Offshore use of currency: Hong Kong's experience

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1. Introduction

This paper discusses a number of issues related to the circulation of Hong Kong dollars (HKD) outside Hong Kong. These include potential benefits and concerns for Hong Kong, and factors contributing to the external demand for HKD. The paper also provides empirical estimates of the likely holdings of HKD outside Hong Kong. Our estimates suggest that some 15-25% of the total outstanding stock of HKD may be held outside Hong Kong. In particular, the demand for HKD in mainland China appears to have increased in recent years, reflecting greater socio-economic integration and the non-convertibility of the renminbi as well as some relaxation of the foreign exchange transaction rules by the mainland authorities. The paper is organised as follows. The next section outlines the implications of HKD circulation outside Hong Kong, including the potential benefits and concerns for Hong Kong. Section 3 examines the factors that have contributed to the external demand. Section 4 provides some estimates of the likely size of the external holdings of HKD, including a review of other studies in this area. The final section concludes.

2. Potential benefits and concerns

There are a number of reasons why we have an interest in gaining some idea of the size of the external holdings of HKD banknotes.[2] First, it brings benefits to Hong Kong in the form of seigniorage. In its purest form seigniorage is simply the profit which accrues to the issuer from the issue of physical currency, because the holders of currency are in effect holding obligations of the central bank or government on which no interest is paid. In Hong Kong, when the three note-issuing banks (NIBs) issue banknotes, they are required to submit US dollars (at HKD 7.80 = USD 1) to the Hong Kong Monetary Authority (HKMA) for the account of the Exchange Fund in return for Certificates of Indebtedness (which are required by law as backing for the banknotes issued).[3] The US dollar funds are then invested by the Exchange Fund in liquid US dollar assets. At the end of 2001, the total amount of outstanding Certificates of Indebtedness was equivalent to about USD 14 billion. Assuming a rate of return of 3.5% per annum, the seigniorage is estimated to be USD 0.48 billion per year.[4] If 20% of the HKD notes are held outside Hong Kong, this means that the SAR government earns USD 0.1 billion per year from non-residents.[5] As will be discussed later, most of the HKD outside Hong Kong are held in the southern parts of mainland China (the mainland), particularly in Guangdong province.

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[1] The views expressed are those of the authors and do not necessarily reflect those of the Hong Kong Monetary Authority. The authors would like to thank Stefan Gerlach, Tony Latter and participants in the BIS/SAFE seminar on Capital Account Liberalisation in Beijing for helpful comments.

[2] Latter (2000) provides a discussion of the benefits and disadvantages of the internationalisation of currencies, which is related to the general use of a currency for international trade and financial transactions.

[3] In the case of coins, which are issued by the HKMA, transactions between the HKMA and the agent bank responsible for storing the coins and distributing them to the public are settled against US dollars at the rate of HKD 7.80 to USD 1. A new HKD 10 note, issued by the SAR government, went into circulation in mid-September, and its backing arrangement is the same as for coins.

[4] The assumption of a 3.5% rate of return was based on the average yields on three-month US Treasuries in 2001. The net return is reduced by the costs of producing the banknotes, but these are negligible relative to the earnings, particularly in the case of the higher-denomination notes.

[5] As shown later, 20% is about the midpoint of the range of our estimates.

One could also count as seigniorage, in a broader sense, any gains to the Hong Kong banking system from the use of HKD in the mainland, associated with additional demand for holding bank balances in the currency. Specifically, some of the HKD banknotes brought to the mainland, say by visitors from Hong Kong, are deposited with mainland banks, and end up as placements by the mainland banks with banks in Hong Kong. The banks in Hong Kong earn a profit margin on this intermediation. Hong Kong residents also benefit from savings on foreign exchange transactions when they use HKD notes for transactions in the mainland.

While the external demand for currency notes brings some benefits, it also has some potential disadvantages that warrant attention. One concern is counterfeiting. Opportunities to counterfeit are increased when a currency circulates outside the issuing jurisdiction because users are unfamiliar with the currency and anti-counterfeiting control mechanisms may be absent. In recent years, there have been occasional reports of a discovery of counterfeit HKD notes, but the total value has been minimal compared with the total notes outstanding. Efforts have been made to combat counterfeiting and increase public awareness of forged notes, including the introduction of new security features to the HKD 1,000 banknotes issued since 2000. In addition, the HKMA has improved and enlarged public education programmes on banknote security features in cooperation with the police and the media.

Second, external holdings of HKD, if significant and unrelated to domestic spending, may complicate the interpretation of movements in the amount of currency outstanding and in various other monetary aggregates. Third, they can also create distortions in the balance of payments statistics. Specifically, circulation of the HKD in the mainland increases Hong Kong's external liabilities, which is a capital inflow in the balance of payments. Conversely, the mainland increases its external claims, which is a capital outflow. However, these flows may not be captured by the balance of payments statistics, and estimates of such flows would help reduce the size of the errors and omissions category in the external transaction accounts.[6]

3. The external demand for Hong Kong dollars

With the opening of the mainland economy since the late 1970s, there have been increasing flows of goods, capital and people across the boundary. In particular, the number of visitors from Hong Kong to the mainland (mainly to neighbouring Guangdong province) has risen strongly in the past two decades (Graph 1). The trade, investment and personal contacts mean that HKD are frequently transferred to the mainland. Some of these HKD flow back to Hong Kong through channels such as interbank placements and spending in Hong Kong by mainland visitors. The remainder circulate in the mainland as a medium of exchange as well as a store of value.[7]

In earlier years, relatively high inflation in the mainland, episodes of renminbi (RMB) devaluation before the unification of the dual exchange rate system in 1994, and the comparative lack of alternative financial assets were important factors underlying the demand for HKD.[8] Since the mid-1990s, the RMB has been stable along with the strong performance of the mainland economy. In fact, reflecting increased confidence in the RMB and the rising importance of the mainland as a trade and investment partner, there is increasing use of RMB in the neighbouring economies including Hong Kong. Nevertheless, demand for the HKD continues in the mainland. In fact, there have been signs of an increase in the external holdings of HKD in recent years.

First, HKD banknote issuance has expanded considerably in recent years against a background of generally weak economic activity in Hong Kong, and only a moderate rise in broad money. As a result, the ratio of currency to broad money has increased (Graph 2). Of course, there are also factors that suggest a rise in domestic demand for cash. In particular, the price deflation in the past few years has

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[6] If the funds flow back to Hong Kong through the interbank placements as noted above, they are still Hong Kong's liabilities, but would be reflected in the balance of payments statistics.

[7] HKD banknotes have long been circulated in Macau in parallel to patacas. However, the magnitude of the holdings in Macau is estimated to be small because of the small size of its population (about 437,700) and economy. See Chan (2001).

[8] During 1986-93, the mainland maintained a dual exchange rate system, with an official rate that was adjusted periodically and a more depreciated market-determined rate set in the swap centres.

increased the amount of small-value purchases, and thus the use of cash. The introduction of bank charges and fees on various types of services may have induced some customers to make fewer, but larger, cash withdrawals, resulting in greater cash holdings.[9] It may have also discouraged the use of cheques or bank coupons for small-value transactions. In addition, the decline in interest rates in 2001 has reduced the opportunity costs of holding cash.[10] On the other hand, there has been increasing use of non-cash payment means including credit cards. The number of credit card accounts has nearly doubled in the past four years (to 9.5 million as of end-June 2002). The more popular use of Octopus cards in some retail chains since 2000 may have also substituted cash to some extent in small-value transactions.

Second, the rise in the stock of HKD banknotes in recent years was due largely to issuance of large-denomination notes (Graph 3). Considering the increasing use of non-cash payment means, and the weak economic activity in Hong Kong, it is difficult to imagine that the greater issuance of large banknotes was solely for domestic use. Third, informal information from some major banks suggests that the transfer of HKD cash across the boundary changed from a net inflow to Hong Kong three to four years ago to a net outflow currently, indicating increased demand from the mainland.

The unabated demand for HKD in the mainland in the face of a stable RMB probably reflects a combination of factors. First, the RMB remains a non-convertible currency, and there are controls on capital and financial account transactions by the mainland authorities. Holdings of HKD banknotes - the HKD being a convertible, stable currency - represent a means of accumulating foreign assets for some individuals and business firms in the mainland.

Second, there is an increasing number of Hong Kong enterprises operating in the mainland, and a rising number of Hong Kong residents live in or frequently travel to the mainland.[11] For these persons, the preferred means of transaction remains the HKD, reflecting the RMB's non-convertible status.

Third, the relatively large denominations of the HKD banknotes probably help the HK currency's use as a store of value as well as a means of payment, as the mainland is still largely a cash-based economy. While HKD banknotes are issued in large denominations, including HKD 100, 500, and 1,000, the denomination of the largest RMB note is only 100 (about HKD 95 at an exchange rate of 1.05).[12]

Finally, some regulatory changes in the mainland in the past few years have possibly also facilitated the increased use of HKD banknotes. Foreign-invested enterprises in the mainland are now allowed to use their RMB earnings to buy HKD from banks to pay the salary and reimburse the living expenses of their foreign employees. In addition, more domestic banks in the mainland are being allowed to conduct foreign exchange transactions. Moreover, foreign banks are being permitted to conduct such business not only with foreign-funded enterprises as in the past, but also with mainland enterprises and residents. These factors imply that demand by banks for HKD vault cash has increased to meet daily transaction needs in the mainland.[13]

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[9] A number of banks in Hong Kong have introduced a wider variety of fees and charges on account and banking services following the final phase of interest rate deregulation in July 2001.

[10] Furthermore, there has reportedly been an increase in underground economic activity, such as rising numbers of hawkers. While it is difficult to gauge the size of this increase, the incentive structure suggests that it is unlikely to be large. The tax regime has been stable and, if anything, there have been tax concessions in the past few years. Moreover, an increase in the number of tourists from the mainland, who use cash as the primary means of transaction, may have also raised the use of HKD cash in Hong Kong. Nevertheless, some of the transactions by mainland visitors are now conducted in RMB.

[11] According to a recent survey conducted by the Planning Department, some 41,300 Hong Kong residents were living in the mainland. Of that total, around 95% were living in Guangdong province and 78% were "required by work". Another survey conducted in 2001 suggests that some 496,300 persons travelled frequently, at least once a week, across the boundary for various purposes, including business, work, leisure and visits to family members. The number represented an increase of 35% over that of the 1999 survey, and most of the people concerned travelled to areas in Guangdong (Shenzhen, Dongguan and Guangzhou).

[12] Experiences in the United States indicate that the net new demand for USD 100 notes came primarily from abroad (Porter and Judson (1996)). Rogoff (1998) suggests that the issuance of large euro notes (including EUR 100, 200 and 500 bills) may enable the euro over time to challenge the dominance of the US dollar in the global market as a safe, reliable vehicle currency.

[13] This point was made by a bank that conducts considerable foreign exchange transactions in the mainland.

4. Estimating external holdings of Hong Kong dollars

In general, there are two possible ways of estimating the portion of the currency stock that is held externally. Either we could find data that measure the size of external holdings directly or we can try to find characteristics that explain domestic holdings and then take foreign holdings as the residual. The first method cannot be applied to Hong Kong because of a lack of data.[14] There are a couple of studies that rely on indirect methods by examining the demand for HKD. The following provides a brief review of the existing studies, as well as our own estimates based on alternative approaches.

Hawkins and Leung (1997) and Chan (2001) estimated external holdings of HKD by explicitly taking into account the influence of the opening-up and reform of the mainland, using a currency demand function for HKD. The former added a "dummy" time trend in the currency demand equation to approximate the external influences. The latter explicitly included macroeconomic variables in Guangdong in the model. Both studies assumed that "the mainland impact" started from around the mid-1980s.[15] Hawkins and Leung estimated that around 25% of the total currency outstanding at end-1994 was held outside Hong Kong, while Chan's estimates pointed to about 11% as of end-1999.[16]

It should be noted that both methods have limitations. In Hawkins and Leung's case, the linear time trend may not capture the dynamic impact on demand for HKD alongside the ongoing structural and financial reforms in the mainland. There is no reason to assume an increasing linear trend in the demand for HKD, for example. One drawback of Chan's method is that the estimates rely heavily on the use of appropriate macroeconomic variables of the mainland, which may vary in line with the structural and regulatory changes in the period.

An earlier study by Greenwood (1990) employed a more straightforward method, based on the assumption that the currency/GDP ratio (CR) would decrease over time as a result of the development of cashless payments and other financial innovations. Specifically, a trend to the ratio was fitted for the period 1966-84, which was extrapolated to predict the domestic demand for HKD in 1985-89. Greenwood's estimates suggest that about 18% of total outstanding HKD were held outside Hong Kong at end-1989.

We update Greenwood's estimates by extending the sample period to 2001. Graph 4 exhibits the ratio of currency to nominal GDP from 1966 and 2001. The ratio recorded a pronounced downward trend during the period 1966-84, but reversed to an increasing trend in the subsequent period. This change in the trend is similar to the patterns observed for the United States and Germany, both of which are known to have a significant amount of their currencies circulating offshore (Graph 5, Panel A). However, it is in contrast with the trend in the ratios for a group of Asian economies and some small OECD economies (Graph 5, Panels B and C).

A curve of the form of equation (1) was fitted for the period 1966-84, which was used to extrapolate the CR series for the period 1985-2001. Specifically,

$$CR = a + bx^{-n} \qquad (1)$$

where x is the time trend 66,67 …84, and n = 12.[17]

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[14] Studies on foreign holdings of the US dollar have made use of some direct sources of information about currency flows abroad. These include the Currency and Monetary Instrument Reports required by the US Customs Services and information acquired by the Federal Reserve Bank of New York on incoming and outgoing currency shipments by banks. However, these do not provide a complete picture as they miss much of the cash that is hand-carried or remitted by guest workers and travellers. Sources of indirect information about currency flows such as surveys have thus been employed. Porter and Judson (1996) provide a review of the different approaches to estimating the amount of US dollar holdings by foreigners.

[15] In the early stages of the mainland's "open door" policy (1979-83), the emphasis was put on the agricultural sector. It was only after 1984 that the emphasis shifted. Price reforms were implemented and the economy was moved towards the socialist market system. Reforms have also been steadily introduced since the mid-1980s to the financial and monetary sectors.

[16] Including an estimate of about 3% of holdings in Macau.

[17] The value of n was selected by trial and error to ensure that the CR converges asymptotically to a.

The constant *a* of equation (1) was determined with reference to the average ratio (of 0.06) in three Asian economies (South Korea, Malaysia and Taiwan, China) during 1990-2001.[18] These economies are suitable benchmarks because they have similar sets of holidays, festivals and customs to Hong Kong, and there is no significant external demand for their currencies.

Graph 6 shows the actual and extrapolated CR for the period under study. It was found that the deviation of the fitted CR from the actual CR was around 2% at end-2001, implying that about 25% (or HKD 25 billion) of total outstanding HKD were held externally. It should be noted that the estimates are sensitive to the assumption of the underlying value of the ratio. For example, if the underlying ratio was assumed to be 4% or 5%, external holdings would be about 50% and 37% respectively of the total amount as of end-2001 (Graph 7). Furthermore, this method does not capture the effects of changes in interest rates on domestic demand for currency. In particular, the declines in interest rates in 2001, which have reduced the opportunity cost of holding currency, should have raised the demand for HKD.

To capture the interest rate effect, we estimated a demand function for the HKD. However, rather than allowing explicitly for the influence of the mainland factors, we let the data search for the best-fit function for domestic demand. This was done by trying different proportions of external holdings of HKD in searching for the maximum of the log likelihood function (LLF). Specifically, the demand for narrow money balances in Hong Kong was specified as a function of real income and opportunity cost variables (including the real interest rate and expected inflation rate) (equation (2)).[19]

$$\log\left(\frac{M-\theta * CU}{P}\right)=\alpha_o+\alpha_1\log\left(\frac{Y}{P}\right)+\alpha_2\pi+\alpha_3 r+\varepsilon \qquad (2)$$

where

M = nominal narrow money, which includes the total outstanding stock of currency (*CU*) and demand deposits with banks;

θ = the ratio of external holdings of HKD ($0 \le \theta \le 1$);

P = the price level;

Y = nominal income;

π = the expected inflation rate; and

r = the real interest rate.

The left-hand side of the equation represents the real narrow money balances that are demanded domestically. For $\theta = 0$, all currency is held at home; for $\theta = 1$, all currency is held abroad. Equation (2) was estimated successively to find the value of θ that yields the maximum of the LLF (see Appendix for the details on data and estimation). The estimates suggest that the LLF reaches its maximum at $\hat{\theta} = 0.16$ (Graph 8). This implies that some 16% (or HKD 16 billion at end-2001) of HKD were held externally. A limitation of this method is that it assumes a constant proportion of external holdings, which may not be appropriate. As a result, it may overestimate the ratio in the earlier years but underestimate it in the more recent periods.

In view of the limitations and uncertainties of the different methods, all the point estimates should be treated with caution. Nevertheless, they provide a broad indication of the likely size of the external holdings of HKD. Specifically, our own two estimates in this paper suggest that a range of 15-25% of the total amount of HKD is probably held outside Hong Kong (Table 1). This is broadly in line with the estimates of the other studies for the earlier periods. For a given ratio, the increased total amount of HKD in circulation implies a rise in the external holdings in recent years. For example, at a ratio of

[18] It is assumed that should there be no offshore demand for HKD, the CR would converge gradually to the average ratio in these economies. Greenwood assumed a value of 4% for *a* with reference to the ratios in seven developed economies in the mid-1980s.

[19] A similar methodology was applied by Krueger and Ha (1995) to estimate the demand for South African rand in Swaziland. The real interest rate captures the real return on interest bearing financial instruments, while the expected inflation rate measures the opportunity cost of holding narrow money.

20%, the amount of external circulation would be about HKD 21 billion in June 2002, compared with HKD 18 billion and HKD 20 billion at end-2000 and end-2001 respectively.

Table 1

Summary of estimates of external holdings of HKD

Study	Estimates of external holdings of HKD		Period
	Value (HKD bn)	In % of total currency in circulation	
Greenwood (1990)	6	18	End-1989
Hawkins and Leung (1997)	17	25	End-1994
Chan (2001)	9	11	End-1999
Peng and Shi (2002a)[1]	25	25	End-2001
Peng and Shi (2002b)[2]	16	16	End-2001

[1] An updating of Greenwood estimates. [2] Method based on searching for the best fit of the domestic money demand function.

5. Concluding remarks

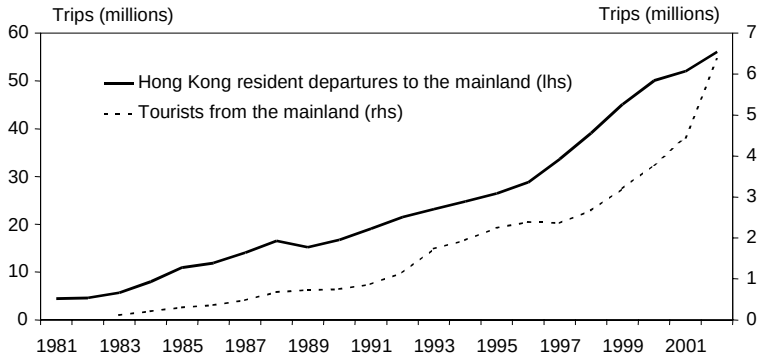
This paper examines a number of issues related to the circulation of HKD banknotes outside Hong Kong. These include potential benefits and concerns for Hong Kong, factors underlying the external demand for HKD, and empirical estimates of its likely size. Our estimates suggest that a significant amount of HKD - in a range of 15-25% of the total outstanding stock - is currently circulating outside Hong Kong.

What is interesting is that there seems to have been an increase in holdings of HKD banknotes in the mainland in recent years. This is against the background of a stable RMB, which itself has become a stronger currency that is increasingly being used in the neighbouring economies, including Hong Kong. This development probably reflects a combination of factors, including the non-convertibility of the RMB, increasing socio-economic integration between Hong Kong and the mainland, the relatively large denominations of the HKD, and some relaxation of foreign exchange transaction rules by the mainland authorities.

Finally, it should be noted that the external demand for HKD largely depends upon conditions outside Hong Kong. In particular, the non-convertibility of the RMB probably makes the acquisition of HKD - a convertible currency - particularly attractive. While the relatively large denominations of banknotes probably help, it is certainly not the case that they were designed to promote their offshore use.

Graph 1

Hong Kong resident departures to the mainland and tourist arrivals from the mainland

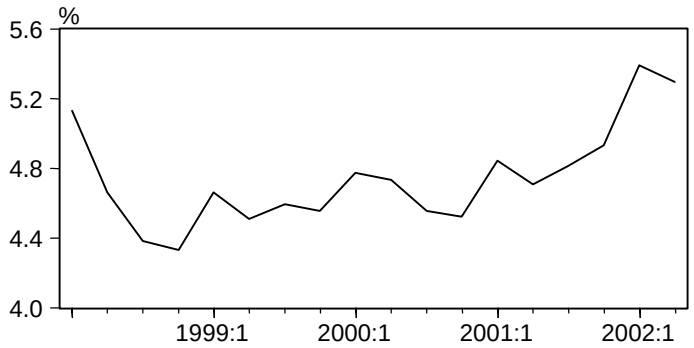


Note: 2002 figures are projected using the year-on-year growth in the first half.

Graph 2

Ratio of HK currency to broad money

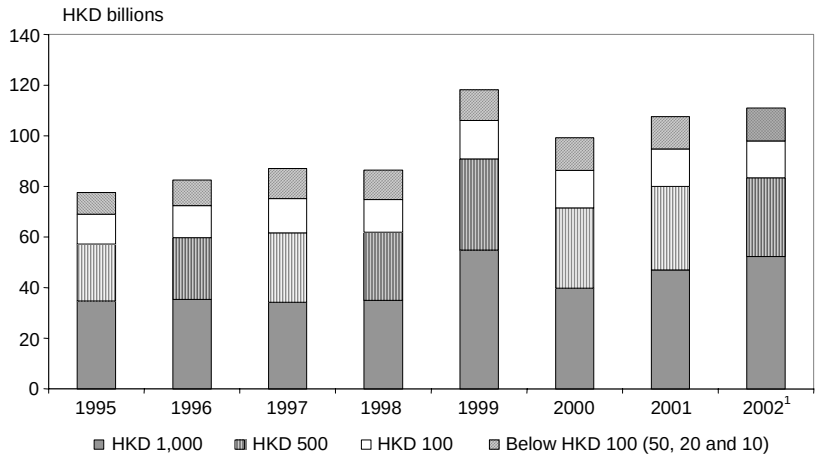
(quarterly figures)



Graph 3

Distribution of notes in circulation

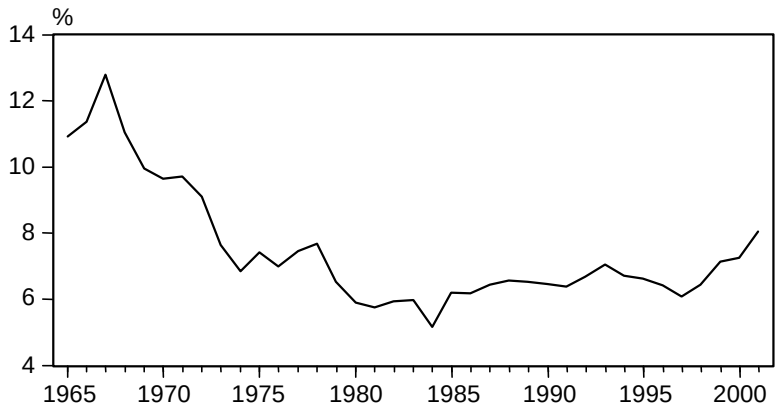
(by value)



[1] End-July 2002 figures.

Graph 4

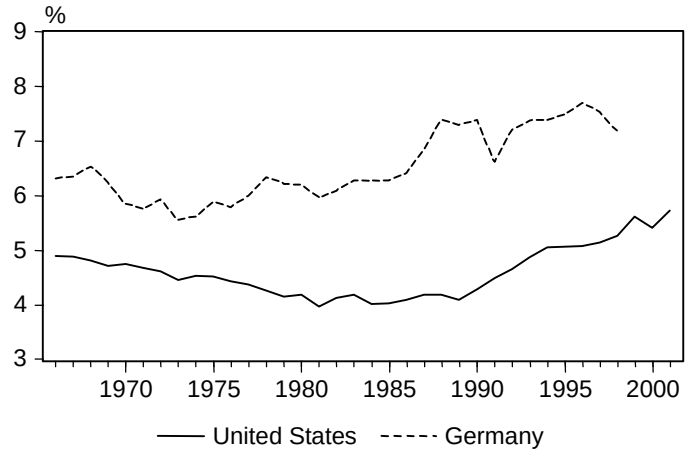
Ratio of currency to nominal GDP in Hong Kong



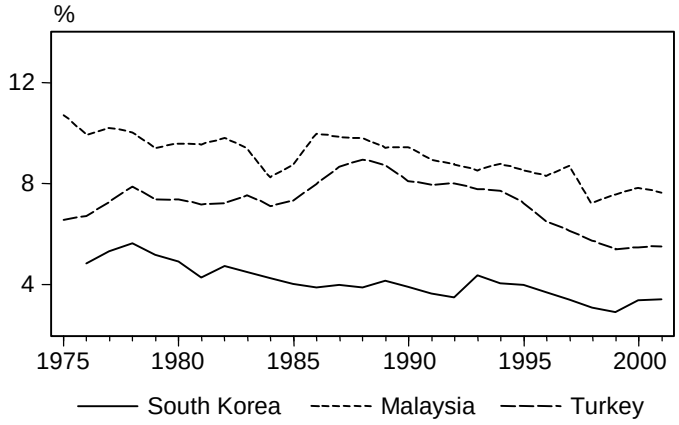
Graph 5

Ratio of currency to nominal GDP

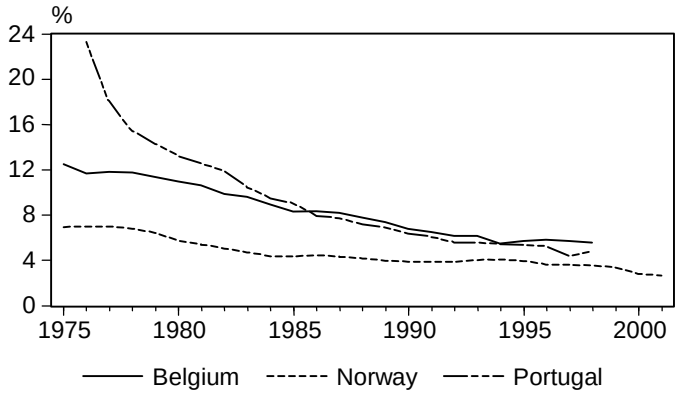
Panel A: United States and Germany



Panel B: Asian economies

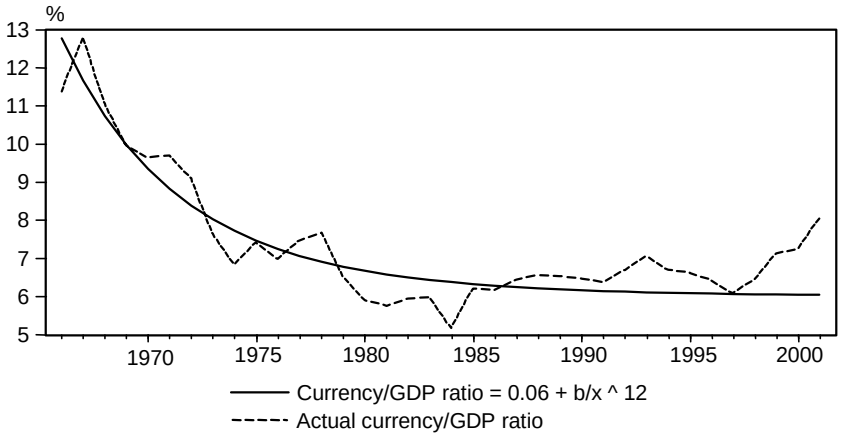


Panel C: Small OECD economies



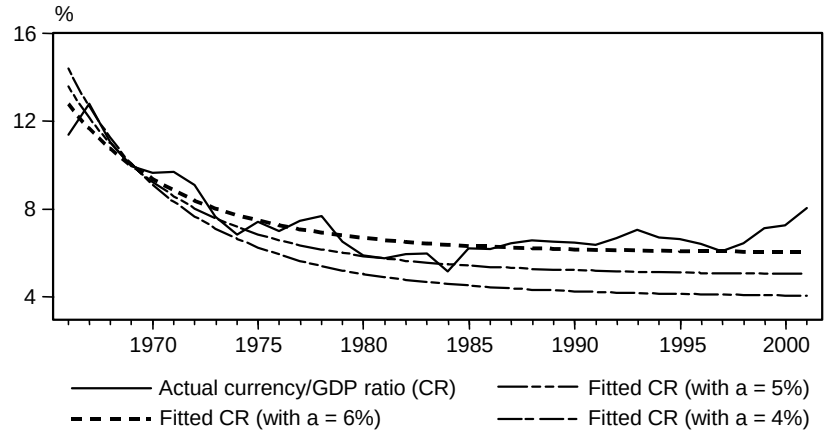
Graph 6

Actual and fitted currency/GDP ratios



Graph 7

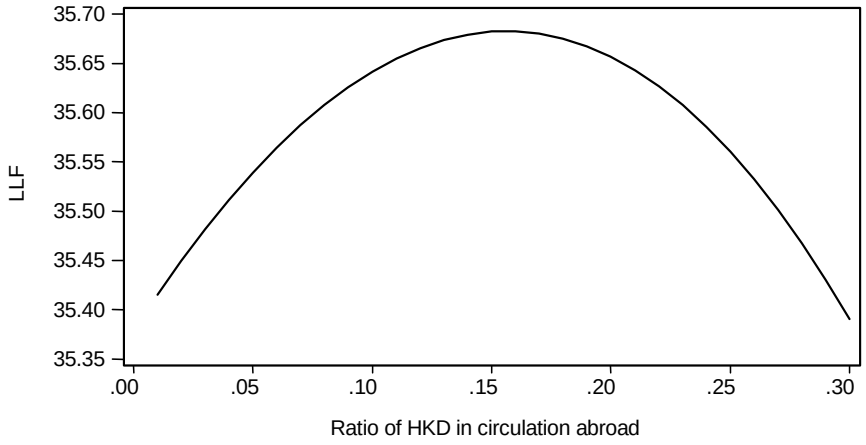
Comparison of various currency/GDP ratios



Note: The dotted curves were fitted by assuming different underlying currency/GDP ratios.

Graph 8

Log likelihood functions (LLF) for various values of θ



Appendix:
Search for the best fit of the domestic demand for money

Annual data from 1972 to 2001 were used in the estimation, and θ was assumed to be zero before 1985. Real narrow money balances were obtained by deflating the nominal data by the price deflator for private consumption expenditures, and real income was measured by real GDP. The real interest rate was computed as the difference between the average three-month deposit rate and the inflation rate, which is measured by the year-on-year percentage change of the private consumption deflator. The expected inflation rate was proxied by the percentage change of the private consumption deflator over a year. All data except the interest rate and inflation rate were in logarithms.

An error-correction modelling approach was employed. This requires the variables to be stationary in first difference and cointegrated with a stationary linear relationship. These were confirmed by Augmented Dickey-Fuller unit root tests and some preliminary results of Johansen cointegration tests. The money demand equation was then estimated successively to find the value of θ that yields the maximum of the log likelihood function (LLF). The estimates suggest that the LLF reaches its maximum at $\hat{\theta} = 0.16$. The final estimation results are shown below. All coefficients are significant and have the expected signs. Diagnostic tests do not show evidence of instability in the residuals.

$$\Delta m_t = -1.807 + 1.196\Delta y_t - 1.962\Delta\pi_t - 0.432(m_{t-1} - 0.828y_{t-1} + 4.907r_{t-1} + 6.736\pi_{t-1}$$

(–1.88) (2.51) (–3.64) (–2.38) (–9.28) (3.01) (3.10)

$\bar{R}_2$	0.56	
Equation standard error	0.08	
LM test for serial correlation	0.95	[0.40]
Jarque-Bera test for normality	0.60	[0.74]
White test for heteroskedasticity	1.06	[0.45]

where

$m_t = \log\left(\frac{M - \theta * CU}{P}\right)$, and

Δ = the first difference operator.

Note: Numbers in ( ) are t-ratios, and numbers in [ ] are p-values.

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