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July 2005

Online at <https://mpra.ub.uni-muenchen.de/36451/>

MPRA Paper No. 36451, posted 06 Feb 2012 04:17 UTC

The Economic Strategy for Hong Kong SAR:
Evidence from Productivity and Cost Analysis

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Abstract

By using a growth accounting framework for the period 1980-2000, this paper estimates Hong Kong's total factor productivity and unit labor cost of twenty industries classified into three economic sectors of tradable goods, tradable services and non-tradable services. The results show that Hong Kong's total factor productivity has fallen in the 1990s. The competitiveness of the three sectors of tradable goods, tradable services and non-tradable services has increased, remained unchanged and declined, respectively in the last two decades. Policy recommendation for Hong Kong will be to aim for a supply-drive strategy so as to broaden the economic base.

JEL classification: O11, O47, O53.

Keywords: Hong Kong, Total Factor Productivity, Growth Accounting, Economic Sectors.

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1. Introduction

After becoming a British colony in 1842, Hong Kong became an important trading and re-export hub. Over the years, Hong Kong had acted as a “shelter” receiving a large number of natives fleeing from Mainland China in pursuit of political stability and economic opportunities. Hong Kong’s economic openness and desire to attain economic security enabled Hong Kong to supply goods and services to the rest of the world. The rise in income and demand was the result of the successful outcome of the supply-driven economic strategy.

On July 1, 1997, Hong Kong became the Special Administrative Region (SAR) of the People’s Republic of China. The Central People’s Government in Beijing adopted the “one country, two systems” approach in the post-1997 Hong Kong. Since 1985, Hong Kong experienced economic revival and wealth appreciation, but the rapid growth was soon fuelled with speculation in stocks and properties in the early 1990s, resulting in the economic bubble that eventually burst after the outbreak of the Asian Financial Crisis (AFC) in 1997-1998. The economic problem facing the post-AFC Hong Kong economy was structural imbalances with unemployment rate exceeding 7 percent in 2002. Such short term fiscal incentives as the creation of temporary employments and assistance to small- and medium-sized industries have been introduced. After the outbreak of the severe acute respiratory syndrome (SARS) in the spring of 2003, additional demand-driven solutions aimed to revive the Hong Kong economy, including the entry of visa-free Mainland travelers and the conclusion of two Closer Economic Partnership Agreements in 2003 and 2004 that permitted tariff-free exports of goods and services to Mainland were introduced. Economic optimism resulting from demand-driven policies has picked up and it is expected that when the new Disney Theme park opens in September 2005, the Hong Kong economy would have recovered considerably.

Table 1 shows that Hong Kong’s macro-economy generally performed better in 1980s than in 1990s, and the first half of 1990s was better than the second half of 1990s. Strong re-exports growth lasted till the first half of the 1990s, and export of services maintained high. Growth in domestic investment remained robust in the 1986-1995 decade. The average real GDP growth maintained at 6.56 percent in the 1980s and 5.1

percent in the 1990s. Beginning from the early 1990s, despite the large total export to GDP ratio, domestic export could not keep pace with its growth rate.

Table 1 Periodic Average Growth Rates in Hong Kong's Macroeconomic Indicators

Period Average	Real GDP	DI	Domestic Export	Re-export	Services Export	Unemployment	Total Export /GDP
1981-1985	5.58	7.20	14.64	29.28	16.00	3.82	77.30
1986-1990	7.54	22.10	12.14	32.35	18.58	1.66	102.78
1991-1995	5.36	16.58	0.56	22.04	13.30	2.18	118.07
1996-2000	3.64	1.26	-4.62	4.90	3.56	4.16	113.66
1981-1990	6.56	14.56	13.39	30.80	17.29	2.74	90.04
1991-2000	5.10	7.96	-2.03	13.47	8.43	3.17	115.86
2000-2004	4.76	2.74	-5.48	10.28	9.92	6.40	133.22

Notes: DI = Domestic investment.

Sources: *Hong Kong Annual Digest of Statistics*, Census and Statistics Department, various years.

Post-AFC economic solutions advocated by the free-market school (Enright *et al* 1997, Wong and Tao 2000, Imai 2001) supported demand-driven policies and argued that the Hong Kong economy can recover along with the rest of the world as the linked exchange rate shielded Hong Kong from price differentials. On the contrary, structural or supply-driven advocates (Dodsworth and Mihaljek 1997) noted the structural imbalance and believed that Hong Kong's economic advantage can further be eroded as economic situation in Southern China strengthened.

This paper expanded the data used in Imai (2001) and followed the classification of economic sectors used in Wong and Tao 2000, and extended the empirical analysis by comparing total factor productivity (TFP) with unit labor cost analysis. The empirical analysis show strongly that structural rigidity rests largely on the non-tradable service sector. For Hong Kong to achieve economic revival, economic recovery is the first step, but resources reallocations to the more competitive tradable industry and service sectors will strengthen Hong Kong's advantage and expand Hong Kong's economic base and capacity. The results clearly show the vulnerability and insufficiency of the demand-drive school, and demonstrate that it would be the successful application of supply-driven policies that could lead the Hong Kong economy to a new stage of achievement.

By using economic data from the two decades of 1980-2000, this paper first uses the national accounting approach to work out Hong Kong's economy-wide TFP. The economy-wide capital stock will then be disaggregated to examine the TFP of major economic sectors (tradable goods, tradable services and non-tradable services). Section 2 discusses the debate in relation to Hong Kong's economic recovery. Section 3 uses the national accounting framework to work out the economy-wide TFP. Sections 4 and 5 examine the TFP and unit labor cost of the three economic sectors, respectively. Section 6 suggests policy recommendations and concludes the paper. The description and construction of data are shown in the Appendix.

2. The demand-driven versus supply-driven debate

There are four related arguments in the demand-driven school (Imai 2001, Enright, Scott and Dodwell 1997, Wong and Tao 2000). Adherence to the advantages of the free market *laissez-faire* system has enabled the Hong Kong economy to recover along with the rest of the world according to the cyclical movements. The demand-driven nature of the Hong Kong economy resulted from the experience of the 1960s and 1970s when Hong Kong simply drifted along with or responded to the world demand of light manufacturing exports. Since the 1990s, demand has shifted to producer services.

Secondly, the linked exchange rate system adopted since 1984 can shield Hong Kong from loss in competitiveness because price differentials will eventually be adjusted through the current account. The linked exchange rate system can automatically adjust the Hong Kong dollar prices of tradable goods and services. Thus, Hong Kong's tradable sectors remained price competitive despite wage increases. The rise in price of non-tradable sector is simply the result of expansion in the tradable sector, and a strong domestic demand is reflected in the increase in the value-added content of the non-tradable sector. Thirdly, Hong Kong's advantage lies in its ability to provide business clusters that keep Hong Kong competitive despite the low production cost in Southern China. Cost of production becomes secondary if business opportunities are good and profits are made. The international, open and free nature of Hong Kong is itself a powerful competitive edge that few economies in the neighboring economies possess.

The classification of services shall not exclusively be considered as consumption good. Since the work of one producer can improve or add value to the work of another producer, goods and services have usage in both consumption and production. It is true that with the reallocation of Hong Kong manufacturing plants to Southern China, Hong Kong firms have become service firms and provide services to the manufacturing sector. Economic reform in Mainland China has speeded up Hong Kong's transformation to a manufacture-related service centre. Thus, while Hong Kong loses her comparative advantage in manufacturing, Hong Kong has gained new advantage in producer services.

Producer services contain the output of those industries producing intermediate inputs (for example, business services, wholesale) and some fraction of those industries that are consumer-based (for example, restaurants, hotels and transportation). The estimates in Wong and Tao (2000, Table 2.4 – 2.6) show that producer services is the largest sector and experienced the largest annual average growth rates. For example, the share of the four producer services (business services; transport, storage, and communications; import and export; and finance) accounted for 67 percent of producer services in 1996 (Wong and Tao 2000, p. 4). In terms of average annual growth rates in 1990-1997, producer services experienced a largest increase of 7.9 percent, followed by government services of 5.2 percent, consumer services of 4.4 percent and manufacturing of -4.5 percent. Wong and Tao (2000, p. 51) concluded that Hong Kong has transformed from an “enclave” economy into a “metropolitan” economy.

The supply-driven school (Dodsworth and Mihaljek 1997) acknowledged the fundamental importance of the free market mechanism, but noted the structural imbalance and believed that the high cost can erode Hong Kong's economic competitiveness, which is defined as “the degree to which domestic products and services can be marketed profitably.”¹ Hong Kong's robust economic performance since the conclusion of the Sino-British negotiation in 1984 has led to wealth appreciation and income expansion, but the emergence of short-term investment behavior since the mid-1985s concentrated mainly in speculative activities in stocks and real estates. By the mid-1990s, the Hong Kong economy was speculation-led, characterized by a falling level of

¹ For a more comprehensive discussion on the concept of competitiveness, see UNCTAD 2004, Annex 1, pp. 135-141)

domestic exports and rising cost. Statistics on wage increase showed that in the period 1981-1997, tradable goods have twice experienced a two-digit wage increase in both current and constant price terms, while such non-tradable services as electricity and gas, transportation, and storage and communication, have experienced a total of four or five occasions of two-digit wage increase in both current and constant price terms (Li 2001). Hong Kong's economic structural rigidity is the result of two separate economic trends (Li, 2002). On the one hand, sharp expansion in speculative activities boosted the nominal economy that merely involved monetary transactions. On the other hand, industrial hollowing and the fall in domestic exports resulted in the shrinkage of real economic activities that involved a reduction in employment, industrial output and exports. When the economic bubble burst, the structural imbalance was exposed when the shrinking real economy could not support the collapse of the nominal economy.

2. Calculation of total factor productivity

Differentiating the Cobb-Douglas production function that specified a relationship between aggregate output (Y) and the three factors of capital stock (K), quantity of labor (L) and level of technology (A) with respect to time and dividing the result by Y , a production function can be constructed as follows:

$$\dot{Y}/Y = g + \left(\frac{F_K K}{Y}\right) \cdot (\dot{K}/K) + \left(\frac{F_L L}{Y}\right) \cdot (\dot{L}/L), \quad (1)$$

where F_K and F_L are the factor marginal products and g represents technological progress or an estimate of TFP, commonly known as the Solow residual. Let $s_K = F_K K/Y$ and $s_L = F_L L/Y$ represent the shares of capital and labor factor payment in total output, respectively. A constant return to scale means that $s_K + s_L = 1$. The value of TFP can thus be calculated from Equation (1) if all the other variables are known.

The capital stock figures are estimated from the following equation:

$$K_t = K_{t-1} + RNI_t, \quad (2)$$

where RNI is real net investment, which is real gross investment less depreciation. Hong Kong's aggregate output can be measured by the production-based real GDP. The GDP deflators are used in deriving the real figures expressed in constant 1990 prices. The capital stock figures are constructed from the accumulation of gross investment. Real

gross investment consisted of the gross fixed capital formation in the private sector, which included non-residential building, other construction, real estate developer's margin and all machinery and equipment, and change in stocks, expressed in constant 1990 prices. A depreciation rate of 5 percent is assumed, and the initial capital stock (in 1966 which is the earliest year when the gross fixed capital formation figures are available) is set equal to five times the value of the gross fixed capital formation (Kim and Lau 1994, Appendix I).

The labor input is measured by the number of working hours (H). Employment in each time period is simply the size of the registered labor force (l) less the unemployed. The total number of labor hours is total employment multiplied by the average number of working hours per time period (see Appendix). The labor variable can be constructed from Equation (3) with u indicating the unemployment rate.

$$L = l(1 - u) \cdot H. \quad (3)$$

The data on the compensation of employees are adjusted to include the self-employed. One assumption is that the share of self-employed in the number of people engaged is the same in all industries. Dividing the adjusted compensation of employee by the total value-added in each industry gives the share of labor income. By deducting from unity the labor share in total factor payment gives the capital share in total factor payment.

The constructed data (see Appendix Table 1) shows that between 1980 and 2000, production-based real GDP increased by 183 percent, while capital stock and labor increased by 341.5 percent and 43.4 percent, respectively. Table 2 summarizes the total factor productivity estimates for the period 1981-2000. Output, capital and labor have grown by 5.34 percent, 7.71 percent and 1.82 percent, respectively. Output has experienced the highest growth in the 1986-1990 periods, with an average annual growth rate of 8 percent. Capital experienced a higher growth rate in the 1980s than the 1990s, and the first half of the two decades showed a better performance (8.71 percent and 8.45 percent, respectively) than the latter half (7.50 percent and 6.18 percent, respectively). Although the growth of labor is similar in the two decades, the growth rates in the 1981-1985 and 1996-2000 periods exceeded two percent. The shares of factor payment between labor and capital remained constant over the years.

Total factor productivity (TFP) shows an average of 0.86 percent in the entire 1981-2000 decades, but its performance was higher in the period 1986-1990 (with 3.98 percent) than other periods. In the overall and sub-periods, the contribution of capital to output is higher than labor. Hong Kong experienced high productivity growth in the second half of the 1980s, but it has fallen considerably since the early 1990s. Despite a fall in the TFP in the two sub-periods of 1986-1990 and 1991-1995, contribution by capital (3.46 percent as compared to 3.97 percent) and labor (0.6 percent as compared to 0.62 percent) were similar. Hong Kong experienced a worse productivity rate (-0.89) in the period 1996-2000 that covered the AFC than the 1981-1985 period (-0.07) during the Sino-British negotiation. By contrast, labor's contribution increased to 1.36 percent in the 1996-2000 periods, suggesting that labor productivity increased when unemployment increased and cost fell.

Table 2 Hong Kong's Productivity Accounting: 1981-2000
(Percentage Average Annual Growth Rates)

	Output	Capital	Labour	Share of Payment		Contribution to Output by		
				Labour	Capital	TFP	Labour Input	Capital Input
1981-1985	5.25	8.71	2.61	55.46	44.54	-0.07	1.45	3.88
1986-1990	8.04	7.50	1.11	53.91	46.09	3.98	0.60	3.46
1991-1995	4.97	8.45	1.17	53.05	46.95	0.38	0.62	3.97
1996-2000	3.15	6.18	2.40	56.64	43.36	-0.89	1.36	2.68
1981-1990	6.64	8.10	1.86	54.69	45.31	1.95	1.02	3.67
1991-2000	4.06	7.31	1.78	54.85	45.15	-0.22	0.98	3.30
1981-2000	5.34	7.71	1.82	54.77	45.23	0.86	1.00	3.49

Note: The sum of the last three columns should equal to the first column, the decimal figures may result in the difference. Any difference results from rounding off.

3. Industries and sector total factor productivity

The twenty industries in Hong Kong are classified under 8 major categories by the government.² The TFP of manufacturing improved strongly in the first half of the 1990s, while the performance of most services deteriorated in the 1990s, especially after

² The productivity accounting estimates of these twenty industries are excluded her but are available upon request.

the AFC. These twenty industries can be classified into three economic sectors of tradable goods, tradable services and non-tradable services as follows:

Tradable Goods Sector: Manufacturing; Mining and quarrying.

Tradable Services Sector: Import/export trade; Hotel; Storage; Financing (banking + finance and investment companies + stock, commodity and bullion brokers, exchanges and services + financial institutions); Insurance; Business services (rental of machinery and equipment + business service other than rental of machinery and equipment); Land transport (land passenger transport + supporting services to land transport + land freight); Water transport (ocean and coastal water transport + inland water transport + supporting services to water transport); Air transport; and Other transport services.

Non-tradable Sector: Construction; Electricity, gas and water; Wholesale; Retail; Restaurants; Communication; Real estate; and Community, social and personal services.

The output of tradable goods sector reached its peak in 1989 with a share of 18.9 percent, but by the late 1990s it fell to around ten percent (see Appendix Table 2). Output of tradable services sector has expanded most in real terms as its percentage share has doubled in the two decades (from 25.7 percent in 1980 to 51.9 percent in 2000), and since 1991 it has exceeded the percentage share of non-tradable services that declined from 58 percent in 1980 to about 40 percent in 2000. The TFP of the three economic sectors is shown in Table 3. The tradable goods sector, which is largely dominated by manufacturing, enjoyed a positive TFP growth rate in all periods, giving an average of 5 percent in the 1983-2000 period with a higher rate in the 1980s (6.1 percent) than the 1990s (4.2 percent). The tradable services sector has a lower TFP growth rate, but remained positive except in the period 1983-1985, giving an average of 0.7 percent in the two decades of 1983-2000. Contrary to the tradable goods sector, the TFP growth rate for the tradable services sector is higher in the 1990s (1.1 percent) than the 1980s (0.2 percent), suggesting that tradable services expanded mostly in the 1990s. The performance of the non-tradable services sector showed a negative TFP growth rate in most periods with a negative average (- 0.8 percent) in the whole 1983-2000 periods. And in the AFC period of 1996-2000, the positive TFP growth rate of 1.9 percent could have produced by a fall in the growth rates of both capital and labor.

Table 3 Productivity Accounting of Economic Sectors: 1983-2000
(Percentage Annual Growth Rates)

	Output	Capital	Labor	Share of Payment		Contribution to Output by		
				Labor	Capital	TFP	Labor Input	Capital Input
Tradable Goods								
1983-1985	6.1	13.5	0.5	0.69	0.31	1.6	0.4	4.2
1986-1990	9.3	7.0	-3.4	0.63	0.37	8.8	-2.2	2.6
1991-1995	-4.2	-5.9	-13.5	0.60	0.40	6.2	-8.1	-2.4
1996-2000	-2.0	4.4	-10.3	0.57	0.43	2.0	-5.9	1.9
1983-1990	8.1	9.4	-2.0	0.65	0.35	6.1	-1.3	3.3
1991-2000	-3.1	-0.9	-11.9	0.58	0.42	4.2	-7.0	-0.4
1983-2000	1.7	3.6	-7.6	0.62	0.38	5.0	-4.7	1.4
Tradable Services								
1983-1985	6.8	12.2	8.0	0.49	0.51	-3.3	3.9	6.2
1986-1990	11.2	7.9	10.0	0.49	0.51	2.2	4.9	4.0
1991-1995	10.2	12.9	6.3	0.50	0.50	0.6	3.1	6.5
1996-2000	5.7	9.6	-0.7	0.54	0.46	1.7	-0.4	4.4
1983-1990	9.5	9.5	9.3	0.49	0.51	0.2	4.6	4.8
1991-2000	7.9	11.2	2.7	0.52	0.48	1.1	1.4	5.4
1983-2000	8.6	10.4	5.6	0.51	0.49	0.7	2.8	5.2
Non-tradable Services								
1983-1985	3.9	1.2	1.3	0.63	0.37	2.6	0.8	0.5
1986-1990	1.4	7.6	3.8	0.60	0.40	-3.9	2.3	3.0
1991-1995	2.4	8.3	2.7	0.59	0.41	-2.6	1.6	3.4
1996-2000	3.1	2.1	0.8	0.66	0.34	1.9	0.5	0.7
1983-1990	2.3	5.1	2.9	0.61	0.39	-1.4	1.8	2.0
1991-2000	2.7	5.2	1.7	0.63	0.37	-0.3	1.1	1.9
1983-2000	2.6	5.2	2.2	0.62	0.38	-0.8	1.4	2.0

Note: The sum of the last three columns should equal to the first column; any difference is the result of rounding off.

The demand-driven advocates (Wong and Tao 2000, Appendix I) emphasized the rapid expansion of producer service industries, but noted the difficulty in deciding on the choice of producer services. Both the definition and the estimation of the proportion of producer services are subject to debate. Producer service is defined by subtracting the nominal values of consumer services and government services from the nominal value-added of total services. The percentage calculations are based on rough estimations, but are highly questionable (as reproduced in Appendix Table 3). For example, all hotel services are regarded as producer services, but hotels accommodation is demanded by tours to Hong Kong that are consumer related. In the case of storage facilities, an

assumption of 45 percent consumed as producer service suggested that the rest of 55 percent would be used for consumption purpose by private individual households.

Table 4 Productivity Accounting of Producer Services
(Percentage Average Annual Growth Rates)

	Output	Capital	Labour	Share of Payment		Contribution to Output by		
				Labour	Capital	TFP	Labour Input	Capital Input
Tradable								
Producer Services								
1983-1985	7.7	12.2	8.8	0.47	0.53	-2.9	4.2	6.5
1986-1990	14.4	7.8	11.0	0.48	0.52	5.0	5.3	4.0
1991-1995	12.2	13.4	6.4	0.48	0.52	2.2	3.1	6.9
1996-2000	4.8	9.8	-1.2	0.52	0.48	0.7	-0.6	4.7
1983-1990	11.8	9.4	10.2	0.48	0.52	2.0	4.9	4.9
1991-2000	8.4	11.6	2.5	0.50	0.50	1.4	1.3	5.8
1983-2000	9.9	10.6	5.9	0.49	0.51	1.6	2.9	5.4
Non-tradable								
Producer Services								
1983-1985	1.5	-7.4	1.5	0.45	0.55	5.0	0.7	-4.1
1986-1990	7.1	12.9	4.9	0.39	0.61	-2.7	1.9	7.9
1991-1995	2.8	7.6	2.7	0.37	0.63	-3.0	1.0	4.8
1996-2000	1.0	-0.8	-1.2	0.43	0.57	2.0	-0.5	-0.4
1983-1990	5.0	4.8	3.6	0.41	0.59	0.6	1.5	2.8
1991-2000	1.9	3.3	0.7	0.40	0.60	-0.4	0.3	2.0
1983-2000	3.2	4.0	2.0	0.41	0.59	0.1	0.8	2.4

Note: The sum of the last three columns should equal to the first column; any difference is the result of rounding off.

The estimates based on the division between tradable producer services and non-tradable producer services as conducted in Wong and Tao's (2000) can be repeated by using the data and the calculations from Table 3. Table 4 shows the TFP growth rates of tradable producer services and non-tradable producer services using the percentage shares between the consumer and producer components in each of the service industry given in Appendix Table 3. Real output growth shown in the first column is much higher in the tradable producer services (9.9 percent) than the non-tradable producer services (3.2 percent). Capital stock grew much faster in the tradable producer services (10.6 percent) than the non-tradable producer services (4.0 percent). The TFP calculations also differed considerably. Other than the period 1983-1985, the total factor productivity growth rates

of tradable producer services were positive in all other periods, giving an overall of 1.6 percent for the sample period. In the case of non-tradable producer services, other than a large percent growth of 5 percent in 1983-1985, TFP fell in the decade of 1986-1995. The entire 1980s showed a score of 0.6 percent, followed by a score of -0.4 percent in the 1990s, giving an overall average of 0.1 percent for the entire sample period. The TFP growth rates increased rapidly in 1996-2000 when both the growth rates of capital (-0.4 percent) and labor (-0.5 percent) fell, suggesting that a drop in factor inputs could lead to a rise in productivity. These estimates show that even with the use of Wong and Tao's (2000) classification, the tradable producer services were more competitive than the non-tradable producer services.

4. Labor productivity and unit cost

Labor productivity is indicated by the ratio of real output and the number of persons engaged, while the unit labor cost is the ratio of the payroll per person and labor productivity. Labor productivity in the tradable goods sector, which is shown in Figure 1, has been rising since 1985, while unit labor cost maintained a stable trend until the late 1990s. As Hong Kong's manufacturing industries have migrated to Southern China beginning from the mid-1980s, demand for industrial workers in Hong Kong has fallen, and only those efficient and productive workers can remain in the industry. The stable unit cost trend shows that the increase in output came mainly from productivity. Thus, the improvement in labor productivity has maintained Hong Kong's competitiveness in the manufacturing sector.

Figure 2 gives a mixed picture for the tradable services sector. Labor productivity has shown an overall rising trend, but unit labor cost has also caught up significantly and remained high until the late 1990s. Tradable services probably faced a competitive world price, and the economic overheating in the first half of the 1990s has pushed up the unit labor cost. The fall in demand and price in tradable services after the AFC, however, could have led to a considerable fall in unit labor cost. The picture shown in Figure 3 on the non-tradable services sector suggests that while the labor productivity trend in the entire period showed only a narrow movement, the unit labor cost has shown a

continuous rise in the entire decade between 1988 and 1998 from about 50 to over 200 index points.

Figure 1 Tradable Goods Sector

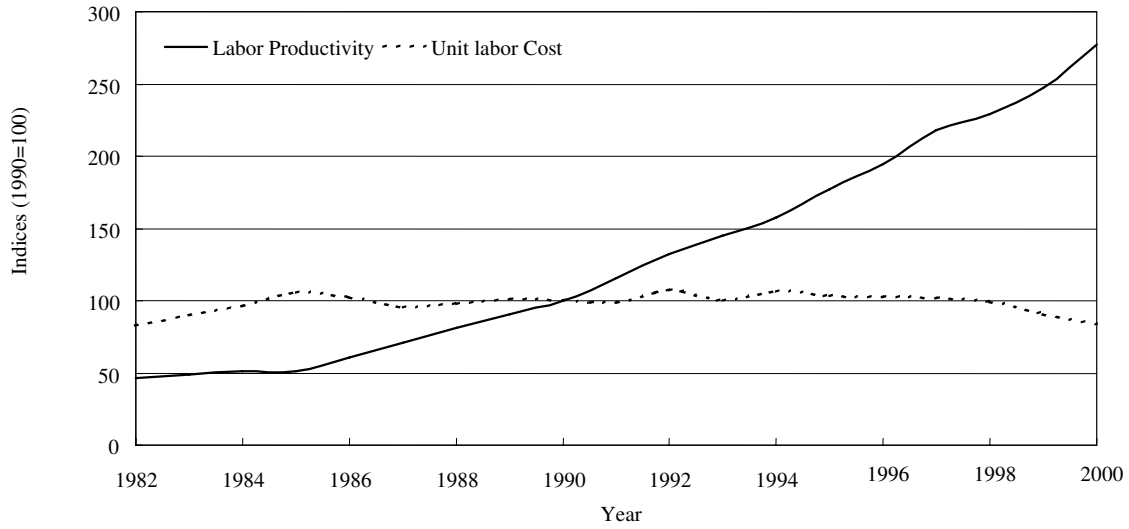


Figure 2 Tradable Services Sector

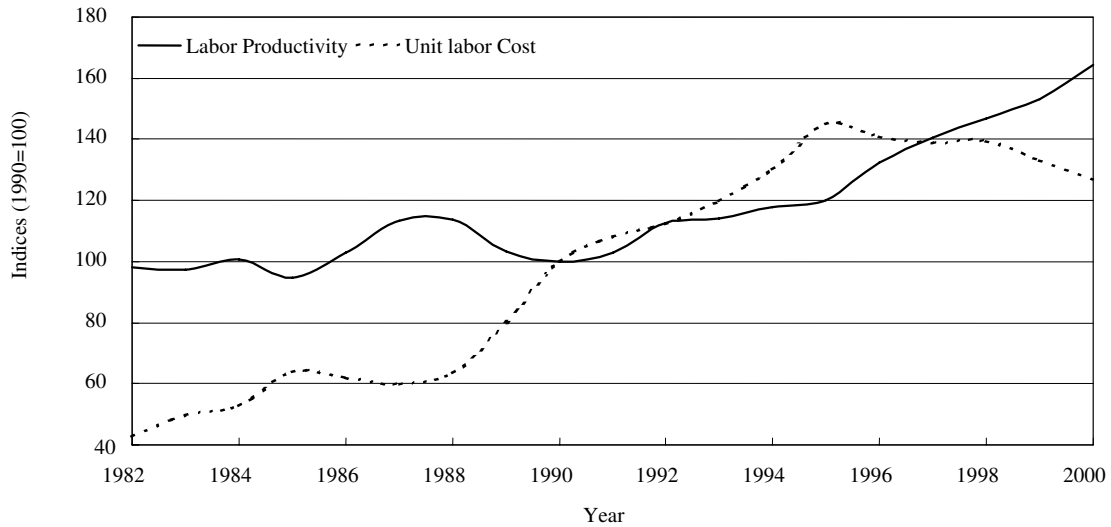
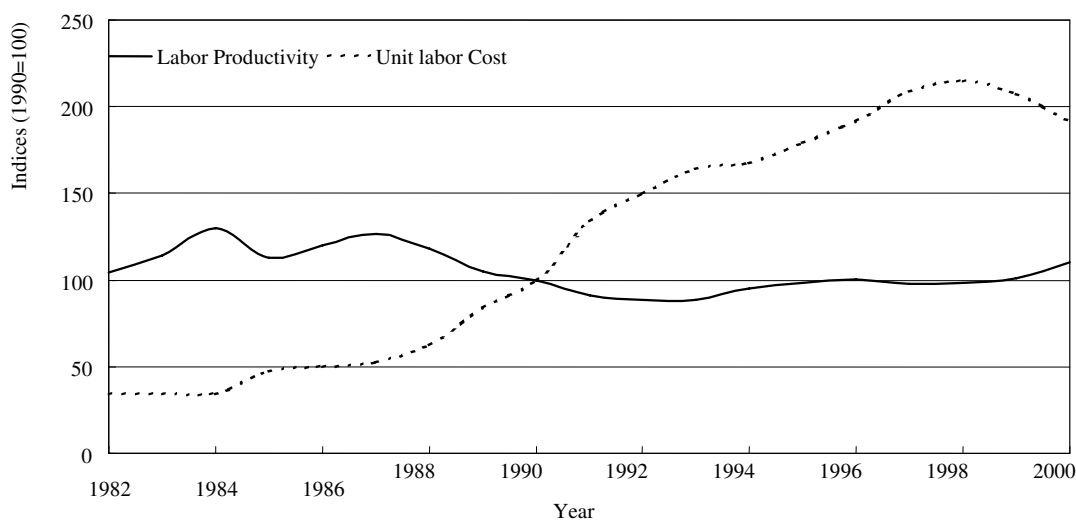


Figure 3 Non-tradable Services Sector



One possible explanation on the high unit labor cost and low labor productivity in the non-tradable services sector could be their monopolistic position that shielded them from international price competition. The price and cost movements of non-tradable services tended to be rigid downwards, and that their monopolistic nature enabled them to increase price faster during the boom time, but was reluctant to let price to fall in a recession time.

In the tradable goods sector, manufacturing definitely showed an improvement in labor productivity, as the number of workers has fallen and unit labor cost has fallen since the early 1990s. In the tradable services sector, labor productivity has risen in import/export trade, hotel, storage, financing and water transport. The tradable services industries that showed a trend of rising unit labor cost included business services, land transport, and air transport. The industries that showed a mixed trend included insurance and other transport services.

In the non-tradable services sector, those industries that showed a clear trend of rising unit labor cost include real estate, community, social and personal services, restaurant and retail. In construction, labor productivity showed a declining trend, while unit labor cost showed a rising trend. In electricity, gas and water, labor productivity rose significantly after 1998. The result of these two industries may not reflect the true picture, as there is deficiency in the data on the number of persons engaged. Communication and

wholesale are the two industries that showed a rising trend in both labor productivity and unit labor cost. In wholesale, unit labor cost has a higher overall trend.

The geometric average performance of unit labor cost growth rates in the second half of the 1990s (1995-2000) for the sectors and individual industries are summarized in Table 5. Given the outbreak of the AFC in 1997-1998, one would expect to see a fall in the unit cost in the second half of 1990s. In the non-tradable services sector, the geometric average still showed an increase in unit labor cost by an average of 1.38 percent, while both tradable services sector and tradable goods sector experienced an average fall of 2.66 percent and 4.08 percent, respectively. Price in the non-tradable services sector was rigid downwards, while the fall in the unit labor cost of tradable goods and services were in line with the movement of international prices. While the Hong Kong is linked to the US currency, the devaluation of major regional currencies had meant that the price of Hong Kong imports has fallen, and that would lead to a fall in price and deflation.

Economic Sectors	%	Industries	%
Non-tradable Services	1.38	Construction	10.30
Tradable Services	-2.66	Mining and Quarrying	6.45
Tradable Goods	-4.08	Insurance	5.93
		Wholesale	4.96
		Real Estate	4.55
		Community, Social and Personal Services	3.64
		Restaurant	2.89
		Land Transport	2.23
		Business Services	0.58
		Financing	0.12
		Other Transport Services	0.10
		Hotels	-0.19
		Retail	-0.30
		Communication	-0.95
		Manufacturing	-1.90
		Storage	-1.93
		Import/Export	-2.12
		Electricity, Gas and Water	-3.69
		Air Transport	-3.94
		Water Transport	-5.48

With the exception of mining and quarrying that occupied only a small portion of GDP, individual industries that showed a positive geometric percentage growth in unit labor cost belong mainly to the non-tradable services (construction; community, social and personal services; real estate; restaurant and wholesale) and some tradable services (insurance; land transport; other transport services; business services and financing). Those industries that experienced a fall in the unit labor cost are mainly the tradable goods and tradable service industries. Among the twenty individual industries, eleven of them showed an increase in the geometric average unit labor cost, and the average percentage increase is 3.79 percent. The large increase in construction pushed up this percentage. By contrast, the average of the nine industries with decreases in unit labor cost is -2.27 percent. The large percentage change can be due to the initial low wage paid to workers. In construction where sub-contracting is common, for example, a considerable amount of the cost would have taken up by the middlemen, while the actual wage paid to the construction workers is low.

Figures 4 and 5 show the labor productivity and unit labor cost calculation using Wong and Tao's (2000) definition of tradable producer services and non-tradable producer services. In Figure 4, both labor productivity and unit labor cost have risen. Although labor productivity leveled off in the late 1980s, it kept rising until 1997. On the contrary, the unit labor cost has risen rapidly in the late 1980s but has declined since 1995. In Figure 5, labor productivity has remained static with only small improvements since 1993 and a downward readjustment in 1998. The unit labor cost of non-tradable producer services kept increasing in the entire period, except a small V-shape recovery during the AFC. The rise in unit labor cost was not matched by a rise in labor productivity, suggesting that this sector was losing its cost competitiveness.

Figure 4 Tradable Producer Services Sector

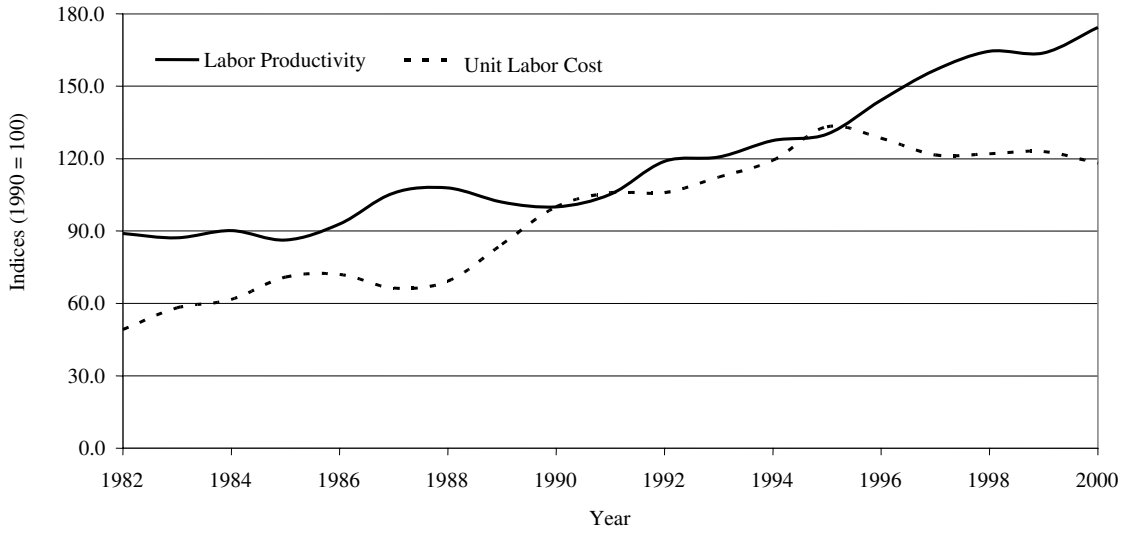
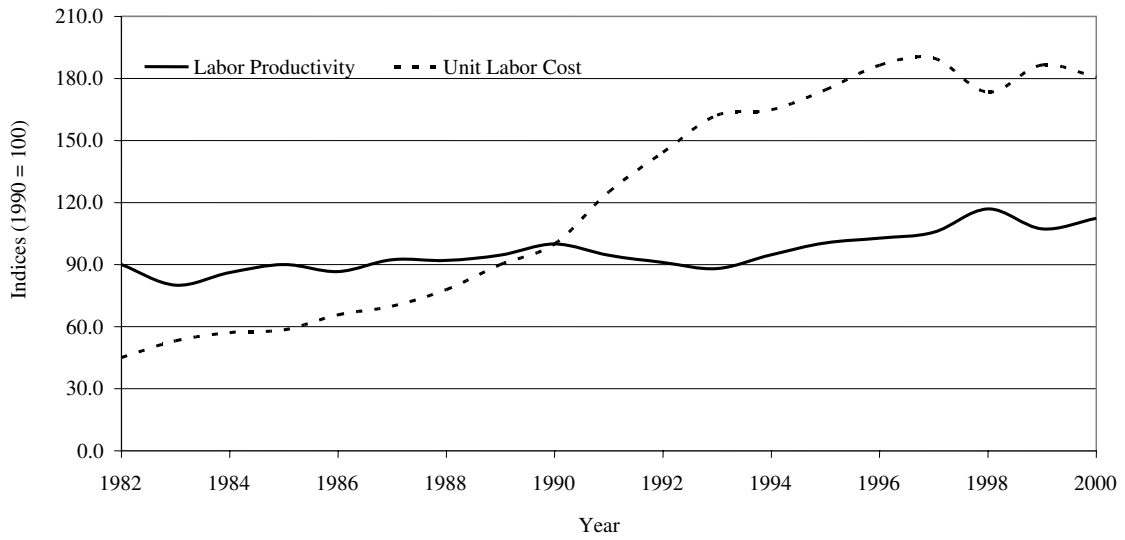


Figure 5 Non-tradable Producer Services Sector



5. Policy recommendations and conclusion

By using a standard Cobb-Douglas production function for the two decades of 1980-2000, this paper shows that Hong Kong's TFP has declined since the early 1990s, and has reached negative growth rates in the second half of the 1990s. Hong Kong has experienced an undisturbed period of robust economic growth until the outbreak of the AFC in 1997/98. The estimates on the labor productivity of twenty individual industries show that the non-tradable services have performed poorly, and their unit labor cost has expanded. One can conclude that the solution to Hong Kong's economic problem rests on the unit labor cost and the uncompetitive nature of many non-tradable services. In the case of manufacturing industries, the high productivity suggested that new investments in Hong Kong's manufacturing sector could take place, though Hong Kong will not only confine to labor-intensive industries anymore. Given the increasing role of the service economy, the expansion of the tradable services, including the tradable producer services, will be most suitable for Hong Kong, as its development can raise domestic demand and employment in line with international competitiveness.

Although the economic downturn results in rising unemployment, unit labor cost has revised downwards through market forces. Despite the short-term economic sacrifice, productivity in Hong Kong can be improved in line with wage revision and new demands, both locally and internationally. Hong Kong needs to explore new economic channels, in addition to the various existing comparative advantages.

This paper raises new questions on the relevance of sector composition in Hong Kong industries. The debate between demand-driven and supply-driven policies can complement each other. A flexible economic structure facilitates the function of the free market. The flexible economic structure means that Hong Kong should pursue supply-side strategies, as the availability of additional resources can attract further demand. In policy terms, this requires the continued investment in infrastructure, investment in human capital and the provision of more resources, typically land resources that can promote the economic capacity of Hong Kong. A long term strategy that projects a multi-dimension economy is more suitable than to use short term policies to reduce temporary economic ills, and repetition in the use of short term policies could deprive the benefits of

a long term policy. Hong Kong cannot be a national economy, but a diversified economic base permits productivity to improve both extensively and intensively.

Acknowledgements

The author is indebted to the referees, Manoranjan Dutta, Francis Lui and Hiroyuki Imai for their comments on the earlier draft, participants in the Hong Kong Economic Association biannual conference in December 2002 and Eric Kwok for his research assistance. Funding support from the APEC Study Center and the Research Center for International Economics of the City University of Hong Kong is gratefully acknowledged. The author is responsible for all remaining errors.

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Appendix 1 Data Construction

Data

The Hong Kong data used in this paper can be found in the author's own website at: <http://fbstaff.cityu.edu.hk/efkwli/Data.html>.

The GDP deflators are obtained from Table 2 and 12-14, *Gross Domestic Product 2001*, Census and Statistics Department. The data for the various industries come mainly from three publications of the Census and Statistics Department, namely the *2001 Gross Domestic Product*, the various issues of the *Annual Digest of Statistics* and *Quarterly Report of Employment, Vacancies and Payroll Statistics*.

The economy-wide labor variable

Labor force and employment statistics are available from *Annual Digest of Statistics* (Census and Statistics Department, various years). For the period 1987-2000, the statistics on the average hours per employee worked in the last working week of the time period are available in the *Labor Statistics* (International Labor Organization, various years). These figures are then multiplied by a total of 52.14 weeks (365 / 7 days) to obtain the average number of hours worked per employee per year. For the period 1980-1986, the statistics on the median hours per employee worked in the last working week of each time period are available and obtained from the Census and Statistics Department. A similar formula is applied to derive the annual statistics, and the median hours are assumed to equal to the average hours.

Payment to the labor factor

The value-added figures of each economic sector are used in calculating the labor factor share. Each economic sector's value-added is given by the compensation of employees and gross operating surplus. The former is mainly wage payment to workers, while the latter is the return to employers and entrepreneurs including self-employed workers. In order not to understate the share to labor factor payment, the compensation of the self-employed should be included in the compensation of employees. This is done by calculating the adjusted compensation of employees, which includes the original level of compensation of employees and the portion of compensation derived from the self-employed. The statistics on the number of self-employed for the period 1985-2000 can be obtained from the *Annual Digest of Statistics* (Census and Statistics Department, various years), and the figures before 1985 were extrapolated. The analysis assumes that the compensation of the self-employed is the same as the employed. The share of labor factor payment is calculated from the rate of adjusted compensation of employees to the production-based GDP in current price.

Sector deflators

The composite deflator of domestic exports is used as the deflator for the tradable goods sector, while the composite deflator of exports of services is used for the tradable services sector. The deflator for the non-tradable services sector is the geometric difference of the GDP deflator and the tradable sector's deflator shown in *2001 Gross Domestic Product* (Table 2, pp. 18-19).

Industry deflators

The industry-specific implicit price deflator is the ratio of value index and industrial production index or volume index. Manufacturing and mining and quarrying are the only two industries that used the industrial production index data. Most service industries used the volume index data.

There are some exceptions. In electricity, gas and water, data on the consumption of electricity and gas (*CEIC Database*) and the consumption index are used to replace the industrial

production index. In the import/export trade, the proxy deflator is the weighted average of the deflators for domestic exports, retained imports, and exports and imports of trade-related services. The transportation sub-index in the Hong Kong Composite Consumer Price Index (CPI) is used as the proxy for the deflator for land transport. This covers fares for ferries, trains, taxis and public transport, motor licenses and insurance, parking fees and tunnel tolls. In the case of water transport, air transport and other transportation services, the proxy deflator is the weighted average of the deflators for exports and imports of transportation services. The weights used are their nominal shares in the exports and imports of transportation services. The deflator for storage is derived from the rental index for private flatted factories.

The telephone service in the Miscellaneous Service Index of the Composite CPI is used as the proxy deflator for communication. The weighted average of the deflators for export and import of financial services and the deflators for export and import of insurance services are used as proxy deflators for financing and insurance, respectively. The implicit price deflator for real estate developers' margin is used as the proxy deflator for real estate. The implicit price deflator for the exports of other services is used as the proxy deflator for business services. For community, personal and social services, the proxy deflator is the Miscellaneous Services sub-index of the Composite CPI. This covers school fees and education charges, medical services, entertainment expenses, household services, hairdressing, repairs of personal and household goods, subscriptions, and postal and telephone services.

The proxy deflator for wholesale is the implicit price deflator of retained imports. The Census and Statistics Department provides the estimate for the value of retained imports and its quantum index for the period 1990-2001 (*Hong Kong Monthly Digest of Statistics*, December 2000, pp. FA8). The difference in the value of imports and re-exports gives the value of retained imports, and the value at current price can easily be transformed into value at 1990 price. The retained import value for the period 1981-1989, however, is estimated from extrapolating the 1990-2001 data. The implicit price deflator is calculated from the values of retained imports at current price and at 1990 price.

The industries that had experienced a rapid rise in inflation in the 1990s include community, social and personal services, electricity, gas and water, land transport, restaurants, construction and real estate. All these industries belong to the non-tradable sector where competition is limited.

Labor productivity and unit labor cost

Labor productivity is the ratio of real output and the number of persons engaged, and a labor productivity index with 1900 as the base year is calculated. The unit labor cost index with 1990 as the base year is the ratio of nominal payroll index per person engaged and the labor productivity index. The nominal payroll per person engaged equals to total value of payroll at current market price divided by total number of persons engaged.

Statistics on the production-based GDP at current market price (*2001 GDP*, Tables 12-14, pp. 66-84) are used to represent nominal output. The number of persons engaged (including individual proprietors and active partners) is end-of-year figures from the principle statistics shown in the *Annual Digest of Statistics*. There are two exceptions. For electricity, gas and water, the number of persons engaged for water is not available; the figures used in the analysis contain the number of persons engaged in electricity and gas only. The number of persons engaged in construction is the number of persons engaged in construction sites only. Since the reported number of persons engaged would be smaller than the actual number, the labor productivity so calculated could be biased upwards.

Nominal payroll statistics found in *Quarterly Report of Employment, Vacancies and Payroll Statistics* are used because they include wages and other related cash payments, namely, wages, overtime pay, shift allowance, attendance and efficiency bonuses, cost-of-living or dearness allowance, food and transportation allowances, year-end seasonal bonuses and payment

in lieu of leave, and so on. The *Quarterly Report of Employment, Vacancies and Payroll Statistics* gives the nominal payroll index per person engaged in four different base years (June 1980, March 1991, March 1994, and March 1999), which are then converted into one standardized series with 1990 as the base year for all industries. In cases where industries are being grouped together, namely land transport, water transport, financing and business services, the overall nominal payroll index per person engaged is the weighted average of the indices of its constituents. The weights are the number of persons engaged in the constituents.

Appendix Table 1 Aggregate Data for Productivity Accounting

	Production-based Real GDP (HK\$ Million)	Capital Stock (HK\$ Million)	Number of Persons Employed (Thousand)	Total Labor Working Hours (Million)	Adjusted Labor Share
1980	294,204	458,018	2,236.1	5,363	0.529
1981	326,808	518,300	2,393.1	5,740	0.527
1982	331,293	568,171	2,407.1	5,773	0.550
1983	348,642	610,610	2,426.7	5,820	0.562
1984	378,216	656,216	2,505.2	6,009	0.555
1985	380,049	695,292	2,543.3	6,100	0.579
1986	426,524	741,480	2,623.7	6,430	0.559
1987	485,179	802,796	2,680.8	6,500	0.532
1988	529,293	872,544	2,725.0	6,749	0.522
1989	536,489	931,877	2,723.1	6,574	0.534
1990	559,446	998,346	2,711.5	6,447	0.548
1991	578,310	1,072,007	2,753.7	6,633	0.545
1992	611,119	1,159,320	2,737.6	6,352	0.530
1993	638,592	1,234,448	2,800.1	6,687	0.528
1994	683,577	1,347,765	2,872.8	6,860	0.511
1995	713,063	1,497,964	2,905.1	6,831	0.539
1996	748,981	1,623,602	3,073.3	7,387	0.533
1997	772,094	1,772,247	3,163.6	7,456	0.541
1998	728,843	1,872,586	3,122.0	7,358	0.576
1999	751,161	1,921,510	3,112.1	7,464	0.591
2000	832,643	2,022,053	3,207.3	7,693	0.591

Sources: *Gross Domestic Product 2001*, and *Hong Kong Annual Digest of Statistics*, Census and Statistics Department, Hong Kong.

Appendix Table 2 Real Output (1990 Price) and Percentage Share of Economic Sectors

Year	Tradable Goods		Tradable Services		Non-Tradable Services	
	HK\$ Million	Percentage Share	HK\$ Million	Percentage Share	HK\$ Million	Percentage Share
1980	51,148.6	16.1	81,588.8	25.7	184,474.1	58.2
1981	55,358.7	15.7	91,443.8	25.9	206,717.1	58.5
1982	53,008.3	15.4	93,174.2	27.1	197,922.5	57.5
1983	58,489.9	15.6	98,167.5	26.2	218,148.8	58.2
1984	65,360.1	15.3	111,365.1	26.0	251,460.0	58.7
1985	63,323.6	15.9	113,640.9	28.5	221,978.7	55.6
1986	73,745.3	16.4	131,697.4	29.2	245,040.3	54.4
1987	86,230.0	16.8	160,974.8	31.3	266,767.4	51.9

1988	94,025.0	17.6	181,116.1	33.8	260,233.8	48.6
1989	97,663.6	18.9	180,464.4	35.0	237,805.7	46.1
1990	98,562.0	18.6	193,183.0	36.5	237,753.0	44.9
1991	95,722.0	17.5	220,847.5	40.3	231,205.6	42.2
1992	97,151.6	16.8	249,354.2	43.2	230,712.9	40.0
1993	90,602.7	14.9	279,638.3	46.0	238,244.1	39.2
1994	83,670.5	13.0	299,936.2	46.7	258,361.4	40.2
1995	79,446.3	12.0	314,555.7	47.6	267,040.1	40.4
1996	77,572.4	11.0	346,981.6	49.1	282,023.7	39.9
1997	76,862.2	10.5	366,628.9	50.3	285,239.2	39.1
1998	69,960.7	10.1	357,770.8	51.6	265,627.0	38.3
1999	66,944.3	9.3	374,421.6	51.8	280,939.7	38.9
2000	71,936.3	9.0	414,594.7	51.9	311,664.0	39.0

Sources: *2001 Gross Domestic Product, Annual Digest of Statistics*, various issues and *Quarterly Report of Employment, Vacancies and Payroll Statistics*, various issues, Census and Statistics Department, Hong Kong SAR.

Appendix Table 3 Proportion of Producer Services

Service Industry	Producer Service Component (%)
Wholesale	100
Retail	45
Import/export	100
Restaurant	15
Hotel	100
Transportation	45
Storage	45
Communication	45
Financing	90
Insurance	20
Real estate	50, 40 (1983-1986)
Business service	100
Community, social & personal services	5

Source: Wong and Tao (2000), Appendix I, p. 66-67.