

Box 1.2**Contribution to economic growth
through education and experience upgrading**

As discussed in Box 1.2 in the 2007 *Third Quarter Economic Report*, education and experience upgrading have contributed significantly to the accumulation of human capital stock in Hong Kong. This article followed the previous discussion by showing that the continual increase in human capital stock has led to labour productivity growth, and hence economic growth.

Decomposition of sources of labour productivity growth

As a refresher of the analytical framework laid out in the previous article, the construction of the human capital stock series is based on headcount employment adjusted for the age-education specific productivity content or earning potential. This makes tracing the sources of productivity growth possible.

In common usage, labour productivity (LP) is defined as the output of the economy (GDP) divided by employment (EMP):-

$$LP = \frac{GDP}{EMP}$$

In principle, the labour productivity growth can be decomposed into two factors, one being the education upgrading and experience accumulation in the workers employed ($\hat{K}_{EMP} - \hat{EMP}$), the other being the underlying human capital stock productivity increase ($\hat{GDP} - \hat{K}_{EMP}$), which is the component of labour productivity growth due to other factors.

$$LP = \frac{GDP}{EMP} = \frac{GDP}{K_{EMP}} \cdot \frac{K_{EMP}}{EMP}$$

$$\hat{LP} = \underbrace{(\hat{GDP} - \hat{K}_{EMP})}_{\text{Underlying human capital productivity growth}} + \underbrace{(\hat{K}_{EMP} - \hat{EMP})}_{\text{Labour productivity growth from education upgrade and experience accumulation}}$$

where

$\hat{LP}$ = Labour productivity growth

$\hat{GDP}$ = GDP growth

$\hat{K}_{EMP}$ = Growth in human capital stock in employment

$\hat{EMP}$ = Rate of increase in employment

Labour productivity growth from education and experience factors

To facilitate comparison, an alternative human capital stock series is constructed by adjusting headcounts by education-specific income ratios (instead of age-education specific income ratios), so that the gap between this series and the headcount series represents the uplifting effect on productivity due to education upgrading. In addition, using age structure of the population as a proxy for experience accumulation, a third human capital stock series is compiled by using age-specific income ratios, for gauging the separate effect of experience accumulation on productivity.

Box 1.2 (Cont'd)

By applying these decompositions, the contributions to productivity growth from education upgrading and experience accumulation as individual factors are given in the first and second columns of **Table 1** respectively. The combined effects of the two factors are given in the third column. Figures in the brackets represent the part of productivity growth not explained by the specified factors.

Table 1 Productivity gain is much more obvious when taking the effects of education uplifting and experience accumulation together

Productivity lift due to education upgrading and demographics

Year	Education factor		Experience factor		Education & experience combined	
Contribution to trend growth in labour productivity (% point)						
1997 - 2006 (10 years)	1.3	(1.4)	0.3	(2.4)	2.0	(0.8)

Note: Due to rounding, the horizontal addition may not equal to the trend growth in labour productivity over the period.

Considering solely the education upgrading in the population, the factor alone accounted for some 1.3 percentage points of the 2.8% trend growth in labour productivity over the past 10 years. Separately, only 0.3 percentage point of the trend growth in labour productivity was explained by experience accumulation alone over the same period. However, either factor when separately assessed tends to ignore the substantial synergy effect that may arise when a more educated worker can make more gains as his experience grows, be it through the learning-by-doing process or other forms of training and learning. This synergy effect had actually been sizeable, as seen from the difference between the third column and the sum of the first two columns in the table. When the education upgrading and experience accumulation within the employed workers are considered altogether, the part of labour productivity growth attributable to these two quality changes in the workers was a remarkable 2.0% per annum over 1997-2006. That was equivalent to about three quarters of the trend labour productivity growth over the same period, and higher than the 1.6 percentage points, which was the horizontal sum of the two factors when considered separately. As such, ***the interaction between education and experience on labour productivity uplifting is multiplicative*** - when a worker is more educated, the marginal gain in his productivity as his experience grows is much higher than that of his less-educated peer, as seen from the steeper curve of earning potentials over an average tertiary-educated worker's working life than that of the relatively less-educated counterparts in Box 1.2 in the 2007 Third Quarter Economic Report.

From the above decomposition analysis, it is apparent that the two huge sources that have underpinned the impressive labour productivity growth over the past 10 years are (1) rising proportion of workforce with higher education; and (2) experience accumulation as the workforce mature (median age of Hong Kong's workforce in recent years was around 40, approaching the peak of the life-time earning profile especially for the tertiary education group).

Box 1.2 (Cont'd)

This accumulation in experience and upgrading in educational attainments in the overall labour force in deployment can also be illustrated by **Chart 1**, which compares the employment share distributions across the sub-groups divided by age and educational attainment in 1996 and 2006.

Several observations can be made:

1. The overall share of higher-educated workers, who in general possess higher productivity, has increased as per total employment;
2. the increase in the proportion of higher-educated workers aged 40+, who possess a significantly higher productivity than an average worker and their less-educated counterparts, has been notable; and
3. the workforce overall has become more experienced. While in 1996 the age-groups which dominate the headcounts in employment were those younger than 40-44, the age distribution in 2006 seems to have a more balanced pattern.

Chart 1 Demographic shift and education upgrading factors have been conducive to overall productivity growth, and should remain so in the near future

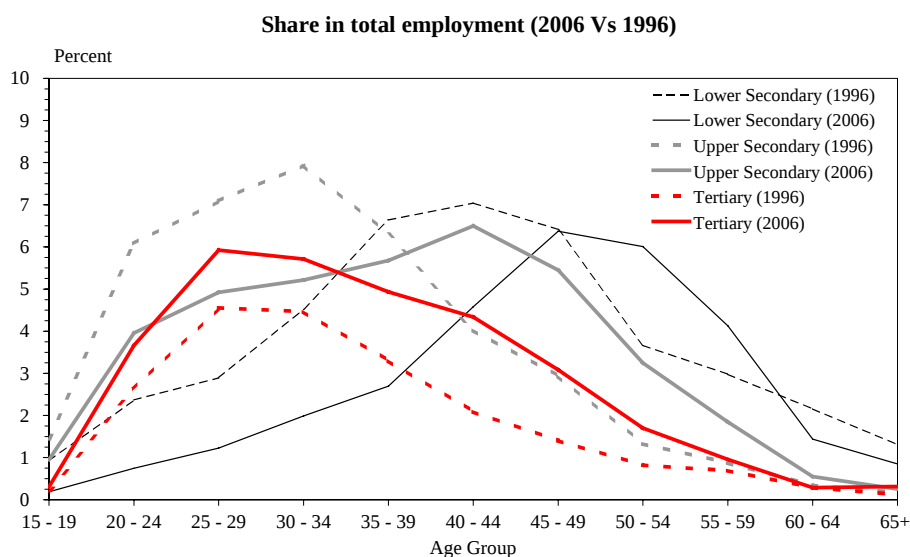


Chart 1 also sheds some light on the labour productivity growth in the near future. With the younger generation in general are more educated than the older ones, ***the stream of productivity growth from the process of education uplifting and experience accumulation will go unabated.***

Another important observation from **Table 1** is that after discounting for the play-out of the uplifting effects of education upgrading and experience accumulation, the growth of underlying human capital stock productivity remained sizeable, averaging at 0.8% per annum over the past 10 years. Conventional factors such as technological advancements and intensification of capital stock per capita, while contributing to the realisation in labour productivity growth from education upgrading and experience accumulation in general, should as well be supportive to the underlying productivity growth in this framework. The synergy effect with the Mainland economy may also unlock some of the production capacity previously not seen in the workers.

Box 1.2 (Cont'd)

A comparison is made between Hong Kong's underlying productivity growth and those in the EU economies. The latter figures are extracted from a similar European study on human capital stock. The comparison reflects a relatively strong underlying productivity growth in Hong Kong, as shown in **Table 2**.

Table 2 Growth in Hong Kong's underlying human capital stock productivity compares favourably with the EU economies

**Growth in underlying human capital stock productivity:
HK and selected EU economies (% per annum)**

Hong Kong

1997 - 2006 (10 years)	0.8
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EU economies (1993 - 2005)*

Sweden	0.0
United Kingdom	-0.1
Finland	-0.3
Germany	-0.8
Netherland	-1.2

Source: (*) Innovation at Work: The European Human Capital Index, Lisbon Council Policy Brief (2006)

This article has explained the education upgrading and experience accumulation as the key factors in driving labour productivity growth in Hong Kong. In view of the present sustained economic upturn, this increase in production capacity arising from the productivity growth will be one of the key factors in containing the overall inflation. To secure the future productivity growth, the Government will continue to play its part in investing in education and re-training, attracting talents from the Mainland and overseas, and maintaining the flexibility of the labour market.