

SOURCES OF UNEMPLOYMENT: RECENT DEVELOPMENTS AND PROSPECTS

This paper looks into two broad sources of unemployment in Hong Kong: one related to structural factors — the natural rate of unemployment — and the other to the cyclical condition of the economy. Our estimates suggest that the natural rate of unemployment picked up from about 2-3% in the first part of the 1990s to 3-4% in more recent years. The modest rise may be attributable to the effect of structural change in the economy. But it could also reflect an upward bias in estimation at the end part of the sample period.

Most of the variations in the unemployment rate in recent years were attributable to the cyclical condition of the economy. The unemployment rate rose significantly — relative to the natural rate — to above 6% amid the economic downturn in 1998-99. The gap narrowed considerably in 2000 following the strong economic recovery, but has widened again in recent quarters, as economic growth has been slowing sharply.

I. Introduction

Hong Kong's unemployment rate increased in the wake of the Asian financial crisis, from 2¼% in the third quarter of 1997 to a high of 6¼% in the first quarter of 1999. It subsequently dropped to below 4½% by the last quarter of 2000, along with the recovery in economic activity. However, it has risen to about 5½% in more recent months.

This paper examines the sources of changes in unemployment in recent years. Section II highlights some stylised facts of the Hong Kong labour market. Section III presents an estimate of the natural rate of unemployment, and on that basis discusses the recent developments. The final section presents some concluding remarks.

II. Some Stylised Facts

This section provides some stylised facts about (i) labour demand and supply; (ii) distribution

of unemployment among different socio-economic groups and industries; and (iii) the impact of structural changes in the economy on unemployment.

a. Determinants of Unemployment

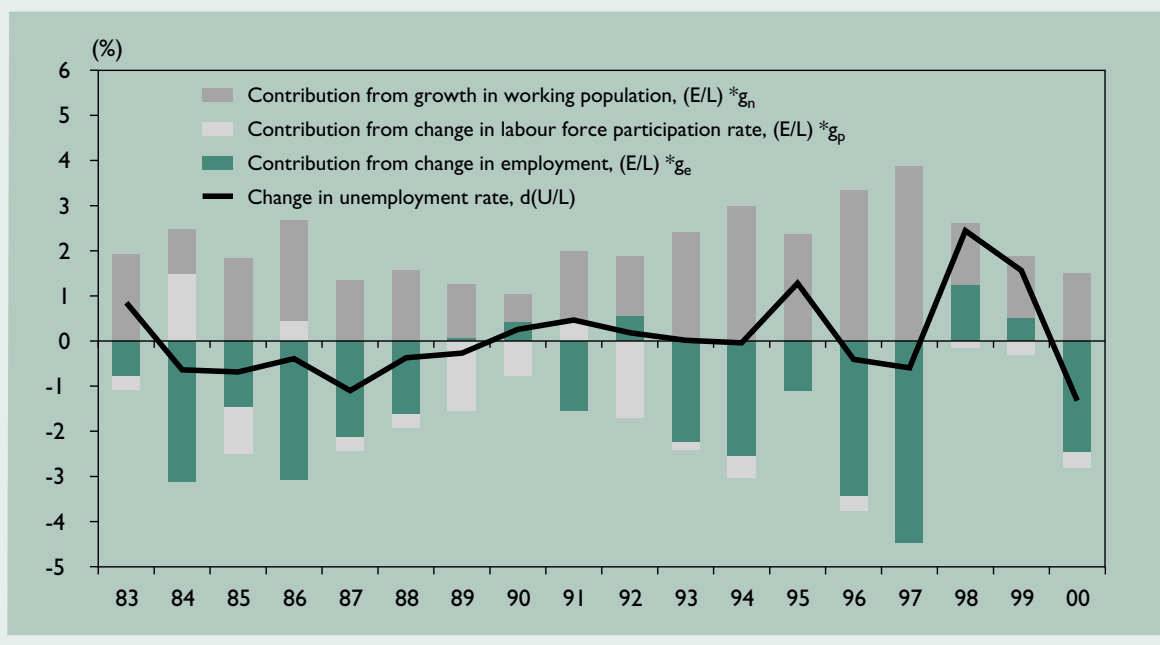
Changes in unemployment could be attributable to both labour demand and supply shocks. The following decomposition is useful in identifying the proximate determinants of changes in the unemployment rate, U/L.¹

$$\Delta(U/L) = (E/L)*g_n + (E/L)*g_p - (E/L)*g_e$$

where E/L denotes the ratio of employment over labour force at the beginning of the period, g_n , and g_e stand for percentage changes in working age population and employment respectively, and g_p change in the labour participation rate. Data for Hong Kong suggests that fluctuations in the unemployment rate have mainly been attributable to labour demand rather than supply factors

¹ This expression can be derived by differentiating the identity $U=PN-E$, where U, P, N and E denote unemployed population, the participation rate, total population and employed population, respectively. $L=PN$ corresponds to labour force.

Chart I
Determinants of the Unemployment Rate



(Chart 1). Specifically, while population growth has exerted upward pressure on the unemployment rate, most turning-points in the latter seem to have reflected variations in employment growth.

Employment growth can be further analysed using a simple growth accounting framework. Specifically, using a Cobb-Douglas production function with constant returns to scale, we can write

$$\Delta l = (\Delta y - \Delta a - \alpha \Delta k) / (1 - \alpha)$$

where l , y , k , and a denote logarithms of employment, GDP, capital and total factor productivity (TFP) respectively and α the share of capital in national income. This decomposition indicates that the bulk of variation in employment growth has been related to that in output growth

(Chart 2). Growth in capital stock—through the substitution effect—affected employment growth adversely throughout the sample period, but the magnitude of the effect was relatively small and stable over the years. Improvement in TFP also tended to reduce employment growth, with two notable exceptions in 1985 and 1998. In those two years, TFP declined in line with the economic downturns, reflecting the pro-cyclical nature of productivity growth.

On the labour supply side, a couple of factors are also worth noting. First, variation in population growth is mainly explained by the net migration of people into the territory (Chart 3).² In particular, two episodes of significant net inflows led to a pick-up in population growth in the late 1970s and around the mid-1990s respectively.³ Secondly, the labour participation

2 The natural increase in population recorded a steady downward trend since the early part of the 1980s. Rising income and increased costs of childcare—both in terms of the time cost of women and the cost of housing space—probably contributed to a decline in the fertility rate.

3 Hong Kong experienced a wave of immigration from the Mainland during the late 1970s, as the latter started to open up to the outside world. As border control was strengthened, immigration subsided in the early 1980s. Starting in the second half of the 1980s, an increasing number of Hong Kong residents began leaving the territory in anticipation of the handover. This contributed to much reduced net inflows of people, and even a small net outflow in 1990. Many of these residents returned, as confidence in a successful handover increased. As a result, there were significant net inflows starting from 1993, leading to a minor population boom in the mid-1990s.

Chart 2
Determinants of Employment Growth

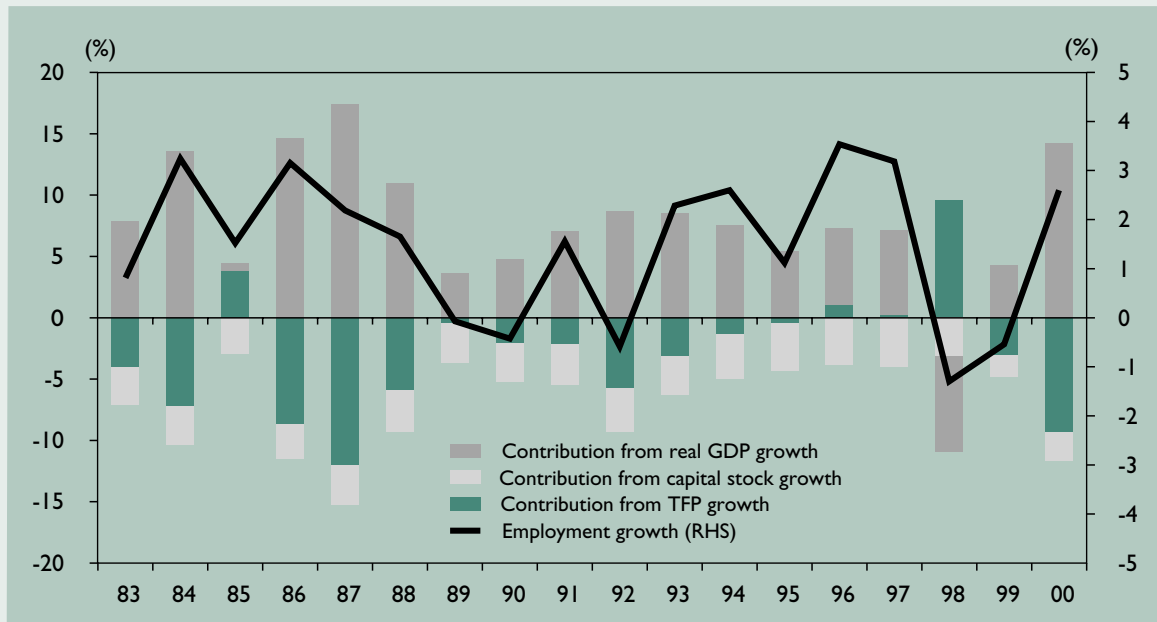


Chart 3
Changes in Population

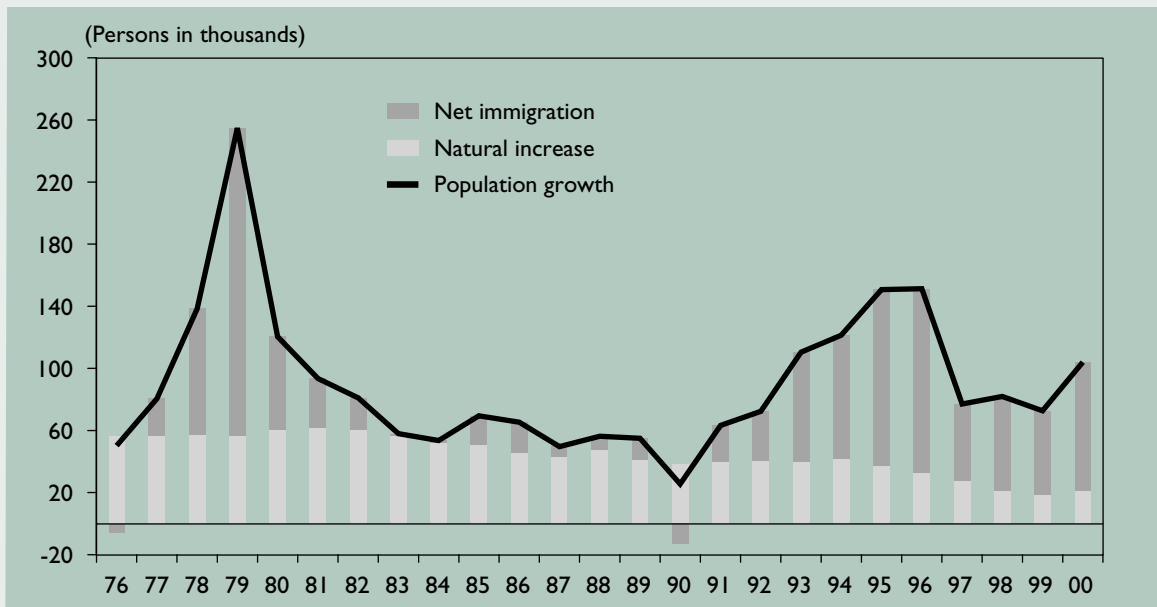
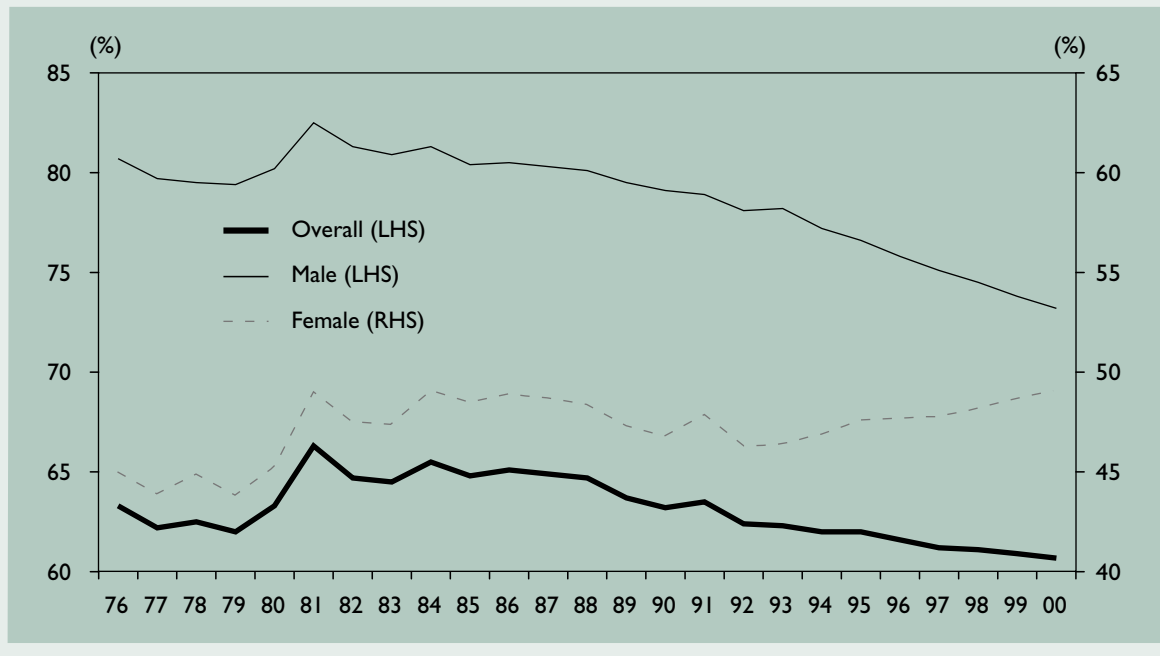


Chart 4
Labour Force Participation Rate



rate has declined steadily from about 65% in the early 1980s to below 61% in 2000 (Chart 4). The decline reflected mainly a drop in the male participation rate, which in turn was due to a considerable drop in the participation rates of the young (15 to 24 year-olds) and old-age (55 years and above) groups.⁴

With regard to developments in the past few years, strong employment growth was able to absorb increased labour force associated with the minor population boom in the mid-1990s, leading to a drop in the unemployment rate in 1996-97. Subsequently, employment declined as output contracted following the Asian financial crisis. As a result, the unemployment rate picked up in 1998-99 notwithstanding much slower growth in population. The unemployment rate eased considerably in 2000, as employment returned to

positive growth amid the strong economic recovery, but has risen again this year as growth has slowed.

b. An Anatomy of Unemployment

The distribution of unemployment has been uneven among demographic groups, among workers with different skills and education, and among industries.

Demographic groups

The unemployment rate has been higher for male workers than for female, and the gap has widened significantly in recent years (Chart 5). This may in part be explained by a much higher proportion of male workers employed in the construction industry, which has been hardest-hit

⁴ This was attributable mainly to improvements in education opportunities for youths, as well as earlier retirement of older workers along with rising income. The female participation rate was broadly stable for much of the 1980s, but recorded a slight upward trend in the 1990s, as the participation rate for prime-age women increased. The latter reflected probably a combination of factors including better education, a lower fertility rate, increased part-time participation, and the changing perception of the role of women in society. Moreover, the increase in the female participation rate in more recent years may also be attributable to the effects of the economic downturn. That is, as the traditional earners in the family lose their job or as household income declines, other family members need to join the labour force to offset income losses.

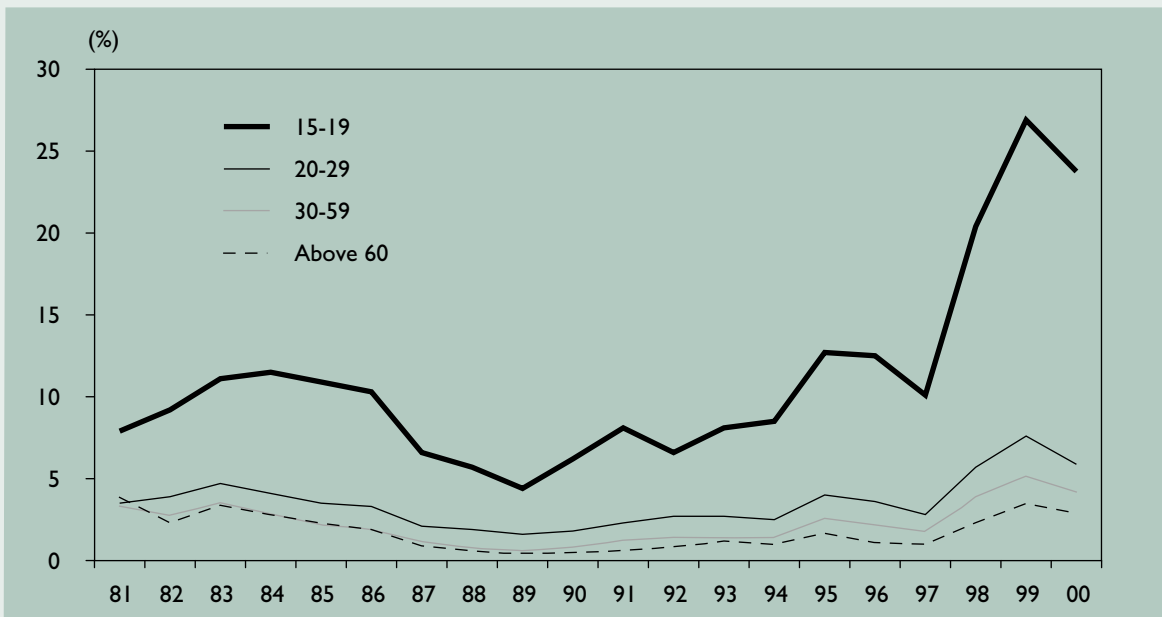
by the weakness in the property market. In 2000, for example, the unemployment rate in the construction industry was 10¼%, more than double the overall unemployment rate of 5%.

To examine unemployment by age group, we consider four broad groupings, 15 to 19 years, 20 to 29 years, 30 to 59 years, and 60 years and above (Chart 6). The youth group (15 to 19 year-

Chart 5
Unemployment Rate by Sex



Chart 6
Unemployment Rate by Age Group



olds) is found to have had a much higher rate of unemployment than the older age groups. Specifically, the unemployment rate for the youth group was over 20% in recent years in contrast to below 5% for those above 30 years old. On the

other hand, the share of the youth group in the total labour force has declined steadily from about 10% in the early 1980s to just above 2% in 2000, reflecting increased education opportunities for youths (Chart 7).

Chart 7
Share of Youths in the Labour Force and Population



Chart 8
Unemployment Rate by Educational Attainment

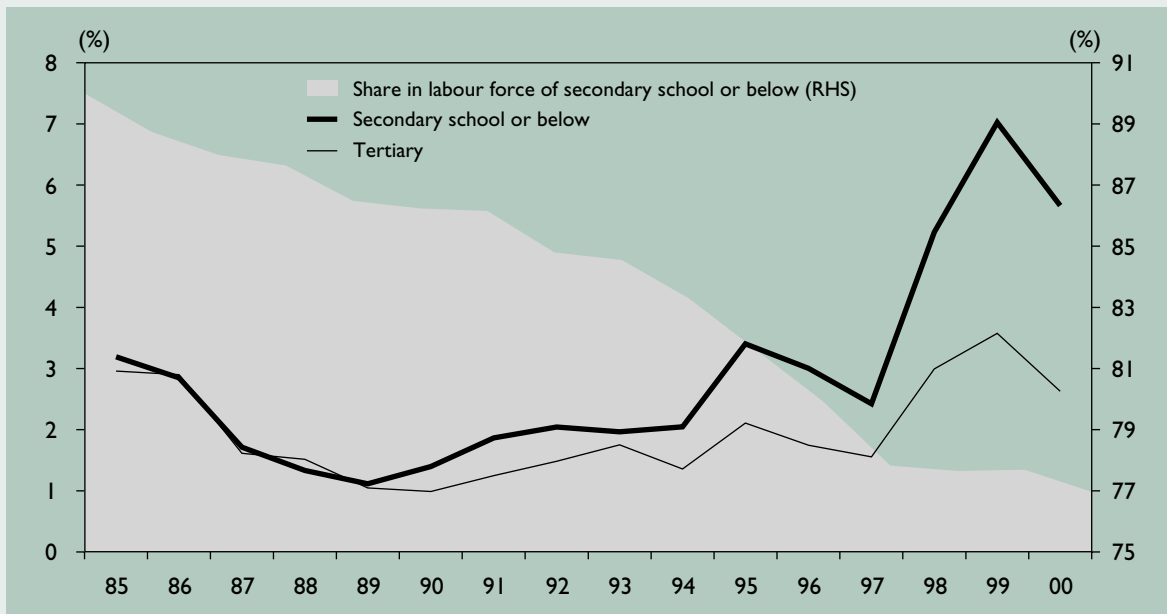
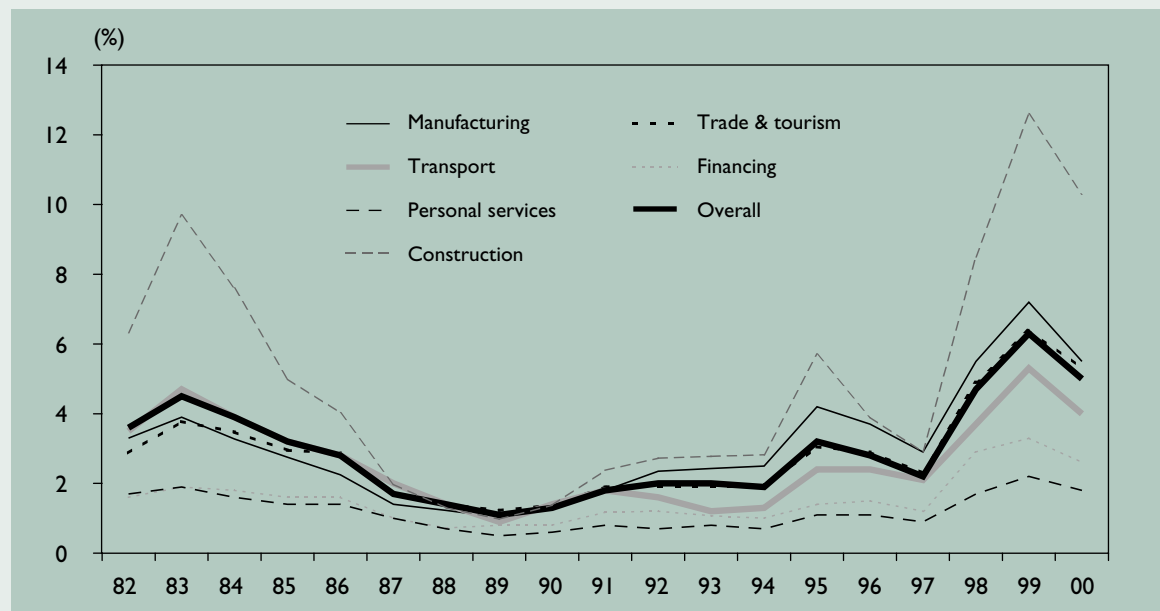


Chart 9
Unemployment Rate by Industry



Education and skills

The unemployment rate has also been higher for workers with relatively low levels of educational attainment, and the gap also widened significantly in recent years (Chart 8). For example, workers with education of secondary school or below registered a peak in the unemployment rate of 7% in 1999, compared with that of 3½% for workers with tertiary education. This suggests that the burden of the rise in unemployment has fallen disproportionately on the less educated group. Nevertheless, the share of labour force with educational attainment of secondary school or below in the total labour force declined from 90% in 1985 to 77% in 2000.

Industry

In terms of economic sector, the unemployment rate has been higher in the construction and manufacturing industries than in

the service sector (Chart 9). In particular, while the aggregate unemployment rate reached its peak of 6½% during the latter part of 1999, the unemployment rates in the personal services and financing industries increased by much less, to 2½% and 3¼% respectively.⁵

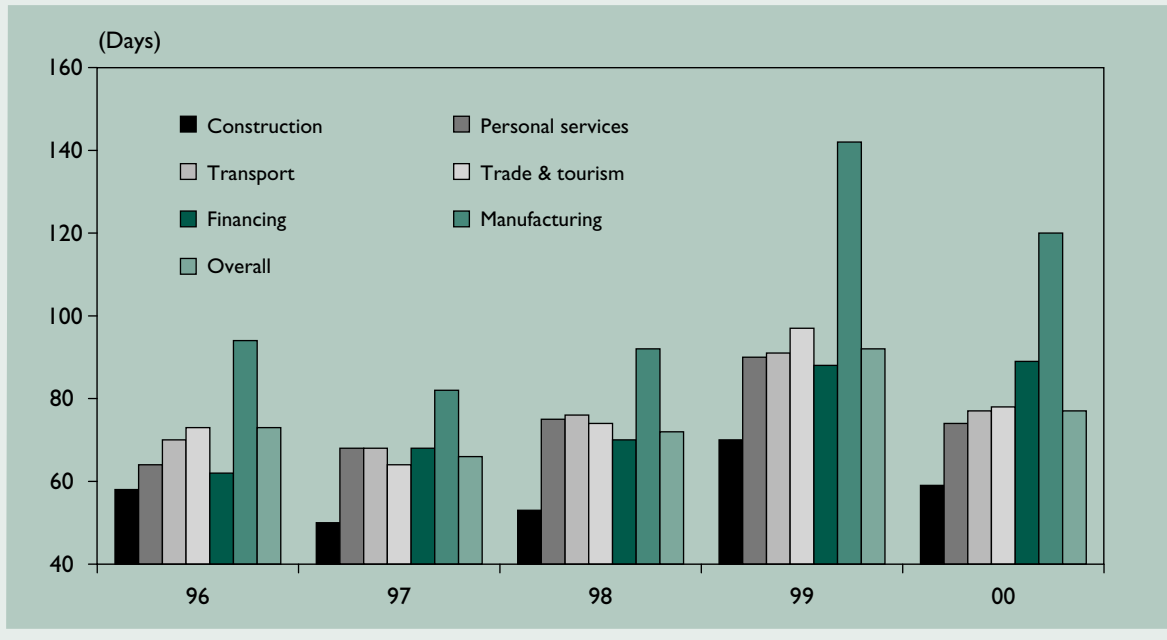
Duration of unemployment

The increase in unemployment in recent years has seen a corresponding rise in the prevalence of longer-term unemployment. The longer-term unemployment rate (those unemployed for more than six months) increased from ½% in 1997 to around 2% in 1999, before declining to 1¼% in 2000. In 2000, the longer-term unemployed accounted for 24% of total unemployed persons, compared with 17% in 1997. The median duration of unemployment was the longest in the manufacturing industry, due to reduced employment opportunities in that sector as the production base shifted across the border (chart 10).⁶

5 Personal services include government services, educational, medical and recreational services, and other miscellaneous services.

6 Notwithstanding a relatively high rate of unemployment, the construction industry has recorded the shortest median duration of unemployment. This reflected in part the project-based nature of construction activities.

Chart 10
Median Duration of Unemployment by Industry



c. Structural Change and the Natural Rate of Unemployment

Hong Kong has undergone a structural transformation from a manufacturing to service-

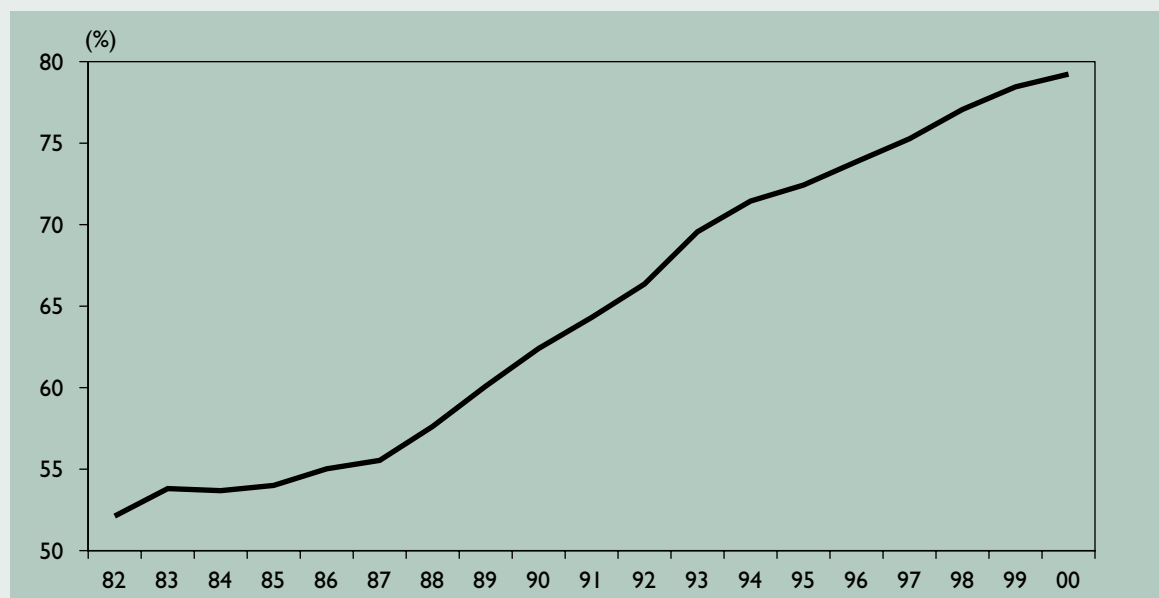
based economy in recent decades. This was reflected in much varied rates of growth in employment among the different industries (Table I). Specifically, employment growth was highest in the financing, insurance, real estate and

Table I
Employment Growth by Industry

	Share in total employment		Average annual rate of growth
	1981 (%)	2000 (%)	(2000 over 1981) (%)
Manufacturing	39	10	-5.3
Construction	9	10	1.9
Service Sector:	52	80	3.9
Trade & tourism	21	31	3.7
Personal services	18	24	3.2
Financing and business services	5	14	7.3
Transport	7	11	4.3
Overall	100	100	1.6

Source: Census and Statistics Department

Chart 11
Share of Services Industry in Total Employment



Note: Include trade and tourism, transport, financing, and personal services sectors.

business services industries, recording an average annual rate of growth of 7¼% in 1981-2000. On the other hand, employment in the manufacturing sector declined by an average rate of 5¼% during the same period, while construction employment registered only modest growth. As a result, the share of service employment in total employment rose from some 50% in the early 1980s to about 80% in 2000 (Chart 11).

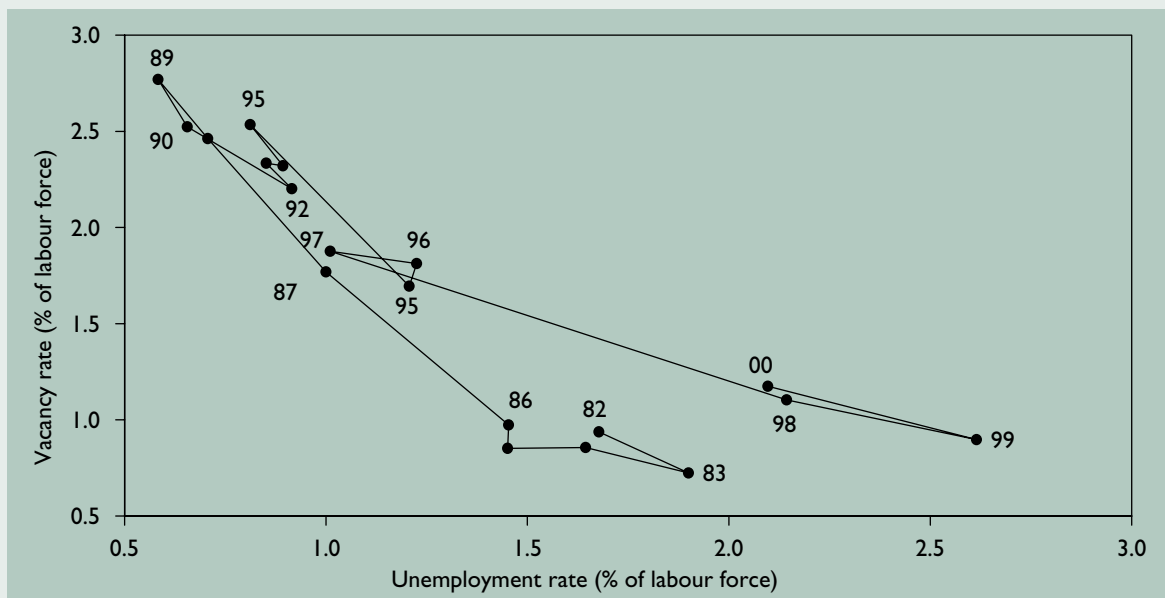
Several indicators point to the possibility of a rise in the natural rate of unemployment as a result of the structural change in the economy. First, the high rate and long duration of unemployment in the manufacturing sector relative to most other sectors suggest that there might be an increase in “frictional” unemployment, as workers who had dropped out of the manufacturing sector encountered difficulties in finding another job. Secondly, there are some indications of skill mismatch in the service sector. Specifically, a Beveridge curve for the service sector

shows a higher rate of unemployment in the 1990s than in the 1980s at the same rate of vacancy (Chart 12a).⁷ Also, a comparison with the manufacturing and construction sectors suggests that the service sector has recorded much lower rates of unemployment for the same level of vacancy rates in the past few years (Chart 12b). The relatively high degree of skill mismatch may reflect rapid growth in the financial service and IT industries. These industries require more advanced education and specialised skills, which may not be fully met by the existing labour force.

To sum up the main findings of this section, most of the short-term variations in the unemployment rate seemed to be demand-driven and were in line with the cyclical conditions of the economy. The long-term trend in the unemployment rate—the natural rate of unemployment—might have been adversely affected by the structural change in the economy. On the other hand, demographic changes such as the

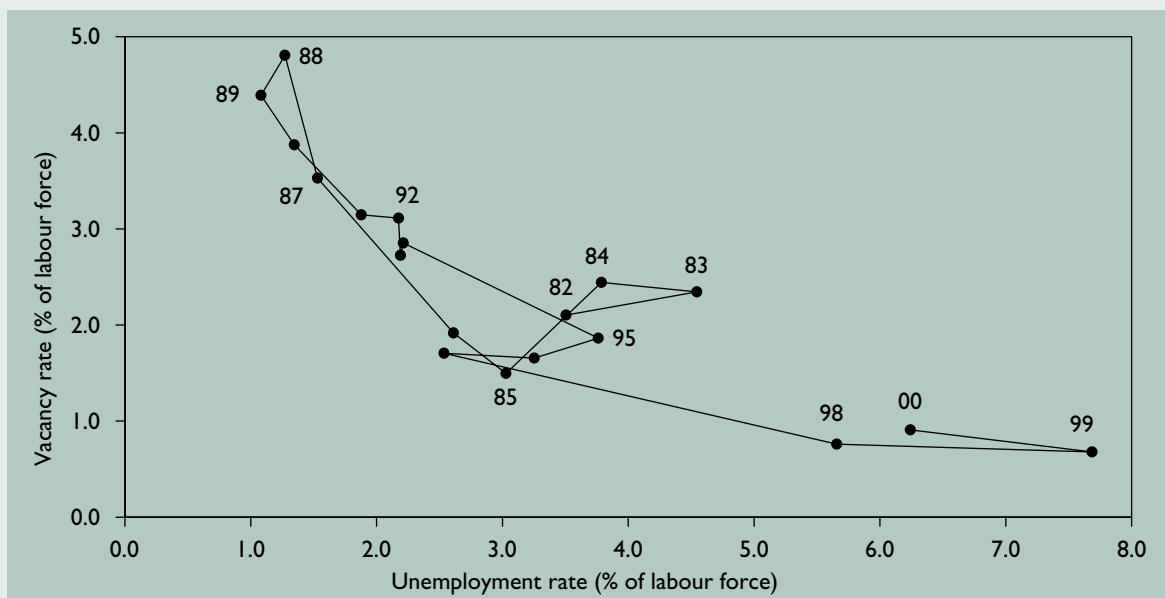
7 A traditional tool for analysing skill mismatch is the Beveridge curve, which is a downward sloping curve relating the unemployment rate to vacancy rate. Under the Beveridge curve framework, a north-east shift of the curve—implying that higher unemployment is associated with the same level of vacancies—would be a sign of rising skill mismatch or falling search effectiveness in the job market.

Chart 12a
Beveridge Curve for Skilled Workers*



* Include workers in financing and personal services sectors.

Chart 12b
Beveridge Curve for Unskilled Workers*



* Include workers in manufacturing, distributive trade and construction sectors.

reduced shares of the youth group and the less educated group in the labour force have helped reduce the aggregate rate of unemployment.

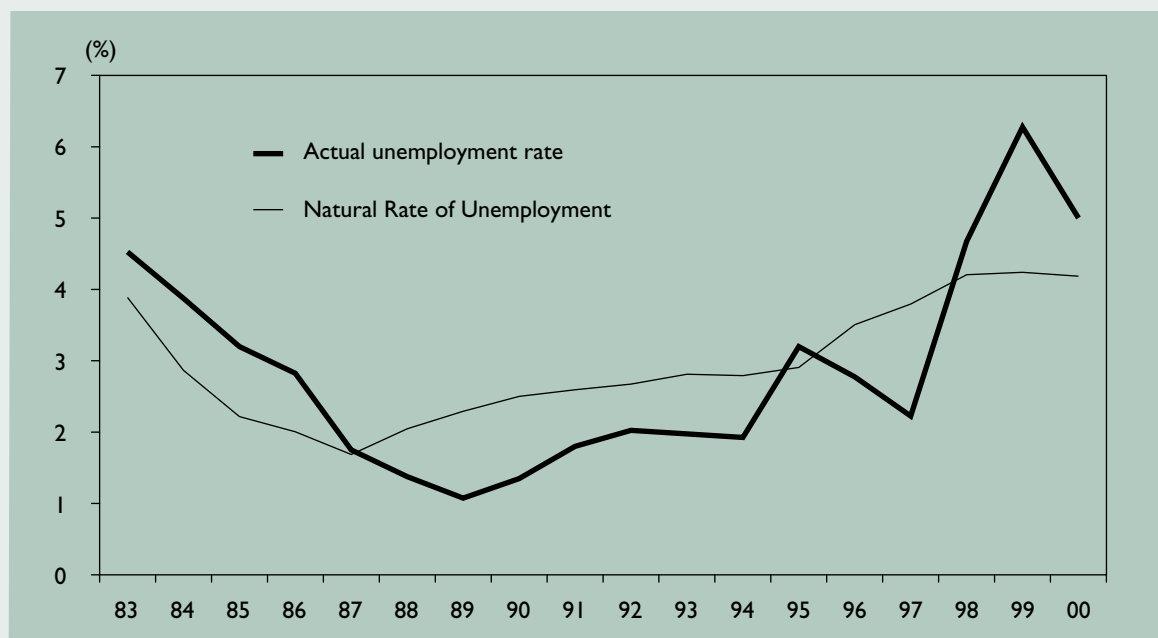
III. An Estimate of the Natural Rate of Unemployment

This section provides an estimate of the natural rate of unemployment in Hong Kong by employing a system equation estimation approach. The detailed model and estimation results are presented in Appendix I. Our estimates show that the natural rate has followed a modest uptrend since the latter part of the 1980s (Chart 13). It increased from 2-3% in the first half of the 1990s to 3-4% in the subsequent period. Taking our estimates literally, the rise in the natural rate reflected the effect of the structural change in the economy, which more than offset the favourable effect of the reduced share of youth group in the

labour force. However, it was also possible that our estimates were biased upwards by observations of high rates of unemployment at the end part of the sample period. In this respect, it is noted that a large demand shock could lead to a persistently higher rate of unemployment due to the effect of hysteresis.⁸ As a result, it may be too soon to ascertain whether the rise in the unemployment rate in recent years represented in part an increase in the natural rate, or was wholly attributable to the large negative demand shock in the wake of Asian financial crisis.

Notwithstanding the modest increase in recent years, the natural rate remained relatively low from an international perspective. In particular, our estimate of the natural rate was lower than those reported in a recent OECD study for most OECD countries including the US (OECD, 2000).⁹ This supports the general view that the labour

Chart 13
Actual and Natural Rate of Unemployment



8 The latter was indicated by the significance of the lagged dependent variable in the unemployment rate equation.


9 The OECD study reported estimates—for 1999—of 7³/₄%, 6³/₄%, 8¹/₂%, 5¹/₄%, and 4% for Germany, the UK, Canada, the US and Japan respectively.

market in Hong Kong has been flexible in adjusting to the dramatic structural change in the economy in the past two decades.

A comparison of the actual and natural rate of unemployment suggests that variations in the unemployment rate reflected mainly changes in its cyclical component in line with the general economic conditions. The unemployment rate was lower than the natural rate in much of the 1990s, reflecting booming economic activity during the period. It increased in the wake of the Asian financial crisis to levels significantly above the natural rate. It subsequently eased along with the economic recovery in 2000, but remained above the natural rate. The gap has widened again in 2001 as the unemployment rate rose considerably amid the growth slowdown.

IV. Concluding Remarks

This paper examines the sources of change in unemployment in Hong Kong by decomposing the unemployment rate into a natural rate and a cyclical component. Econometric estimates suggest that the natural rate of unemployment edged up from 2-3% in the first part of the 1990s to 3-4% in more recent years. Notwithstanding the modest rise, the estimated natural rate was relatively low from an international perspective. Furthermore, our estimates may be biased upwards by the observations of relatively high rates of unemployment at the end part of the sample period.

Most of the variations in the unemployment rate in recent years appear to reflect cyclical conditions in the economy. The unemployment rate increased to significantly above the natural rate amid the sharp economic downturn in 1998-99. It eased in 2000 due to the strong economic growth, but remained above the natural rate. Looking ahead, as economic growth slows down sharply this year, the unemployment rate is expected to rise again relative to the natural rate. 

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ESTIMATION OF THE NATURAL RATE OF UNEMPLOYMENT

Following a brief review of the existing literature, we present an empirical model for our econometric analysis, followed by the estimation results.

a. A Brief Review of the Existing Literature

There are various approaches to estimating the natural rate of unemployment. The most well-known is estimation of a Phillips-curve type equation, which relates (changes in) price or wage inflation to some measure of excess demand or real disequilibrium, measured by an unemployment gap. Embedded in the Phillips curve is the concept of non-accelerating inflation rate of unemployment (NAIRU)—which implies that the natural rate is equivalent to the unemployment rate at which inflationary pressures are constant.¹⁰ This approach has the advantage of focusing on the relationship between inflation and the labour market disequilibrium, which is important if the policy interest in the natural rate of unemployment concerns mainly its implications for inflation.

The empirical implementation is typically done through a single-equation regression. It is recognised that the natural rate is not constant over time, and that estimates should therefore be capable of handling variations across time. The Kalman filter is one method that has often been employed to derive the unobservable time-varying natural rate. However, Kalman filter estimates tend to be sensitive to model specification.

An alternative approach is to focus more explicitly on the structural determinants of

unemployment. The key requirement of this approach is to distinguish between cyclical and structural factors, with the natural rate being derived from the unemployment rate expressed as a function of the structural factors. This is important if the main purpose of the study is to explain the sources of change in the unemployment rate. Typically, this approach involves an equation system that encompasses the key relationships describing the goods and labour market—including the Phillips curve and the unemployment rate equations. It has the advantage of incorporating information from different economic relationships. Moreover, because of the explicit account of structural factors—which change over time—a variable natural rate could be derived. Nevertheless, the system equation approach has the disadvantage of being sensitive to specification errors, where misspecification in one equation could be carried through to the rest of the equation system.¹¹

b. An Empirical Model for Hong Kong

In this paper, we also adopt the system equation approach to estimate the natural rate of unemployment in Hong Kong, in part because our main purpose is to understand the sources of changes in unemployment.¹² Our model follows closely that of Adams and Coe (1990), and consists of the following equations:

$$U = \alpha_0 + \alpha_1 (y - y^p) + \alpha_2 SEMP + \alpha_3 SYLF + \alpha_4 U_{-1} + \varepsilon_1 \quad (A1)$$

$$\Delta w = \beta_0 + \beta_1 \Delta p_{-1} + \beta_2 (U - U^N) + \beta_3 pr + \varepsilon_2 \quad (A2)$$

$$\Delta p = \delta_0 + \delta_1 (y - y^p) + \delta_2 \Delta p^{exp} + \delta_3 \Delta w + \delta_4 \Delta mp + \varepsilon_3 \quad (A3)$$

$$y^p = 0.7(1 - U^N)h + 0.3k + a_0 + a_1 SEMP + a_2 T + \varepsilon_4 \quad (A4)$$

10 There exists a large amount of literature on the estimation of Phillips curve over the past decades. In recent years, Laubach (1997) and Meyler (1999) provide some country-specific estimates. Gordon (1997) and King, Stock and Watson (1995) present discussion on the policy relevance of the NAIRU estimates.

11 Adams and Coe (1990) provides a useful technical account of the system equation approach and presents a much cited study on the US.

12 There are few published studies on the estimation of the natural rate of unemployment in Hong Kong. The studies that we have come across do not provide estimates of the natural rate of unemployment per se, but generally point to a flexible labour market in Hong Kong. For example, Suen and Chan (1997) found that due to the virtually non-existence of minimum wage and union activities, wage in Hong Kong is flexible. More recently, an IMF Staff Country Report (2000) suggested that Hong Kong's labour market has proved to be highly flexible both in terms of adjusting to cyclical changes as well as to the rapid structural transformation of the economy during the last two decades. The rise in the unemployment rate in the wake of the Asian financial crisis was found to reflect mostly the effects of the economic downturn. On the outlook for unemployment, the analysis suggested that the unemployment rate would decline only gradually in the short run, as the labour force continued to rise and high real wages adjusted with a lag, thereby slowing down the recovery in corporate profitability. Over the medium term, it was argued that improvements in general education would remain a central priority.

All variables in lower-cases are in natural logarithm. Equation (A1) relates the unemployment rate (U) to its level in the previous period, a set of structural variables including the share of service employment in total employment (SEMP) and the share of young workers in total labour force (SYLF), and a cyclical variable represented by the deviation of actual output (y) from potential output (y^p).¹³ Equation (A2) is a Phillips curve relating growth of wage (Δw) to price inflation in the previous period (Δp_{-1}), productivity growth (pr), as well as the gap between the actual and natural rate of unemployment (U^N). In equation (A3), price inflation (Δp) is determined by output gap ($y - y^p$), inflationary expectations (Δp^{exp}), wage growth, and change in import price (mp). Equation (A4) represents a Cobb-Douglas production function which relates output to labour (h) and capital (k) inputs, and TFP.¹⁴ The latter was related to SEMP—representing the structural change in the economy—and a time trend (T), which is intended to capture any secure trend in TFP.

The estimation of the above system was implemented using an iterative procedure. First, the production function was estimated in order to derive the output gap. For this purpose, a certain start value (the average value of the actual unemployment rate in the past decade) for the natural rate of unemployment was assumed for adjusting labour input to potential level. Secondly, the unemployment rate, wage and price inflation equations were estimated as a system, using derived output gap from the production function estimation. The estimated natural rate obtained from the equation system was then substituted back into the production function. The iterative procedure was repeated until the resultant estimates of the natural rate and potential output converged in successive runs.¹⁵

The estimates of the natural rate of unemployment and potential output were then derived as:

$$U^N = \alpha_0/(1-\alpha_4) + \alpha_2/(1-\alpha_4)SEMP + \alpha_3/(1-\alpha_4)SYLF \quad (A5)$$

$$y^p = 0.7(1-U^N)h + 0.3k + (a_0 + a_1SEMP + a_2T) \quad (A6)$$

c. Estimation Results

The equation system was estimated using three-stage least squares, with all lagged endogenous variables and predetermined variables used as instrumental variables. The estimation results are summarised in Table A1. All of the estimated coefficients were of correct signs and most were statistically significant.

Table A1
Summary of System Estimation Results

Equation			
(A1)	(A2)	(A3)	(A4)
$\alpha_0 = -0.081$ (-5.2)	$\beta_0 = 0.001$ (3.3)	$\delta_0 = -0.001$ (1.3)	$a_0 = 8.81$ (40.4)
$\alpha_1 = -0.068$ (-5.4)	$\beta_1 = 0.678$ (8.3)	$\delta_1 = 0.020$ (1.3)	$a_1 = -1.69$ (-3.7)
$\alpha_2 = 0.098$ (5.7)	$\beta_2 = -0.139$ (-1.3)	$\delta_2 = 0.656$ (6.9)	$a_2 = 0.014$ (7.1)
$\alpha_3 = 0.508$ (5.0)	$\beta_3 = 0.005$ (4.5)	$\delta_3 = 0.341$ (2.9)	
$\alpha_4 = 0.557$ (8.3)		$\delta_4 = 0.114$ (3.3)	
$R^2 = 0.94$	$R^2 = 0.72$	$R^2 = 0.88$	$R^2 = 0.89$

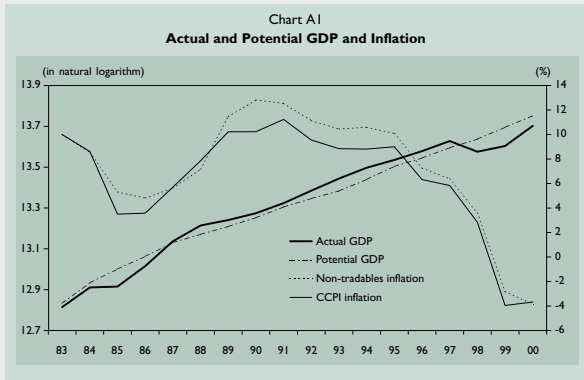
* The t-statistics are given in parentheses.


Source: HKMA Research Department estimates.

13 The lagged unemployment rate variable is intended to capture the possibility of hysteresis (persistence) in unemployment. A high degree of persistence in unemployment (as indicated by the significance and magnitude of the estimated coefficient) implies that once a shock drives the unemployment rate away from its natural rate, the former would only gradually return to its structural rate. We also tried to include the share of workers with secondary school education or below in total labour force as another structural variable. The estimation yielded a statistically insignificant coefficient, however. This is perhaps not surprising, as this variable and the share of youth group both had a downward trend in the past decades, driven by a common force of increased opportunities for education.

14 The output elasticities with respect to labour and capital were set at 0.7 and 0.3 respectively, based on IMF estimates for Asian economies as a whole (Sarel, 1997).

15 That is, additional runs of the procedure yielded unchanged estimates.



In addition to the estimated natural rate of unemployment presented in Section III, our estimation also yields an estimate of potential output. The associated output gap shows a consistent story with the unemployment rate gap. Specifically, the economy was operating above potential throughout the latter part of the 1980s and much of the 1990s. The fall in real GDP in 1998 following the Asian financial crisis has resulted in a negative output gaps in recent years. The gap narrowed somewhat in 2000 reflecting the strong growth in real GDP, but remained in the negative territory. 

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