchases of cotton in 1989.

Among these factors, the relatively low price of cotton was the most important factor. When the cotton price is lower than the international price, at least two events may emerge. First, exporting cotton was financially profitable, especially when the foreign trade sector was relatively liberalised (Chapter 4). This led to an increase of cotton exports. Second, cotton processing industries might be also profitable, due to its under-priced intermediate inputs. This lead to an expansion of cotton textile industries, especially in the rural sector. As a result, when there was a "shortage" of cotton in the domestic market, about a one fifth of the domestic produced cotton was exported in 1987 (Table 8.4).

This situation can be easily demonstrated by a simple diagram. Figure 8.3 shows a partial equilibrium model of a two stage production process. There are two products in this model, one the finished goods (e.g., clothing) and the other the raw material input (e.g., fibres). Both goods are traded on world markets and their world market prices are P_c and P_f respectively. Assuming that units are specified so that each unit of the final goods requires one unit of fibre these prices can be shown on the same diagram. For simplicity one can assume that these goods are produced only for the world market and therefore

ignore the diversion of output onto the domestic market. In free trade, the price for fibre in the domestic market would be P_f. The fibre producers' supply curve is shown by S_f so at P_f they would produce Q_f. The clothing producers can buy as much they want at the world price, from domestic producers and from the world market. Their supply curve is shown by S_c, with a rising margin on the cost of fibre.[7] At the world price of P_c, their output of clothing is shown by Q_c. The cotton processors thus earn a surplus shown by area A and fibre imports are equal to Q_fQ_c. In the case depicted, the economy is an exporter of the finished product but an importer of fibre.

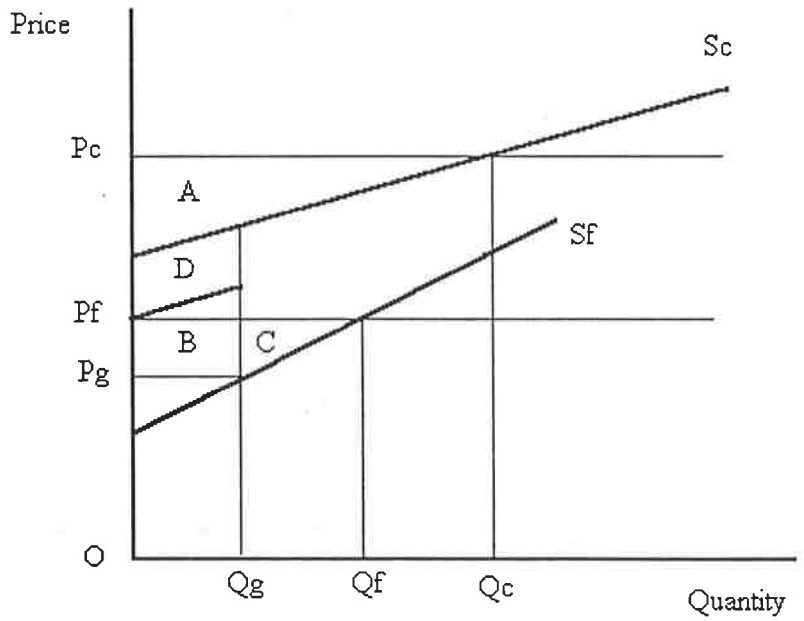

Figure 8.3 Model of Two Stage TC Production

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7 S_c is drawn relative to P_f and not to the domestic supply of fibre.

As discussed in Chapter 4, China had an incentive to discriminate against raw material production to support manufacturing production (price-scissors gaps between industrial and agricultural products), in order to implement an ambitious heavy industrialisation strategy. Simply stated, these price-scissors gaps represent financial transfers from the agricultural sector to the manufacturing sector, supported by a government procurement purchase of most (all before 1978) of the agricultural products and monopolistic selling of most (all before 1978) of the manufacturing goods. As a result, manufacturing goods are likely to be over-priced and the agricultural goods under-priced (Chapter 4).

Given international prices, the under-valuation of domestic raw material prices (P_g) will lead to a reduced domestic production and increased imports of the raw materials. The processing industry benefits from the price distortions by attaining the transferred profits from the agricultural sector as drawn from B to D (B=D) in the figure. As a result, more resources will tend to be allocated to the processing industry. If the imports of the raw materials are limited by, for example, import quota (at any point between Q_t and Q_c), the competition of bidding up the limited domestic raw materials is inevitable in the market that is outside the government plan. Furthermore, if the exporting of the domestic raw materials is also allowed, from the viewpoint of the producers and the foreign trade agencies it will be more profitable if they are exported rather than imported. Therefore some fibres may be also exported (at any point between O and Q_g). This will further enforce the shortage of the raw materials.

8.3 Distinctions in Production between Sectors

Given the segmentation of China's labour market and ignoring the issues of economies of scale, it has been shown that in the absence of price distortions, a sectoral specialisation pattern will result (Chapter 5). That is, rural industries will specialise in producing labour intensive products, for example clothing and cotton textiles, while the urban industries will specialise in producing relatively capital intensive products, such as chemical fibre and wool textiles. Price distortions may lead the chemical fibre industry to be promoted in both sectors, but the distinction in factor intensities between the two sectors may not be altered.

Empirical data can be used to examine this sector specialisation hypothesis. Table 8.6 shows a comparison of China's TC industrial structure (including chemical fibres) between urban and rural sectors from 1985 to 1991. The urban sector data are derived by netting out the data of township enterprises from Table 8.2. The result is convincing. For example, the rural clothing industry accounted for 3.1 per cent of national gross output value in TC sector (including chemical fibres) in 1985, while the share increased to 7.2 per cent by 1991. The share of the same industry in the urban sector declined from 12 per cent to less than 10 per cent over the same time. The share of the textile industry increased in the rural sector from 11 per cent to 21 per cent, but it declined in the urban sector by more than 14 percentage points over seven years. An expected consequence is that the share of chemical fibre industry increased in both sectors, indicating the strong effect of the protection in this industry. However, the increase in the national share of the urban chemical

fibre industry (nearly 2 per cent) is higher than that in rural industry (less than 1 per cent).

Table 8.6 Changes in TC Structure Between Sectors, China, 1985-91

Classification	1985	1986	1987	1988	1989	1990	1991
rural industries							
clothing	4349	5906	8183	11935	15968	20613	27183
textile manufacture	15829	23923	32081	45930	43122	66015	80061
chemical fibres	245	621	854	1253	1592	2294	3359
urban industries							
clothing	15179	16290	19120	21801	26234	29956	36695
textile manufacture	95781	104236	119980	142809	174769	186030	200807
chemical fibres	7685	9538	12325	16208	22069	25300	29794
Total	**139068**	**160514**	**192543**	**239936**	**283754**	**330208**	**377899**
Rural share (%)							
clothing	3.13	3.68	4.25	4.97	5.63	6.24	7.19
textile manufacture	11.38	14.90	16.66	19.14	15.20	19.99	21.19
chemical fibres	0.18	0.39	0.44	0.52	0.56	0.69	0.89
sub-total	**14.69**	**18.97**	**21.36**	**24.64**	**21.39**	**26.93**	**29.27**
Urban share (%)							
clothing	10.91	10.15	9.93	9.09	9.25	9.07	9.71
textile manufacture	68.87	64.94	62.31	59.52	61.59	56.34	53.14
chemical fibres	5.53	5.94	6.40	6.76	7.78	7.66	7.88
sub-total	**85.31**	**81.03**	**78.64**	**75.36**	**78.61**	**73.07**	**70.73**
Total	100	100	100	100	100	100	100

Sources: Zhang (1991a), ZGGYPCZL(1985), Vol. 3, 88-125. ZGTJNJ, 1988:312-5,1989:166:273. 1990:419-20, 1992:329:411-2.

Another distinctive result of Table 8.6 is the "crowding out" effect between rural industries and urban industries, i.e., as rural industry grew, urban industry declined in importance in this sector. Though output in both sectors increased, rural enterprises grew more rapidly therefore the share of urban industry in total production declined. For example, total output value of rural TC industries (include chemical fibres) accounted for about 15 per cent in the national total in 1985, and this share doubled by 1991. Correspondingly, the share of urban enterprises declined over the same period. Over the same time, if the shares are calculated in different industrial branches separately, the share of rural enterprises increased by more than 20 percentage points (from 22 to 43 per cent) in the clothing industry, by more than 14 per cent (from 14 to 28 per cent) in the textile industry and by only 7 per cent (from 4 to 11 per cent) in the chemical fibre industry. Rural industries achieved a more rapid growth in the most labour intensive clothing industry, and a moderate growth in the medium labour intensive textile industry and a relatively low growth in the capital intensive chemical fibre industry.

Table 8.6 shows that the growth of rural TC industries is very impressive in the 1980s though this growth has been greatly discouraged by government regulations. If these regulations were removed, growth of these industries would have been much higher than the table indicates. Unlike Table 8.2, the share of clothing industries increased over time from accounting for 14 per cent of all TC industries (include chemical fibres) in 1985 to 17 per cent in 1991, when data on village enterprises are included.

As a result of the rapid expansion of rural enterprises, the profits of state-owned textile enterprises vanished correspondingly.[8] In 1989 the average target profit tax ratio to capital employed was 14.08 per cent, but 20 regions could not achieve this performance. Taking Shanghai as an example, 3100 million yuan profits tax was paid by the textile industry in 1981 but the profits tax reduced to 1250 million yuan in 1989 and 1000 million yuan in 1990 (*Textile Asia*, December, 1990:86). In 1989 cotton mills sustained a loss of 1500 to 2000 yuan on every tonne of cotton yarn produced. Unprofitable production was also evident in the weaving mills, which on every 1000 metre of cloth suffered a loss of 200 yuan or more (*Textile Asia*, August, 1989). A similar situation happened in other provinces as well. For instance, in Hunan province, among the nine state-owned textile wholesale distribution enterprises, eight were losing money. In Shangdong nine of the 16 textile wholesale distribution enterprises were also suffering heavy losses. In Anhui 16 of the 17 wholesaling enterprises were losing money, to a total loss of about 9 million yuan. In Shaanxi a textile wholesaling enterprise had been forced by the local government to declare bankruptcy (*Textile Asia*, January, 1991:77).

Some of the state owned enterprises therefore lost their competitiveness in cotton textile production. However, the response of the government to this was to reduce or eliminate the non-governmental enterprises, and put raw materials such as cotton tightly under government control.

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8 There are other reasons for the losses of profits of TC industries, for example the decline in demand, the increase of input price (cotton), etc. However, this impact should be the same in both rural and urban industries.

8.4 Comparison of Export Pattern

It has been shown that rural industries are more specialised in labour intensive TC products than the urban sector and their share in TC has increased over time. Therefore one may expect that rural TC exports may also be more significant than those in the urban sector. However, in the absence of substantial and separated statistics of TC exports from rural industries, a time series comparison between the two sectors is impossible. Fortunately recently published yearbooks provide some data on export value of rural enterprises, therefore one can net out the rural TC exports from the national data and define the remainder as urban TC exports. Using this definition, Table 8.7 shows a comparison of export items between rural and urban enterprises in 1988 and 1989, when the rural export data were available.

Rural industry accounted for more than one quarter of national exports in total TC products in the late 1980s, compared to about the same shares of their production in the same years (Table 8.6). The result is not very convincing because only two year data are included. However, this pattern appears to have changed rapidly since 1989. According to the latest Chinese export figures rural clothing exports accounted for 72 per cent of the national total in 1990 (*People's Daily*, 5 May, 1991:2). If this figure is correct, rural clothing exports were more than triple their 1989 level.

Table 8.7 Export Pattern between Sectors, 1988-89, US$b

Year	1988 Rural	1988 Urban	1989 Rural	1989 Urban	1988 Total	1989 Total
Total TC	2.84	7.49	3.48	9.64	10.33	13.12
	(27.52)	(72.48)	(26.54)	(73.46)	(100)	(100)
Textiles	1.73	4.73	2.17	4.83	6.46	6.99
	(26.84)	(73.16)	(31.00)	(69.00)	(100)	(100)
Clothing	1.11	2.76	1.32	4.82	3.72	4.82
	(28.65)	(71.35)	(21.45)	(78.55)	(100)	(100).

Sources: ZGTJNJ, 1990-1, ZGXZQYNJ, 1989-90.
Note: Rural industry data are transferred from RMB to US dollar by the official exchange rate.

8.5 Summary and Conclusions

This chapter further investigated the origins of the changes in China's production and trade in detail and took the typical labour intensive products, i.e., textiles and clothing, as a special case. It has been found that the development of rural enterprises did encourage labour intensive production and exports. When the output value of village enterprises is included, China's TC structure becomes more labour intensive and clothing production expanded in the late half of the 1980s. Data show that rural enterprises accounted for above one quarter of national TC exports in the late 1980s and that this share increased rapidly in the first two years of the 1990s. Rural enterprises have a comparative advantage in this labour intensive manufacturing production when compared to urban enterprises.

The situations of two different intermediate inputs of the TC industries, i.e., cotton and chemical fibres, are also investigated. Cotton as an agricultural product, started to experience a "shortage" in the domestic market when its net exports were at a peak in 1986. Chemical fibres as a capital intensive commodity, in contrast, expanded in both sectors. The different fates of these two inputs reflect the effects of China's price distortions, especially when the factor markets were partially liberalised in the second half of the 1980s.

CHAPTER NINE

CONCLUSIONS AND POLICY IMPLICATIONS

The rapid growth and structural changes of China's national income and international trade in the 1980s initiated this research. This thesis focuses on three issues in this field: the origins of the rapid growth of China's international trade; the radical changes in China's export composition and its relationship to China's dualism.

Applying the standard international trade and development theory, this thesis provides some different insights to these issues, in contrast to previous studies:

First, the rapid growth of China's international trade is not only due to a strategic change in China's trade policy, but also to a partial liberalisation of its domestic markets. Changes in foreign trade policy provided a necessary condition for export promotion in the 1980s, but the changes in trade policy themselves might not necessarily generate economic efficiency, given the distortions that exist in China's price regime (Chapters 3 and 4).

Second, change in China's export pattern is not only a result of rapid income growth and capital accumulation but also a partial liberalisation of its

domestic factor markets and the discriminate price policy in tradeable goods. While factor market liberalisation leads to a boom of rural enterprises and generates labour intensive production and exports, the distorted price regime might encourage capital intensive exports (Chapters 5 and 6).

Third, although the partial liberalisation of China's markets generated economic growth and international trade, it has been not strong enough to remove the dualism in China between a capital intensive urban industry sector and a labour intensive rural sector (the latter is involved in both agricultural and manufacturing activities). A dualism exists in both production and international trade pattern (Chapters 6, 7 and 8).

In terms of empirical investigation, two distinct conclusions are stressed. First, when China's domestic factor markets were regulated in the pre-reform era, the country tended to produce more agricultural products and capital intensive manufacturing goods at the expense of labour intensive manufacturing goods. As a result, its agricultural exports and some capital intensive manufacturing exports were greater and labour intensive manufacturing exports were less than otherwise (Chapter 6). Second, when this distorted economy was liberalised in a particular way, i.e., keeping the divergences between the rural and urban sectors unchanged but promoting the development of rural industries by partially releasing the capital mobility restrictions, the dualism remained in the economy (Chapter 7). It also affected the export pattern of the country. As a result, both capital intensive and labour intensive manufacturing production and exports were encouraged but agricultural exports declined (Chapter 3). Price distortions accelerated this trend over time.

This chapter summarises the main findings of this study and their policy implications. Suggestions for further research are also provided.

9.1 The Main Findings

9.1.1 Agriculture

* When China's factor markets were regulated, in the sense of restricting the mobility of productive factors between urban manufacturing and rural agricultural sectors, agriculture was likely to be protected by substantially increasing labour inputs. This tendency was not affected by price changes since price signals had lost their functions in allocating resources in an earlier period. China's agricultural production was thus promoted by the so-called rural-urban isolation policy (Chapter 5).

* Though agricultural production was also damaged by low prices of farming products, and bureaucratic management in production and marketing of these goods, restrictions on factor mobility were likely to dominate the production process hence price distortions only had redistributive effects (Chapter 5). This tendency was reinforced by a "grain first" policy in place since the birth of the People's Republic.

* As a result of these distortions, China's agricultural production and exports were likely to be promoted in the pre-reform period, which undoubtedly distorted China's international trade pattern (Chapters 3 and 6). In contrast to other developing countries at the similar income level, China's agricultural production and exports were rather robust. This, however, does not mean that China had a

comparative advantage in those agricultural products. Exports of agricultural goods may indicate a welfare transfer from the peasants to overseas' consumers which could, at least from the viewpoint of the nation, be identified as a welfare loss (*feishui wailiu*) and a failure of its foreign trade policy. The same principle applies to the export of China's natural resource products (petroleum, coal, etc).

* The decline of China's agricultural exports in the 1980s is not only a result of rapid economic growth and capital accumulation but also a result of partial removal of the market distortions. A unified economy has not been established and various government regulations exist. Should these distortions be removed entirely, the agricultural share in production and exports may decline even more rapidly. Should China choose an alternative development policy, importing most of its agricultural goods and using its abundant resource (unskilled labour) to produce more labour intensive manufactures, further economic gains can be achieved.

9.1.2 Manufactures

* Given China's market distortions, capital intensive production and exports were encouraged in the urban state owned sector. The production mix and export composition tend to be more capital intensive than otherwise. Prior to the reforms, the state owned industries dominated China's industrial production and foreign trade, therefore the production and international trade pattern were basically irrational (Chapter 6). The share of capital intensive manufactures in production and exports was higher than other countries at a similar income level, and the production structure in the urban sector was not changed by economic reform and the open door policy in the 1980s (Chapter 7).

* As a result of adopting a strong import substitution policy, labour intensive manufacturing production and exports were discouraged. The import substitution policy prevented the full exploitation of China's comparative advantage. Incorporating the bulk of market distortions, this policy induced serious economic problems such as accumulation of rural surplus labour, divergences in factor rewards and inefficiency in resource allocation (Chapters 4 and 7).

* China's dualism was eroded by the economic reforms but in a particular form, encouraging the development of rural manufacturing enterprises. The rural enterprises were created by a partial release of capital mobility, along with the remaining rural-urban migration restrictions and "price scissors" gaps between agricultural goods and manufactures.

* The emergence of rural enterprises in the early 1980s shifted the production and international trade pattern toward China's comparative advantage. As a result, China's production and international trade became more reasonable in the later 1980s than in the early period (Chapter 3). Nevertheless, the dualism still exists in China's production and export structure: the urban industry produces and exports capital intensive products while the rural industry produces and exports labour intensive products (Chapters 6, 7 and 8).

* The emergence of rural enterprises and their considerable importance in creating labour intensive manufacturing exports, may indicate the most significant impact of the factor market liberalisations. When commodity price distortions accelerate the change of export pattern from agricultural goods to

manufactures, discriminate trade policy may encourage some capital intensive goods to export (Chapters 4 and 6).

* A dualism in production and exports implies that further economic gains are available should this dualism be removed by encouraging factor mobility and abolishing price distortions. If the reforms proceed in these directions, the share of China's agricultural exports may decline more rapidly and its exports will become even more labour intensive. This in turn, will generate economic growth as well as allocative efficiency in the future.

9.1.3 Foreign Trade Policy

* China's foreign trade policies have been contradictory, inconsistent, and to a less extent, ineffective for many years (Section 4.3). Those policies are based on an autarchic (self-sufficiency) or import substitution framework. Political considerations rather than economic rationalism are the main concerns of the policy designers. The theory of comparative advantage was usually criticised.

* The reforms in the foreign trade sector so far have been concentrated on the management efficiency of the sector itself. The linkage between domestic market distortions and external transactions in terms of a cost-benefit comparison has not been examined. The reforms in the foreign trade sector have encouraged the growth of foreign trade volume, but this growth would not necessarily maximise economic gains, since the inefficiencies of production, managements and transactions may remain (Section 4.3).

* Since China's real comparative advantage could be disguised by a great variety of market distortions, the "wrong" policy package is likely to be accepted by the current authorities. For example, the current policy tends to encourage the production and/or export of several capital intensive and high-tech commodities (Chapter 4). These commodities include machinery (including automobiles), chemical products (including chemical fibres) and electronics. The high rate of effective protection on these products may not only result in shifting these products to a level of self-sufficiency, but also transferring them into exports. This consequence will be enforced by government interventions in terms of administrative resource allocation, restriction on factor mobility and price distortions.

9.2 Policy Implications

* China's economic reforms have been identified as successful for its eventual evolution rather than radical revolution, in contrast to most of the East European countries and the Former Soviet Republics (Chen, Jefferson and Singh, 1992). Nevertheless, this study argues that China's reforms so far are far from ideal. The process of reform is characterised by partial liberalisations of the markets and contradictory policy packages (Table 4.6). Some of the problems might have been avoided, or substantially mitigated, through the choice of an alternative or revised reform strategy. The rapid growth of the economy can be largely attributed to its long history of mass poverty, lack of a democratic tradition and a large proportion of farmers in the population. Further reforms should be processed toward a more complete transition from the central planning model to a market economy. This transition would not necessarily be radical, but should be carefully designed and as

complete as possible. A comprehensive reform should include the reforms on ownership, factor markets, price regimes as well as foreign trade management.

* In reality a comprehensive blue-print of reforms will not be always available, especially in developing countries where the ability to plan is lacking and reliable data are scarce. Therefore a process of decentralisation of economic power will be a wise choice. Decentralisation requires limiting the functions of the government and elimination of most (if not all) the government interventions on economic activities. From the experience of China's rural economic reform, this liberal policy may derive more positive results than the current interventionist policies.

* No matter how liberal a domestic policy the government would choose, the design of a foreign trade policy is always necessary. Facing the pressure of restoring China's GATT membership, protection of several capital intensive industries is likely to be removed. An adjustment to the current industrial structure is required and this will, although with a time lag, induce a radical extension of labour intensive manufacturing activities. The demand for an unskilled labour force will in turn be created (Chapters 7 and 8 show the case of the TVEs). Given this circumstance, the elimination of the so-called urban-rural isolation policy is needed. If entire removal of the RUMR is not plausible in the short run, sector specialisation should be encouraged. Thus GATT membership will put pressure on various aspects of domestic policy.

* As suggested by this study, while China's comparative advantage is rooted in its abundant factor endowment, i.e., unskilled labour force, there is room for the development of its labour intensive manufacturing products. Promoting

labour intensive manufacturing production will exploit China's production potential and solve the problems of surplus labour, under-employment, shortage of capital and foreign exchange, which may constitute the country's main bottle-neck elements for further economic growth.

* Given its population size and endowments of resources, China has no comparative advantage in agricultural products and physical capital intensive industrial goods. The law of comparative advantage requires that these products could be the main imports of China for a relatively long time. Nevertheless, international trade in these key products will involve more political and security considerations other than merely economic rationalism. These issues are well beyond the scope of this thesis.

9.3 Remarks for Further Studies

* The theoretical framework established in this thesis needs further extension to reflect more realistic situations. The four-factor four-goods model introduced in Chapter 5 can be developed toward a computable general equilibrium (CGE) model (see Appendix 3), to include non-traded goods as well as intermediate inputs. CGE modelling has been widely used in quantitative evaluations of an economy's economic policies, especially foreign trade policies. Should the model be developed, the arguments initiated in this thesis will be greatly enriched.

* The bulk of government interventions in the foreign trade sector, for example, export subsidies, import quotas and licences, etc., has not been discussed in detail in this thesis, mainly due to space constraints. Given the significance of these interventions on China's production and international trade, incorporation of

these distortions should be considered in further research. As argued by Krueger (1977), government subsidies could make any commodity exportable, no matter how weak this commodity is in terms of comparative advantage in that country. A comprehensive theoretical framework requires a more sophisticated model and provides opportunities for further studies.

* Since the methodology of the current study is static or comparatively static, more sophisticated studies involving dynamic simulation would undoubtedly benefit the analysis. For example, Anderson and Tyers (1987) and Anderson (1989, 1990b) linked up the increase of China's manufacturing exports and decrease of its agricultural exports with its rapid economic growth and capital accumulation over the reform period. Although the current study is not inconsistent with their conclusions, a quantitative synthesis of these will derive more interesting results.

* Many scholars (for example Li Yining, 1991) argued that China's economy is far from balanced. Therefore most of the studies based on equilibrium models may fail to provide realistic solutions and predictions. The remedy adopted by the current thesis for this situation is to divide the disequilibrium economy into two parts; rural versus urban sectors, and assume that an equilibrium can be achieved in each sector. However, further division is possible and some disequilibrium models could be also developed.

No economic research is perfect. Aiming to study the most comprehensive activities in the world--human economic behaviour--perhaps the most reliable practice is for an economist to choose as many methodologies as possible, then compare the final results from different approaches. If most of the results point to

a similar solution, the solution could be confidently accepted, otherwise more efforts should be made to verify the problems. The current study has attempted to make a contribution to the available result by an analysis of the issues in China' foreign trade.

APPENDIX 1

THE RANKING AND CLASSIFICATION OF CHINA'S INDUSTRIES BY FACTOR INTENSITY

This appendix displays the ranking of China's manufacturing industries in detail (Tables A1.2 and A1.3 and Figures A1.1-A1.4). The industries can loosely be divided by two grades: the first grade is in the sectoral level, which includes the distinction in different ownership, size and industrial groups (light or heavy industries, etc); the second grade is constituted by the 40 branches within China's manufacturing sector.

It should be noted that the demarcation line of each groups in Table A1.2 and Table A1.3 is based on the national average level of each indicator rather than the number of total industries investigated. For example, the classification based on industry method is made by the 26th place of the ranking in FK/worker and 24th place of the ranking in skill ratio, rather than 20 to 20 of the total industries. While for the ranking of RCVA/worker and RWB/VA, it is 19th and 11th respectively.

Figure A1.1 The fixed capital per worker of China's manufacturing industries, 1985, classified by ownership, size and industrial character.

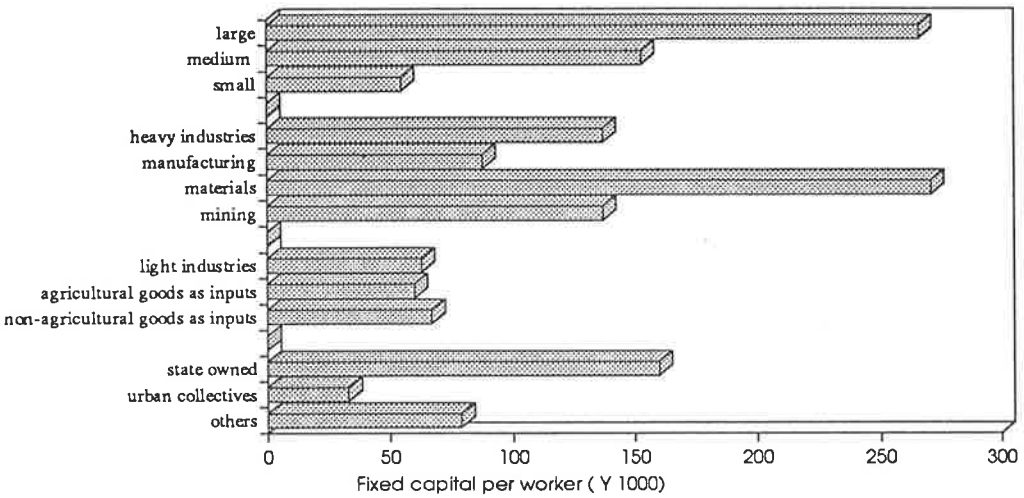

Figure A1.2 The skill ratio of China's manufacturing industries, 1985, classified by ownership, size and industrial character.

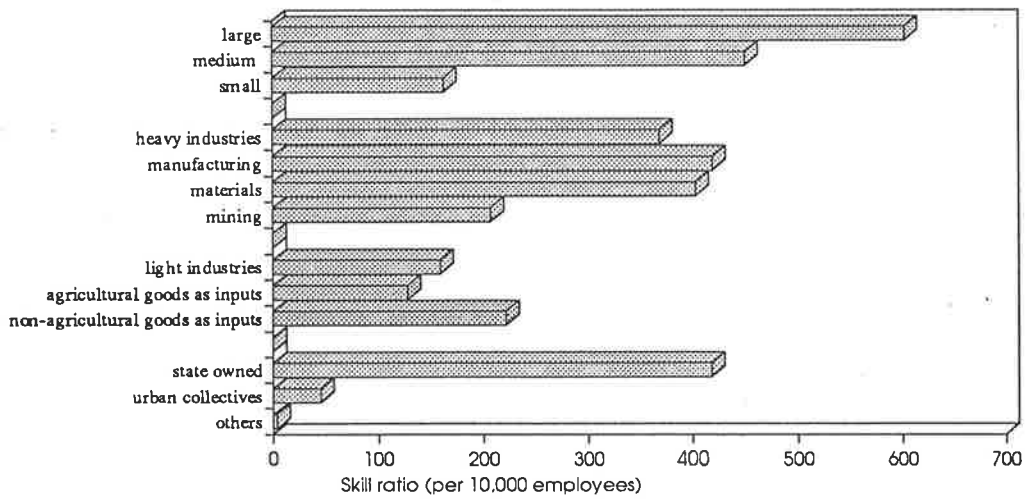

Figure A1.3 The real cost of value added per worker of China's manufacturing industries, 1985, classified by ownership, size and industrial character.

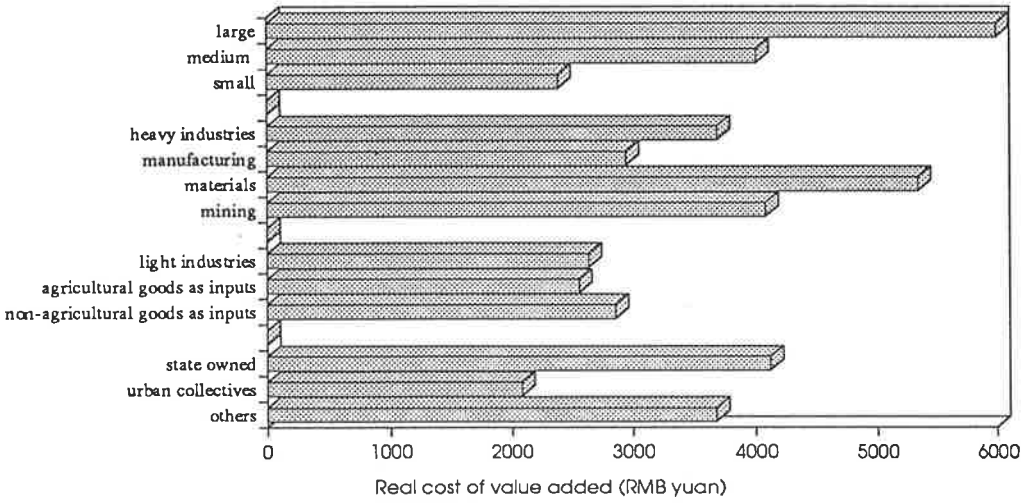

Figure A1.4 The ratio of real wage bill on real cost of value added, China's manufacturing industries, 1985, classified by ownership, size and industrial character.

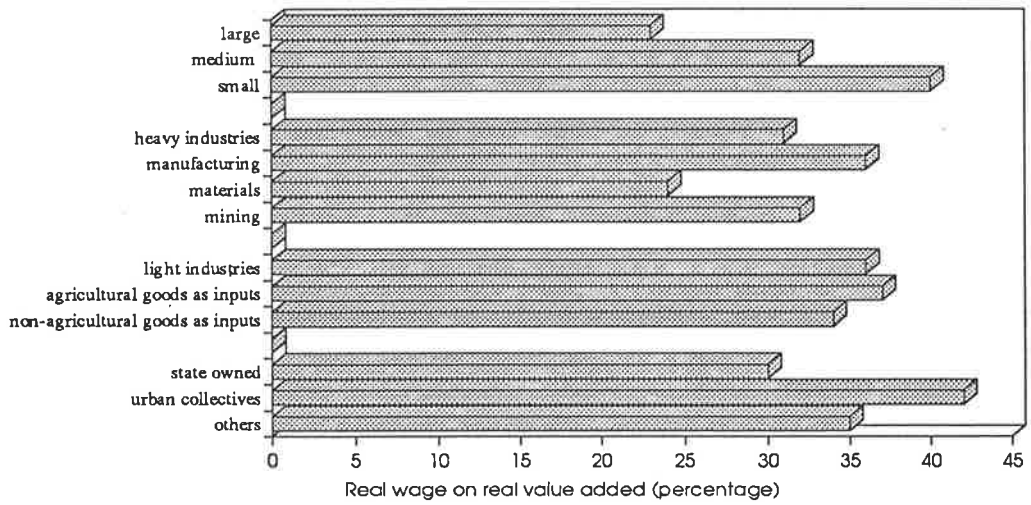

Table A1.1 Industrial Branches Abbreviations

Abbreviations	Industrial Branches
1. NRI	**1. Natural resource intensive**
OTHERMINE	mining of other minerals
MINBUID	mining & preparation of building materials
TIMBER	logging & transport of timber & bamboo
SALT	salt mining
COAL	coal mining & preparation
FERMETAL	ferrous metals mining & preparation
NONFEMET	non ferrous mining & preparation
COKING	coking, gas & coal-related products
PETROLUME	petroleum & natural gas extraction
2. LI	**2. Labour intensive**
CLOTHING	clothing
ARTS	arts & crafts
FURNITURE	furniture manufacture
OTHERS	others
LEATHER	leather, furs & manufactured goods
CULTURAL	cultural, educational & sports materials
METAL	metal products
TIMPRO	timber processing, bamboo, cane, palm fibre
PLASTIC	plastic manufactured goods
PRINTING	printing
BULDMAT	building materials & other non-metal goods
TEXTILES	textile manufacture
RUBBER	rubber manufactured goods
FOODMA	food manufacture
BEVERAGE	beverage manufacture
PAPER	paper making & manufactured goods
3. HKI	**3. Human capital intensive**
ELETRICMA	electric equipment & machinery
INSTRUME	instruments, meters & other measuring equipment
MACHINE	machine building
MEDICAL	medical & pharmaceutical goods
ELECTRONIC	electronic & telecommunication equipment
TRANSPORT	transportation equipments
4. PKI	**4. Physical capital intensive**
ANIMALFD	animal feed manufacture
TOBACCO	tobacco manufacture
CHEMICAL	chemical industry
SMELTFER	smelting & pressing of ferrous metals
SMELTNON	smelting & pressing of non-ferrous metals
CHEMIFIB	chemical fibres
RUNWATER	production & supply of running water
PETROPRO	petroleum processing
POWER	power generation steam & hot water supply
5. AGRCUL	**Agriculture**
TOTAL	**Total**

Table A1.2 The combined ranking and classification of China's manufacturing industrial branches by fixed capital per worker and skill ratios, 1985

Classification	FK/worker		Skill ratio	
	Ranking	Value (Y)	Ranking	%
1. Labour Intensive				
clothing	1	2097	2	0.5
arts & crafts	2	2171	5	0.8
mining of other minerals	3	2353	1	0.4
furniture manufacture	4	3274	4	0.7
others	5	3566	3	0.6
leather, furs & manufactured goods	6	3659	5	0.8
cultural, educational & sports materials	7	4086	17	1.5
metal products	8	4451	19	1.6
timber processing, bamboo, cane, palm fibre	9	4846	9	1
mining & preparation of building materials	10	4879	10	0.8
plastic manufactured goods	11	5747	13	1.4
printing	12	5872	7	0.8
building materials & other non-metal goods	13	5997	10	1.2
textile manufacture	14	6079	16	1.5
rubber manufactured goods	16	6079	23	2.5
food manufacture	18	8158	12	1.3
beverage manufacture	19	8321	21	1.6
paper making & manufactured goods	20	8429	18	1.5
animal feed manufacture	21	8947	11	1.2
tobacco manufacture	26	9894	14	1.4
2. Human Capital Intensive				
electric equipment & machinery	15	6304	30	4.1
instruments, meters & other measuring equipment	17	7252	39	8.1
logging & transport of timber & bamboo	22	9098	27	3.2
machine building	23	9164	32	4.8
medical & pharmaceutical goods	24	9247	35	5.7
electronic & telecommunication equipment	25	9545	40	8.9
3 Physical Capital Intensive				
salt mining	27	10046	15	1.4
coal mining & preparation	29	11197	20	1.6
ferrous metals mining & preparation	30	12148	22	2.3
coking, gas & coal-related products	33	16898	24	2.6
4. Physical & Human Capital Intensive				
transportation equipments	28	11015	36	5.8
non ferrous mining & preparation	31	14293	25	3.1
chemical industry	32	16204	28	3.8
smelting & pressing of ferrous metals	34	22081	29	4
smelting & pressing of non-ferrous metals	35	22903	31	4.8
chemical fibres	36	34349	34	5.3
production & supply of running water	37	39027	26	3.2
petroleum processing	38	44647	38	7.4
petroleum & natural gas extraction	39	66693	33	5.2
power generation steam & hot water supply	40	79196	37	6.2

Table A1 3 The combined ranking and classification of China's manufacturing industrial branches by real cost of value added per worker and real wage to real cost of value added, 1985

Classification	Ranking of RCVA/worker		Ranking of RWVA	
	10% adjustment	5% adjustment	10% adjustment	5% adjustment
1. Labour Intensive				
mining of other minerals	1	1	22	28
timber processing, bamboo, cane, palm fibre	2	2	34	32
clothing	3	6	25	30
arts & crafts	5	7	21	21
furniture manufacture	6	5	36	39
mining & preparation of building materials	7	4	40	40
building materials & other non-metal goods	8	8	31	35
leather, furs & manufactured goods	9	9	26	31
metal products	10	10	37	36
printing	11	11	29	33
cultural, educational & sports materials	12	12	38	38
plastic manufactured goods	13	16	13	15
textile manufacture	14	13	19	22
paper making & manufactured goods	15	14	17	20
food manufacture	16	15	14	18
ferrous metals mining & preparation	18	18	27	29
coal mining & preparation	19	26	33	34
2. Labour or Physical Capital Intensive				
others	4	3	9	12
animal feed manufacture	17	17	11	14
3. Human Capital Intensive				
rubber manufactured goods	20	23	18	16
logging & transport of timber & bamboo	21	22	35	32
coking, gas & coal-related products	23	19	20	27
electric equipment & machinery	24	25	28	19
machine building	25	20	30	25
non ferrous mining & preparation	26	27	24	24
instruments, meters & other measuring equipment	27	21	39	26
transportation equipments	28	28	32	23
chemical industry	29	29	12	9
medical & pharmaceutical goods	30	30	16	13
smelting & pressing of ferrous metals	31	31	15	17
electronic & telecommunication equipment	32	32	23	11
tobacco manufacture	33	34	5	6
4. Human & Physical Capital Intensive				
beverage manufacture	22	24	8	10
production & supply of running water	34	33	7	8
salt mining	35	37	3	4
smelting & pressing of non-ferrous metals	36	35	10	7
chemical fibres	37	36	6	5
petroleum processing	38	38	4	3
power generation steam & hot water supply	39	39	2	2
petroleum & natural gas extraction	40	40	1	1

Notes: **FK/worker: fixed capital per worker.**
RCVA: Real cost of value added (adjusted) per worker.
RWVA: Real wage bill (adjusted wage bill) on value added.

APPENDIX 2

Transformation of China's Industry Groupings into Standard International Trade Classification

BRANCHES	China's Industrial Classification	STIC Aggregate
1. Natural resource intensive		
coal mining & preparation	0818-20	3214
petroleum & natural gas extraction	1910-30	331, 3411
ferrous metals mining & preparation	1010-30	2742, 281, 282
non ferrous mining & preparation	1111-69	283-286, 667
mining & preparation of building materials	1211-99	273
salt mining	1310-40	2763
mining of other minerals	1400-	272, 274, 275, 276-2763-2764
logging & transport of timber & bamboo	1510-20	24
production & supply of running water	1600-	NT
coking, gas & coal-related products	3510-30	3215-3218, 3412
2. Labour intensive		
food manufacture	1711-1899	012, 013, 032, 046, 06, 07, 09, 43
beverage manufacture	1911-90	11
textile manufacture	2211-90	267, 65
clothing	2410-90	84, 85
leather, furs & manufactured goods	2511-42	61, 83
timber processing, bamboo, cane, palm fibre	2610-40	63
furniture manufacture	2710-90	82
paper making & manufactured goods	2810-30	25, 64
printing	2900-	892
cultural, educational & sports materials	3011-90	8914, 8918, 8919, 894, 895
arts & crafts	3110-99	896, 897
rubber manufactured goods	4110-4290	2312-2314, 62
plastic manufactured goods	4310-4490	58, 893
building materials & other non-metal goods	4510-4690	2764, 661-666
metal products	5131-5299	69, 81
others	6610-20	899, 91, 95, 96
3. Human capital intensive		
machine building	5311-5590	71, 8614-8616, 864
transportation equipments	5611-90	73
electric equipment & machinery	5811-5899	721-723, 725, 729
electronic & telecommunication equipment	6011-6190	724, 726, 8911, 8912
instruments, meters & other measuring equipment	6311-90	8611-8613, 8617-8619
medical & pharmaceutical goods	3810-80	54
4. Physical capital intensive		
tobacco manufacture	2010-90	12
forage manufacture	2110-90	08,
power generation steam & hot water supply	3311-30	35
petroleum processing	3410-20	332
chemical industry	3611-3789	51-53, 55-57, 59, 862, 863
chemical fibres	4011-29	266
smelting & pressing of ferrous metals	4810-80	67
smelting & pressing of non-ferrous metals	4911-5120	68
5. Agricultural products		
agricultural products		00, 001, 011, 02, 031, 04 less 046 05, 21, 22, 2311, 261-265, 271, 29, 41, 42, 94, NES from 0-4

Note: NT-- non tradeables

APPENDIX 3

A COMPUTABLE GENERAL EQUILIBRIUM MODEL OF CHINA[1]

A3.1 The Solutions of the Production Model

Given the model

1 $l_u X_u = L_u$

2 $h_a X_a + h_c X_c = H$

3 $k_u X_u + k_r X_r = K$

4 $l_a X_a + l_c X_c + l_r X_r = L$

5 $l_u W_u + k_u R = P_u$

6 $l_r W + k_r R = P_r$

7 $l_a W + h_a N = P_a$

8 $l_c W + h_c N = P_c$

9 $\mathbf{X_u = Lu - l_u}$

10 $Y_{ha}\mathbf{X_a} + Y_{hc}\mathbf{X_c} = \mathbf{H} - (Y_{ha}\mathbf{h_a} + Y_{hc}\mathbf{h_c})$

11 $Y_{ku}\mathbf{X_u} + Y_{kr}\mathbf{X_r} = \mathbf{K} - (Y_{ku}\mathbf{k_u} + Y_{kr}\mathbf{k_r})$

12 $Y_{lr}\mathbf{X_r} + Y_{la}\mathbf{X_a} + Y_{lc}\mathbf{X_c} = \mathbf{L} - (Y_{lr}\mathbf{l_r} + Y_{la}\mathbf{l_a} + Y_{lc}\mathbf{l_c})$

13 $\mathbf{P_u} = Q_{lu}\mathbf{W_u} + Q_{ku}\mathbf{R}$

14 $\mathbf{P_r} = Q_{lr}\mathbf{W} + Q_{kr}\mathbf{R}$

15 $\mathbf{P_a} = Q_{la}\mathbf{W} + Q_{ha}\mathbf{N}$

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[1]. The model has greatly benefited from that developed by Prachowny (1975).

16 $\mathbf{P_c} = Q_{lc}W + Q_{hc}N$

the ls, ks and hs can be solved and substituted into 1.9-1.16 to express proportional changes of the eight endogenous variables, $\mathbf{X_u}$, $\mathbf{X_r}$, $\mathbf{X_a}$, $\mathbf{X_c}$, $\mathbf{W_u}$, **R**, **W** and **N** in terms of the exogenous variables (the proportional changes in prices and endowments) and the parameters (factor distribution shares and the elasticities of substitution).

The factor prices can easily be solved by using equation 13-16.

For example, from 15, we have

$\mathbf{N} = \mathbf{P_c}/Q_{ha} - Q_{lc}W/Q_{ha}$, substitute it into 1.16 to get

$\mathbf{P_a} = Q_{lc}W + Q_{lc}\mathbf{P_c}/Q_{ha} - Q_{hc}Q_{la}W/Q_{ha}$

then

17 $\mathbf{W} = Q_{hc}\mathbf{P_a}/(Q_{lc}Q_{ha} - Q_{hc}Q_{la}) - Q_{ha}\mathbf{P_c}/(Q_{lc}Q_{ha} - Q_{hc}Q_{la})$

Note that $Q_{hc}=1-Q_{lc}$, $Q_{hc}=1-Q_{la}$, substitute to attain

$\mathbf{W} = Q_{hc}\mathbf{P_a}/Q_{la} - Q_{lc}) - Q_{ha}\mathbf{P_c}/(Q_{la} - Q_{lc})$

Subsequently, we can substitute **W** into 1.15 to attain

$\mathbf{N} = \mathbf{P_a}/Q_{ha} - Q_{la}W/Q_{ha}$

$= \mathbf{P_a}/Q_{ha} - Q_{la}Q_{hc}\mathbf{P_a}/Q_{ha}(Q_{la}-Q_{lc}) - Q_{la}Q_{ha}\mathbf{P_c}/Q_{ha}(Q_{la}-Q_{lc})$

$= (\mathbf{P_a}(1-Q_{la}Q_{hc}/(Q_{la}-Q_{lc}) + Q_{la}Q_{ha}\mathbf{P_c}/(Q_{la}-Q_{lc}))/Q_{ha}$

$= (\mathbf{P_a}(Q_{la}-Q_{lc}-Q_{la}Q_{hc})/(Q_{la}-Q_{lc}) + Q_{la}Q_{ha}\mathbf{P_c}/(Q_{la}-Q_{lc}))/Q_{ha}$

Note

$(Q_{la}-Q_{lc}-Q_{la}Q_{hc})$

$=Q_{la}(1-Q_{hc})-Q_{lc}$

$=Q_{la}Q_{lc}-Q_{lc}$

$=-Q_{lc}(1-Q_{la})$

$=-Q_{lc}Q_{ha}$

then

18 $\mathbf{N} = Q_{la}\mathbf{P_c}/(Q_{la}-Q_{lc}) - Q_{lc}\mathbf{P_a}/(Q_{la}-Q_{lc})$

From 1.14 we have

14' $\mathbf{R} = \mathbf{P_r}/Q_{kr} - Q_{lr}\mathbf{W}/Q_{kr}$

substitute **W** into 14'

$\mathbf{R} = \mathbf{P_r}/Q_{kr} - Q_{lr}Q_{hc}\mathbf{P_a}/Q_{kr}(Q_{la}-Q_{lc}) - Q_{lr}Q_{ha}\mathbf{P_c}/Q_{kr}(Q_{la}-Q_{lc})$

$= (\mathbf{P_r} - Q_{lr}Q_{hc}\mathbf{P_a}/(Q_{la}-Q_{lc}) + Q_{lr}Q_{ha}\mathbf{P_c}/(Q_{la}-Q_{lc}))/Q_{kr}$

19 $\mathbf{R} = (\mathbf{P_r}(Q_{la}-Q_{lc}) - Q_{lr}Q_{hc}\mathbf{P_a} + Q_{lr}Q_{ha}\mathbf{P_c})/Q_{kr}(Q_{la}-Q_{lc})$

Substitute 19 into 13 to get

20 $$W_u = P_u/Q_{lu} - Q_{ku}R/Q_{lu}$$
$$= P_u/Q_{lu}-Q_{ku}P_r/Q_{lu}Q_{kr}$$
$$+Q_{ku}(Q_{lr}Q_{hc}P_a-Q_{lr}Q_{ha}P_c)/Q_{lu}Q_{kr}(Q_{la}-Q_{lc})$$

According to the definition of the elasticities, we can solve

21 $$l_u = -Q_{ku}E_u(W_u-R)$$

22 $$l_r = -Q_{kr}E_r(W-R)$$

23 $$l_a = -Q_{ha}E_a(W-N)$$

24 $$l_c = -Q_{hc}E_c(W-N)$$

25 $$k_u = Q_{lu}E_u(W_u-R)$$

26 $$k_r = Q_{lr}E_r(W-R)$$

27 $$h_a = Q_{la}E_a(W-N)$$

28 $$h_c = Q_{lc}E_c(W-N)$$

Note

$$(W-N)=Q_{hc}P_a/(Q_{la}-Q_{lc})-Q_{ha}P_c/(Q_{la}-Q_{lc})$$
$$-Q_{la}P_c/(Q_{la}-Q_{lc})+Q_{lc}P_a/(Q_{la}-Q_{lc})$$
$$=(Q_{hc}P_a+Q_{lc}P_a)/(Q_{la}-Q_{lc})-(Q_{ha}P_c+Q_{la}P_c)/CQ_{la}-Q_{lc})$$
$$=(P_a-P_c)/(Q_{la}-Q_{lc})$$

Subsequently

$$(W-R)=(Q_{hc}P_a-Q_{ha}P_c)/Q_{kr}(Q_{la}-Q_{lc})-P_r/Q_{kr}$$

$$(\mathbf{W_u}-\mathbf{R})=\mathbf{P_u}/Q_{lu}+Q_{lr}(Q_{hc}\mathbf{P_a}-Q_{ha}\mathbf{P_c})/Q_{lu}Q_{kr}(Q_{la}-Q_{lc})-\mathbf{P_r}/Q_{lu}Q_{kr}$$

Substitute 21 into 9 to obtain

$$\begin{aligned}\mathbf{X_u} &= \mathbf{L_u}+Q_{ku}E_u(\mathbf{W_u}-\mathbf{R})\\ &= \mathbf{L_u}+Q_{ku}E_u(\mathbf{P_u}/Q_{lu}+(Q_{hc}\mathbf{P_a}-Q_{ha}\mathbf{P_c})/Q_{lu}Q_{kr}(Q_{la}-Q_{lc})\\ &\quad -\mathbf{P_r}/Q_{lu}Q_{kr})\\ &= \mathbf{L_u}+Q_{ku}E_u(Q_{kr}\mathbf{P_u}-\mathbf{P_r})/Q_{lu}Q_{kr}\\ &\quad +Q_{ku}Q_{lr}E_u(Q_{hc}\mathbf{P_a}-Q_{ha}\mathbf{P_c})/Q_{lu}Q_{kr}(Q_{la}-Q_{lc})\end{aligned}$$

Substitute 25, 26 into 11 to get

$$\begin{aligned}\mathbf{X_r} &= (\mathbf{K}-(Y_{ku}\mathbf{k_u}+Y_{kr}\mathbf{k_r})-Y_{ku}\mathbf{X_u})/Y_{kr}\\ &= (\mathbf{K}-(Y_{ku}Q_lE_u(\mathbf{W_u}-\mathbf{R})\\ &\quad -Y_{kr}Q_lE_r(\mathbf{W}-\mathbf{R})\\ &\quad -Y_{ku}\mathbf{X_u})/Y_{kr}\\ &= (\mathbf{K}-Y_{ku}\mathbf{Lu})/Y_{kr}-Y_{ku}E_u\mathbf{P_u}/Q_{lu}Y_{kr}\\ &\quad +(E_uY_{ku}+E_rY_{kr}Q_{lu}Q_{lr})\mathbf{P_r}/Y_{kr}Q_{kr}Q_{lu}\\ &\quad -(E_uQ_{ku}Q_{lr}Q_{hc}+E_rY_{kr}Q_{lu}Q_{lr}Q_{hc})\mathbf{P_a}/Y_{kr}Q_{kr}Q_{lu}(Q_{la}-Q_{lc})\\ &\quad +(E_uQ_{ku}Q_{lr}Q_{ha}+E_rY_{kr}Q_{lu}Q_{lr}Q_{ha})\mathbf{P_c}/Y_{kr}Q_{kr}Q_{lu}(Q_{la}-Q_{lc})\end{aligned}$$

From 10 we have

10' $\quad \mathbf{X_c} = (\mathbf{H}-(Y_{ha}\mathbf{h_a}+Y_{hc}\mathbf{h_c})-Y_{ha}\mathbf{X_a})/Y_{hc}$

Substitute 10' into 12 to get

$$\mathbf{X_a}=(Y_{hc}\mathbf{H}-Y_{hc}(Y_{lr}\mathbf{l_r}+Y_{la}\mathbf{l_a}+Y_{lc}\mathbf{l_c})$$
$$-Y_{lc}(\mathbf{L}-Y_{lr}\mathbf{h_a}+Y_{hc}\mathbf{h_c})-Y_{lr}\mathbf{X_r})/(Y_{la}Y_{hc}-Y_{lc}Y_{ha})$$

Using 22, 23, 24, 27, 28, 29 to obtain

$$\begin{aligned}\mathbf{X_a} = (&Y_{hc}\mathbf{L}-Y_{lc}\mathbf{H}-Y_{lr}Y_{hc}\mathbf{K}/Y_{kr}+Y_{lr}Y_{hc}\mathbf{L_u}/Y_{kr}\\
&+Y_{ku}Y_{hc}Y_{lr}E_u\mathbf{P_u}/Y_{kr}Q_{lu}\\
&-Y_{lr}Y_{hc}(Y_{kr}Q_{lu}E_r+Y_{ku}E_u)\mathbf{P_r}/Y_{kr}Q_{lu}Q_{kr}\\
&+(Y_{lr}Y_{hc}Q_{lr}Q_{hc}(Y_{ku}E_u+Y_{kr}Q_{lu}E_r)\\
&+Q_{kr}Q_{lu}Y_{kr}(E_a(Y_{hc}Y_{la}Q_{ha}+Y_{lc}Y_{ha}Q_{la})\\
&+Y_{lc}Y_{hc}E_c))\mathbf{P_a}/Y_{kr}Q_{kr}Q_{lu}(Q_{la}-Q_{lc})\\
&-(Y_{lr}Y_{hc}Q_{lr}Q_{ha}(Y_{ku}E_u+Y_{kr}Q_{lu}E_r)\\
&+Q_{kr}Q_{lu}Y_{kr}(E_a(Y_{hc}Y_{la}Q_{ha}+Y_{lc}Y_{ha}Q_{la})\\
&+Y_{lc}Y_{hc}E_c))\mathbf{P_c}/Y_{kr}Q_{kr}Q_{lu}(Q_{la}-Q_{lc}))/(Y_{la}Y_{hc}-Y_{lc}Y_{ha})\end{aligned}$$

By the same token, we can solve

$$\begin{aligned}\mathbf{X_c} = (&Y_{la}\mathbf{H}-Y_{ha}\mathbf{L}+Y_{lr}Y_{ha}\mathbf{K}/Y_{kr}-Y_{lr}Y_{ha}\mathbf{L_u}/Y_{kr}\\
&-Y_{ku}Y_{ha}Y_{lr}E_u\mathbf{P_u}/Y_{kr}Q_{lu}\\
&+Y_{lr}Y_{ha}(Y_{kr}Q_{lu}E_r+Y_{ku}E_u)\mathbf{P_r}/Y_{kr}Q_{lu}Q_{kr}\\
&-(Y_{lr}Y_{ha}Q_{lr}Q_{hc}(Y_{ku}E_u+Y_{kr}Q_{lu}E_r)\\
&+Q_{kr}Q_{lu}Y_{kr}(E_c(Y_{ha}Y_{lc}Q_{hc}+Y_{la}Y_{hc}Q_{lc})\\
&+Y_{la}Y_{ha}E_a))\mathbf{P_a}/Y_{kr}Q_{kr}Q_{lu}(Q_{la}-Q_{lc})\\
&+(Y_{lr}Y_{ha}Q_{lr}Q_{ha}(Y_{ku}E_u+Y_{kr}Q_{lu}E_r)\\
&+Q_{kr}Q_{lu}Y_{kr}(E_c(Y_{ha}Y_{lc}Q_{hc}+Y_{la}Y_{hc}Q_{lc})\\
&+Y_{ha}Y_{la}E_a))\mathbf{P_c}/Y_{kr}Q_{kr}Q_{lu}(Q_{la}-Q_{lc}))/(Y_{la}Y_{hc}-Y_{lc}Y_{ha})\end{aligned}$$

A3.2 Demand Conditions

The demand functions for these four commodities are

1 $A_u = A_u (P_u, P_r, P_a, P_c, Z)$

2 $A_r = A_r (P_u, P_r, P_a, P_c, Z)$

3 $A_a = A_a (P_u, P_r, P_a, P_c, Z)$

4 $A_c = A_c (P_u, P_r, P_a, P_c, Z)$

Where A_i (i = u, r, a, c) are domestic demands for the four goods, and P_i are prices of those goods. Z represents total expenditures. All demand functions are assumed to exhibit zero-degree homogeneity with respect to all prices and total expenditures.

In terms of proportional change, the demand relationships are

5 $\mathbf{A_u} = E_{Au,Pu}\mathbf{P_u} + E_{Au,Pr}\mathbf{P_r} + E_{Au,Pa}\mathbf{P_a} + E_{Au,Pc}\mathbf{P_c} + E_{Au,Z}\mathbf{Z}$

6 $\mathbf{A_r} = E_{Ar,Pu}\mathbf{P_u} + E_{Ar,Pr}\mathbf{P_r} + E_{Ar,Pa}\mathbf{P_a} + E_{Ar,Pc}\mathbf{P_c} + E_{Ar,Z}\mathbf{Z}$

7 $\mathbf{A_a} = E_{Aa,Pu}\mathbf{P_u} + E_{Aa,Pr}\mathbf{P_r} + E_{Aa,Pa}\mathbf{P_a} + E_{Aa,Pc}\mathbf{P_c} + E_{Aa,Z}\mathbf{Z}$

8 $\mathbf{A_c} = E_{Ac,Pu}\mathbf{P_u} + E_{Ac,Pr}\mathbf{P_r} + E_{Ac,Pa}\mathbf{P_a} + E_{Ac,Pc}\mathbf{P_c} + E_{Ac,Z}\mathbf{Z}$

Where the Es represent elasticities of the first subscripted variable with respect to the second subscripted variable, e.g.,$E_{au,pu} = (\partial A_u/\partial P_u)/(P_u/A_u)$. The bold-format letters denote proportional changes (e.g., $\mathbf{A_u}=dA_u/A_u$, etc.) as before.

In the absence of profits, total money income Y may be defined either in terms of returns to factors or total revenue from the sale of products, thus

9 $Y = W_uL_u + WL + RK + NH$
$= X_uP_u + X_rP_r + X_aP_a + X_cP_c$

In terms of proportional changes, 9 becomes

10 $$\mathbf{Y} = Q_{lu}(\mathbf{W_u}+\mathbf{L_u}) + Q_l(\mathbf{W}+\mathbf{L}) + Q_k(\mathbf{R}+\mathbf{K}) + Q_h(\mathbf{N}+\mathbf{H})$$

$$= Q_u(\mathbf{P_u}+\mathbf{X_u}) + Q_r(\mathbf{P_r}+\mathbf{X_r}) + Q_a(\mathbf{P_a}+\mathbf{X_a}) + Q_c(\mathbf{P_c}+\mathbf{X_c})$$

Where Q_i (i=lu, l, k, h) are the shares of each factor in total income and Qj (j=u, r, a, c) are the shares of the four commodities in total income.

From definition, we know that

$$Q_{lu} + Q_l + Q_k + Q_h = 1$$

$$Q_{xu} + Q_{xr} + Q_{xa} + Q_{xc} = 1$$

Total expenditures on the four goods are given by

11 $$Z = P_uA_u + P_rA_r + P_aA_a + P_cA_c$$

Allowing for proportional changes, 11 becomes

12 $$\mathbf{Z} = Q_{Au}(\mathbf{P_u}+\mathbf{A_u}) + Q_{Ar}(\mathbf{P_r}+\mathbf{A_r}) + Q_{Aa}(\mathbf{P_a}+\mathbf{A_a}) + Q_{ac}(\mathbf{P_c}+\mathbf{A_c})$$

Define a price index (GNP deflator) as

13 $$P = X_uP_u + X_rP_r + X_aP_a + X_cP_c$$

Assuming initial prices equal one, 13 can be written in terms of proportional changes as

14 $$\mathbf{P} = Q_u\mathbf{P_u} + Q_r\mathbf{P_r} + Q_a\mathbf{P_a} + Q_c\mathbf{P_c}$$

Finally, trade balance represents the difference between income and expenditure

15 $B = Y - Z$

$= P_u(X_u-A_u) + P_r(X_r-A_r) + P_a(X_a-A_a) + P_c(X_c-A_c)$

If international trade is balanced, Y - Z means **Y - Z**.

A3.3 Price Endogenous

Unlike in the text, the prices are endogenoused when demand conditions are incorporated. Assuming domestic produced goods are all tradable and X_u and X_a are importable and X_r and X_c are exportable, foreign prices for these four goods are P_u*, P_r*, P_a* and P_c*, respectively. Any divergences between the domestic and foreign prices are indicated by the domestic tariffs on importable (t_u, t_a) and the foreign tariff on exportable (t_r* and t_c*). The exchange rate, expressed as the price of the foreign currency, is Π. The price vectors are as follows:

1 $P_u = \Pi P_u^* (1+t_u)$

2 $P_r = \Pi P_r^* (1/(1+t_r^*))$

3 $P_a = \Pi P_a^* (1+t_a)$

4 $P_c = \Pi P_c^* (1/(1+t_c^*))$

Holding only ti (i =u,a) and tj* (j=r,c) constant, we can derive the equations of change as:

5 $\mathbf{P_u} = \mathbf{P_u}^* + \Pi$

6 $\mathbf{P_r} = \mathbf{P_r}^* + \Pi$

7 $\mathbf{P_a} = \mathbf{P_a}^* + \Pi$

8 $\mathbf{P_c} = \mathbf{P_c}^* + \Pi$

With an adjustable-peg system of exchange rate, Π in 5-8 is exogenous.

A3.4 A CGE Model: Equations and Variables

The system is now fully determined. Assembling all the relevant equations in one place, the complete structure of the commodity and factor markets comes into focus:

1 $\mathbf{X_u} = \mathbf{L_u} + Q_{ku}E_u(\mathbf{W_u}-\mathbf{R})$

2 $\mathbf{X_r} = (\mathbf{K} - (Y_{ku}Q_lE_u(\mathbf{W_u}-\mathbf{R}) - Y_{kr}Q_lE_r(\mathbf{W}-\mathbf{R}) - Y_{ku}\mathbf{X_u})/Y_{kr}$

3 $$X_a = (Y_{hc}L - Y_{lc}H - Y_{lr}Y_{hc}K/Y_{kr} + Y_{lr}Y_{hc}L_u/Y_{kr}$$
$$+ Y_{ku}Y_{hc}Y_{lr}E_uP_u/Y_{kr}Q_{lu}$$
$$- Y_{lr}Y_{hc}(Y_{kr}Q_{lu}E_r + Y_{ku}E_u)P_r/Y_{kr}Q_{lu}Q_{kr}$$
$$+ (Y_{lr}Y_{hc}Q_{lr}Q_{hc}(Y_{ku}E_u + Y_{kr}Q_{lu}E_r)$$
$$+ Q_{kr}Q_{lu}Y_{kr}(E_a(Y_{hc}Y_{la}Q_{ha} + Y_{lc}Y_{ha}Q_{la})$$
$$+ Y_{lc}Y_{hc}E_c))P_a/Y_{kr}Q_{kr}Q_{lu}(Q_{la} - Q_{lc})$$
$$- (Y_{lr}Y_{hc}Q_{lr}Q_{ha}(Y_{ku}E_u + Y_{kr}Q_{lu}E_r)$$
$$+ Q_{kr}Q_{lu}Y_{kr}(E_a(Y_{hc}Y_{la}Q_{ha} + Y_{lc}Y_{ha}Q_{la})$$
$$+ Y_{lc}Y_{hc}E_c))P_c/Y_{kr}Q_{kr}Q_{lu}(Q_{la} - Q_{lc}))/(Y_{la}Y_{hc} - Y_{lc}Y_{ha})$$

4 $$X_c = (Y_{la}H - Y_{ha}L + Y_{lr}Y_{ha}K/Y_{kr} - Y_{lr}Y_{ha}L_u/Y_{kr}$$
$$- Y_{ku}Y_{ha}Y_{lr}E_uP_u/Y_{kr}Q_{lu}$$
$$+ Y_{lr}Y_{ha}(Y_{kr}Q_{lu}E_r + Y_{ku}E_u)P_r/Y_{kr}Q_{lu}Q_{kr}$$
$$- (Y_{lr}Y_{ha}Q_{lr}Q_{hc}(Y_{ku}E_u + Y_{kr}Q_{lu}E_r)$$
$$+ Q_{kr}Q_{lu}Y_{kr}(E_c(Y_{ha}Y_{lc}Q_{hc} + Y_{la}Y_{hc}Q_{lc})$$
$$+ Y_{la}Y_{ha}E_a))P_a/Y_{kr}Q_{kr}Q_{lu}(Q_{la} - Q_{lc})$$
$$+ (Y_{lr}Y_{ha}Q_{lr}Q_{ha}(Y_{ku}E_u + Y_{kr}Q_{lu}E_r)$$
$$+ Q_{kr}Q_{lu}Y_{kr}(E_c(Y_{ha}Y_{lc}Q_{hc} + Y_{la}Y_{hc}Q_{lc})$$
$$+ Y_{ha}Y_{la}E_a))P_c/Y_{kr}Q_{kr}Q_{lu}(Q_{la} - Q_{lc}))/(Y_{la}Y_{hc} - Y_{lc}Y_{ha})$$

5 $$P_u = Q_{lu}W_u + Q_{ku}R$$

6 $$P_r = Q_{lr}W + Q_{kr}R$$

7 $$P_a = Q_{la}W + Q_{ha}N$$

8 $$P_c = Q_{lc}W + Q_{hc}N$$

9 $$P_u = P_u^* + \Pi$$

10 $$P_r = P_r^* + \Pi$$

11 $$P_a = P_a^* + \Pi$$

12 $P_c = P_c^* + \Pi$

13 $A_u = E_{Au,Pu}P_u + E_{Au,Pr}P_r + E_{Au,Pa}P_a + E_{Au,Pc}P_c + E_{Au,Z}Z$

14 $A_r = E_{Ar,Pu}P_u + E_{Ar,Pr}P_r + E_{Ar,Pa}P_a + E_{Ar,Pc}P_c + E_{Ar,Z}Z$

15 $A_a = E_{Aa,Pu}P_u + E_{Aa,Pr}P_r + E_{Aa,Pa}P_a + E_{Aa,Pc}P_c + E_{Aa,Z}Z$

16 $A_c = E_{Ac,Pu}P_u + E_{Ac,Pr}P_r + E_{Ac,Pa}P_a + E_{Ac,Pc}P_c + E_{Ac,Z}Z$

17 $Z = Y$

18 $Y = Q_u (P_u+X_u) + Q_r(P_r+X_r) + Q_a (P_a+X_a) + Q_c (P_c+X_c)$

19 $P = Q_u P_u + Q_r P_r + Q_a P_a + Q_c P_c$

Endongeous variables (19):

X_u, X_r, X_a, X_c, W_u, R, W, N, ,P_u,,P_r, P_a, P_c, A_u, A_r, A_a, A_c, Y, Z, P

Exogenous variables (9):

L_u, K, L, H, ,P_u^*,,P_r^*, P_a^*, P_c^*, Π

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