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EXCHANGE RATE RISK PREMIUMS IN HONG KONG DOLLAR: A SIGNAL-EXTRACTION APPROACH

Key Points:

- *Forward exchange rates convey information about the risk premiums of the currency exposures of the investors. The extraction of these risk premiums provides market information for the expected future values of a currency, which may be useful for policymakers in their market surveillance and monitoring.*

- *This study utilises a state-space model and the Kalman-filtering technique to estimate risk premiums of Hong Kong dollar from the forward exchange market from 1996 to 2005. The estimated risk premiums of the 12-month forward contract were as high as 3.4% of the spot exchange rate during the Asian financial crisis in 1998.*

- *The study also finds that the risk premiums have reverted from a discount in late 2004 to close to zero in mid-2005, reflecting that the appreciation pressure on the Hong Kong dollar along with the speculation on the revaluation of the renminbi in early 2005 has subsided after the introduction of the three refinements to the operation of the Linked Exchange Rate system in May 2005 and the reform of the renminbi exchange rate regime in July 2005.*

- *The forward exchange rates, after taking the estimated risk premiums into account, do not have a good forecasting capability for the future spot exchange rates.*

- *Between the two financial factors that drive the risk premiums in the Hong Kong dollar forward rates, the renminbi non-deliverable forward rates appear to have a larger impact than the Aggregate Balance of the banking system. Nonetheless, both factors are important for monitoring the risk premiums of the Hong Kong dollar exchange rate.*

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I. INTRODUCTION

Forward exchange rates convey important information about market expectations of future values of currencies. Under the assumptions of risk neutrality and rational expectations, the forward exchange rate is thought to be an unbiased predictor of the future spot exchange rate. This hypothesis is known as the Unbiased Forward Rate Hypothesis (UFRH) in the literature. When tested against the empirical data, however, most studies not only reject the hypothesis but also find that, contrary to the common belief, the relationship between the forward rate and the future spot rate is negative. Such evidence implies that there are predictable excess returns on foreign currency investment. One explanation for this predictable excess return (also known as the forward discount puzzle) in the literature is the existence of a time-varying risk premium. The presence of risk premiums in the foreign exchange market has significant implications for models of exchange rate determination, effectiveness of central bank interventions, and investment decisions. In particular, as risk premiums may provide market information for the expected future values of a currency, they may be useful for policymakers in their market surveillance and monitoring work.[1]

The risk premiums discussed in this study are different from the Hong Kong dollar forward points (sometimes known as forward premiums or forward discounts). The Hong Kong dollar forward points are the spreads between the forward exchange rates and the current spot exchange rate, which can be at a premium, at par or at a discount to the current spot exchange rate. These forward points simply come from the interest rate differentials between the Hong Kong dollar and US dollar (as determined by the Covered Interest Rate Parity Condition) and thus reflect the relative cost of holding the Hong Kong dollar. The risk premiums in this study are, however, the compensation required by risk-averse investors to take exposures in the foreign exchange market. As discussed in Section II, the risk premiums are measured by the differences between the forward exchange rates and the expected future spot exchange rates.

Econometric methods of measuring risk premiums are usually based on regression equations. In some cases, the choice of the regressors is fairly arbitrary and mainly motivated by the availability of data. Alternatively, Wolff (1987) suggests a state-space model and the Kalman-filtering technique to identify and measure risk premiums in the foreign exchange market. One advantage of this signal-extraction approach is that the behaviour of the risk premiums can be empirically determined from the data on spot and forward exchange rates only and does not involve any arbitrary

[1] As seen in Section II, the risk premiums contain information about the expectation of the future spot exchange rate.

specification in the regression analysis. This paper applies this signal-extraction approach to the Hong Kong dollar market. By identifying and measuring the unobserved risk premiums from the pricing of forward exchange rates of the Hong Kong dollar against the US dollar, this study addresses two questions related to market monitoring work: (1) are the forward exchange rates, after taking the risk premiums into account, useful in forecasting the future value of the currency and; (2) what are the determinants of the risk premiums?

The remainder of this paper is organised as follows. Section II presents the background of the existence of risk premiums in the foreign exchange market and introduces the signal-extraction approach. Section III reports the estimation results and examines the forecasting performance of the forward exchange rates after taking the risk premiums into account. Section IV investigates the determinants of the estimated risk premiums obtained from the signal-extraction approach. Section V concludes this study.

II. THE RISK PREMIUM AND THE SIGNAL-EXTRACTION APPROACH

This section provides an overview of how the idea of risk premiums enters into forward exchange rates and also how the state-space model can be used to extract the risk premiums from the forward exchange rates.

Conceived as a tool for hedging a currency exposure in the spot market, the forward exchange rate is a price that conveys expectation on the prospect of the currency. The information content of the forward exchange rate has often been examined by academics and market participants for its predictive capability on the future spot exchange rate. The relationship between the forward rate and the future spot exchange rate that has constantly been scrutinised in the literature is the UFRH. It is given as:

$$E_t(S_{t+1}) = f_t \tag{1}$$

where $E_t(.)$ is the conditional expectation based on information available at time t, S and f represent the natural logarithm of the spot and forward exchange rates respectively. Assuming rational expectation and risk neutrality, equation (1) implies that the forward rate is an unbiased predictor of the future spot rate, as below,

$$S_{t+1} = f_t + \varepsilon_{t+1} \tag{2}$$

where ε_{t+1} is the rational expectation forecast error defined as a white-noise process with zero-mean.

To avoid the spurious problem in the regression of non-stationary time-series data, the empirical test of the UFRH is often based on the following specification:

$$\Delta S_{t+1} = \alpha + \beta(f_t - S_t) + \varepsilon_{t+1} \tag{3}$$

where Δ is the differencing operator and ΔS_{t+1} is defined as $S_{t+1} - S_t$. Under the UFRH, the specification in equation (3) implies that $\alpha = 0$ and $\beta = 1$. However, empirical estimations of equation (3) overwhelmingly reject the UFRH across various time periods and currencies with the estimated β not only different from one but also negative.[2] One explanation for the empirical failure of the UFRH (or the forward rate anomaly) is suggested by Fama (1984) who argues that risk-averse investors require compensation to assume risk of holding the currency, and the forward exchange rate thus contains an unobserved time-varying risk premium component. In such a case, equation (1) can be rewritten as

$$f_t = E_t(S_{t+1}) + rp_t \tag{4}$$

Equation (4) states that the forward exchange rate is the sum of the expected future spot rate and a time-varying risk premium rp_t. Subtracting S_{t+1} from both sides of equation (4), and defining the expectations error as $\eta_{t+1} = E_t(S_{t+1}) - S_{t+1}$, we obtain

$$f_t - S_{t+1} = rp_t + \eta_{t+1} \tag{5}$$

where η_{t+1}, the expectation error, is assumed to be serially uncorrelated with zero-mean. Equation (5) states that when the forward exchange rate is used as a predictor of the future spot exchange rate, the *ex post* excess forward return ($f_t - S_{t+1}$) consists of a risk premium component and a white-noise market expectations error term. This error term may be due to the arrival of new information between t and t+1.

While the *ex post* excess forward return is observable, the risk premium *rp* is not observable. Wolff (1987) proposes a state-space model with the Kalman-filtering technique to extract the time-varying risk premium from the observed forecast error. The advantage of this signal-extraction approach is that it does not require a specification of the determinants of the underlying risk premium, which is not observable, but instead relies only on the properties of the observed forecast errors themselves. In the state-space form, the relationship between the observed forecast error and the

[2] See Engel (1996) for a survey of the literature on empirical studies. Using data of 1-month Hong Kong forward exchanger rate, Frankel and Poonawala (2004) also find that the estimated β coefficient has a negative sign and significantly different from one (but not significantly different from zero).

unobserved risk premium is characterised by a signal equation, while the evolution of the unobserved risk premium over time is described by a state equation.

In this study, for an *m*-period ahead forwards contract, the signal equation of the state-space model is written as:

$$f_t^{t+m} - S_{t+m} = rp_{t,m} + \eta_{t+m} \tag{6}$$

where f_t^{t+m} is the natural logarithm of the forward exchange rate at time t for contracts delivered at m periods later, S_{t+m} is the corresponding natural logarithm of spot exchange rate at time $t+m$, $rp_{t,m}$ is equal to $f_t^{t+m} - E_t(S_{t+m})$, which is the time-varying risk premium on forward contracts for delivery at m periods later. The market expectation error term η_{t+m} is assumed to follow a moving average process with m-1 lags such that:[3]

$$\eta_{t+m} = e_{t+m} + \theta_1 e_{t+m-1} + \theta_2 e_{t+m-2} \ldots + \theta_{m-1} e_{t+1} \tag{7}$$

where $e_{t+j} \sim N(0,V)$, $j = 1, \ldots, m$

i.e. e_{t+j} is assumed to distribute normally with mean zero and variance V.

For the state equation, there is some evidence in the literature that the risk premium exhibits persistence over time.[4] Following Wolff (1987), we specify the dynamics of the risk premiums as an autoregressive process:

$$rp_{t,m} = \sum_{i=1} \delta_i \, rp_{t-i,m} + \mu_{t,m} \tag{8}$$

$$\mu_{t,m} \sim N(0,U) \tag{9}$$

and η_{t+m} and $\mu_{t,m}$ are assumed to be independent for all t.

Equations (6) to (9) in the state-space form are estimated by the maximum likelihood method through the application of the Kalman filter.[5] Estimation results are presented in Section III.

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3 This specification is similar to Gordon (2003).

4 Canova and Ito (1991), Cheung (1993) and Engel (1996).

5 See Kalman (1960 and 1963) for the original contributions and Harvey (1987 and 1989) for its applications. The estimations are performed using Eviews.

III. ESTIMATION RESULTS

Hong Kong dollar/US dollar forward exchange rates with maturities of 1-month, 3-month, 6-month and 12-month, along with the spot exchange rate measured at the end of each month are used for the empirical analysis. All data start from January 1996, and depending on which forward exchange rates are used, the full sample state-space estimations end in August 2005 with the 1-month forward exchange rate and in September 2004 with the 12-month forward exchange rate. To conduct the out-of-sample analysis, the state-space models are re-estimated with one year of observations reserved for out-of-sample analysis.

The sample autocorrelation and partial autocorrelation functions of the *ex post* excess forward return series are reported in Table 1. These sample estimates suggest that it is reasonable to characterise the dynamics of the risk premiums in the state equation as an autoregressive process.[6]

Table 1. Autocorrelations (AC) and Partial Autocorrelations (PAC) of Excess Forward Return Series

		Excess forward return = $f_t^{t+m} - S_{t+m}$			
	Lag	**m** = 1-month	3-month	6-month	12-month
AC:	1	0.319	0.698	0.813	0.854
	2	0.303	0.571	0.718	0.774
	3	0.224	0.424	0.603	0.671
	4	0.111	0.297	0.476	0.569
	5	0.166	0.329	0.490	0.581
	6	0.071	0.294	0.439	0.534
PAC:	1	0.319	0.698	0.813	0.854
	2	0.224	0.162	0.165	0.165
	3	0.091	-0.046	-0.056	-0.084
	4	-0.035	-0.059	-0.122	-0.079
	5	0.089	0.234	0.332	0.370
	6	-0.023	0.018	-0.035	-0.069
Sample period from Jan 96 to		Aug 05	Jun 05	Mar 05	Sep 04

Notes: All series start from January 1996. Forward exchange rates and spot exchange rate are in natural logarithm.

6 The autocorrelation function decays slowly and the partial autocorrelation function exhibits a significant spike at the first lag, indicating the excess forward return series has a low order autoregressive representation. According to the specification in equation (6), this autoregressive representation also applies to the dynamics of the risk premiums.

Table 2 reports the state-space estimation results based on the model specification in equations (6) to (9). The order of the autoregressive process of the risk premiums in the state equation is chosen so that the serial correlation problem in the residuals is corrected.

Table 2. Estimation Results of State-Space Model

$$f_t^{t+m} - S_{t+m} = rp_{t,m} + \eta_{t+m} \,,$$
$$\eta_{t+m} = e_{t+m} + \theta_1 e_{t+m-1} + \theta_2 e_{t+m-2} \ldots + \theta_{m-1} e_{t+1} \,, \; e_{t+j} \sim N(0,V), \; j = 1,\ldots, m$$
$$rp_{t,m} = \sum_{i=1} \delta_i \, rp_{t-i,m} + \mu_{t,m} \,, \; \mu_{t,m} \sim N(0,U)$$

	Forward exchange rate for contracts delivered at			
m =	1-month	3-month	6-month	12-month
δ_1	0.85* (0.00)	0.88* (0.00)	0.93* (0.00)	0.96* (0.00)
V (x 10^{-6})	1.80* (0.00)	5.02* (0.03)	3.71 (0.81)	0.29 (0.95)
U (x 10^{-6})	0.32 (0.20)	2.61 (0.29)	4.87 (0.55)	12.30 (0.63)
Log-likelihood	584.19	503.54	446.15	372.06
Mean of *rp* (in percent)	0.02	0.07	0.21	0.66
Variance of *rp* (in percent)	0.01	0.09	0.24	0.99
Q(10)	7.07	15.53	10.49	2.43
Sample period from Jan 96 to	Aug 05	Jun 05	Mar 05	Sep 04
Observations	116	114	111	105

Notes: * indicates significant at the 5% confidence level. Figures in parentheses are p-values. All series start from January 1996. The estimated moving average parameters of the error terms are not reported. Forward exchange rates and spot exchange rate are in natural logarithm. Q(10) is the Ljung-Box Q-statistics based on the first ten serial correlation coefficients of the levels of standardised residuals. Q(10) is asymptotically distributed as a χ^2 with 10 degrees of freedom. The critical value of χ^2 (10) at the 5% confidence level is 18.31.

Estimation results in Table 2 show that, in general, all the estimated autoregressive parameters are statistically significant. This implies that the risk premiums in the foreign exchange rates have a certain degree of persistence. For all forward contracts, the estimated means of the risk premiums are positive. The estimated means and variances of risk premium increase with the maturity of the forward contracts. The Ljung-Box Q-statistics calculated from the standardised residuals are used to detect serial correlations at the levels. The insignificant Q-statistics indicate the dynamics of the data are adequately modelled without any serial correlations.[7]

Chart 1. Estimated Risk Premiums of Hong Kong Dollar Forwards Contracts delivered at Different Horizons (1996-2005)

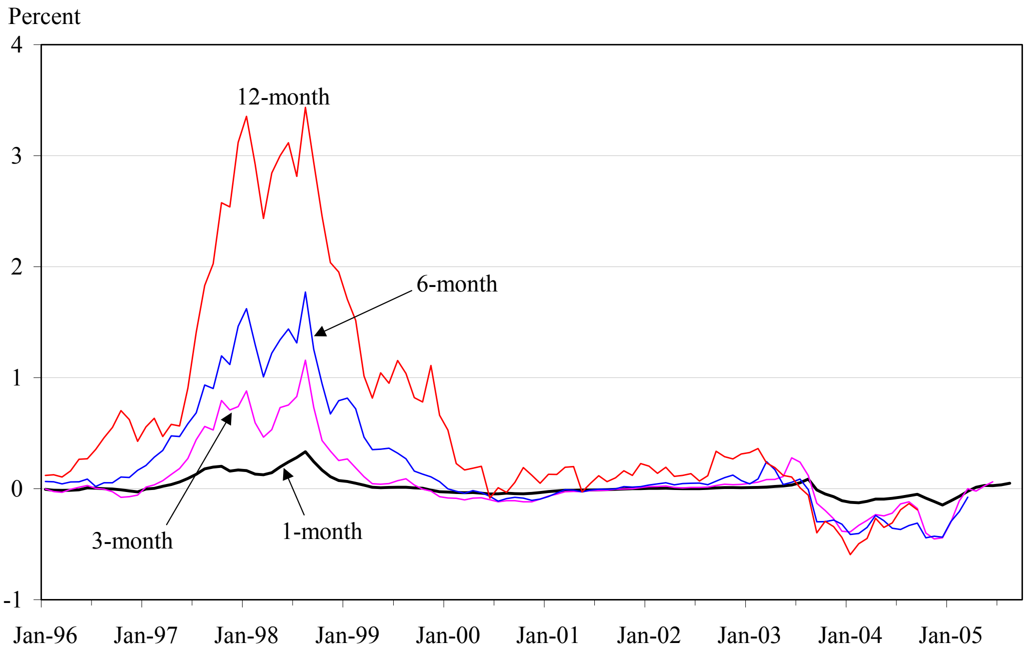

Chart 1 depicts the profiles of the estimated risk premiums of Hong Kong dollar forwards with different maturities. There are some interesting features. Firstly, the estimated risk premiums were flat at the beginning of 1996, rose sharply during the Asian financial crisis and then had been moving around and close to zero since 2000. Starting from late 2003, the estimated risk premiums have turned from positive to negative, implying that risk premiums are required for holding a short position of Hong Kong dollar in the forward market. Secondly, as expected, the risk

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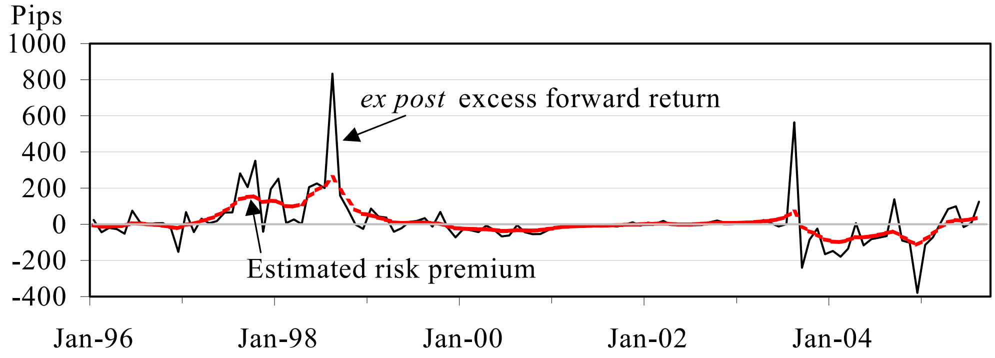
[7] It is noted that the Q-statistics from the squared standardised residuals for all delivery horizons are bigger than the critical value of 18.31, indicating that there are serial correlations in the second moment. Nevertheless, as we are more interested in the levels of the data than their second moment, and to make the state-space model as parsimonious as possible, the presence of serial correlations in the second moment should not affect the analyses that followed.

premiums for contracts with longer maturity (say 12-month) are higher than those of the shorter ones (say 1-month), implying that the forward contract with longer maturity requires more premiums to compensate for its risk. Thirdly, it is noted that the estimated exchange rate risk premiums for 1-month, 3-month and 6-month contracts have reverted from a discount in late 2004 to close to zero in mid-2005. This reflects that the appreciation pressure on the Hong Kong dollar along with the speculation on the revaluation of the renminbi in early 2005 has subsided after the introduction of the three refinements to the operation of the Linked Exchange Rate system in May 2005 and the reform of the renminbi exchange rate regime in July 2005.

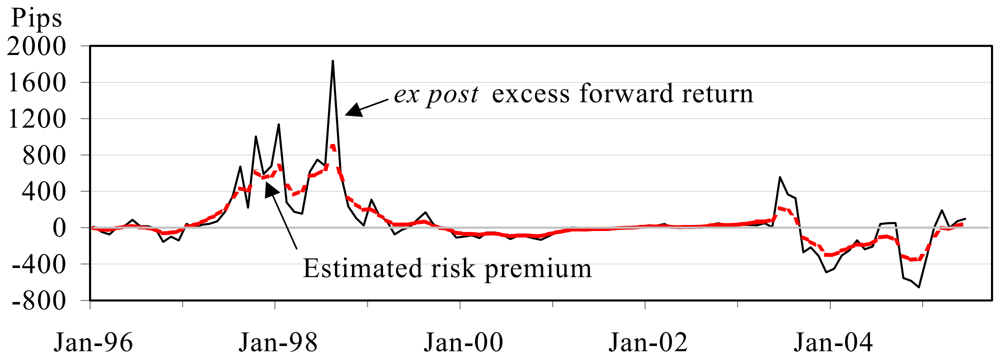
As seen from equation (6), the *ex post* excess forward return ($f_t^{t+m} - S_{t+m}$) consists of a risk premium component $rp_{t,m}$. Chart 2 presents these *ex post* excess forward returns with the estimated risk premiums of various Hong Kong dollar forwards contracts with different maturities. As shown in the chart, the estimated risk premiums move closely with *ex post* excess forward returns, indicating that exchange rate risk premiums account for a substantial portion of movements in the forward exchange rates.

Chart 2. *Ex Post* Excess Forward Returns and Estimated Risk Premiums

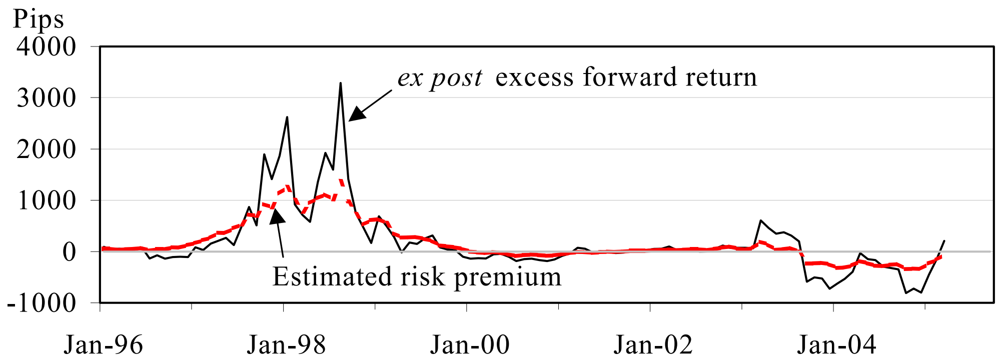
1-month *ex post* excess forward return and estimated risk premium



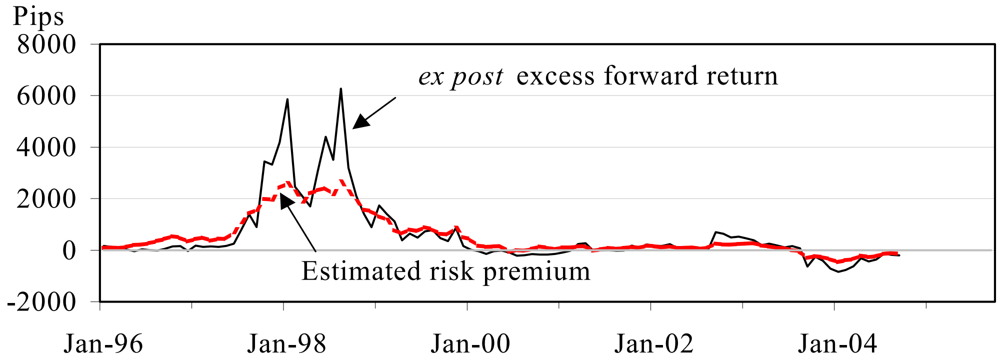
3-month *ex post* excess forward return and estimated risk premium



6-month *ex post* excess forward return and estimated risk premium



12-month *ex post* excess forward return and estimated risk premium



As discussed in Section II, the forward exchange rate can be viewed as the sum of two components: an expected future spot rate and a time-varying risk premium (see equation (4) above). Now, with the risk premiums estimated from the state-space model, one can assess whether the expected future spot rates derived from the forward exchange market are useful in forecasting.[8] Our assessment is made by re-estimating the state-space models with one year of observations reserved for out-of-sample analysis, and then comparing the out-of-sample forecast performance of the expected future spot rate with those obtained from a random-walk model.[9] The forecasting period is from October 2004 to September 2005. The mean squared prediction errors (MSE) and the mean absolute prediction errors (MAE) of the one-month ahead forecasts of spot rates obtained from the estimated state-space model and the random-walk model in the forecasting period are presented in Table 3 for comparison.

Table 3. Out-of-Sample Forecast Errors

One-month Ahead Forecast errors based on		1-month	3-month	6-month	12-month
MSE (in pips)	State-space estimates of risk premiums	1.85	5.60	7.30	20.63
	Random Walk	1.23	4.10	3.90	4.60
MAE (in pips)	State-space estimates of risk premiums	101.48	182.76	205.11	399.14
	Random Walk	75.46	190.25	151.67	188.58

Notes: Numbers reported in the tables are mean squared errors (MSE) and mean absolute errors (MAE) of one-month ahead *ex ante* forecasts. The forecasting period is from October 2004 to September 2005.

[8] The expected future spot exchange rate is obtained by subtracting the estimated risk premium from the forward exchange rate.

[9] The random-walk model is specified as $S_{t+1} = S_t + \varepsilon_t$

Table 3 shows that the out-of-sample forecasts of expected spot exchange rate derived from the state-space models have larger forecast errors than those obtained from the random-walk model. These results seem to support the views that structural exchange rate models or other forecasting techniques cannot improve exchange rate forecasts.[10]

IV. DETERMINANTS OF RISK PREMIUM

In this section, we examine the factors that may drive the variation of the risk premiums in the forward rates. As shown in Chart 1, for example, risk premiums were at their highest level during the Asian financial crisis in 1997-98 and had been moving close to zero after the crisis was over. To facilitate monitoring of the market expectations, it is therefore important to understand how these risk premiums are determined.

The study here focuses on two financial factors that are believed by market participants to have a close relationship with the depreciation (or appreciation) pressure on the Hong Kong dollar, namely the renminbi non-deliverable forward (NDF) rates and the Aggregate Balance of the banking system. Because of Hong Kong's close economic relationship with China, investors and speculators alike have been using Hong Kong dollar forwards as an instrument to speculate the possible revaluation of the renminbi (which is reflected in the renminbi NDF rates).[11] As speculation surrounding the appreciation of the renminbi escalates, it is expected that the discounts in the Hong Kong dollar forward exchange rates will increase. Regarding the second factor, under the Linked Exchange Rate system, the inflow of funds into Hong Kong will be reflected in the Aggregate Balance of the banking system. Thus, it is likely that the Hong Kong dollar forward exchange rates, and hence their implied risk premiums, are affected by the changes in the Aggregate Balance.[12]

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[10] Using a structural exchange rate model, Meese and Rogoff (1983) do not find the model outperform the random-walk model. Diebold and Nason (1990) also note that non-parametric prediction techniques cannot improve exchange rate forecasts.

[11] See HKMA (2005).

[12] Cheung (1993) uses monetary and macroeconomic variables such as money supplies and industrial production indexes to examine their relationship with the risk premiums of British pound, Deutsche mark and Japanese yen. Based on a theoretical model of exchange rate determination, Carlson and Osler (1999) show that the currency risk premiums should depend on two factors, namely interest differentials and the current deviation of the exchange rate from its long-run equilibrium.

To assess the effects of these two financial factors, the estimated risk premiums from the state-space model are regressed on the Aggregate Balance and the renminbi NDF rates of the matching delivery horizon based on the following equation:

$$\Delta rp_{t,m} = C + \alpha \Delta aggbal_t + \beta \Delta NDF_{t,m} + \varepsilon_{t+m} + \phi_1 \varepsilon_{t+m-1} + \phi_2 \varepsilon_{t+m-2} + \ldots + \phi_{m-1} \varepsilon_{t+1} \quad (10)$$

where Δ is the differencing operator, $rp_{t,m}$ is the state-space estimate of risk premium at time t for the forward contract with a delivery horizon of m periods, $aggbal_t$ is the natural logarithm of the Aggregate Balance at time t, and $NDF_{t,m}$ is the natural logarithm of the renminbi NDF rate at time t for the forward contract with a delivery horizon of m periods.

Table 4. Determinants of Risk Premiums

$$\Delta rp_{t,m} = C + \alpha \Delta aggbal_t + \beta \Delta NDF_{t,m} + \varepsilon_{t+m} + \phi_1 \varepsilon_{t+m-1} + \phi_2 \varepsilon_{t+m-2} + \ldots + \phi_{m-1} \varepsilon_{t+1}$$

	Estimated risk premiums with delivery horizon *m* of			
	1-month	3-month	6-month	12-month
C (x 10^{-3})	-0.01 (0.81)	-0.01 (0.95)	-0.01 (0.85)	-0.08 (0.67)
$\Delta aggbal_t$ (x 10^{-3})	-0.16* (0.00)	-0.23* (0.00)	-0.13* (0.03)	-0.53* (0.00)
$\Delta NDF_{t,1}$	-0.00 (0.78)	-	-	-
$\Delta NDF_{t,3}$	-	0.03* (0.00)	-	-
$\Delta NDF_{t,6}$	-	-	0.01* (0.00)	-
$\Delta NDF_{t,12}$	-	-	-	0.05* (0.00)
R-squared	0.21	0.47	0.62	0.53
Q(12)	10.64	5.79	13.84	5.47
Sample period From Jan 99	Aug 05	Jun 05	Mar 05	Sep 04
Observations	80	78	75	68

Notes: * indicates significant at the 5% confidence level. Figures in parentheses are p-values. All estimations start from January 1999. The estimated moving average parameters of the error terms are not reported. Q(12) is the Ljung-Box Q-statistics which is asymptotically distributed as a χ^2 with 12 degrees of freedom. The critical value of χ^2 (12) at the 5% confidence level is 21.03.

Table 4 gives the estimation results of equation (10). As shown in Table 4, the parameter estimate of the changes in the Aggregate Balance is negative, implying that the risk premium will fall when there is an increase in fund inflows. Except for the 6-month contract, the estimated coefficients of the $\Delta aggbal$ increase with the maturity of the contract. This suggests that the impacts of the fund inflows on the exchange rate risk premiums are larger for contracts with longer maturities.

For the changes in the renminbi NDF rates, the parameter estimate is positive, implying that the exchange rate risk premiums of Hong Kong dollar will rise with increases in the renminbi NDF rates. For example, if the 12-month renminbi NDF rate rises one percent from 7.84 per US dollar (the closing price as at 4 October 2005) to 7.92 per US dollar, other things being unchanged, the risk premium of 12-month Hong Kong dollar forward will increase by 0.05 percentage points to -0.20 percent of the spot exchange rate from -0.25 percent. Moreover, except for the 6-month contract, the impact of the increases in the renminbi NDF rates on the exchange rate risk premiums increases with contract period.

V. CONCLUSION

This paper uses a signal-extraction approach to identify and measure the unobserved risk premiums from the Hong Kong dollar forward exchange rates. The estimated risk premiums show a certain degree of persistence over time and are also the key factor contributing to the excess returns in the forward exchange rates. It is also found that the risk premiums were as high as 3.4% of the spot exchange rate for a 12-month horizon during the Asian financial crisis. From late 2004 to mid-2005, the premiums have reverted from a discount to close to zero, reflecting that the appreciation pressure on the Hong Kong dollar along with the speculation on the revaluation of the renminbi in early 2005 has subsided after the introduction of the three refinements to the operation of the Linked Exchange Rate system in May 2005 and the reform of the renminbi exchange rate regime in July 2005.

Based on these estimated risk premiums, we find that the expected future spot rate derived from the forward contract does not have a good forecasting capability as the out-of-sample forecasts of future spot exchange rates do not provide a consistently better performance than the simple random-walk model. These results confirm the views that structural exchange rate models or other forecasting techniques cannot improve exchange rate forecasts.

Finally, our empirical analysis shows that the changes in the exchange rate risk premiums are negatively influenced by the changes in the Aggregate Balance, while the changes in the renminbi NDF rates are positively associated with the changes in the exchange rate risk premiums. The results suggest that these two factors are important for monitoring the risk premiums of the Hong Kong dollar exchange rate.

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