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Servicing the Service Industries: Lifelong Education as Human Capital Investments for Hong Kong

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The age of lifelong learning has dawned...Lifelong learning is the key to a person's success, and to Hong Kong's success.

~ Education Commission, Hong Kong, September 1999.

I. Lifelong education plays a significant role in human resource development for the rapidly growing service industries of Hong Kong

Economists, educators and managers generally agree that a better-trained workforce leads to higher productivity and in turn contributes to a higher Gross Domestic Product (GDP). In the specific context of Hong Kong, an adaptive and competitive workforce is of particular importance as the structure of the economy has changed rapidly in the past two decades.

The expansion of the service industries in Hong Kong in the last two decades has been well discussed by economists. The reasons for such expansion have been the opening of China, the globalisation of economic activity, and rapid growth of the Asia-Pacific region (Wong, 1996: 38). The contribution of the service sector to GDP at factor cost rose from 67.54% to 81.32% from 1983 to 1993. The share of service sector employment grew from 55.0% in 1983 to 77.5% in 1993 (Wong, ibid.). In 1994, service sector employment rose again to 83.9% of total employment (Fok, 1997: 90). Some economists even projected that by the year 2003 all employment in Hong Kong would be in the service sector.

Although the accuracy of such projection is questionable because manufacturing employment is unlikely to vanish altogether, there is no doubt that Hong Kong's workforce is constantly adjusting to the rapidly changing employment structure and has by and large met the challenge with success. Hence a key factor of Hong Kong success is its *human resources*.

Talking about Hong Kong's transformation from a manufacturing to a service-oriented economy, the former Governor of Hong Kong Chris Patten said that it would be more accurate to describe the change as "a transformation from a lower-skilled, lower value-added economy to a higher-skilled and higher value-added one" (Patten, 1996: 2). He further remarked that this transformation has resulted from "the creativity and initiative of our businessmen and the skills of our workforce" (Patten, 1996: 3). In other words, Patten attributes the success of Hong Kong to its human resources. Indeed, Hong Kong lacks physical or natural resources, unlike the United States or Australia. It is Hong Kong's human resources competencies that have given its economy a unique competitive advantage (Stone, 1995).

One would justly ask how Hong Kong's businessmen remain creative and how the workforce upgrades its skills. The answer obviously lies in education and training. To invest on human resource development, Hong Kong must focus on professional and continuing education as well as basic schooling. Visions, enthusiasm and lifelong learning would be the major ingredients that make our workforce highly skilled and creative. In defining "lifelong learning", we would like to borrow the insights of Longworth and Davies of the European Lifelong Learning Initiative:

> Lifelong learning is the development of human potential through a continuous supportive process which stimulates and empowers individuals to acquire all the knowledge, values, skills and understanding they will require throughout their lifetimes and to apply them with confidence, creativity and enjoyment in all roles, circumstances, and environments (cited in Merrill, 1997: 102).

The stress is on development through "a *continuous supportive process* which stimulates and empowers..." In this paper, the terms *lifelong learning, lifelong education* and *continuing education* are used interchangeably to mean education and training that is pursued beyond one's initial schooling. Though some authors insist on the distinction between lifelong learning and lifelong education, using the former to mean the learning process and the latter to refer to the structural and methodological aspects, such distinction is unnecessary here. In this paper, the broader sense of the term education is employed.

II. The importance of Lifelong Education as human capital investment for Hong Kong

In view of the recent Asian economic crisis, it has been recognised that Hong Kong's workforce has to be more productive in new ways in order to sustain a higher-value-added economy. Education and training are keys to raising productivity of our workforce and are critical to Hong Kong's competitiveness in the future (Enright, Scott and Leung, 1999: 61). Besides the already identified needs for enhancing language proficiency, particularly in English and Putonghua, and better skills in information systems, there is evidence that managerial training for the service sector is

vital. As Hong Kong continues to be a provider of services to the national market of China, "the focus of education and training should be to provide the skills and capabilities that will be necessary for Hong Kong to expand its role as a management and co-ordination centre and to eventually become a true world city" (ibid.). One of the necessary modes to deliver the needed training is through continuing education.

Hong Kong studies on participation in lifelong learning

Recent research in Hong Kong finds that its people are very keen about continuing education and the annual expenditure on such activity is rather high. According to a sample survey among adults (age 18 and over) in Hong Kong in 1991, 22.53% of the respondents (73 out of 324 valid responses) indicated that they participated in some kind of continuing educational course in the previous year (Chan & Holford, 1994: 75). Out of these 73 respondents, 27.4% has already attained tertiary educational level or above.

At the time of the 1991 survey, the population aged 18 or above was estimated to be 4.12 million. A 22.53% participation rate implies that there were about 930,000 persons taking continuing education courses each year. The study also found that the average number of courses taken by each participant was 1.76 and the average fee paid for each course was HK$1,600. On an average, these individuals were paying HK$2,816 for their studies. Hence, the total volume of investment in terms of fees paid for continuing education was estimated to be over 2.6 billion per annum (HK$1,600 x 1.76 x 930,000).

A similar telephone survey conducted in April 1999 successfully interviewed 542 Hong Kong residents of age 18 or above (*SPACE News* 1,1999: 8). It was reported that 20.7% of the respondents indicated that they attended continuing education courses in the preceding 12 months; 24.4% indicated that they attended continuing education courses earlier but did not do so in the preceding 12 months. There were 23.6% of the respondents who indicated that they planned to attend continuing education courses in the coming 12 months and, on an average, were prepared to pay HK$12,054 for such activity. Furthermore, individuals who participated in continuing education courses in the previous 12 months have on an average spent HK$8,983 for such activity (unpublished report, SPACE Research & Development, 1999).

Based on this recent survey, it is possible to estimate the total expenditure of Hong Kong's productive population (aged between 20 to 64) on lifelong learning in the year 1998/99. If we multiply the participation rate (20.7%) and actual expenditure per person (HK$8,983) with a conservative estimate of Hong Kong's productive population (4,214,300),[1] a sum of HK$7.84 billion has been spent. Furthermore, we may consider the survey respondents' projection of the coming year to be fairly close to reality, that 23.6% of the adult population is likely to pay

[1] Hong Kong's population aged between 20-64 in 1997 is used for this calculation. This figure equals 4,214,300 according to statistics of the Hong Kong Census and Statistics Department. Since this is a figure for 1997 and that many persons in Hong Kong work before reaching the age of 20 and beyond the age of 65, this is considered a rather conservative estimate of the productive population of Hong Kong. Among this group, the number of persons participating in lifelong education is estimated to be 872,360 (4,214,300 x 20.7%) and that for such activity they are paying HK$7,836,410,778 (872,360 x $8,983).

HK$12,054 per person for continuing education in the year 1999/2000. In this case, it can be projected that our productive population is likely to spend a total of HK$11.99 billion on continuing education in the coming year. This estimate of actual and projected expenditures represents the seriousness of Hong Kong people about continuing education.

Lifelong education provision in Hong Kong

As we have discussed earlier, continuing and professional education (CPE) activity is so important in Hong Kong for human capital development that they cannot be ignored. (See Appendix III for the milestones in the historical development of CPE activity in Hong Kong). In the 1996 Report on Higher Education in Hong Kong, the number of students attending CPE courses was originally estimated to be 320,000 with a full-time equivalence (FTE) of 46,000 which compares with 56,000 FTE students on first degree courses and another 22,000 FTE students doing higher diplomas or their equivalents (UGC, 1996). In the recently published supplement to the 1996 Report, the total of size (headcount) engaged in CPE courses has been revised to 370,000 with a full time equivalence of 61,000 (Supplement Chapter 3, August 1999).

The CPE units within existing Higher Education Institutions (HEI) are the major providers of continuing and professional education in Hong Kong. The following table shows the breakdown of the size of CPE units (1997-98) for the year 1997-98:

Table 1: Size of CPE Activity in Hong Kong (1997-98)

Institution	*CPE Unit*	*No. of Admin. Staff*	*No. of FT Teachers*	*No. of PT Teachers*	*No. of Courses*	*No. of Students*	*Expenditure (HK$ million)*
City U	SCOPE	7	-	770	565	15,916	45
HKBU	SCE	49	8	597	1,720	46,351	117
LC	-	-	-	19	2	1,450	0.03
CUHK	SCS	10	-	1,041	1,508	27,535	53
HKIEd	DCPE	14.5	-	330	164	4,739	7.4
PolyU	PACE	6	3	350	619	20,968	35
	CPBE	5	10	30	400	7,200	15
HKUST	-	4	0	12	91	2,279	9
HKU	SPACE	145	47	967	1,609	69,274	285

Source: Supplement to 1996 Report on Higher Education, Hong Kong, August 1999.

Apart from the above-mentioned CPE units, the Open University of Hong Kong (OUHK) with 22,900 students (headcount) and courses is the largest provider of CPE courses at higher level. Other providers include: the Caritas Adult and Higher Education Service, the Hong Kong Management Association with 52,000 students, and the Hong Kong College of Technology.

With these figures, the essential role of CPE programmes to the enhancement of human capital development is so obvious. At this point, it should also be stressed that empirical research has shown that the accumulation of human capital by formal schooling has been somewhat over-emphasized. Some researchers argued that the contribution of education could be further increased when information on the expected

prospect of future career paths is first made available to students. In other words, previous engagement in the labour market allows an individual a wider assessment of his own talents and abilities that would enable him to evaluate the future earnings of various career paths. As a result, he would be in a better position to choose the type of training programme and education curriculum that maximizes his future earnings. In this regard, Siebert (1985) for example has found that post-school investment in education accounted for a significant difference in earnings between identical twins, ceteris paribus.

III. Research on the importance of lifelong education as human capital investment

Defining human capital and its relation to education

It has long been established that education should be treated as an investment and that its consequences be treated as a form of capital, namely human capital (Schultz, 1960: 571-583). T. W. Schultz is one of the first economists who make such a proposal. As education becomes an inseparable part of the person receiving it, Schultz refers to it as *human capital.*

Since then, the basic idea of increasing human capital has been elaborated to mean the decision to acquire training and education, which may be either at school or on the job, and which entails some sacrifice in current earnings in addition to the necessary expenditure charged for the training, in the expectation that future earning can be increased. Because this

acquisition of skills is expected to generate future return, this behavior is commonly treated as an investment decision in economics.

In the traditional economic literature, labour input and entrepreneurial input are supposedly two distinct kinds of resources that are utilized in the production process. Labour is invariably treated as a "low level" resource that undergoes some mechanical and repetitive activities within a firm under the direction of the entrepreneur. Today, the restructuring of industries in developed countries toward a more efficient use of global information and the focus on the capacity to make good judgement in a dynamic environment, both outside and within the firm, have blurred the dividing line between labour and entrepreneur. We have entered a stage of post-industrialization where enterprises are seeking the input of information and judgement from the employees rather than the old fashioned labour. Human resources can no longer be defined without some reference to managerial talent and decision making under unexpected contingencies.

Hence, it is human capital instead of the population of the "labour force" that affects the national income and economic growth. This is now agreed by almost all policy-makers, although many differences in thinking exist in the ways and the extent to which human capital can best be formed, as well as the degree of exponential effect of human capital development on economic growth.

Research on investments in human capital and economic growth

Numerous empirical studies have tried to estimate the importance of education in the growth of national income, specifically how much education contributes to the overall growth rate of real national income.

According to Schultz (1960), a substantial part of the unexplained increases in national income in the United States are attributable to the additions to the stock of human capital. Schultz estimated that during the first half of the twentieth century, 1% increase in real income in the Untied States was associated with 3.5% increase in resources spent on education (Schultz, 1960: 579). More recent research by Denison (1985) has found that as much as half of the growth in real national income in the United States during 1973 to 1982 was attributed to education.

Early studies tend to focus on resources entering into three forms of education, namely elementary, secondary and higher education. Like Schultz's research, they overemphasize the significance of formal schooling and neglect other forms of education such as continuing and professional education. If these researchers were to conduct their studies now, one can be sure that lifelong education would be part of their agenda.

In Europe, recent studies indicate that economic and demographic changes have forced governments to consider the merits of lifelong learning almost to the extent of viewing lifelong learning as essential to the survival of society (Merrill, 1997: 98). In Asia, research has also revealed a close relationship between economic growth and the input into human resource development through education. For any appropriate assimilation and absorption of technology, both basic education and continuous skill upgradation play a significant role (Virmani and Rao, 1997).

As Hong Kong turns into a higher-skilled and higher-value-added economy, universities in Hong Kong are opening up as centres for lifelong learning, just like their counterparts in the United States and in

Europe. However, research on the effect of lifelong education, human capital and economic growth is inadequate. Estimating resources input into lifelong education seems much more complicated than estimating expenditure on formal schooling because of the diversity of the behaviours of both providers and consumers. In the next section of this paper, an economic model for such estimates in the context of Hong Kong is proposed.

IV. Evaluating Hong Kong's investment in human capital through lifelong education: a proposed economic model

In Hong Kong, there is indeed very little research on human capital development. Only a few attempts have been made, the most comprehensive being perhaps the 1992 study by P. W. Liu. The study shows that the amount invested in human capital through education in Hong Kong in 1986 is about 20% of the total amount invested in physical capital formation, signifying therefore the importance of education in economic development. Using an econometric model, he also demonstrated that the growth in human capital had accounted for the bulk of the growth in average labour productivity in the manufacturing industries in the 1970s and 80s. Liu's research, like many previous studies, was based only on government funded education programmes and had totally left out the huge amount of lifelong education programmes offered by other types of CPE providers.

Compared to the calculation of investment in formal schooling, the calculation of investment in lifelong education is much more difficult. There is not enough published data about enrolment figures, programme

fees and number of graduates of the various programmes offered by the local CPE providers. The introduction of the Non-local Higher and Professional Education Ordinance in 1996, which requires providers to submit enrolment figures and course fees of individual programmes to the Education Department, should make the estimation of CPE providers' contribution to human capital development easier in the future. This legislation, however, is relatively new and compilation of statistics for the first time is still in progress.

Any serious effort to assess human capital development through higher education in Hong Kong should include the following four types of programmes: (1) government funded education programmes, (2) self-funding CPE lifelong education programmes, (3) training programmes conducted by employers, and (4) overseas programmes which our citizens have completed in other countries.

The benefits that education brings to human capital development in an economy can be estimated by measuring the marginal net gain of attaining one higher level of education by its citizens. If data on the number of graduates, sub-degree as well as professional qualification holders produced in an economy in a period are known, then the gain or benefits contributed through higher education to the economy in that period can be calculated by first finding the difference in income of the above groups (i.e. income before and after one higher level of studies) over their remaining working life and by discounting and then summing up all the various streams of income to present value. The cost of education, both explicit and implicit, should be deducted from this lump

sum present value to arrive at what we call marginal net gain for the economy.

This may sound absurd. First of all, it should be noted that to all the above individuals, the marginal gain in terms of an increase in income derived from pursuing one higher level of education will be enjoyed for many years till they leave the workforce. To find marginal gain for these individuals, a number of assumptions have to be made. First, the number of years that the various groups of graduates (graduates, sub-degree holders, e.g., diploma holders and professional qualification holders) will be contributing to the economy. Second, the average increase in income over the graduates' future working years due to pursuing one higher level of education. Third, the rate of discount to bring their future income to present value. The rate of discount varies according to different economic conditions. Normally, the market interest rate for the period concerned will be used as the discount rate to bring future income to the present value.

The concept of present and discount value can be illustrated by using the Fisherian approach: If an individual borrows $100 from the bank for one year at an annual interest rate of 10%, he is obliged to pay the bank next year an amount of $110, i.e. the principle plus the interest. Economists would interpret that the amount of income available next year $110, is equivalent to $100 today, or has a present value of $100. In other words, a future value of $110 available next year when discounted at 10% is equivalent to $100 of the present value. If the individual borrows the same amount for two years, then he will have to pay $121, i.e. the principal plus the compound interest. The amount of $121 available two

years from now is said to have a present value of $100. In this way economists can transform a future income stream into a lump sum of present value by first discounting each income to be earned in a future year into a present value equivalence and then summing all the discounted values together.

In the case of a fresh graduate, the marginal benefits of university education to him or her is the difference between the present values of incomes earned by a degree holder and that earned by a non-graduate. To this graduate, the benefits derived is not without cost. First he or she has to bear an explicit cost i.e. tuition fee payments for the years of his or her studies. Second, the individual should have been working for three years (undergraduate studies take three years) if he or she has not taken up a course in the university. The income forgone due to studying for three years is the opportunity cost or implicit cost to the graduate for pursuing his or her studies. Both the explicit and implicit costs have to be deducted from the marginal benefits derived from obtaining a degree to arrive at a net marginal benefit. If we know the number of graduates produced in an economy in a period, say in one year, then we can simply multiply the number of graduates produced in that year with the net marginal benefits derived by each graduate and come up with a figure to show the net marginal benefits derived by all graduates in the period in the economy.

Similarly, those who have first acquired a sub-degree (e.g., a diploma), will also derive some net marginal benefits. The net marginal benefits for a sub-degree holder is the difference between the present value of incomes earned by a sub-degree holder and that earned by a non-graduate, net explicit and implicit costs. Again, if we know the number of sub-

degree holders produced in an economy in a period, we can then use this number to multiply the net marginal benefits derived by each sub-degree holder and come up with a figure to show net marginal benefits derived by all sub-degree holders in the period in the economy.

If we assume that professional qualification holders earn the same amount of income as graduates, then the net marginal benefits derived by a professional qualification holder upon completion of his studies is the difference between the present values of incomes earned by a degree holder and that earned by a non-graduate net explicit and implicit costs (there is no published information on income of professional qualification holders). Again, if we know the number of professional qualification holders produced in an economy in a period, we can use this number to multiply the marginal benefits derived by each professional qualification holder upon his or her completion of studies and the result would be the net marginal benefits derived by all professional holders in the economy in the period.

If we define higher education as a system to produce graduates, sub-degree holders and professional qualification holders, then the benefits higher education brings to an economy are the sum of the net marginal benefits derived by all these three groups. Although these benefits are enjoyed by individuals, the economy as a whole also benefit as its citizens are better educated and qualified and will therefore be ready for higher productivity. These benefits in terms of higher productivity to be received by the economy are indeed what we have always been referring to as human capital development or human capital formation; and in the way described in the above paragraphs, human capital development can

be qualified. The basic question is how one relates net marginal benefits derived by all who pursue one level of higher education in colleges and universities with productivity and human capital development. Economists interpret that net marginal benefits in terms of increase in income enjoyed by an individual would be equivalent to his contribution to the work force in terms of an increase in productivity. In a fluid market situation economists would interpret that an individual will not enjoy benefits higher or lower than his or her productivity, because in a perfectly informed market, there are automatic mechanisms for adjusting imbalances.

As mentioned above, to assess human capital development through higher education in Hong Kong, one should include four types of programmes: (1) government funded education programmes, (2) self-funding CPE lifelong education programmes, (3) training programmes conducted by employers, and (4) overseas programmes which Hong Kong residents have completed in other countries. For this paper, due to the lack of data we are not prepared yet to include the employer–organised programmes and programmes which Hong Kong residents have completed overseas. Hence, we can only focus on (1) and (2). We will also not be able to give an accurate calculation for (2) because these programmes have a high drop out rate and a large number of non-award bearing programmes. It is quite impossible to estimate differences in earnings for individuals due to completion of non-award bearing programmes. There are, however, published data on average income of graduates and sub-degree holders. Although data are scarcely available, we would like to demonstrate our model of calculation and show how human capital development can be estimated using this approach.

Higher Education and Human Capital Formation: a model for calculation

Parameters of the study

(1) The calculation includes all graduates of higher education (sub-degree, degree, postgraduate and professional qualification) of Hong Kong government funded programmes and self-funding CPE non-local award bearing programmes.

(2) Due to the lack of data, the CPE non-award bearing courses and local award-bearing CPE courses are not included.

(3) The year 1995 was chosen as more data are available for the calculation. The study concentrated on 1995 total output of graduates.

Theoretical Background

Following the standard Fisherian tradition, human capital formation in higher education is defined as the discounted present value of an increase in future income over time, net of the explicit cost of education and the opportunity cost to students in completing the programme. Because the future is not yet realized, four simplifying assumptions are imposed:

(i) Income earned at any given period of time is wage income.

(ii) Each graduate participates in the labour market for 40 years, without any interim period of unemployment, until they retire.

(iii) Wage income increases at a constant rate of 11% per annum (on the basis of the average nominal wage adjustment in Hong Kong from 1984 to 1995[2]).

(iv) The annual interest rate remains constant at 6% (on the basis of the current yield of the U.S. 30-year Treasury Bond).

Basis of Calculation

(1) Let 1994 be the base year to which all future incomes are discounted, and expenditure compounded.

(2) Examine the marginal gain of attaining higher education – degree (including post-graduate studies) and sub-degree.

(3) The average annual wage incomes under different educational attainment in 1995 are estimated and assumed to increase at a steady rate of 11% per annum.

(4) The marginal gain to degree / sub-degree graduates in 1995 is the discounted present value (by an annual interest rate of 6%) of an increase in wage income over the next 40 years relative to matriculation / upper secondary education.

(5) The present value of marginal gain to each degree holder at 1994 prices =

$$\sum_{t=1}^{40} [WI_{degree}(t) - WI_{matriculation}(t)] / (1 + 0.06)^t$$

[2] *Hong Kong Monthly Digest of Statistics, January 1996.*

where *WI(1)* stands for annual wage income in 1995 following the assumption $WI(t)\ (1+0.11) = WI(t+1)$.

Similarly, the marginal gain to sub-degree holders =

$$\sum_{t=1}^{40} [WI_{\text{sub-degree}}(t) - WI_{\text{upper secondary}}(t)] / (1 + 0.06)^t$$

1995 Human Capital Formation

(1) Graduates from government funded institutions in 1995 (see Appendix I):

Marginal gain to all degree holders = $\$2.57 \times 10^{11}$
Marginal gain to all sub-degree holders = $\$2.04 \times 10^{11}$

Graduates from self-funding CPE conducted non-local award bearing programmes (see Appendix II):

Marginal gain to degree holders = $\$1.12 \times 10^{11}$

Marginal gain to professional qualification holders = $\$6.66 \times 10^{9}$

Marginal gain to sub-degree holders = $\$1.37 \times 10^{10}$

(2) Cost of higher education (at 1994 prices):

(a) for government-funded programmes (see Appendix I)

= Government expenditure + student fees paid to complete the relevant programme + wage income forgone

(Assume all UGC-funded programmes take three years to complete.)

Government expenditure

= recurrent expenditure on higher education + depreciated non-recurrent expenditure (at 10%) from 1992 / 93 to 1994 / 95, compounded to 1994 figures at the interest rate of 6%, with a proportion of 1/3 spent on the 1995 graduates = $8.9 x 10^9.

Student fees paid

= 3 years of fees (from 1992 / 93 to 1994 / 95) compounded to 1994 figure:

$9.28 x 10^8 for degree holders

$5.17 x 10^8 for sub-degree holders

Wage income forgone = total wage income (compounded from 1992 / 93 to 1994 / 95 at 6% interest rate) which could have been earned during the completion of higher education if students choose to devote such period of time to the labour market at a lower educational qualification, i.e.,

$6.3 x 10^8 for degree holder,

$3.43 x 10^8 for sub-degree holders.

(b) for CPE programmes (see Appendix II)

= student fees paid to complete the relevant programmes

(Assume students remain active in the labour market.)

Student fees paid (assume 4 years for degree, 3 years for professional programmes, and 2 years for sub-degree):

$4.88 x 10^8 for degree

$7.03 x 10^6 for professional programmes

$6.51 x 10^7 for sub-degree

(3) Human capital formation for government-funded programmes = marginal gain of higher education – government expenditure – student fees paid – wage income forgone

= $4.50 x 10^{11}.

Human capital formation for CPE programmes = marginal gain of higher education – student fees paid

= $1.31 x 10^{11}.

Conclusion

Based on the proposed model, human capital development contributed by self-funding lifelong education programmes in 1995 was 29% of that contributed by government funded programmes. In reality this figure should be much higher because a substantial part of the CPE programmes were excluded in the study. Due to the lack of data, only those non-local (overseas) award bearing CPE programmes offered locally were included in the calculation. The large number of local award courses and non-award bearing CPE programmes (e.g., short courses and in-house training programmes) had been left out. If one were to include these latter programmes, the figure would be boosted up from 29% to a much closer comparison to the contribution made by government funded programmes.

The result of this research is tentative as the coverage is not wide enough to include all of the CPE programmes. Even so, it does clearly show that the contribution by CPE providers is substantial and lifelong education provides an important ground for developing human capital for Hong Kong. The model we developed for calculating human capital development through education should provide a good framework for similar studies in the future.

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1995 UGC Graduates

1995 Degree Graduates

1991 marginal gain (1991 figure is used since only 1991 census was available at the time of this research):

$(S_{degree} - S_{martric}) \times 12 = \$92916$ (at 1991 prices)
where S ≡ monthly salary

Projected 1994 marginal gain:

$(S_{degree} - S_{matric}) \times 12 \times (1 + 0.11)^3 = \$127075$ (at 1994 prices)
where average yearly increment in salary is taken *from Hong Kong Monthly Digest of Statistics*, January 1996, F6, Table 1.

Assume that (i) yearly wage increment = 11%, (ii) nominal interest rate = 6%. Then the *Present Value of marginal gain over the next 40 years per graduate* (the present value is measured in terms of 1994 prices):

$$\sum_{t=1}^{40} \text{marginal gain (t)} \frac{1}{(1 + 0.6)^t}$$

$$= \sum_{t=1}^{40} \text{1994 marginal gain} \times (1 + 0.11)^t / (1 + 0.06)^t \text{ (from 1995 to 2035)}$$

(The first term in the summation refers to 1995 marginal gain)

$$= \sum_{t=1}^{40} 127075 \times 120 = \$15249000.$$

Total no of graduates in 1995:

15771 from City U, BU, Lingnan College, CUHK, HK PolyU, HKUST, HKU[3]
1066 from OLI[4]
17 from APA
Total no. of graduates = 16854

Marginal Gain for degree graduates in 1995:

$15249000 x 16854
= **$2.57 x 10^{11}** **[A]**

Opportunity cost (wage income forgone) to F/T students at 1994 prices, from 1992 to 1995:

16854 x salary forgone x 8/12
= 16854 x S_{matric} (@1992) x $[(1+0.06)^2 + (1+0.11)(1+0.06) + (1+0.11)^2]$ x 8/12
= 16854 x 9582 x (1+0.11) x $[(1+0.06)^2 + (1+0.11)(1+0.06) + (1+0.11)^2]$ x 8/12
= **$6.33 x 10^8** **[B]**

3 years of student fees:

1992 / 93	$11600
1993 / 94	$17000
1994 / 95	$24000

Fees paid per degree student in 3 years (compound to 1994)

= $11600 x $(1.06)^2$ + 17000x (1.06) + 24000
= $55054

Total student fee (Degree) (at 1994 prices)

= $55054 x 16854
= **$9.28 x 10^8** **[C]**

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[3] *Hong Kong Annual Digest of Statistics 1996*, pp 226-7, Table 11.23.
[4] *Hong Kong Annual Digest of Statistics 1996*, p 225, Table 11.22.

1995 Sub-degree Graduates

1991 marginal gain:

$= (S_{non\text{-}d} - S_{second}) \times 12$

$= \$47316$

Projected 1994 marginal gain:

$= \$47316 \times (1+0.11)^3$

$= \$64710$

PV of marginal gain over the next 40 years per graduate (The first term in the summation refers to 1995 marginal gain):

$$\sum_{t=1}^{40} \$64710 \times (1 + 0.11)^t / (1 + 0.06)^t.$$

$= \$7765200$

Total no of non-degree 1995 graduates:

6480 from City U, Lingnan, HK PolyU[5]
4410 F/T, 1780 mixed F/T, 3660 P/T day and 7600 evening from Technical Institute[6]
8 from OLI[7]
1256 F/T and 877 P/T from HKIEd[8]
256 from APA
Total = 26327

Marginal Gain for 1995 non-degree graduates

$=$ 26327 x \$7765200

$=$ **\$2.04 x 10^{11}** **[D]**

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[5] *Hong Kong Annual Digest of Statistics 1996*, pp 226-7, Table 11.23
[6] *Hong Kong Annual Report 1996*
[7] *Hong Kong Annual Digest of Statistics 1996*, p 225, Table 11.22
[8] *Hong Kong Annual Report 1996*

Opportunity Cost to students:

Salary forgone from 1992 to 1995 (3 academic years) per student:
= Salary of upper secondary (@1992) $[(1.06)^2 + (1.11)(1.06) + (1.11)^2] \times 10/12$
= $7210 \times (1.11) [(1.06)^2 + (1.11)(1.06) + (1.11)^2] \times 10/12$
= $7210 \times 3.92 \times 10/12$
= $25845

Total Salary forgone
= Salary forgone per student x No. of non-degree graduates
= $25845 x (6480 + 4410 + 1780/2 + 1256 + 256)
= **$3.43 x 10^8** **[E]**

Student Fees (1992 / 93 – 1994 / 95) compound to 1994 (per student):

City U, Lingnan, Poly U, OLI,: and APA (Sub-degree)	$9000 (1.06)^2 + 12750 (1.06) + 18000 = $41627
Tech. Inst.:	
F/T	$4050 (1.06)^2 + 5100 (1.06) + 5900 = $15857
P/T day	$1460 (1.06)^2 + 1825 (1.06) + 2125 = $5700
Evening	$1056 (1.06)^2 + 1263 (1.06) + 1469 = $3995
HKIEd:	
F/T	$4550 (1.06)^2 + 6300 (1.06) + 8000 = $19790
P/T	$19790/2 = $9895 (assumption)

Total Student Fee paid = $41627 x (6480 + 256 + 8) + $15857 x (4410 + 1780)+ $5700 x 3600 + $3995 x 7600+ $19790 x 1256 + $9895 x 877
= **$5.17 x 10^8** **[F]**

Government expenditure on higher education:

1992-93	$\$6.99 \times 10^9$	($\$7.85 \times 10^9$ compound to 1994)
1993–94	$\$8.4 \times 10^9$	($\$8.91 \times 10^9$ compound to 1994)
1994-95	$\$9.93 \times 10^9$	

Total = $\$2.67 \times 10^{10}$

Assume one-third is allocated to the 1995 graduates. Therefore, government expenditure on them = **$\$8.9 \times 10^9$**. **[G]**

Net Human Capital (1995) for government-funded higher education programmes:

= Marginal gain for degree graduates – opportunity cost of degree graduates – total fees paid by degree students + margerial gain for sub-degree graduates – opportunity cost of sub-degree graduates – total fees paid by sub-degree students – government expenditure on higher education

= A – B – C + D – E – F – G

= $\$4.50 \times 10^{11}$

APPENDIX II

1995 Graduates of CPE programmes

Table 1

Graduate number for Degree, Sub-degree, and Professional Programmes provided by CPE units in Hong Kong (1995).

	No. of Graduates for Degree Programmes	No. of Graduates for Sub-degree Programmes	No. of Graduates for Professional Programmes
Total (60%)	4417	1056	262
Total (100%)	7362	1760	437

Source: Academic Programme Guide 1994-95. Hong Kong Council for Academic Accreditation (which only covers 60% of the programmes and courses on offer in Hong Kong).

Table 2

Total Student Fees paid by 1995 CPE graduates of Degree, Sub-degree, and Professional Programmes

	Total Student Fees for Degree Programmes	Total Student Fees for Sub-degree Programmes	Total Student Fees for Professional Programmes
Total (60%)	HK$292,692,198	HK$39,035,647	HK$4,215,369
Total (100%)	HK$487,820,329	HK$65,059,411	HK$7,025,614

Source: Academic Programme Guide 1994-95. Hong Kong Council for Academic Accreditation (which covers 60% of the programmes and courses on offer in Hong Kong only).

Remark: Exchange rates: GBP 1 = HK$12.5
US$ 1 = HK$7.8
AUS$ 1 = HK$5.8
NZ $ 1 = HK$5.3

PV of marginal gain over the next 40 years per graduate:

Degree: $\$15249 \times 10^3$
Sub-degee: $\$7765.2 \times 10^3$
Professional: $\$15249 \times 10^3$

Marginal Gain for CPE programme Graduates:

Marginal gain to all degree holders $= 7362 \times \$15249 \times 10^3$
$= \$1.12 \times 10^{11}$

Marginal gain to all professional qualification holders $= 437 \times \$15249 \times 10^3$
$= \$6.66 \times 10^9$

Marginal gain to all sub-degree holders $= 1760 \times \$7765.2 \times 10^3$
$= \$1.37 \times 10^{10}$

Total Student Fees paid:

Degree Programmes: $\$487820329 = \$4.88 \times 10^8$

Professional Programmes: $\$7025614 = \$7.03 \times 10^6$

Sub-degree Programmes: $\$65059411 = \$6.51 \times 10^7$

Net Human Capital of 1995 of CPE programmes

Degree Programmes: $7362 \times \$15249 \times 10^3 - \$487820329$ **[A]**
$= \mathbf{\$1.12 \times 10^{11}}$

Professional Programmes: $437 \times \$15249 \times 10^3 - \$7025614$ **[B]**
$= \mathbf{\$6.66 \times 10^9}$

Sub-degree Programmes: $1760 \times \$7765.2 \times 10^3 - \$65059411$ **[C]**
$= \mathbf{\$1.36 \times 10^{10}}$

Net Human Capital (1995) for CPE programmes

$= \mathbf{A + B + C}$
$= \mathbf{\$1.31 \times 10^{11}}$

Milestones in the Development of Lifelong Education in Hong Kong

Institution	Establishments (Date)		Developmental Yardsticks	
University of Hong Kong (HKU)	1956-92	Department of Extramural Studies	1956/57	Twelve courses offered with a total enrolment of 330
			1971-81	Significant growth by 292%
	1992-	School of Professional and Continuing Education (SPACE)	1999	Incorporation into a company of HKU
			Currently has an enrolment of over 83,000 students (about 13,000 FTE)	
Chinese University of Hong Kong (CUHK)	1965-94	Extramural Department	1971-81	Significant growth by 137%
	1994	School of Continuing Education (SCE)	1979	Diploma and certificate programmes have been developed since.

Institution	Establishments (Date)		Developmental Yardsticks	
Caritas Hong Kong	1963	Continuing and Adult Education Section	Initially the Caritas Francis Hsu College was offering two-year Diploma programmes as well as A-Level courses to secondary school leavers. In 1990, the College obtained the approval of the Hong Kong Government to provide three-year post secondary Professional Diploma programmes. CAPS specializes in the local administration of tertiary programmes offered in Hong Kong by overseas institutons and institutions in Mainland China.	
	1985	Caritas Francis Hsu College		
	1997	Caritas Adult and Higher Education Service (CAPS) was established under Caritas Francis Hsu College.		
Hong Kong Baptist College (1956-1994) Hong Kong Baptist University (HKBU, since 1994)	1975	Department of Extramural Studies	1985	Provision of a bachelor degree programme (B.Ed.) in collaboration with the Univ. of Iowa; this is the first adult learner's award-bearing programme delivered in conjunction with an overseas university
	1983	Renamed as the School of Continuing Education		

Institution	Establishments (Date)		Developmental Yardsticks	
Hong Kong Polytechnic (1972-1994) Hong Kong Polytechnic University (since 1994)	1988-99	Centre for Professional and Continuing Education (PACE)	1997/98	A total of 20,968 students
	1999	School of Professional Education and Executive Development (SPEED)		
City Polytechnic of Hong Kong City University of Hong Kong (since 1994)	1991	School of Continuing and Professional Education (SCOPE)	Deliver degree and sub-degree course for professional practice, retraining and self-development.	
Open Learning Institute (1989-1997) Open University of Hong Kong (1997-)	The OUHK has four schools - School of Arts and Social Sciences, School of Business and Administration, School of Education and Languages, and School of Science and Technology - offering a wide range of degree courses. In addition, the Centre for Continuing and Community Education provides sub-degree and short courses.		1997/98 1998/99	24,318 students enrolled (FTE equivalent=9,937) 24,836 students enrolled (FTE equivalent=10,602)

Sources:

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