Chapter 11: Cross-border Investment and Economic Integration: The Case of Guangdong Province and Hong Kong SAR

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1. Introduction: Cross-border Investment and Economic Integration in Guangdong Province and Hong Kong SAR in the Context of Globalization

Globalization—the integration of national economies into a global system—entails in part the transfer of manufacturing sectors from the industrialized world to developing countries. As Feenstra (1998) demonstrates, measured by the merchandise trade relative to value-added, the world is much more integrated than in the past. However, this on-going trade integration brings with it the disintegration of production processes, whereby, to increase profits, firms seek to outsource activities either domestically or abroad. This outsourcing of manufacturing and services spurs controversy and debate not only in the advanced countries from which the manufacturing sectors move, but also in the developing countries which receive the foreign direct investment (FDI). Leaders of advanced countries face political opposition to the unemployment that results from firms' relocating their production facilities abroad (Rodrik, 1997; Schultze, 2004). For their part, observers in FDI-recipient countries are concerned about the potentially negative effects of domination of the manufacturing sector by foreign-owned companies. Local industries in recipient countries must weather fierce competition

from their foreign counterparts and face difficulties in upgrading their technological competence from the low end of the global value chain. Motivated by intense debate about these issues, this paper undertakes a comparative empirical study of the performance of local and foreign competitors' manufacturing firms in one such FDI-recipient region—Guangdong Province, China—and analyzes the policy implications of the comparison for the advanced, FDI-outflow region—Hong Kong Special Administrative Region (HKSAR).

Among developing countries, China indisputably has attracted the most FDI over the past two decades. Around one-third of FDI to China in the period of 1985-2003 went to Guangdong province (see Figure 1). Guangdong was able to attract 30 percent of China's total FDI in part because of its geographical and cultural proximity to Hong Kong, Macau, and Taiwan, all three of which have invested heavily in China over the past 25 years. Ninety percent of FDI in Guangdong was invested by Hong Kong's entrepreneurs in 1985. The ratio fluctuated in the second half of the 1980s and decreased steadily after the mid 1990s, but in 2003, approximately 55 percent of FDI in Guangdong still came from Hong Kong.[1] During the period 1979-2001, cumulative FDI from Hong Kong in Guangdong amounted to US$79 billion, accounting for 71 percent of total cumulative FDI inflows in Guangdong (Federation of Hong Kong Industries, 2003). Nearly 70 percent of the FDI to China or Guangdong has been devoted to the manufacturing sectors, securing China's current position as a world manufacturing center.

[Figure 1 here]

[1] On the whole, China's FDI policy has been maturing gradually. Since 1997, for example, government policies began to focus more on linking FDI promotion to domestic industrial objectives. This was illustrated in the Guiding Catalogue of Foreign Investment Projects, in which FDI is classified into four categories: encouraged, restricted, prohibited, and permitted. For a more in-depth discussion of the changing nature of China's FDI policies, see, Fung et al. (2002).

From Hong Kong's perspective, Guangdong is the most important investment destination in Mainland China. Since the mid 1990s, Hong Kong-based entrepreneurs have allocated almost half of their investment in China to Guangdong (see Figure 1). Along with the transfer of manufacturing sectors to Mainland China, economic activities in Hong Kong have been reconfigured extensively. Indeed, since the opening of China Hong Kong has transformed itself from an industrializing city into a center of manufacturing-related service activities (Chan, 2002; Tao and Wong, 2002). A significant proportion of Hong Kong's income has been generated by China-related trade and investment. Sun and Wong (2000) estimate that the ratio of Hong Kong's China-related trade and investment to its GDP reached 24.4 percent in 1996.

Many scholars, in order to understand Hong Kong's economic interdependence with Guangdong, have thus far either dedicated themselves to analyzing Hong Kong's economic transition in the context of manufacturing cross-production in Guangdong (see, for example, Eng, 1997; Hollows, 1999; Kwong, et al., 2000) or focused on the two regions' economic integration from a Hong Kong perspective (Tuan and Ng, 1995, 2004). Few studies have examined the changing nature of economic ties between Hong Kong and Guangdong as a function of industry dynamics in Guangdong, especially studies that discuss policy measures. Yeung's (2001, 2002) articles are exceptions in examining Guangdong industrial development by linking it to the Hong Kong factor, but they consist almost entirely of qualitative analyses.

We argue that such a study of Guangdong's industry dynamics—one that not only contextualizes the nature of economic and technological ties between HKSAR and Guangdong but also does so with a view towards policy measures in one of the two regions—

is necessary given the closer ties being forged between Hong Kong and southern China over the last two-and-a-half decades (particularly following the handover of Hong Kong from Britain to the People's Republic of China in 1997). To fulfill this task, in this paper, we center our analysis on the productivity performance of Guangdong's local and foreign-funded manufacturing sectors. By highlighting changes in productivity that vary with changes in manufacturing firm ownership, we reveal that domestic firms have been catching up with their foreign counterparts, including Hong Kong-based firms, though foreign firms have successfully strengthened their dominating position in Guangdong's manufacturing industry. Informed by the history of Hong Kong's manufacturing industry, we discuss strategy options for future industry and innovation policy coordination between Guangdong and Hong Kong from a HKSAR-perspective.

1.1 Changing Characteristics of Economic Activities of Hong Kong-Owned Firms in Guangdong Province

The opening-up process in southern China (featuring Special Economic Zones) catalyzed the transformation of Hong Kong's and Guangdong's industry sectors. The most striking change in Hong Kong's economy triggered by the opening-up process was that, as the role of manufacturing decreased, the services sector's role increased. At its peak in the mid-1980s, the manufacturing sector in Hong Kong employed 41.7 percent of the active labor force, but by 1995 it employed only 15.3 percent (Berger and Lester, 1997: 9).[2] The contribution made by manufacturing to Hong Kong's GDP dropped from 23.6 percent in 1980 to just 4.6 percent in 2002; concurrently, the contribution made by services to Hong Kong's GDP rose from 67.3 percent to 87.4 percent.

[2] Among services sectors, the most important are wholesale, retail, import and export, restaurants, and hotels; financing, insurance, real estate, and business services; and community, social, and personal services.

[Insert Table 1 here]

By shifting parts of their operations to China, Hong Kong industrialists vastly increased the scope of their enterprises. By 1997, Hong Kong manufacturing companies were estimated to employ some 5 million people in their plants in Hong Kong and China (Berger and Lester, 1997: 10)—over five times the workforce they had employed in Hong Kong at the peak of manufacturing in the territory in 1984. By the end of 2001, the figure was estimated by the Federation of Hong Kong Industries (2003) to have surpassed 11 million. By 2003, manufacturing production services accounted for around 50 percent of Hong Kong's GDP. Approximately 1.5 million jobs involving over 40 percent of Hong Kong's labor force were related to Hong Kong companies' manufacturing activities in Guangdong (Federation of Hong Kong Industries, 2003). Hong Kong has therefore entered, particularly in the years following 1997, a period of warming economic, political, social, and cultural ties with Mainland China.[3] Hong Kong companies, or investors operating out of Hong Kong, today employ at least 14-15 million people and own 60,000 factories in Guangdong province.

Thus the migration of production facilities to Guangdong in many ways has represented growth, rather than decline, in Hong Kong's engagement in manufacturing; for political reasons, however, such growth was categorized as outside the territory, even if it was, from a historical perspective, a reintegration into Guangdong markets. The effects on the service industries have also brought economic benefits, as most of the migration spurred further growth and increased sophistication in producer business services (Tao and Wong, 2002).

[3] It is presently the Hong Kong government's unequivocal objective to advance economic integration with Guangdong Province.

In establishing and upgrading these networks, Hong Kong firms have exploited their traditional strategies of imitation and followership while emphasizing the development of organizational know-how rather than formal R&D for new product development. Several surveys of electronics firms in Hong Kong have found, for example, that 60-70 percent of such firms have succeeded by copying or modifying other products instead of initiating independent product design (Yu and Robertson, 2000). The bulk of R&D expenditure by private firms in Hong Kong is devoted to redesigning and improving products as well as to making them easier and cheaper to produce. In other words, process innovation has often taken precedence over product innovation in Hong Kong industries. By learning extensively from their original equipment manufacturing (OEM) contacts overseas, Hong Kong firms have been instrumental in setting up and improving production facilities in Guangdong—transferring innovative production technology and management organization rather than product innovations.

These changing conditions underscore the historical and present-day importance and interdependence of Hong Kong and Guangdong Province. An important question that arises here, however, is: What is the nature of the change that has been occurring in manufacturing in Hong Kong and Guangdong? In particular, what is the performance of local and foreign invested firms, including those based in Hong Kong with production facilities in Guangdong? What are the policy implications? Our approach to answering these questions is centered on total factor productivity (TFP) and labor productivity growth in manufacturing in Guangdong Province.

3. Technological Catching-up of Manufacturing Sectors in Guangdong: Total Factor Productivity and Labor Productivity Analysis

Since China opened its doors to welcome foreign investors, Hong Kong companies have been the largest source of FDI in Guangdong. By shifting parts of their operations to China, Hong Kong industrialists vastly increased the scope of their enterprises. As demonstrated in the previous section, a significant proportion of foreign direct investment in Guangdong was from Hong Kong, the expansion of Hong Kong-funded firms in Guangdong was recorded in industrial statistical data as the output growth of foreign firms. Table 4 shows the breakdown of the industrial gross output value of Guangdong manufacturing firms, based on the three domestic ownership groups—state-owned enterprises, collective enterprises, and shareholding enterprises—and one foreign ownership group—foreign enterprises.[4] Shares above 60 percent are marked in bold text in the table. From 1997 to 2006, the share in industry gross output taken by foreign enterprises had increased in 17 of the total of 27 manufacturing sectors. State-owned companies expanded their shares in six sectors. The share taken by shareholding enterprises grew in 24 sectors; in contrast, the share taken by collectively owned firms declined in all but one sector. The growth in shares of output in manufacturing sectors taken by shareholding companies, as well as the decrease in shares taken by state-owned enterprises, stems mainly from the ownership reform taking place during our observation period, over the course of which many state-owned companies were transformed into shareholding companies and were publicly listed on stock exchanges. In 2006, foreign firms produced more than 60 percent of the total industrial output in 14 sectors, further securing their predominant sectoral positions in Guangdong's economy.

[Table 4 here]

[4] The ownership status of a firm that operates in China is determined according to Chinese legislative regulations, when the firm registers with agencies of the Administration for Industry & Commerce. In general, a firm is classified as a foreign-funded firm only if the foreign equity stake is at or above 25 percent (the classification standard can be found in http://www.stats.gov.cn/tjbz/t20061018_402369831.htm). More detailed discussion of the classification of foreign-funded firms in China can be found in Huang, 2003, p.4 and p.35.

Even though foreign firms surpassed their domestic counterparts in Guangdong in terms of output growth, domestic enterprises gained in labor productivity, which is calculated as added value divided by labor input. As demonstrated in Table 5, in 1997 foreign enterprises featured higher labor productivity than domestic firms in 20 out of 27 sectors. In many of those sectors, foreign firms' labor productivity in 1997 was twice or three times that of local enterprises. Significantly, however, domestic companies had, within 10 years, gained the lead in 16 out of 27 sectors (marked in bold text in Table 5). From 1997 to 2006, pressured by fierce competition from FDI-funded companies, domestic companies shrank in size while simultaneously achieving higher labor productivity growth rates and regaining the advantage in over half of Guangdong's manufacturing sectors.

[Table 5 here]

When obtained through the growth accounting method, Total Factor Productivity (TFP) is traditionally utilized to explain technological change at the firm, industry, and country levels.[5] Li (1999) utilizes the translogarithmic production function to analyze a panel of state factories in Guangdong province during the period 1980 – 1987. His research, based on firm-level data, reveals the rapid TFP growth that Guangdong manufacturing firms achieved during the period in question. Following Li, we adopt the following translog function as a framework for calculating TFP growth in Guangdong manufacturing sectors:

[5] Young's paper (1995) on East Asia's fast-growing economies (including Hong Kong's) and Krugman's subsequent interpretation (Krugman, 1994) are based on total factor productivity. Their results have received much criticism, however, from scholars such as Chen (1997), Felipe (1999), Nelson and Pack (1999), Rodrigo (2000) and Felipe and McCombie (2003). Critics argue that several assumptions underlying Young's (1995) TFP growth accounting methodology—i.e. that technological progress is exogenous, disembodied, and Hick-neutral—are too far removed from reality. Critics also argue that deriving measurements from a neo-classical production function affects the consistency of the results reached in different studies. They call for policy attention to entrepreneurship, innovation, and learning in a country's effort to catch up economically.

$$q = \exp[a_0 + a_k \ln k + a_l \ln l + a_t t + \frac{1}{2} b_{kk} (\ln k)^2 + b_{kl} (\ln k)(\ln l) + b_{kt} (\ln k) t$$

$$+ \frac{1}{2} b_{ll} (\ln l)^2 + b_{lt} (\ln l) t + \frac{1}{2} b_{tt} t^2], \quad (1)$$

where q is the deflated added value, k is the deflated capital input, l is the labor input, and t is the time-trend variable. Under the assumption of constant returns to scale, the parameters of Function (1) satisfy the following condition:

$$a_k + a_l = 1 \quad \text{and} \quad b_{kk} + b_{kl} = b_{ll} + b_{kl} = b_{kt} + b_{lt} = 0 \quad (2)$$

The TFP growth across discrete time periods is:

$$TFP_{t-1,t} = (\ln q_t - \ln q_{t-1}) - \alpha_k (\ln k_t - \ln k_{t-1}) - \beta_l (\ln l_t - \ln l_{t-1}), \quad (3)$$

where α_k and β_l denote the elasticity of output with respect to capital and labor input, respectively, and:

$$\alpha_k = (\alpha_{k,t} + \alpha_{k,t-1})/2; \quad (4)$$

$$\beta_k = (\beta_{k,t} + \beta_{k,t-1})/2. \quad (5)$$

According to the definitions of α_k and β_l and the assumption of constant returns to scale, we obtain $\alpha_{k,t}$ and $\beta_{l,t}$ through the following functions:

$$\alpha_{k,t} = \frac{\partial \ln q}{\partial \ln k} = a_k + b_{kk} (\ln k_t) + b_{kl} (\ln l_t) + b_{kt} t \quad (6)$$

$$\beta_{l,t} = 1 - \alpha_{k,t} \quad (7)$$

Our dataset is taken from various issues of the Guangdong Statistical Yearbook. It covers 27 two-digit manufacturing sectors and also embraces four ownership groups: state-owned,

collective, shareholding, and foreign enterprises in the period spanning 1997 – 2006.[6] With reference to Jefferson et al.'s (1992, 1996) variable deflation methodology, which is designed particularly for Chinese industrial statistics data, we utilize the price deflators for gross industrial output reported in the Chinese Statistical Yearbook to obtain the deflated variable of added value.[7] The variable of capital input is deflated by the price indices of fixed-asset investment. The details pertaining to our variable deflation are elaborated in Table 7.

The OLS estimation of Function (1), with standard deviation in parentheses, is as follows:

$$q = \exp[0.022_{(0.093)} + 0.53_{(0.056)} \ln k + 0.36_{(0.059)} \ln l + 0.15_{(0.025)} t + 0.20_{(0.011)} (\ln k)^2 - 0.0025_{(0.023)} (\ln k)(\ln l) - 0.027_{(0.054)} (\ln k)t - 0.010_{(0.013)} (\ln l)^2 - 0.010_{(0.0058)} (\ln l)t - 0.0044_{0.0021} t^2], \quad (8)$$

with adjusted R-square=0.913, F(9,1092)=1279.8, and N=1102. With the estimated coefficients of Equation (1) and Equations (3) – (7), we obtain the TFP growth of state-owned, collective, shareholding, and foreign manufacturing sectors in the period of 1997 – 2006.

Table 6 reveals the average annual TFP growth rates for enterprises falling into the four above-mentioned ownership groups. In 25 of 27 manufacturing sectors, at least one domestic

[6] In various issues of the Guangdong Statistical Yearbook, in addition to data on the 27 manufacturing sectors, data on tobacco, coal mining, petroleum and natural gas extraction, ferrous metal mining, nonferrous metal mining, nonmetal minerals mining, electricity supply, gas supply, and water supply are also consistently reported. Private and foreign capital was however denied entry in most of these industry sectors in our observation period; therefore, we do not include these sectors in the analysis of this paper. Moreover, in various issues of Guangdong Statistical Yearbook, besides the data on state-owned, collective, shareholding, and foreign enterprises, the data on employee shareholding cooperative enterprises are reported as well. Due however to their miniscule economic scale—in 2006, their gross industrial output accounted for less than 1 percent of total gross industrial output in Guangdong—we do not include the ownership group comprised of employee shareholding cooperatives in the analysis.

[7] According to the China Statistical Yearbook (2004, p.572), Value-added of Industry = Gross Industrial Output Value – Intermediate Input + Value-added Tax. Since there is no specific added-value deflator published in the China Statistical Yearbook, we adopt the Ex-factory Price Indices of Industrial Products as our added-value deflator. Differing from us in their methodology, Jefferson et al. (1992 and 1996) estimate the production function as Gross Industrial Output Value = Capital Input + Labour Input + Intermediate Input. Added-value does not enter their production function.

ownership group achieved faster TFP growth than did foreign firms (marked in bold text in Table 6). In several sectors—garments, paper, chemical products, pharmaceutical products, ferrous metals smelting, nonferrous metals, special mechanical products, transportation equipment, and instruments and office machinery—all three domestic ownership groups achieved superior levels of TFP growth as compared with foreign firms.

The above analysis of TFP growth based on assumptions typical of neo-classical economic theory confirms the result obtained by theory-free labor productivity that productivity grew more rapidly in Guangdong domestic firms than in their foreign counterparts in the observation period of 1997 – 2006. Guangdong domestic firms achieved technological catching-up in comparison with their foreign counterparts, although foreign firms further secured their dominant position in manufacturing sectors in Guangdong.

We therefore find ourselves needing to explain apparently paradoxical results: (a) domestic firms in Guangdong have been catching up with foreign firms in the province; but (b) foreign firms have increased their output share in Guangdong's manufacturing sectors. We suggest two complementary explanations. First, from 1997 through 2006, Guangdong firms did not catch up with foreign firms at a conspicuously rapid pace. In 11 out of 27 sectors, Guangdong domestic firms still demonstrated inferior labor productivity compared with that of foreign firms in 2006. In 17 of 27 sectors, at least one domestic ownership group had not caught up in terms of TFP growth. While the catching-up in productivity of Guangdong domestic firms might have provided them with a favorable market position in the future, this catching-up was not robust enough over our observation period to reverse the trend that saw foreign firms expanding their businesses in Guangdong.

The second factor that resolves the apparent paradox is that, since the opening-up of the Chinese economy, many foreign firms have been attracted—by low manufacturing costs—to move their overseas production bases to China. A large number of such foreign firms are concentrated in the processing business, particularly in producing and exporting labor-intensive products (Huang, 2003). These foreign firms sourced the raw materials from within China or imported critical components, hired local workers for processing and assembly, and then *exported the final products to overseas markets*.[8] Lemoine and Unal-Kesenci (2004) and Fung (2005) confirm that the recent expansion of China's exports in machinery, electrical equipment, etc., was attributable to the processing trade. According to a report by the Chinese Ministry of Commerce, processing trade exports accounted for 55 percent of China's total exports in 2004 (Xinhua Net, 2004).

Indeed, as the first province in China to welcome foreign investment, Guangdong has attracted a large number of overseas investors, principally from Hong Kong, to establish processing businesses in its territory. According to the Guangdong Statistical Yearbook (2007), 74.9 percent of Guangdong's exports were due to the processing trade in 1995, a ratio that had decreased, but still remained as high as 65.6 percent in 2006. In 2006, 76.5 percent of exports from foreign-funded firms in Guangdong were classified in the category of 'processing and assembling with import materials' whereas only 11.1 percent of such exports were recorded under 'general trade'. Foreign firms that were engaged in the processing business and targeted overseas markets would not compete head-to-head with those domestic firms in Guangdong that focused on the domestic market. The expansion of foreign manufacturing firms in Guangdong was not influenced strongly by the catching-up in

[8] In Chinese foreign trade statistics, this type of processing of imports and exports is recorded in the categories of processing and assembling with customer materials, processing and assembling with import materials, and compensation trade, which are separate from general trade. In line with this classification standard, the firms that are engaged in processing trade are classified as foreign firms.

productivity of domestic firms as this expansion depended in part on overseas demand and foreign firms' own strategies. By this logic, the progress of domestic firms in terms of productivity growth should have little direct impact on the activity of foreign firms, at least in the short run.

4. From Low-Cost Oriented Cross-Border Production to Innovation-Based Competitiveness: Development of Manufacturing in Hong Kong and Guangdong

The development of Hong Kong's manufacturing industry–in a broad sense, it rocketed economically after the Second World War—was, to a great extent, tied up with developments in China. Proximity to Mainland China meant unprecedented opportunities for development in Hong Kong's manufacturing sector, while at the same time the close connection to China also shaped the technological contours of the manufacturing industry. Understanding salient features of the history of manufacturing development in Hong Kong should serve as a point of departure in discussing future economic integration strategies for Hong Kong and Guangdong.

4.1 Hong Kong's Manufacturing in History: Low-Tech and Low-Cost

From its early beginnings during the period between the 1950s and 1970s, technological sophistication had little to do with the establishment of Hong Kong's manufacturing industries. In fact, the roots of Hong Kong's manufacturing can be traced to the opportunistic exploitation of a geographic land space by Mainland Chinese immigrants, particularly textile barons from Shanghai, who transferred start-up capital and managerial expertise to the colony (Wong, 1988; Hollows, 1999). These Shanghai industrialists concentrated on low-cost

manufacturing in the labor-intensive textile and clothing industries and turned to the British trading houses in Hong Kong, which had established links with international export markets (Tsui-Auch, 1998: 9). Over time, however, as Hong Kong's manufacturers faced limits to low-cost manufacturing, they found an escape route for their manufacturing industries in the shape of the opening up of China from 1979 onwards. This opening up enticed many of Hong Kong's manufacturers to move their operations north of Hong Kong's border so that it could exploit even cheaper land and labor resources for their production activities. Unlike other newly industrialized East Asian economies, Hong Kong's entrepreneurs, because of their linguistic and cultural familiarity, could easily leverage the abundant labor and land resources in Guangdong, instead of moving up to the global value chain, to offset the disadvantage of heightened labor costs. Enjoying the cost advantage of cross-border production in Guangdong, Hong Kong's manufacturing firms did not pursue technological sophistication as did their counterparts in other "Asian tigers." Automated processes were limited and R&D activities were few (Eng, 1997). Similarly, in the early 1980s, Hong Kong was not recognized as a major source of advanced technology in Mainland China. The technology transferred through Hong Kong's FDI outflow was likely to be either low-level or quite standardized technology (Kamath, 1990).

The idea that the growth and profitability of Hong Kong's manufacturing companies was based on lowering their factor input costs is supported by scholars in the field. For example, Kwong et al. (2000) finds that, during the period of 1984-1993, Hong Kong's manufacturing sector demonstrated an overall decrease in TFP, although such a technological decline did not mean lower profitability. It was during this period that Hong Kong's firms engaged in a frenzy of manufacturing facility relocation to Guangdong. Because the unfinished products shipped at low prices from the manufacturing base in Guangdong, Hong Kong's firms could

enjoy high profitability even as technology declined. Thus Kwong et al. conclude that Hong Kong has grown mainly by utilizing the Mainland's cheaper resources, instead of through technological advancement. They also argued that technology upgrading might have seemed too daunting a task for Hong Kong's manufacturing firms as compared with moving the production base to Guangdong to maintain a competitive edge in global markets.

Tuan and Ng's (1995) findings complement those of Kwong et al. Tuan and Ng find that the principal reasons that Hong Kong firms moved their manufacturing base to Guangdong were Guangdong's cheap labor costs, low rents, and geographical proximity. A higher return on investment, a shorter pay-back period, and factor-cost savings are strongly associated with the cross-border operation of Hong Kong's manufacturing firms. Therefore, existing studies already provide historical and empirical evidence that helps explain our findings related to productivity growth in Guangdong's manufacturing sectors and the potential impact of Hong Kong-based firms.

Table 1: Percentage Contribution to GDP by Economic Activity in Hong Kong

Economic Activity/ Year	Agriculture, Fishing, Mining, Electricity, Gas and Water	Construction	Manufacturing	Services
1980	2.5	6.6	23.6	67.3
1985	3.5	5.0	22.0	69.5
1990	2.8	5.4	17.5	74.4
1995	2.6	5.3	8.3	83.7
2000	3.3	5.2	5.8	85.7
2002	3.5	4.4	4.6	87.4

Source: Census and Statistics Department, Hong Kong SAR

Table 4: Percentage Breakdown of Industrial Gross Output Value in Guangdong province, 1997 and 2006[1]

Sectors	1997				2006			
	Domestic Enterprises			Foreign Enterprises	Domestic Enterprises			Foreign Enterprises
	State-Owned Enterprises	Collective Enterprises	Shareholding Enterprises		State-Owned Enterprises	Collective Enterprises	Shareholding Enterprises	
Agri-food Processing	18.9	11.6	8.9	**60.6**	8.1	1.5	45.9	44.5
Food	20.5	15.4	1.9	**62.3**	6.9	1.2	22.2	**69.6**
Beverage	15.6	13.4	9.5	**61.4**	13.3	0.5	15.6	**70.6**
Textile	2.3	34.5	0.0	**63.2**	3.6	2.3	25.8	**68.3**
Garments	3.4	17.5	0.4	**78.7**	1.8	1.7	32.1	**64.4**
Leather	15.8	44.0	0.0	40.1	0.4	4.1	11.9	**83.6**
Wood Processing[2]	5.4	43.4	0.0	51.2	1.7	0.7	53.9	43.7
Furniture	12.2	26.9	4.6	56.3	0.3	0.4	28.2	**71.2**
Paper	19.0	25.0	0.3	55.7	6.7	2.8	30.7	59.8
Printing	5.3	32.7	0.7	**61.2**	6.1	1.5	35.7	56.7
Educational and Sports Products	**86.7**	0.8	1.5	10.9	1.7	5.4	15.3	**77.6**
Petroleum Products	19.7	15.0	6.4	58.9	45.3	0.0	46.6	8.0
Chemical Products	38.6	11.1	4.4	45.9	12.5	0.6	23.9	**62.9**
Pharmaceutical Products[2]	6.6	13.9	46.1	33.3	20.5	2.0	42.3	35.2
Chemical Fiber	13.6	12.8	0.0	**73.5**	23.9	0.8	23.9	51.4
Rubber[2]	5.4	33.2	6.2	55.2	15.8	1.4	33.6	49.2
Plastics	21.3	38.1	6.8	33.8	1.5	1.1	28.8	**68.6**
Nonmetal Mineral Products	41.9	19.2	26.2	12.7	5.0	3.1	53.1	38.9
Ferrous Metals Smelting	42.7	25.2	1.5	30.6	23.0	1.1	28.8	47.2
Nonferrous Metals Smelting	6.7	30.4	2.0	**60.9**	8.6	3.1	44.2	44.1
Metal Products	34.2	24.1	2.8	38.9	1.7	1.7	35.4	**61.2**
General Mechanical Products	29.1	30.2	5.0	35.7	6.2	1.6	34.9	57.3
Special Mechanical Products	20.6	17.4	10.4	51.5	5.3	0.8	32.6	**61.3**
Transportation Equipment	10.1	21.2	21.3	47.4	28.8	0.2	9.1	**61.8**
Electrical Equipment	5.5	7.8	2.3	**84.4**	7.7	0.7	43.9	47.7
Telecommunication and Computer	6.0	8.1	0.6	**85.3**	2.4	0.2	21.0	**76.4**
Instruments and Office Machinery	36.4	14.5	9.2	39.9	1.5	1.8	7.1	**89.7**

Data Source: Various issues of the Guangdong Statistical Yearbook.
Note: 1. Sum of the value of state-owned, collective, shareholding and foreign enterprises is taken as 1. Share values over 60 percent are marked in bold text.

Table 5: Labor Productivity of State-owned, Collective, Shareholding, and Foreign Enterprises in Guangdong province (10^4 RMB/Person, 2000 Constant Price), 1997 and 2006

Sectors	1997				2006			
	Domestic Enterprise			Foreign Enterprises	Domestic Enterprise			Foreign Enterprises
	State-Owned Enterprises	Collective Enterprises	Shareholding Enterprises		State-Owned Enterprises	Collective Enterprises	Shareholding Enterprises	
Agri-food Processing	2.23	4.66	4.85	14.32	11.01	7.96	**13.52**	12.22
Food	2.16	1.84	4.39	7.45	8.16	9.70	7.11	15.08
Beverage	3.88	3.74	4.06	13.03	26.61	6.53	13.33	34.53
Textile	1.21	1.70	5.70	3.18	**5.02**	4.52	**5.35**	4.94
Garments	1.50	1.32	N.A.	1.84	**8.02**	2.54	**4.54**	2.85
Leather	0.92	1.45	0.35	0.45	**3.78**	1.68	**2.71**	2.41
Wood Processing	3.29	2.79	N.A.	4.41	**7.34**	4.15	**8.70**	6.17
Furniture	1.39	1.78	N.A.	2.04	**4.35**	**4.81**	**5.05**	4.00
Paper	2.19	2.57	3.20	5.85	8.36	7.09	7.87	10.14
Printing	2.18	2.46	1.41	3.40	**11.90**	6.14	**7.00**	6.68
Educational and Sports Products	2.46	1.32	1.48	1.32	**7.75**	**3.41**	**4.29**	2.36
Petroleum Products	8.62	6.57	22.23	36.78	66.73	N.A.	50.22	99.78
Chemical Products	1.72	2.84	4.05	12.72	28.52	7.92	12.98	38.41
Pharmaceutical Products	4.58	3.49	2.98	13.85	17.12	17.69	13.87	18.52
Chemical Fiber	1.15	2.74	6.06	2.35	**43.01**	10.52	**17.55**	11.62
Rubber	1.39	2.10	N.A.	2.56	**6.88**	2.15	**7.21**	3.32
Plastics	3.64	2.39	10.01	3.24	**7.65**	3.44	**7.02**	5.52
Nonmetal Mineral Products	1.35	1.62	2.35	3.62	8.98	5.21	8.49	9.95
Ferrous Metals Smelting	1.91	4.09	5.33	7.50	18.79	13.06	19.65	28.42
Nonferrous Metals Smelting	2.32	3.64	1.10	7.10	10.08	12.93	11.45	16.35
Metal Products	2.09	2.17	3.36	4.50	**9.50**	4.92	**7.02**	6.52
General Mechanical Products	1.65	1.97	1.71	5.67	6.78	3.81	7.16	9.67
Special Mechanical Products	1.46	2.30	5.30	4.94	**9.87**	5.35	**8.55**	8.45
Transportation Equipment	2.11	2.13	7.67	9.27	**65.92**	6.38	9.72	32.16
Electrical Equipment	2.79	2.99	30.27	2.88	**22.98**	2.88	**12.59**	6.72
Telecommunication and Computer	2.98	2.49	1.96	6.58	12.64	2.45	**25.59**	13.18
Instruments and Office Machinery	2.39	1.45	0.34	3.85	**12.31**	4.92	8.71	9.09

Note: 1.The sectors in which Guangdong domestic firms had gained the lead in terms of labor productivity over our observation period are marked in bold text.

Table 6: Average Annual TFP Growth Rate of State-owned, Collective, Shareholding, and Foreign Enterprises in Guangdong province (Percentage), 1997-2006

Sectors	State-Owned Enterprises	Collective Enterprises	Shareholding Enterprises	Foreign Enterprises
Agri-food Processing	**15.30**	-0.88	**9.77**	3.15
Food	8.28	**12.49**	8.22	10.63
Beverage	**12.50**	3.70	**19.50**	11.39
Textile	**12.51**	**12.84**	5.12	7.75
Garments	**21.30**	**11.33**	**9.49**	6.21
Leather	**18.55**	9.29	**28.83**	18.57
Wood Processing	-4.25	5.38	**29.64**	7.16
Furniture	7.87	**17.56**	**11.16**	9.63
Paper	**4.94**	**6.90**	**11.66**	4.79
Printing	**11.11**	6.32	**13.83**	7.93
Educational and Sports Products	4.97	**12.32**	**8.73**	6.94
Petroleum Products	9.65	N.A.	-2.39	10.03
Chemical Products	**10.62**	**8.19**	**11.98**	4.49
Pharmaceutical Products	**8.77**	**12.24**	**11.49**	5.28
Chemical Fiber	**20.07**	**18.11**	14.82	14.98
Rubber	**7.34**	3.93	3.76	6.33
Plastics	4.71	6.98	4.48	9.02
Nonmetal Mineral Products	**14.07**	9.00	**15.28**	12.66
Ferrous Metals Smelting	**10.04**	**17.21**	**9.10**	6.80
Nonferrous Metals Smelting	**10.52**	**18.54**	**35.02**	9.61
Metal Products	**11.19**	**10.52**	9.18	9.81
General Mechanical Products	**11.14**	**9.30**	**11.57**	9.01
Special Mechanical Products	**18.94**	**8.72**	**7.32**	6.60
Transportation Equipment	**27.11**	**13.96**	**16.16**	12.02
Electrical Equipment	**21.10**	5.48	2.96	13.72
Telecommunication and Computer	**14.25**	6.36	**22.82**	8.44
Instruments and Office Machinery	**17.30**	**22.04**	**26.61**	12.07

Note: 1. The TFP growth rates of state-owned, collective or shareholding firms which are higher than those of foreign firms are marked in bold text.

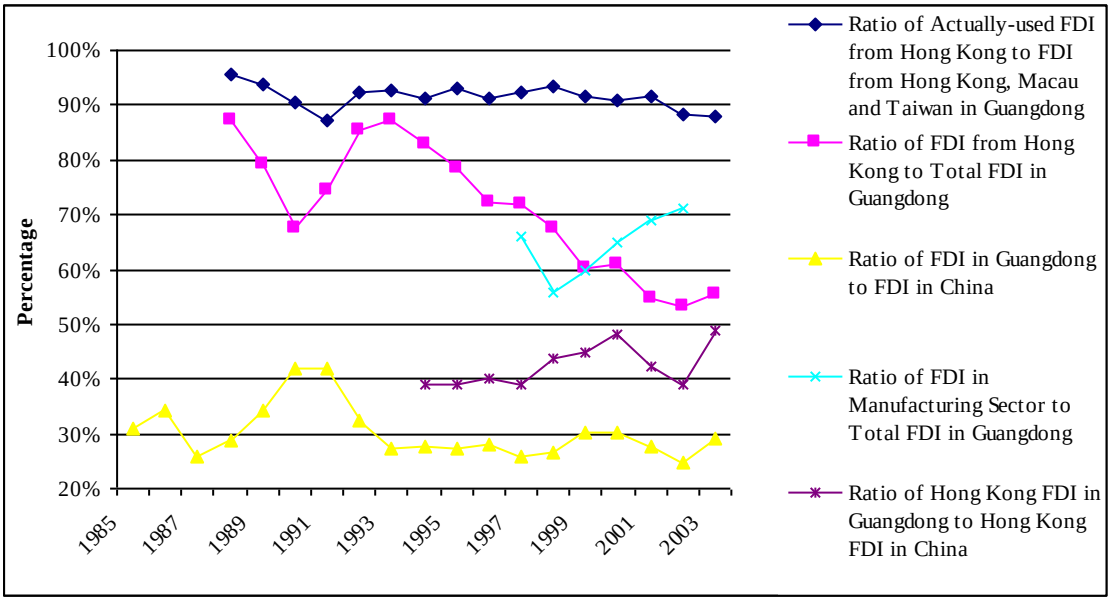
Table 7: Formation of Variables for TFP Calculation[1]

Variables Entered in the Function (6)	Variables Directly or Calculated from the Statistical Yearbook	Deflator or Calculation Equation	Deflator Data Description	
			1997-2000	2001-2006
Deflated Added Value	Industrial Added Value (100 million RMB at current price)	Deflator of Added Value = Ex-factory Price Indices of Industrial Products (2000 Price as 1)	Data cover only 15 industry sectors. The general indices for all sectors are adopted for the industry sectors which lack of data.	Data cover 37 two-digit industry sectors.
			1997-2000	2001-2006
Deflated Gross Industrial Output Value	Gross Industrial Output Value (100 million RMB at current price) The data for three ownership groups i.e. state-owned collective and foreign enterprises are collected separately.	Deflator of Gross Industrial Output Value = Ex-factory Price Indices of Industrial Products (2000 Price as 1)	Data only cover 15 industry sectors. The general indices for all sectors are adopted for the industry sectors which lack of data.	Data cover 37 two-digit industry sectors.
Deflated Capital Input	Average Balance of Net Value of Fixed Assets for Production	Average Balance of Next Value of Fixed Assets for Production = (1) Average Balance of Net Value of Fixed Assets * (2) Ratio of Fixed Assets for Production to Total Fixed Assets		
	(1)Average Balance of Net Value of Fixed Assets (100 million RMB at current price)	Deflator of Average Balance of Net Value of Fixed Assets = Price Indices of Investment of Fixed Assets (2000 Price as 1)	Data are available for the period of 1997-2006.	
			1997-2000 and 2004-2006	2001-2003
	(2) Ratio of Fixed Assets for Production to Total Fixed Assets	Ratio of Fixed Assets for Production to Total Fixed Assets = Fixed Assets for Production[1] (100 million RMB without depreciation) / Total Fixed Assets[1] (100 million RMB without depreciation)	Not Available. The mean of the data in the period of 2001-2003 is adopted for this period.	Panel Data cover three ownership groups, i.e. state-owned, collective and foreign enterprises and 37 two-digit industry sectors. The capital deflator of state-owned enterprise is also applied to shareholding enterprise.
Labor Input	Annual Average			

	Number of Employed Persons (10 000 persons)			
			1997-2000	2001-2006
Deflated Intermediate Input	Intermediate Input = Gross Industrial Output Value – Value-added of Industry + Value-added Tax[2]	Deflator of Intermediate Input = Purchasing Price Indices of Raw Materials Fuels and Power (2000 Price as 1)	Data only cover 9 industry sectors. The general indices for all sectors are adopted for the industry sectors which lack of data.	Data cover 37 two-digit industry sectors.

Note: 1. All the variables and price deflators are taken from various issues of the Guangdong Statistical Yearbook except for Fixed Assets for Production and Total Fixed Assets, which are taken from various issues of China Industry Economy Statistical Yearbook.

Figure 1: Foreign Direct Investment in Guangdong, 1985-2003



Source: Various issues of Guangdong Statistical Yearbook and China Statistical Yearbook.
Note: 1. When calculating the "Ratio of Hong Kong FDI in Guangdong to Hong Kong FDI in China" for the period of 1994-1997, the authors adopt the FDI data, which include data reflecting foreign loans and foreign non-direct investment.

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