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Long- and Short-Run Determinants of the Demand for Money in the Asian-Pacific Countries: An Empirical Panel Investigation

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This paper examines the long- and short-run determinants of the demand for money in six countries in the Asian-Pacific region using panel data (1975-2002). Various country-specific coefficients are allowed to capture inter-country heterogeneities. Consistent with theoretical postulates, it is found that (a) the demand for money in the long-run positively responds to real income and inversely to the interest rate spread, inflation, the real effective exchange rate, and the US real interest rate; (b) the long-run income elasticity is greater than unity; and (c) both the currency substitution and capital mobility hypotheses hold only in the long run.

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JEL *classification numbers:* E41, E52, and C33, O11.

1. INTRODUCTION

The importance of a well-specified demand for money to the implementation of monetary policy is of paramount importance in the existing literature. Goldfeld (1994) considers that the relation between the demand for money and its main determinants is an important building block in macroeconomic theories and is a crucial component in the conduct of monetary policy. As a result, the demand for money is one of the topical issues that has attracted the most attention in the literature both in developed and developing countries. In the context of developed countries it is argued that disequilibrium in the demand for money (defined as the difference between the real money stock and the long-term equilibrium real money stock) may affect the efficacy of interest rate policy in the long run via its impact on output gap and/or inflation. There are a number of studies that highlight the importance of the demand for money in developed countries because the "real money gap" (the resulting residuals from the money demand function) helps to forecast future changes in the output gap and/or inflation (see, *inter alia*, Laidler, 1999, Gerlach and Svensson, 2004, and Siklos and Barton, 2001).

A consensus among economists is emerging in support of the view that it is not a valid argument to focus exclusively on a single policy instrument and entirely neglect an important information variable because both the interest rate and monetary aggregates do matter in policy formation. Therefore, a well-specified money demand function is still important in this era of inflation targeting. It is essential to track both the interest rates and the money stock in order to assess precisely how monetary policy impacts upon the economy. Laidler (1999, p.26) in the context of the OECD countries, which pursue inflation-targeting policy, posits that monetary aggregates should not be used “as the only target of monetary policy, but rather as a supplementary intermediate target variable in a regime whose principal anchor is an inflation goal”.

This paper examines the impact of the interest rate spread on the demand for money in developing countries, an important issue which has not been investigated by previous studies. Existing studies considered only one interest rate in the money demand equation. But this single interest rate does not adequately represent the opportunity cost of holding money, particularly in an era of financial deregulation and innovation. This paper also provides further empirical evidence that the rate of inflation, the real effective real exchange rate and a foreign real interest rate exert a negative impact on the demand for money.

The rest of this paper is structured as follows. Section 2 provides a brief review of the relevant literature. Section 3 postulates a theoretical model that captures a conventional model of the demand for money using an unbalanced panel for six developing countries from 1975 (if available) to 2002 with 146 observations. These countries are China, Fiji, Japan, Malaysia, the Philippines and Singapore. The empirical econometric results for the long- and short-run demand for money functions, as well as policy implications of the study are set out in Section 4. Section 5 presents some concluding remarks.

2. A BRIEF REVIEW OF LITERATURE

A considerable body of literature has investigated the demand for money in developing countries (Wong, 1977, Arize 1989, Gupta and Moazzami, 1989, Arrau, 1991, Bahmani-Oskooee and Malixi, 1991, Simmons, 1992, and Sriram, 2000). For example, Arize (1989) estimates the demand for money in four Asian economies: Pakistan, the Philippines, South Korea, and Thailand. He argues that foreign interest rates, exchange rate depreciation and technological change are important determinants of the Asian money demand functions. Bahmani-Oskooee and Malixi (1991) estimate the demand for money function in 13 developing countries as a function of inflation, real income and the real effective exchange rate. They conclude that, *ceteris paribus*, a depreciation in real effective exchange rate results in a fall in the demand for domestic currency. This hypothesis is also confirmed in the present study. However, they did not include the interest rate spread to capture the general process of financial asset substitution.

Agenor and Khan (1996) estimate a dynamic currency substitution model incorporating forward-looking rational expectations for a group of ten developing countries. They also allude to the view that the foreign rate of interest and the expected rate of depreciation of the parallel market exchange rate play a crucial role in the choice between holding domestic money or switching to foreign currency deposit held abroad. Simmons (1992) employs an error-correction model to estimate the demand for money in five African economies. This study emphasises the role of opportunity cost variables including the domestic interest rate and expected exchange-rate depreciation. His empirical results indicate that the domestic interest rate is an important determinant of the demand for money functions for three of the five countries, whereas external opportunity cost variables are significant for only one of the others. He also finds that in four out of five cases inflation plays an extremely important role in determining the demand for money. The review of literature on the demand for money also reveals a growing consensus among economists that M2 should be considered as an appropriate indicator of monetary aggregate. For a concise review of the recent empirical money demand studies in the context of developing countries see Sriram (2000).

The demand for money in the literature (*e.g.* Ericsson, 1998, Beyer, 1998, Coenen and Vega 2001, and Felmingham and Zhang, 2001) is conventionally specified as a function of real income, a long-run interest rate on substitutable non-money financial assets, a short-run rate of interest on money itself and the inflation rate. Mundell (1963, p.484) conjectured that in addition to the interest rates and the level of real income, the demand for money should be augmented by the exchange rate. Ewing and Payne (1999) have investigated the role of the exchange rate on the demand for narrow money in several developed countries. They utilise a standard cointegration technique to examine the relevance of the inclusion of the effective exchange rate in the money demand function. They suggest that "income and interest rate are sufficient for the formulation of a long-run stable demand for money in Australia, Austria, Finland, Italy, U.K., and U.S. However, for Canada, Germany and Switzerland, the effective exchange rate should be incorporated" (Ewing and Payne, 1999, p.84).

A number of studies have considered the general process of financial asset substitution and justified the use of an exchange rate and a foreign interest rate in the analysis of the demand for money. These include, *inter alia*, Bahmani-Oskooee and Rhee (1994), Traa (1991) and Chowdhury (1995). All these studies are clearly in favour of both the currency substitution and capital mobility hypotheses. Therefore, it is very important to include the real effective exchange rate and a measure of the foreign real interest rate in the money demand function. In fact, due to the lack of consistent and reliable data on the real effective exchange rate, this study has included only six countries for which the data were available in the 2004 World Development Indicators.

3. THEORETICAL FRAMEWORK

Against the background of the preceding discussion, the present paper postulates the demand for real balances as a function of real income, the interest rate spread [the difference between the deposit and lending rates], the inflation rate, the real effective exchange rate and the US real interest rate as follows:

$$\begin{aligned} Ln(M2_i / P_i)_t = \sum_{i=1}^{n=6} \gamma_{0i} + \gamma_1 Ln(Y_i)_t + \gamma_2 (RD_i - RL_i)_t + \gamma_3 \Delta Ln(P_i)_t + \gamma_4 Ln(REER_i)_t + \\ \gamma_5 Ln(R_{US})_t + \varepsilon_{it} \end{aligned} \quad (1)$$

where i denotes a specific country varying from 1 to 6, t is time starting from 1975 to 2002, $M2$ is the stock of nominal money, P is the GDP price deflator, Y is the real GDP as a proxy to capture transactions and precautionary demand for money, RD is the deposit interest rate (*i.e.* the interest rate on money itself), *RL* is the lending interest rate (*i.e.* a proxy for the rate of return on assets outside of money) and *REER* and R_{US} denote the real effective exchange rate and the US real interest rate which can be used to test the currency substitution and capital mobility hypotheses, respectively.

The expected sign and magnitude of the coefficient for *Y* is as follows: if γ_1=1, the quantity theory applies; if γ_1=0.5, the Baumol-Tobin inventory-theoretic approach is applicable; and if γ_1>1, money can be considered a luxury or it might also be interpreted as an indication of neglected wealth effects. According to Ball (2001), an income elasticity of less than unity has a number of implications for monetary policy. For instance, one may conclude that the Friedman rule is not optimal in this case and the supply of money should grow more sluggishly than output to achieve the goal of price stability (Ball, 2001, p.36). For a detailed discussion of controversy about the quantity theory see Laidler (1991). See also, *inter alia*, Laidler (1993) and Hoffman and Rasche (2001) for a comprehensive account of the literature on money demand.

It is also expected that the coefficient signs for all other four variable to be negative (*i.e.* γ_2, γ_3, γ_4 and γ_5<0). The rate of inflation, or $\Delta LnP_t=ln(P_t)-ln(P_{t-1})$, is considered as a proxy to measure the return on holdings of goods, and its coefficient should be negative, *i.e.* γ_3<0, as goods (*e.g* real estate and shares etc.) are an alternative to holding domestic currency. According to Ericsson (1998, p.309), the exclusion or inclusion of inflation in this equation is a matter of empirical investigation. Following Agenor and Khan (1996), Bahmani-Oskooee and Rhee (1994) and Arize, Malindretos and Shwiff (1999), the standard demand for money function is further augmented by the real effective exchange rate, *Ln(REER)*, and the US real interest rate $Ln(R_{US})$. The expected signs for both variables are negative (or γ_4 & γ_4<0), *ceteris paribus*, supporting the currency substitution and capital mobility hypotheses. This basically means that the currency depreciation and a rise in the U.S real interest rate can lead to a higher propensity to substitute away from domestic currency.

In order to capture inter-country heterogeneities one can use the fixed effects model, which allows γ_0 to vary across countries by estimating different intercept terms (*i.e.* γ_{01}, γ_{02}, γ_{03},…, γ_{06}). This method is also referred to as the "least squares with dummy variables" or LSDV (See equation 1). In this method the "within" mean is subtracted from each variable and then estimate OLS using the transformed data. However, one can argue that the considerable heterogeneities among these countries may not be adequately captured by a simple "intercept varying model". Given the importance of the income elasticity in the demand for money, the long-run model allows both γ_0 and γ_1 differ in the estimation process. Equation (1) is thus recast as follows:

$$Ln(M2_i / P_i)_t = \sum_{i=1}^{n=6} \gamma_{0i} + \sum_{i=1}^{n=6} \gamma_{1i} Ln(Y_i)_t + \gamma_2 (RD_i - RL_i)_t + \gamma_3 \Delta Ln(P_i)_t + \gamma_4 Ln(REER_i)_t + \gamma_5 Ln(R_{US})_t + \varepsilon_{it} \tag{2}$$

Allowing γ_{0i} and γ_{1i} to take specific values for each country entails a loss of the degree of freedom. Estimating county-specific coefficients involves a trade-off between the degrees of freedom lost and the resulting gain obtained in terms of country specificity and the enhanced goodness-of fit statistics. However, it is necessary to formally test the following two hypotheses before accepting the estimated equation (2) in lieu of equation (1): (a) the common intercept term hypothesis or $H_0^1 : \gamma_{0i} = \gamma_0$, and (b) the common income elasticity hypothesis or $H_0^2 : \gamma_{1i} = \gamma_1$, where i=1,2,…,6. If these two hypotheses are rejected, the use of equation (2) will be justified (the gains in identifying country-specificity outweighing the losses).

4. EMPIRICAL RESULTS AND POLICY IMPLICATIONS

Annual time series data for the period 1975-2002 are used to form an unbalanced panel data with 146 observations. For consistency, the data have been obtained from one single source of the World Development Indicator CD-ROM (World Bank, 2004). The choice of the countries in this paper was contingent upon the availability of consistent time series data on all the variables included in the model, particularly the interest rate spread and the real effective exchange rate which are the most limiting variables. While the number of countries in the sample is only six, they differ considerably among themselves in terms of per capita income, human development, degree of industrialisation and other indicators of socio-economic development. Allowing for country-specific coefficients in equation (2), to some extent, helps capture the cross-country diversity.

It should be noted that according to de Brouwer, Ng and Subbaraman (1993, p.10), a broader measure of money is more appropriate for modelling purposes because it: a) is less distorted by financial deregulation and innovations; and b) has a more reliable relationship with income. M2 is the broadest monetary aggregate for which data are available for all the six countries for the period under consideration. It should be noted that the choice of interest rates depends on the measure of money being modelled. Ericsson (1998) suggests that long-run rates should not be included in the demand equation for M1. However, if a broader definition of money (such as M2) is modelled, it is essential to incorporate longer-term interest rates in the demand for money function so as to capture financial asset substitutions.

Before undertaking any regression analysis we have examined the time series properties of the data using the Im, Pesaran and Shin (IPS, 2003) test. In the IPS test a separate ADF regression is specified for each country as follows:

$$\Delta Ln(Y_i)_t = C + \alpha Ln(Y_i)_{t-1} + \sum_{j=1}^{q1} \beta i_j \Delta Ln(Y_i)_{t-j} + \delta T_t + e_{it} \qquad (3)$$

Where $Ln(Y_i)_t$ is the variable under investigation in country i and time t, T_t is a trend variable and N denote the total number of observations in the panel. The null hypothesis is expressed as $H_o : \alpha_i = \rho - 1 \Rightarrow \alpha_i = 0$ where i=1,2,…,6 and the alternative hypothesis is written below:

$$H_1 : \begin{cases} \alpha_i = 0 \; for \; i = 1, 2, ..., N_1 \\ \alpha_i < 0 \; i = N + 1 + N + 2, ..., N \end{cases}$$

The IPS involves the following two steps: first, the separate ADF regressions are estimated for each country, and second, the average of the t-statistics for α_i from the estimated individual ADF regressions, *i.e.* $t_{iT_i}(q_i)$, is obtained in the following manner: $\bar{t}_{NT} = \left(\sum_{i=1}^{N} t_{iT_i}(q_i) \right) / N$

The Schwarz Information Criterion (SIC) has been used to determine the optimal lag length (q_i) based on the Newey-West method for bandwidth selection using Bartlett kernel. The IPS test results have been presented in Table 1, suggesting that all the dependent and independent variables appearing in equation (2) are I(1), with the only exception being the rate of inflation or $Ln(P_i)_t$ which is I(0). Then equations (1) and (2) have been estimated by pooling annual data from 1975 to 2002 for China, Japan, Malaysia, the Philippines, Singapore and Fiji. The econometric results are presented in Table 2. Before proceeding any further one needs to test the two null hypotheses discussed in Section 3 (*i.e.* H_0^1 and H_0^2). These results are also presented in Table 2. Both hypotheses are rejected at 1 per cent level, justifying the use of country-specific coefficients for the intercept and the income elasticity. In other words, these results as well as the Akaike information criterion and the SIC indicate that equation

(2) should be preferred to equation (1). It should also be noted that the residuals are stationary and well behaved (in term of the Jarque-Bera normality test) only in equation (2) when both the intercept and income elasticity are country-specific.

[Tables 1 and 2 about here]

The estimated coefficients of equations (1) and (2) presented in Table 2 are consistent with *a priori* expectations regarding sign and order of magnitude and are statistically highly significant. Both equations also perform very well in terms of goodness-of-fit ($\bar{R}^2 = 0.999$) but only equation (2) generate white noise residuals. According to the results set out in Table 2 and consistent with theoretical postulates discussed in Section 3, the demand for broad money is positively related to real income and negatively to the interest rate spread, the inflation rate, the real effective exchange rate and the US real interest rate. It should be noted that the estimated long-run country-specific income elasticities in Table 2 are well above unity for all countries, varying from 1.16 in Fiji to 2.76 in the Philippines.

Based on the results presented in Table 2 one can argue that the inflation rate (as the opportunity cost of the monetary asset relative to real assets or other excluded financial assets *e.g.* such as gold and foreign currencies) has a negative significant coefficient ($\gamma_3 = -0.454$), suggesting that the demand for money has also implications for portfolio decisions in these countries. Compared with the interest rate spread, the real effective exchange rate and the US real interest rate, the inflation rate has a relatively higher long-run effect on real money balances, whereby an increase in the rate of inflation immediately encourages agents to diversify their portfolios by acquiring real assets amongst other things.

Given that the estimated coefficients of $\gamma_2 = -0.03$ and $\gamma_4 = -0.124$ and $\gamma_5 = -0.009$, the demand for real money balances is negatively related to the interest rate spread, the real effective exchange rate and the US real interest rate. Therefore, *ceteris paribus*, a rise in the domestic interest rate spread, the US real interest rate and a currency depreciation can indeed lead to a significant decrease in the demand for real money balances. Under these circumstances individuals may either diversify their portfolios in the economy by substituting other currencies (say \$US, Euros etc) for domestic currency in their financial portfolio or can acquire other financial and/or real assets (say shares, gold and real estate property).

Attention is now directed to the formulation of a short-term dynamic model for the growth rate of real money balances using an error correction model. Using the resulting residuals (the *ECM* term= ε_{it}) from the long-run relationship in equation (2), according to the Engle-Granger two-step procedure, one can estimate a panel VEC model which captures the short-run dynamics of the demand for money. That is:

$$\begin{aligned}\Delta Ln(M2_i/P_i)_t = \sum_{i=1}^{n=6} \lambda_{0i} + \lambda_1 \Delta Ln(Y_i)_t + \lambda_2 \Delta(RD_i - RL_i)_t + \lambda_3 \Delta Ln(P_i)_t + \\ \lambda_4 \Delta Ln(REER_i)_t + \lambda_5 \Delta Ln(R_{US})_t + \lambda_6 \Delta Ln(M2_i/P_i)_{t-1} + \theta ECM_{it-1} + v_t\end{aligned} \quad (4)$$

where λ_i are the estimated short-term coefficients; θ is the feedback effect or the speed of adjustment, whereby short-term dynamics converge to the long-term equilibrium path; and the lagged dependent variables are added to ensure that v_t (or the resulting residuals) is white noise.

The general-to-specific methodology is now used to omit the insignificant variables in equation (4) on the basis of a battery of maximum likelihood tests. Using I(0) variables in the estimating procedure, joint zero restrictions are imposed on explanatory variables in the general model or equation (4) to obtain the most parsimonious and robust estimators. The empirical results for the parsimonious model capturing short-run dynamics for money demand are presented in Table 3.

The estimated coefficients have been sensibly signed, with the change in the rate of return on non-financial assets (as proxied by the inflation rate) and the interest rate spread having negative coefficients of -0.58 and -0.011, respectively. As expected, changes in real income exert a positive impact (+0.79) on money demand. Furthermore, the feedback coefficient for the *ECM* term is highly significant, validating the significance of the cointegration relationship in the short-run model for money demand. The magnitude of the estimated coefficient for *ECM* indicates that the lagged excess money will reduce holdings of money by 26 per cent in each year. The real effective exchange rate and the US real interest rates were not statistically significant and consequently they have not been included in the short-run dynamic model.

[Table 3 about here]

The major findings of this paper, which can augment our understanding of money demand in Asia-Pacific countries, are summarized below. First, it is plausible to argue that, *ceteris paribus*, the long-run income elasticity is greater than unity and the short-run income elasticity is around 0.79. The null hypothesis that the short-run income elasticity equals unity (i.e. λ_1=1) is also rejected as F(1, 129)=3.42 with p-value=0.06. Second, inflation has an immediate and relatively larger effect on the demand for money both in the long- and short-run. After real income, the estimated coefficient on inflation has the largest magnitude. Rising inflation, *ceteris paribus*, instantly encourages agents to diversify their portfolios in the economy by acquiring real assets. Third, it appears that a change in the interest rate spread can affect the money demand equation in the long- and short run. See Tables 2 and 3. Fourth, although both the real effective exchange rate and the US real interest rate determine the long-run demand for money, they are found to be insignificant in the short run.

Therefore, the currency substitution and capital mobility hypotheses can hold only in the long run.

5. CONCLUSION

The existence of a well-specified demand for money is important for the conduct of monetary policy, whether the central banks' major policy variable is the stock of money or the official interest rate or inflation. This paper examines the long- and short-run determinants of the demand for real money balances in the following six Asian-Pacific countries for which consistent annual time series data were available, namely China, Japan, Malaysia, the Philippines, Singapore and Fiji. Pooling the time series data for the period 1975-2002 and cross-sectional data for these six countries, various fixed-effect regressions are used to model the long- and short-run demand for real money balances.

The Im, Pesaran and Shin (2003) test for unit roots support the view that all the variables appearing on a standard money demand function are I(1), except for the rate of inflation which is I(0). The Engle-Granger two-step procedure has then been employed to test for cointegration. The results of cointegration test clearly indicate that in the long-run there is a cointegrating vector, which links the real demand for M2 with real income, the interest rate spread, the inflation rate, the real effective exchange rate, and the US real interest rate. Unlike previous studies, this paper considers all possible factors which could impact on the money demand function. Consistent with theoretical postulates, this paper finds that the demand for money in the long run positively responds to an increase in real income and negatively to a rise in the interest rate spread, the rate of inflation, the real effective exchange rate and the US real interest rate. This means that real M2 is a predictable monetary aggregate. The estimated long-run income elasticity for all six countries exceeds unity.

Furthermore, this paper presents a dynamic error correction model capturing the short-run dynamics of money demand. The estimated coefficients for income, inflation and the interest rate spread in this model are highly significant and have consistent signs. In other words, the estimated error correction model indicates that in the short run only changes in income, the interest rate spread and the rate of inflation are statistically significant in explaining changes in the demand for money. Given the fact that the real effective exchange rate and the US real interest rate were statistically insignificant in the short-run dynamic model, one can conclude that the currency substitution and capital mobility hypotheses hold only in the long run.

TABLE 1.
The IPS Unit Root Test Results

Variables	Intercept only	q (optimal lag length)	Both intercept and trend	q (optimal lag length)
$Ln(M2_i / P_i)_t$	0.512 [0.696]	1	-0.345 [0.365]	4
$\Delta Ln(M2_i / P_i)_t$	-11.183 [0.000]	0	-9.779 [0.000]	3
$Ln(Y_i)_t$	-0.882 [0.189]	4	0.723 [0.765]	4
$\Delta Ln(Y_i)_t$	-10.180 [0.000]	0	-9.266 [0.000]	3
$(RD_i - RL_i)_t$	-1.120 [0.131]	2	-0.827 [0.204]	2
$\Delta(RD_i - RL_i)_t$	-11.479 [0.000]	1	-8.908 [0.000]	1
$\Delta Ln(P_i)_t$	-6.098 [0.000]	1	-5.102 [0.000]	1
$Ln(REER_i)_t$	-0.727 [0.234]	1	0.498 [0.691]	1
$\Delta Ln(REER_i)_t$	-5.761 [0.000]	0	-4.451 [0.000]	3
$Ln(R_{US})_t$	-0.451 [0.326]	0	0.761 [0.777]	0
$\Delta Ln(R_{US})_t$	-3.761 [0.000]	0	-2.564 [0.005]	0

Notes: (a) The SIC and the Newey-West bandwidth selection method based the Bartlett kernel are used in the test procedure. (b) The figures in the square brackets represent the corresponding p-values.

TABLE 2.

The Long-Run Determinants of the Demand for Real Balances $Ln(M2_i / P_i)_t$

Independent variables	Fixed Effects Model With Country-Specific Intercept			Fixed Effects Model With Country-Specific Intercept and Income Elasticity		
	Coefficient	*t*-ratio	P-value	Coefficient	*t*-ratio	P-value
Country-specific intercept:						
China	-12.028	-13.99	0.00	-16.558	-13.83	0.00
Japan	-15.160	-15.99	0.00	-20.329	-14.32	0.00
Malaysia	-11.117	-14.32	0.00	-10.564	-8.72	0.00
Philippines	-12.094	-14.80	0.00	-47.726	-10.65	0.00
Singapore	-11.137	-14.77	0.00	-7.527	-8.52	0.00
Fiji	-9.782	-14.56	0.00	-3.590	-0.87	0.39
$Ln(Y_i)_t$	1.484	61.79	0.00	-	-	-
Country-specific income elasticity: $Ln(Y_i)_t$						
China	-	-	-	1.620	45.72	0.00
Japan	-	-	-	1.620	36.60	0.00
Malaysia	-	-	-	1.437	34.68	0.00
Philippines	-	-	-	2.763	16.93	0.00
Singapore	-	-	-	1.315	38.94	0.00
Fiji	-	-	-	1.161	6.09	0.00
$(RD_i - RL_i)_t$	-0.018	-2.25	0.03	-0.029	-3.80	0.00
$\Delta Ln(P_i)_t$	-0.951	-5.01	0.00	-0.454	-2.24	0.03
$Ln(REER_i)_t$	-0.255	-6.49	0.00	-0.124	-2.93	0.00
$Ln(R_{US})_t$	-0.008	-2.38	0.02	-0.009	-2.66	0.01
R^2	0.999			0.999		
$\bar{R}^2$	0.999			0.999		
Akaike information criterion	-1.073			-1.918		
Schwarz information criterion	-0.848			-1.591		
F-statistic	12953		0.00	20757		0.00
Unit root test for the residual term Using the IPS test	1.056		0.86	-2.608		0.01
Jarque-Bera normality test	4.553		0.10	2.310		0.32
$H_0^1 : \gamma_{i0} = \gamma_0$ F(5, 135) $\chi^2(5)$	2013 10066		0.00 0.00			
$H_0^2 : \gamma_{i1} = \gamma_1$ F(5, 130) $\chi^2(5)$				120 600		0.00 0.00

Note: The White cross-section standard errors & covariance are used in the estimation of the *t*-ratios.

TABLE 3.

The Short-Run Determinants of the Demand for Real Balances $\Delta Ln(M2_i / P_i)_t$

Independent variables	Fixed Effects Model With Country-Specific Intercept		
	Coefficient	*t*-ratio	P-value
Country-specific intercept:			
China	0.087	5.53	0.00
Japan	0.024	3.39	0.00
Malaysia	0.044	3.39	0.00
Philippines	0.096	5.85	0.00
Singapore	0.033	1.83	0.07
Fiji	0.034	2.33	0.02
$Ln(Y_i)_t$	0.792	7.02	0.00
$\Delta(RD_i - RL_i)_t$	-0.011	-3.56	0.00
$\Delta Ln(P_i)_t$	-0.581	-4.07	0.00
$(ECM_i)_{t-1}$	-0.262	-2.84	0.01
$\Delta Ln(M2_i / P_i)_{t-1}$	0.193	2.27	0.02
R^2	0.562		
$\bar{R}^2$	0.528		
Akaike information criterion	-2.861		
Schwarz information criterion	-2.630		
F-statistic	16.572		0.00
Unit root test for the residual term $(ECM_i)_t$ using the IPS test	-6.48		0.00
Jarque-Bera normality test	2.17		0.34
Common intercept hypothesis: $H_0^1 : \gamma_{i0} = \gamma_0$ F(5, 129) $\chi^2(5)$	8.46 2.31		0.00 0.00

Note: The White cross-section standard errors & covariance are used in the estimation of the *t*-ratios.

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