

# Recent Developments in Labour Earnings in Hong Kong

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Cost and price flexibility is an important factor underpinning the sustainability of a fixed exchange rate regime. Despite a significant fall in the consumer price index since 1998, official estimates of average labour earnings have remained broadly stable, notwithstanding some modest declines in recent quarters. These seemingly divergent movements in price and wage indicators have raised concerns about the degree of nominal wage flexibility in Hong Kong.

However, possible biases in measurement techniques have probably resulted in an underestimation of the degree to which wages have adjusted to the economic downturn. This article looks at measurement issues and finds that a wage index adjusted for changes in average working hours suggests a greater degree of wage flexibility than is apparent in the published estimates.

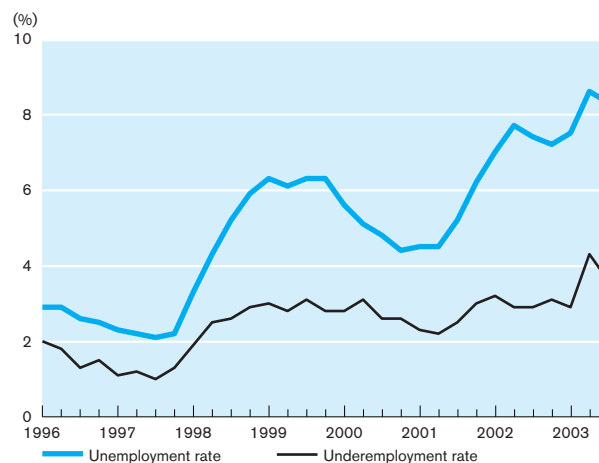
## I. INTRODUCTION

Hong Kong has experienced deflation in consumer prices since 1998, with the Composite Consumer Price Index (CCPI) falling by more than 15%. Nevertheless, nominal wages, as measured by official estimates of labour earnings, have been broadly stable, notwithstanding some modest declines in recent quarters. There has been more adjustment in labour market quantities. Unemployment rose to historical highs of 8.7% in the three months ending July 2003, although it declined to 8% in the August-October period (Chart 1).<sup>1</sup> The underemployment rate also rose to a high level of about 4%, compared with around 1% in 1997. This has raised concerns over the degree of nominal wage flexibility in Hong Kong, and the potentially high costs of adjustment to economic shocks under the Currency Board arrangement.

However, labour earnings statistics are often plagued by measurement problems. This article examines some of the measurement issues in relation to two

<sup>1</sup> The current series of unemployment rates is based on information from the General Household Survey, conducted by the Census and Statistics Department (C&SD) since 1981.

CHART 1  
Unemployment and Underemployment Rates



Source: Census & Statistics Department.

widely quoted labour earnings statistics: the *wage index* and the *index of payroll per person engaged* (hereafter, the *payroll index*). Based on our analysis, some preliminary adjustments are made to the official labour earnings statistics to better reflect underlying economic developments. The rest of the article is organised as follows. The next section reviews the two measures of labour earnings published by the Government and provides some stylised facts about recent developments. Section III discusses possible

biases in the official series and presents an adjusted index that takes into account changes in average working hours. Section IV compares the official and adjusted series in terms of their behaviour in a (wage) Phillips curve. The conclusion is presented in the final section.

## II. OFFICIAL INDICES OF LABOUR EARNINGS

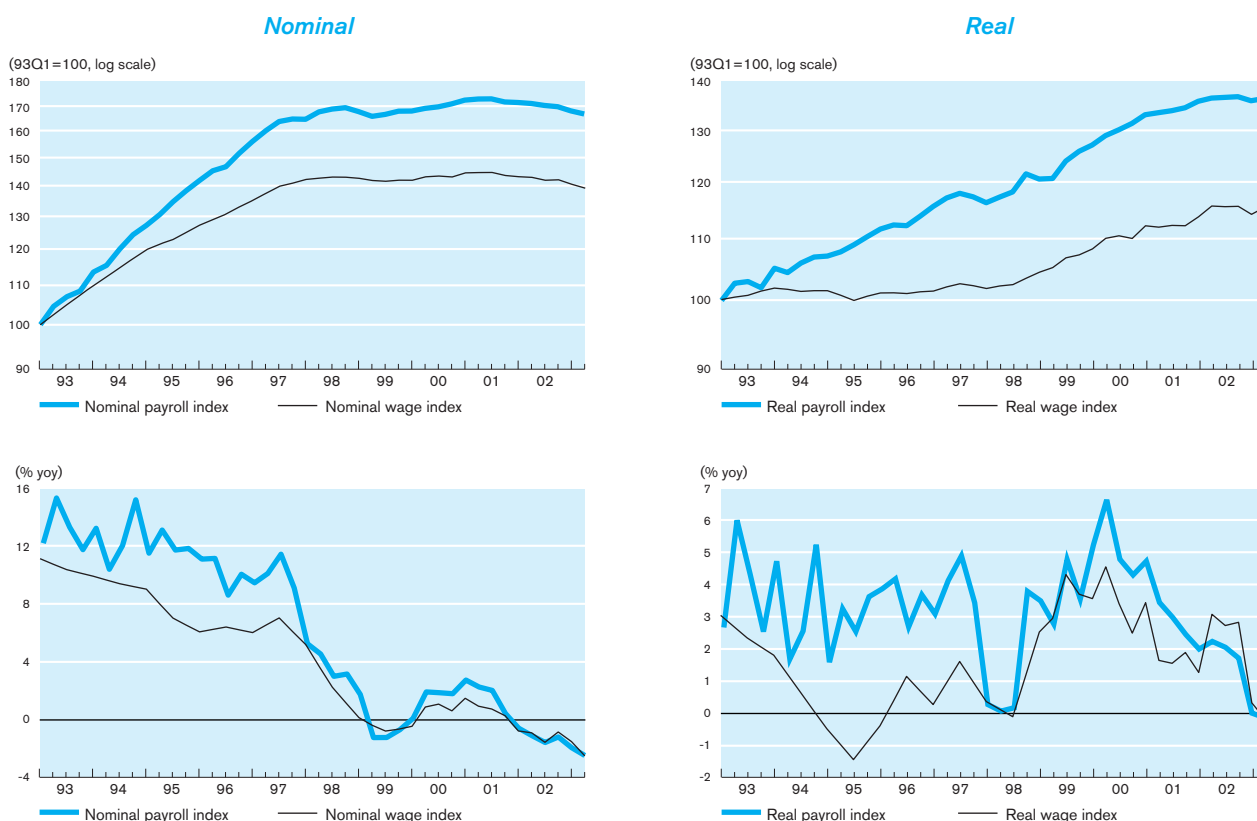
Both the *wage* and *payroll indices* are compiled and published by the Census and Statistics Department (C&SD) on a quarterly basis. The *wage index* measures changes in the average wage rate, holding constant the structure of the labour force with respect to industry, occupation and sex between two

successive rounds of surveys. However, difficulties in quantifying the experience and quality of workers may distort movements in the index. The wage rate comprises basic wages and salaries, commissions and tips, and regular and guaranteed bonuses and allowances of employees up to a supervisory level.<sup>2</sup> Proprietors, family workers, out-workers (people who work at home for a firm), and employees who are paid less than the established wage rates (such as part-time workers, apprentices, learners, trainees and workers on probation), are excluded. The real *wage index* is obtained by deflating the nominal index by the Consumer Price Index (A).<sup>3</sup>

*Payroll index* is defined as total monthly payroll divided by the total number of persons engaged.

CHART 2

### Movements in Labour Earnings Indicators (Seasonally adjusted)



Source: Census & Statistics Department.

Note: Seasonal adjustments on nominal and real *wage indices* were done by HKMA Research Department using the US Bureau of Census X-12 method.

<sup>2</sup> Wages and salaries of managerial and professional employees (excluding top management) are collected separately by the Survey of Salaries and Employee Benefits on an annual basis. The movements in this series are broadly in line with the wage index of employees for lower occupation categories.

<sup>3</sup> The Consumer Price Index (A) is a better indicator of inflation for lower-income groups and is therefore considered to be more relevant as the price deflator for the *wage index* which covers employees up to a supervisory level only.

Payroll covers the same elements of remuneration as the wage rate, but also includes overtime payments, back-pay and other irregular allowances and bonuses. However, the index may not represent a precise measure of the average income of employees because payroll refers to total payments to employees and other engaged persons who are paid, whereas persons engaged include not only employees but also working proprietors, business partners and unpaid family members. The real *payroll index* is obtained by deflating the nominal index by the Composite Consumer Price Index.

Chart 2 compares movements in the two series over the past decade. The *payroll index* increased much faster than the *wage index* during the boom period between 1993 and 1997. The two indices moved more closely together in the subsequent period. Between 1998 and 2003 Q2, the *wage index* declined by 2% while the *payroll index* was broadly stable. Both have declined in the past two years, by 3½% from their peak in 2001.

Chart 3 shows developments in both indices by major industrial sector. In most sectors of the economy, the *wage* and *payroll indices* rose until mid-1998 and have been broadly stable since then. One notable exception, however, is the finance, real estate and business services sector, for which the *payroll index* declined between 1997 Q4 and

1999 Q2. This probably reflects the salary structure of the sector, in which discretionary bonuses account for a significant part of the salary and the sharp fall in this element of pay in the wake of the Asian financial crisis. By contrast, the *wage index* for this sector, which does not include discretionary bonuses, has shown only a modest decline since 1998 Q4.

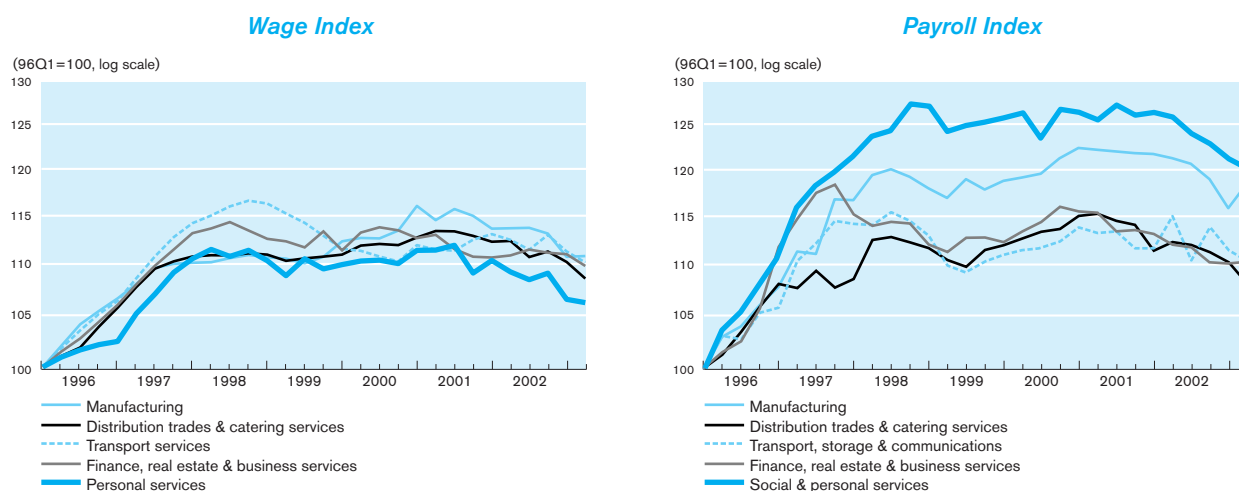
A second observation is that the *wage* and *payroll indices* for the manufacturing sector show a rising trend up to 2001. Since then they have shown a modest decline. The fact that labour earnings in this sector have held up, probably reflects significant corporate downsizing and restructuring which has led to a reduction in temporary and casual workers who tend to have relatively low average pay. As a result, while total payroll in the manufacturing sector has fallen, per capita payroll has increased.

### III. POSSIBLE BIASES IN THE OFFICIAL MEASURES

In general, the *payroll index* has a more complete coverage of occupations and compensation than the *wage index*, but the latter is a more accurate indicator of changes in wage rates. However, both are subject to a number of measurement problems that may bias their role as an indicator of labour costs. This section examines these problems. We have attempted to adjust the official statistics to take

CHART 3

#### Nominal Labour Earnings by Major Industry (Seasonally adjusted)



Source: Census & Statistics Department.

Note: Seasonal adjustments on the *wage indices* were done by HKMA Research Department using the US Bureau of Census X-12 method.

account of some of the biases, with the aim of deriving a measure that better reflects underlying wage developments.

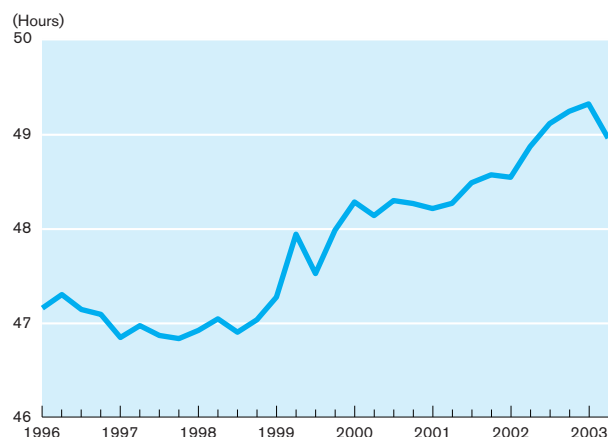
### a. Changes in Average Working Hours

Both the *wage* and *payroll indices* fail to measure increases in average working hours that are not fully compensated. In recent years, there has been a general trend towards longer working hours, from around 47 hours in 1998 to 49 hours in 2003 Q2 (calculated on the basis of the frequency distribution of employees by weekly working hours) (Chart 4).<sup>4</sup> After adjusting for increased working hours, both the *wage* and *payroll indices* exhibit more significant declines than the published estimates (Chart 5).<sup>5</sup>

### b. Changes in the Structure of Employment

Another source of potential bias arises from changes in the structure of employment, which complicates comparisons of average earnings over time. Higher unemployment, due to corporate downsizing and

**CHART 4**  
Average Weekly Working Hours

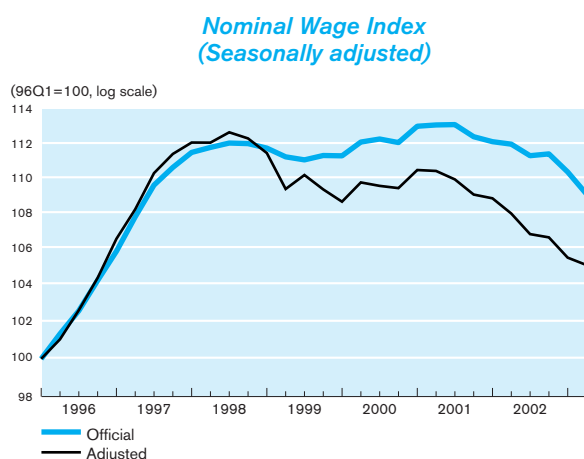


Source: HKMA Research Department estimates.

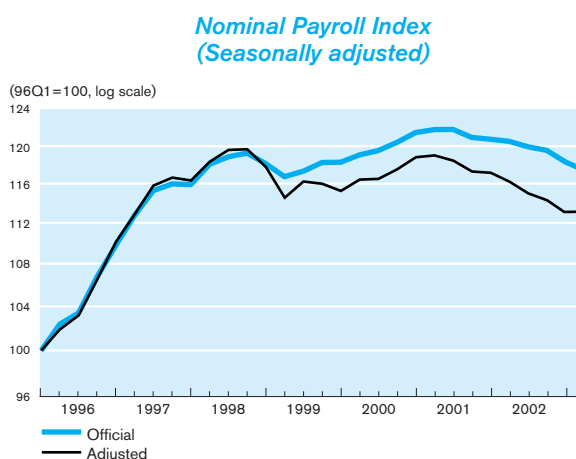
restructuring, is likely to have increased the share of skilled (high pay) labour in the total workforce, raising average payroll for given levels of wage rates of skilled and unskilled workers.<sup>6</sup> During such restructuring exercises, less experienced and skilled staff tend to be laid off, while more experienced and skilled workers, who are usually higher paid, are retained. Some supporting evidence for this is given by the rising share of managerial and professional staff in total employment, which increased from 29%

**CHART 5**

Wage Series Adjusted for Average Weekly Working Hours



Sources: Census & Statistics Department and HKMA staff estimates.



<sup>4</sup> Appendix provides details about the calculation.  
<sup>5</sup> This adjustment for the *payroll index* should be interpreted with caution, as part of the increase in average working hours are compensated and therefore taken account of in the index.

<sup>6</sup> The number of unemployed persons who were dismissed or laid off as a share of the total number of unemployed persons increased substantially from 52% in 1997 Q3 to 82% in 1999 Q1 and has remained between 70-80% in recent years.

in 1998 to 33% in 2002 (Chart 6).<sup>7</sup> This compositional change can be expected to increase per capita payroll, even though total payroll declines. Our estimates suggest that changes in the occupational composition of the workforce may have increased average payroll by around 3<sup>1</sup>/<sub>2</sub>% between 1998 and 2002.<sup>8</sup>

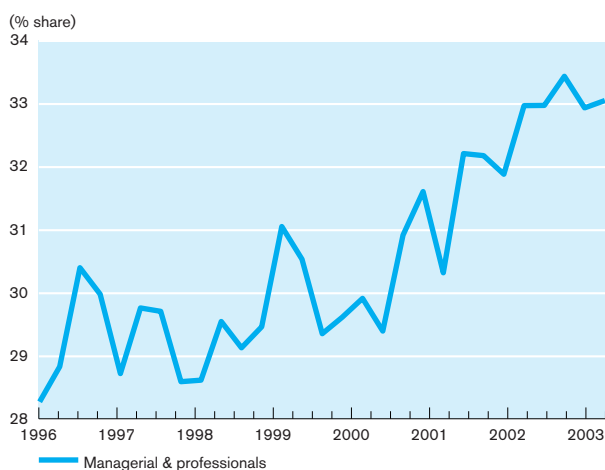
### c. Changes in the Salary Structure

An increasing number of companies have shifted from guaranteed to non-guaranteed bonus schemes in recent years; the latter is captured by the *payroll index* but not the *wage index*. According to a Pay Trend Survey conducted by the Hong Kong Institute of Human Resource Management (IHRM), 89% of the 104 surveyed companies reported that they provided a non-guaranteed bonus scheme to their

staff in 2002. Moreover, only 52% of employees covered by a non-guaranteed bonus scheme were actually awarded a bonus in 2002, compared with almost 90% in 2001.

Furthermore, employees' remuneration is not limited to cash payments covered by the *payroll* and *wage indices*, it also includes fringe benefits, such as employers' contributions to pension/provident funds and insurance plans, which form part of the total pay package. Both private and public institutions appear to be reducing fringe benefits, partly in response to the economic downturn. According to the HR Strategies Survey conducted by IHRM in 1999, 24% of the 136 responding companies, which provide fringe benefits, either reduced or cancelled some of these benefits from December 1997 to May 1999.<sup>9</sup> The reductions ranged from 22% to 45%. While information is not available for more recent years, anecdotal evidence suggests that this trend has continued.

CHART 6  
Employment by Occupation



Source: Census & Statistics Department.

### d. Summary

The wage and *payroll indices* suffer, to varying degrees, from a number of measurement problems that may affect their reliability as measures of labour costs. These include increases in average working hours, and changes in the structure of employment and compensation. It is likely that these factors have caused official measures of average labour earnings to understate the decline in labour costs since 1998.

Some of these measurement problems also affect estimates of labour productivity. For example, measured labour productivity calculated as the ratio of real GDP to total employment, rose significantly

<sup>7</sup> The unemployment rate has been higher for workers with relatively low levels of skill and educational attainment, as these workers are disproportionately affected by the economic downturn. Peng *et al.* (2001) provides a detailed study of unemployment.

<sup>8</sup> As *wage* and *payroll indices* by occupation are either incomplete or unavailable, the series for *median monthly employment earnings* by occupation is used. This is published by the C&SD in its *Quarterly Report on General Household Survey*. The overall monthly earnings are calculated as a weighted-average based on the number of employees in each

occupation category. Our estimates show that the overall monthly earnings using contemporary weights are higher than the estimates using fixed weights (at their 1998 level) by 3<sup>1</sup>/<sub>2</sub>% in 2002.

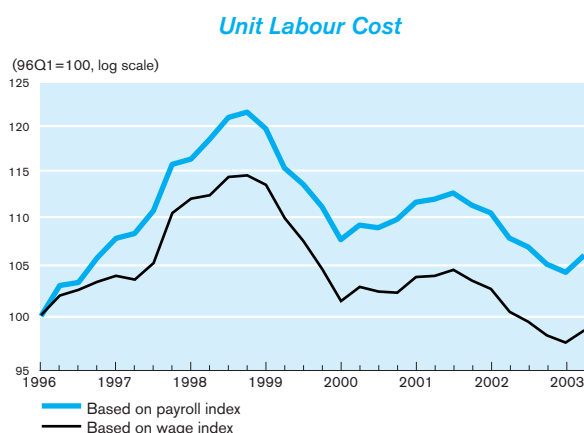
<sup>9</sup> "Survey of Effectiveness of HR Strategies on Business Performance since the Financial Crisis" conducted by the Hong Kong Institute of Human Resource Management in May 1999. The survey covered 152 member companies, which were mainly medium and large-sized companies. See Wong *et al.* (2001) for details.

CHART 7

Labour Productivity and Unit Labour Cost (Seasonally adjusted)



Source: HKMA staff estimates.



between 1998 Q4 and 2003 Q2 (Chart 7). But the increase is, at least partly, due to the failure of the employment data to capture increases in average working hours. Aggregate unit labour cost measures, constructed as the ratio of total wages or payrolls of all employees to real GDP, are not affected by changes in average working hours and show a sharp decline of about 15% since 1998 Q4. Both measures fail to capture the decline in non-wage compensation, such as fringe benefits.

#### IV. SOME PRELIMINARY ECONOMETRIC ANALYSIS

To examine the significance of the biases discussed in the previous section, some preliminary econometric results are presented below. Specifically, a wage Phillips curve is estimated to compare the usefulness of the official and adjusted (for changes in working hours) *wage indices* as measures of labour cost movements.<sup>10</sup> The expectations-augmented Phillips curve is expressed as:

$$(1) \quad \Delta w = \Delta p^e + \alpha_0 + \alpha_1 (U - U^N) + \alpha_2 \Delta pr + \varepsilon$$

where  $w$  denotes nominal wages,  $p^e$  is the expected price level for the period over which wages are set, and  $U$  are  $U^N$  the unemployment rate and the natural rate of unemployment respectively,  $pr$  is labour productivity, and  $\varepsilon$  is an error term. Lower-case letters represent logarithms of the respective variables. The natural rate ( $U^N$ ) is estimated by applying a Hodrick-Prescott filter to the unemployment series. Labour productivity is constructed as the ratio of real GDP to total employment, adjusted for changes in working hours. Equation (1) can be modified as:

$$(2) \quad \Delta w = \Delta p_{-1} + \alpha_0 + \alpha_1 (U - U^N) + \alpha_2 \Delta pr + \alpha_3 \Delta(w-p)_{-1} + \varepsilon$$

Inflation expectations are assumed to be backward-looking, and the inclusion of lagged real wage growth allows for some stickiness in wage setting.<sup>11</sup>

<sup>10</sup> The biases discussed in the previous section tend to underestimate the decline in wages in recent years, but are difficult to quantify. In the empirical analysis, only a *wage index* adjusted for changes in average working hours is used.

<sup>11</sup> The specification of equation (2) is similar to the wage equation adopted by Ball and Moffitt (2001), who express the wage Phillips curve as  $\Delta w - \Delta p_{-1} = \alpha_0 - \alpha_1 U + \alpha_2 \Delta pr + (1 - \alpha_2) \Delta x$  where  $\Delta x$  is the 'aspiration wage' increase, which is defined as a weighted average of the past increases with exponentially declining weights.



Equation (2) is estimated using OLS with quarterly data from 1985 Q1 to 2003 Q1 for the official and adjusted *wage indices* separately.<sup>12</sup> The regression results are presented in Table 1. All coefficients of the explanatory variables have the expected signs and are statistically significant at the 1% level. The results show that the adjusted *wage index* is more responsive to the unemployment rate gap and productivity growth than the published index. In addition, lagged real wage growth has a smaller effect on the adjusted series than the published series, indicating greater wage flexibility once average working hours are taken into account.<sup>13</sup>

It is interesting to examine whether the responses of wages to the explanatory variables differ during the “inflation” and “deflation” periods. Equation (2) was re-estimated over two separate samples — 1995 Q1-1998 Q2 and 1998 Q3-2003 Q1 — respectively. Table 2 shows that the coefficients for the two sample periods are not significantly different

**TABLE 1**  
Wage Phillips Curve

	Adjusted wage index	Official wage index
$\Delta_4 p_{-1}$	1.00 <sup>b</sup>	1.00 <sup>b</sup>
$U-U^N$	-0.61 (3.28)	-0.25 (3.33)
$\Delta_4 pr$	0.21 (8.37)	0.10 (6.70)
$\Delta_4 (w-p)_{-1}$	0.74 (11.90)	1.01 (19.69)
Adjusted R-squared	0.80	0.91
Durbin-Watson statistics	2.09	2.31

Notes:

- a) The constant terms in both regressions are smaller than 0.005.  
b) The coefficient is constrained to equal 1.  
c) Numbers in parentheses are the t-statistics.

from each other. Furthermore, a Chow breakpoint test cannot reject the hypothesis of no structural change during the whole sample period. This suggests that the wage equation works (equally) well in both the inflation and deflation periods.

**TABLE 2**

Wage Phillips Curve for Different Sample Periods

	Adjusted wage index		Official wage index	
	1985 Q1-1998 Q2	1998 Q3-2003 Q1	1985 Q1-1998 Q2	1998 Q3-2003 Q1
$\Delta_4 p_{-1}$	1.00 <sup>a</sup>	1.00 <sup>a</sup>	1.00 <sup>a</sup>	1.00 <sup>a</sup>
Constant term	-0.01 (4.38)	– <sup>b</sup>	-0.01 (4.03)	– <sup>b</sup>
$U-U^N$	-0.77 (2.84)	-0.72 (6.28)	-0.36 (1.90)	-0.39 (6.34)
$\Delta_4 pr$	0.26 (8.88)	0.21 (3.71)	0.11 (4.64)	0.17 (8.17)
$\Delta_4 (w-p)_{-1}$	0.68 (8.27)	0.71 (10.79)	0.95 (10.59)	0.85 (28.47)
Adjusted R-squared	0.79	0.86	0.88	0.96
Durbin-Watson statistics	2.02	2.69	2.12	3.08

Notes:

- a) The coefficient is constrained to equal 1.  
b) The constant term is insignificant.  
c) Numbers in parentheses are the t-statistics.

<sup>12</sup> The sample starts from 1985 Q1 because the estimated series on average weekly working hours is available from that period only (see Appendix).

<sup>13</sup> A similar method was applied to Singapore and US data as well. The coefficients on lagged real wage growth were 0.7 and 0.9 for Singapore and the US respectively. These results suggest that the degree of wage flexibility in Hong Kong is similar to that in Singapore.

## V. CONCLUSIONS

Movements in the official estimates of labour earnings in recent years have raised concerns about the degree of nominal wage flexibility in Hong Kong. However, the data suffer from a number of measurement biases, which have probably resulted in an underestimation of the degree to which wages have adjusted to the economic downturn. In particular, the statistics fail to account for changes in average working hours and non-wage remuneration, such as fringe benefits.

A wage index adjusted for changes in average working hours suggests that the decline in nominal wages in recent years has been steeper than shown by the published statistics. The extent of wage adjustment would be even greater if cuts in fringe benefits are also taken into account. Empirical analysis suggests that, once the official wage index is adjusted for changes in average working hours, it is less influenced by past wage growth, indicating a higher degree of wage flexibility than suggested by the published estimates.



## APPENDIX

## ESTIMATION OF AVERAGE WEEKLY WORKING HOURS

The Census and Statistics Department publishes the median number of hours worked per week for all employed persons and the frequency distribution in its *Quarterly Report on General Household Survey* (Table A1).

The median number of hours worked increased from 45 to 48 hours in 1999 Q3 and since then has been broadly flat except for a few dips in certain quarters (Chart A1). This suggests that the median number of hours worked might not be suitable for adjusting the wage and payroll indices for changes in average working hours. Instead, a weighted-average series is compiled based on the frequency distribution using the following formula:

$$(A1) \quad \frac{\sum n_i h_i}{\sum n_i}$$

where  $n_i$  is the number of employees in group  $i$ , and  $h_i$  is the mid-point working hours of group  $i$ .

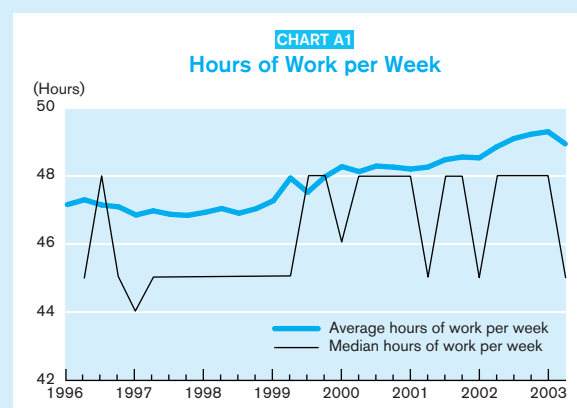
TABLE A1

## Distribution of Employees by Hours of Work per Week

(2003 Q1)		
Hours of work	Number ('000)	Share (%)
< 20	260.7	8.0
20 – 29	160.7	5.0
30 – 34	103.2	3.2
35 – 39	239.3	7.4
40 – 44	666.9	20.6
45 – 49	572.2	17.6
50 – 54	400.5	12.3
55 – 59	101.0	3.1
≥ 60	739.3	22.8
Total	3,243.7	100.0

Source: Census & Statistics Department.

The following assumptions are made in the calculation. First, only groups of weekly working hours over 30 are included to avoid distortions arising from volatility in the number of part-time workers. Secondly, a mid-point value of 62 hours is assumed for the largest open-end group of 'not less than 60 hours'.<sup>14</sup> Chart A1 shows that the estimated average number of weekly working hours stayed at around 47 hours during 1996-98 and rose gradually to 49 hours in 2003 Q2.



Sources: Census & Statistics Department and HKMA estimates.

<sup>14</sup> A series based on mid-point of value of 65 hours was also compiled, but the difference was marginal.

## REFERENCES

Ball, Laurence and Robert Moffitt (2001), "Productivity Growth and the Phillips Curve", *NBER Working Paper 8421*, August 2001.

Peng, Wensheng, Lillian Cheung and Kelvin Fan (2001), "Sources of Unemployment: Recent Developments and Prospects", *HKMA Quarterly Bulletin*, November 2001.

Wong, Jim, Ip-wing Yu, Eva Law and Laurence Fung (2001), "Corporate Restructuring in Hong Kong in the Aftermath of the Asian Financial Crisis", *HKMA Quarterly Bulletin*, May 2001.