Hong Kong Monetary Authority

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THE SLOWDOWN OF HONG KONG DOLLAR BROAD MONEY GROWTH

Key points:

- *The recent slowdown in Hong Kong dollar broad money growth reflects sluggish economic activity and low deposit interest rates relative to the yield on bonds rather than weakened confidence in the currency and banking system.*

- *Econometric analysis confirms that changes in broad money are well explained by the macro-economic variables. The estimates, based on data for the period Q1/1991 – Q4/2000, indicate a stable relationship between broad money, GDP and the opportunity cost of holding money. The relationship continues to hold, after extending the sample period to 1Q/2001 – 1Q/2002. In particular, model projections of broad money growth from the first quarter of 2001 onwards are in line with actual outcomes.*

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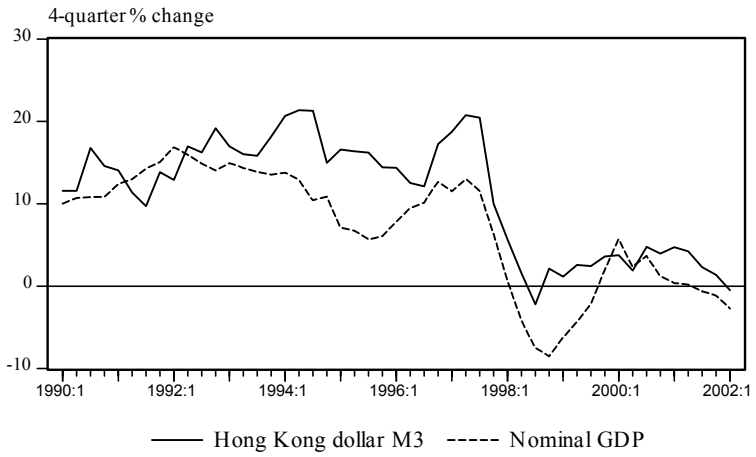
I. INTRODUCTION

Hong Kong dollar broad money (M3) growth moderated steadily from the third quarter of 2001. Broad money at end-March was about 1% (HK$15 billion) lower than the recent peak at end-September 2001. The year-on-year growth rate slowed from about 5% in early 2001 to currently below 1%. This paper examines the factors leading to this slowdown. The rest of the paper is organised as follows. Section II discusses possible contributory factors, notably developments regarding income and the opportunity cost of holding money. Section III examines the significance of these macroeconomic variables using an empirical money demand function. The last section concludes.

II. FACTORS CONTRIBUTING TO A SLOWDOWN IN BROAD MONEY

The moderation in broad money growth seems in line with developments in macroeconomic conditions. First, as economic growth has slowed and deflationary pressures persisted, the demand for money has slackened. Chart 1 shows that growth of broad money has been tracking closely that of nominal GDP.

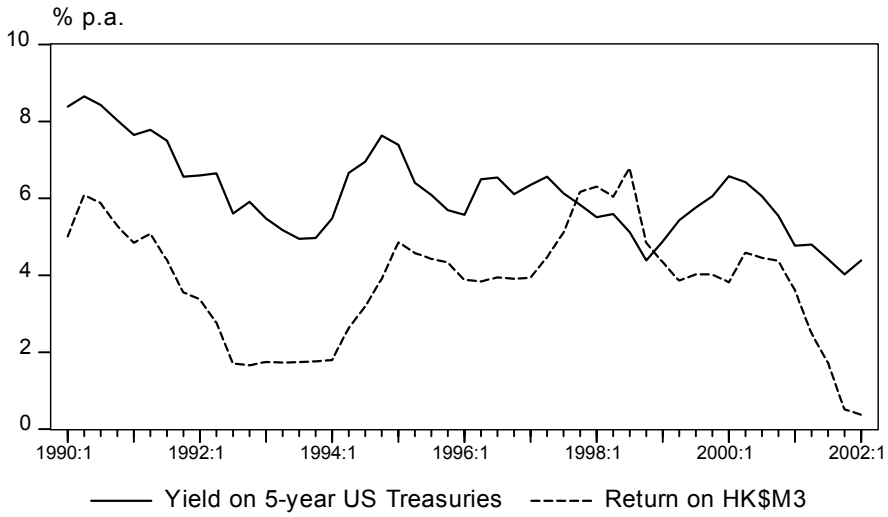
Chart 1. Hong Kong Dollar M3 and GDP
(Quarterly Figures)



Note: HK$M3 was adjusted to exclude the effect of deposit repatriation from June 1998. The introduction of an exemption of interest income on corporate deposits from profit tax from June 1998 resulted in a repatriation of offshore deposits to onshore deposits, which boosted growth of broad money from mid-1998 to 2000.

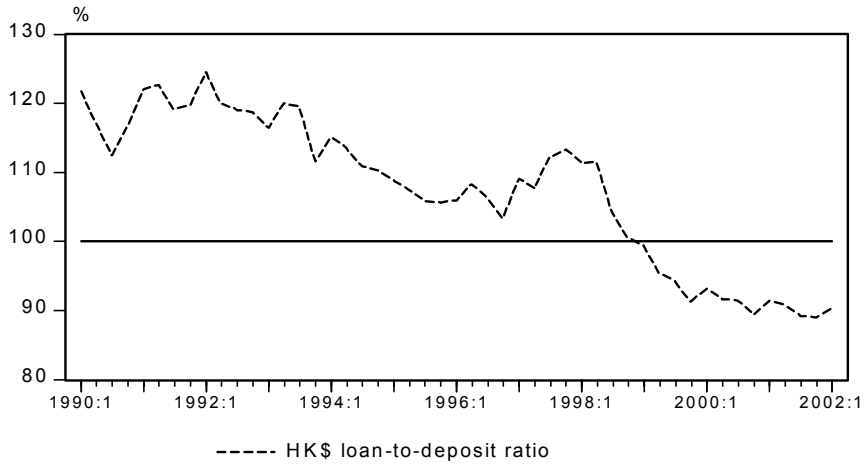
Secondly, along with declines in deposit interest rates relative to the yield on bonds, the opportunity cost of holding monetary assets has risen. This has provided incentives for economic agents to shift to alternative assets with higher return. Specifically, the rate of return on broad money - estimated by the weighted average of the (nominal) yield of the components of broad money - dropped by around 290 basis points to 0.42% in the twelve months to end-March. The yield spread against alternative assets, for example, 5-year US Treasury bills, widened substantially (Chart 2).

Chart 2. Rate of return on HK$M3



The portfolio re-allocation amid a low interest rate environment can be seen from an increase in retail interest in bonds and guaranteed funds. The Balance of Payments statistics also showed that portfolio investment on non-resident assets rose by around 80% in 2001. However, these outflows were a result of portfolio adjustment in seeking higher returns, rather than reduced confidence with the linked exchange rate system. It is noted that the liquidity in the banking system remains abundant, as reflected in the relatively low Hong Kong dollar loan-to-deposit ratio (Chart 3). The Hong Kong dollar interest rates continued to stay close to their US dollar counterparts.

Chart 3. Hong Kong Dollar Loan-to-Deposit Ratio



III. EMPIRICAL ANALYSIS

Econometric analysis was conducted to quantify the relationship between Hong Kong dollar M3 and the possible explanatory variables, notably income and opportunity cost of M3 holdings. An error correction model was estimated with use of quarterly data from Q1/1990 to Q4/2000. The data over the recent five quarters (Q1/2001 - Q1/2002) were set aside to examine the model's out-of-sample forecast performance.

The demand for broad money (in real terms) was specified as a function of real income and the opportunity cost of holding monetary assets. Real income was measured by real GDP. The opportunity cost of broad money holdings was calculated by subtracting the own rate of return on broad money from the yield on 5-year US Treasuries. The former was estimated as a weighted average of the rate of return of components of M3.[1] Real property prices were included in the regression to capture wealth effects and, potentially, the importance of capital inflows.[2] Money balances and property prices were

[1] The components include currency held by the public, demand deposits, savings deposits, time deposits, and negotiable certificates of deposits held by the public. A zero rate of return was taken for currency held by the public and demand deposits.

[2] Anecdotal evidence suggests that significant inflows took place during early to mid-nineties and the impact was largely borne by asset prices. While both Hang Seng Index and property prices were included in preliminary estimates, only property prices were found to be a significant explanatory factor. Also, money holdings would increase, ceteris paribus, along with a rise in property prices and the associated expansion of wealth. While there could be a substitution effect between property and monetary assets, the empirical results suggest that the wealth effect likely dominated the substitution effect.

deflated by the composite consumer price index. All data except the opportunity cost were in logarithms, and seasonal dummies were included to account for seasonality.

The estimation of an error correction model requires the variables to be stationary in first difference and co-integrated with a stationary linear relationship. These pre-requisites have been confirmed by Augmented Dickey Fuller unit root tests and Johansen co-integration tests.

The results are reported in Equation (1) below. Using a general-to-specific approach, the model specification started from four lags and insignificant lags were dropped one by one to derive a parsimonious equation.[3] The estimated model satisfies a number of diagnostic tests, and shows no evidence of serial correlation in the residuals or instability in the sample. The stability of the coefficients is also confirmed by recursive estimates (Chart 4).

$$(1)\quad \Delta m_t = \underset{(-2.71)^{***}}{-2.237} + \underset{(2.83)^{***}}{0.840}\,\Delta y_t + \underset{(1.93)^{*}}{0.079}\,\Delta pp_{t-1} - \underset{(-2.92)^{***}}{0.211}(m_{t-1} - \underset{(-12.63)^{***}}{1.664}\,y_{t-1} + \underset{(3.54)^{***}}{0.042}\,ir_{t-1})$$

$\overline{R}_2$	0.26	
Equation standard error	0.02	
LM test for serial correlation	0.57	[0.57]
Jarque-Bera test for normality	1.67	[0.43]
White test for heteroskedasticity	1.37	[0.23]

Notes: Numbers in parentheses are t-ratios. *, ** and *** indicate statistical significance at 10%, 5% and 1% levels. Numbers in brackets are p-values. Coefficients for seasonal dummies are not reported above.

where

m_t = real Hong Kong dollar M3;

y_t = real GDP;

pp_t = real property price index;

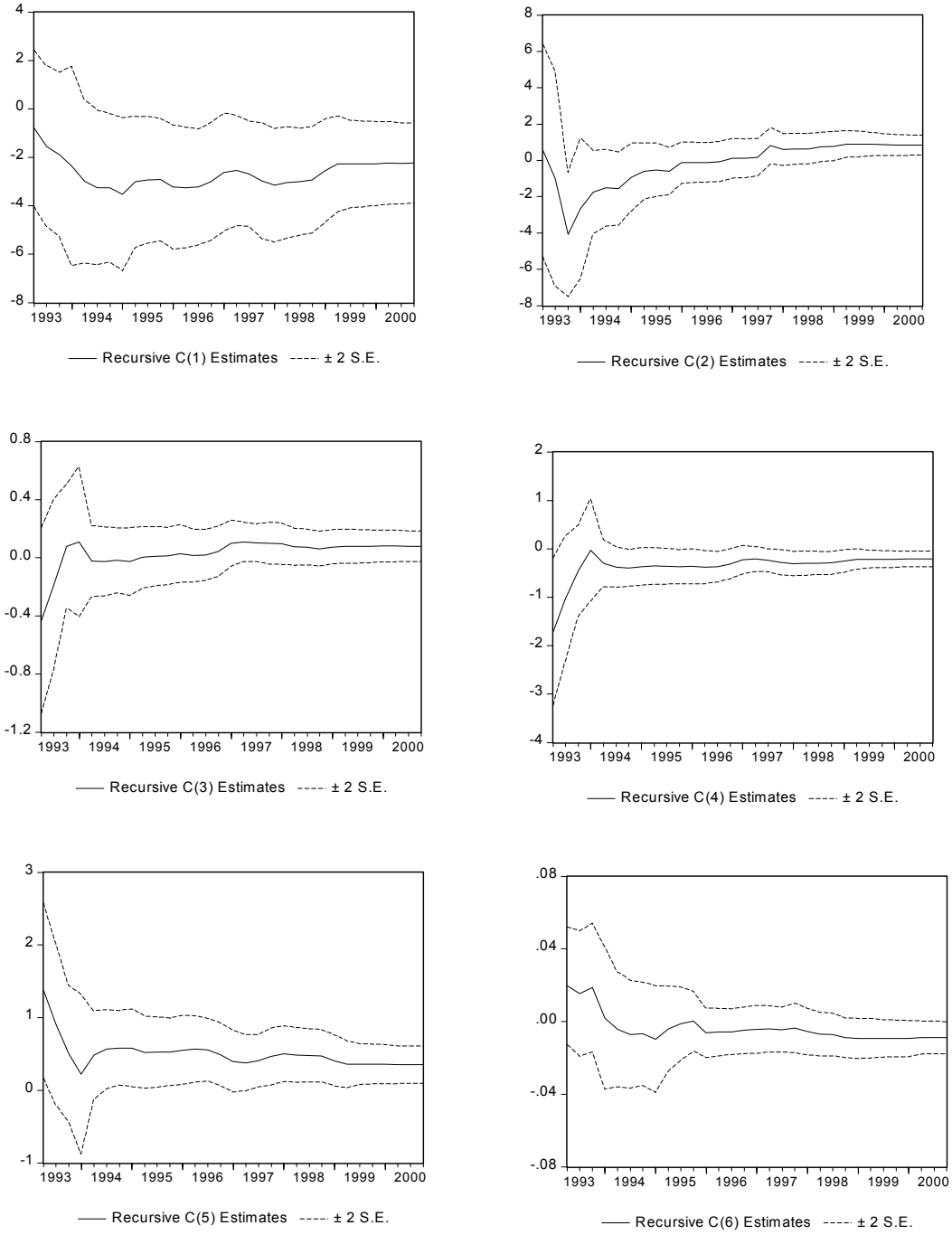
ir_t = opportunity cost of holding money (%);

Δ is the first difference operator.

[3] The likelihood ratio test suggests that the restricted model (as against the general model) provides satisfactory results, as evidenced by a p-value of 0.25.

Chart 4. Recursive estimates of Coefficients

$$\Delta m_t = \mathrm{C}(1) + \mathrm{C}(2)\,\Delta y_t + \mathrm{C}(3)\,\Delta pp_{t-1} - \mathrm{C}(4)\,m_{t-1} + \mathrm{C}(5)\,y_{t-1} - \mathrm{C}(6)\,ir_{t-1}$$



All variables are of correct signs and statistically significant. In particular, the results indicate a positive impact of real GDP and a negative effect of the interest rate on the demand for money. The long run elasticity of real money balances with respect to real income and the semi-elasticity of the opportunity cost are given by coefficients of y_{t-1} and ir_{t-1} respectively. Taking the estimates literally, a rise of 1 percent in real GDP would raise the real money demand by 1.7 percent in the long run, while an increase of 1 percentage point in the opportunity cost of money holdings would reduce money balances by 4.2 percent.

Turning to the short-run dynamics, the results suggest that a 1 percent increase in real GDP would initially raise real money balances by 0.8 percent. Changes in property prices (lagged one-quarter) are significant in the short-run, potentially signifying the effect of capital flows. By contrast, the opportunity cost is not significant in the short run. The coefficient of the error correction term (-0.211) suggests that around 20% of the deviation between actual and equilibrium money balances would be corrected in the following quarter. It takes around three quarters for the deviation to be reduced by half, all else being equal.

The model performs well in out-of-sample projections. One-step-ahead forecasts for nominal M3 were constructed for the period Q1/2001 to Q1/2002.[4] Chart 5 shows that projected year-on-year rates of growth in nominal broad money are broadly in line with the actual values, and both lie within the 95% confidence intervals. This suggests that the underlying economic relationship has not shifted in the period Q1/2001 – Q1/2002.[5]

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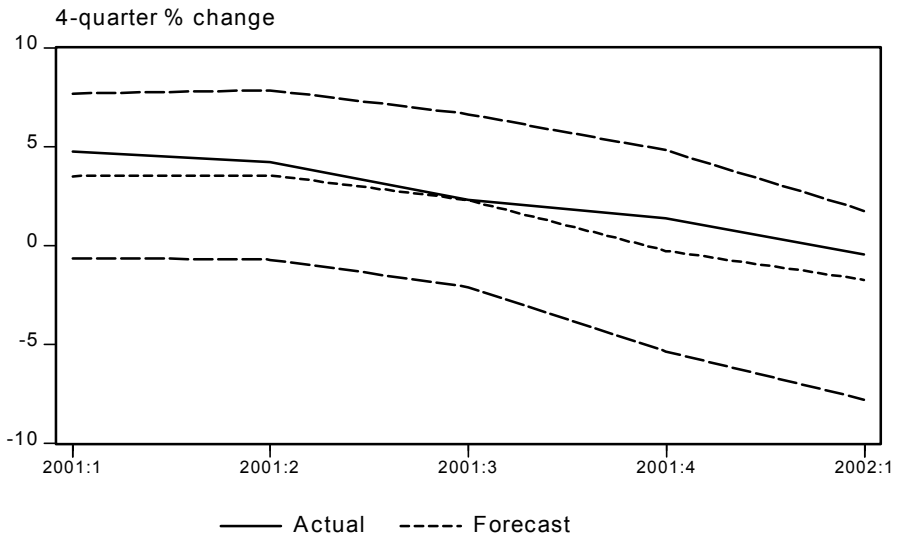
[4] The forecasts were derived from a static simulation of the model, using the actual values of prices, real income and the opportunity cost of holding money.

[5] This is supported by a formal Chow forecast test, which yields a p-value of 0.92.

Chart 5. Out-of Sample Forecast of Nominal HK$M3
(with 95% confidence bands)



IV. CONCLUSION

The analysis suggests that the recent decline in broad money growth is mainly attributable to the cyclical conditions of the economy and low deposit interest rates relative to bond yields. The development can be explained well by a stable money demand relationship. There is no sign of a weakening of confidence in the currency and the banking system. Hong Kong dollar interest rates continues to stay near their US dollar counterparts.