Demand for money in Fiji: an econometric analysis

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Management of monetary policy is one of the many challenges facing Fiji's policymakers. To understand the main factors affecting the demand for money in Fiji, short-run and long-run demand for money functions are estimated. As well, the pre and post-reform periods are analysed to see if the reforms affected the stability of the money demand function. The tests do not provide strong evidence that the reforms affected the stability of the money demand function.

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The objectives of this study are two-fold. First, we seek to estimate a long-run demand function for money in Fiji to facilitate policy decisions for promoting economic growth in the long run, along with a short-run demand function. The second objective is to test the stability of the demand for money function, which is required to assure policymakers that there is potential for achieving price stability by controlling the growth rate of money supply.

This paper reports on an econometric investigation of a quarterly money demand model for Fiji. The variables considered for the model are real income, real interest rate, real effective exchange rate and the expected rate of inflation, which are the likely determinants of money demand in Fiji. Both versions of the Chow test, and the CUSUMSQ test for parameter stability are used to test the stability of demand for M2 money between the 1975–87 pre-reform period and the 1988–96 post-reform period. The tests do not provide strong evidence that the reforms have affected the stability of the money demand function.

Institutional structure

Of all the South Pacific island countries, Fiji has the most sophisticated financial sector. The institutional framework covers a network of institutions, including the Reserve Bank of Fiji, five commercial banks, three life insurance and four general insurance companies, a fully government-owned development bank, the Fiji National Provident Fund and the Unit Trust of Fiji (Skully 1997, Jayaraman 1996). The sector was further strengthened in 1996 by the enactment of a Fiji Capital Market Authority Act.

Monetary policy objectives

The objectives of Fiji's monetary policy are maintenance of internal stability in terms of a stable price level and external financial stability in terms of adequate foreign exchange reserves, while playing a supporting role to fiscal policy in regard to demand management (Siwatibau 1993). In the context of promoting private sector development through development of money and capital markets, monetary policy is geared to maintaining a stable financial environment and, as part of this, demand management continues to be important.

Financial sector reforms

Financial sector reforms began in 1987, soon after the two military coups, as part of economy-wide reforms to liberalise the economy. The economy-wide reforms also included deregulation of markets and privatisation as well as corporatisation of public enterprises. The financial reforms were initiated by dismantling interest rate controls in 1987 and thereafter in 1988 by removing credit controls. Consequently, the banks' lending rates and deposit rates reflected market rates by rising to contain credit and discourage withdrawal of deposits.

Reliance on indirect controls

Direct controls until December 1998 included both statutory reserve deposits (SRD) and unimpaired liquid asset ratio (ULAR). Under SRD, the commercial banks are required to keep a statutory minimum deposit with the Reserve Bank of Fiji; and under ULAR, discontinued since January 1999, they were required to keep a certain proportion of deposits and other similar liabilities in terms of eligible paper plus government and government-guaranteed securities with a maturity of less than 10 years, plus promissory notes of public enterprises.

Since 1997, the SRD ratio has continued at 5 per cent after being reduced from 6 per cent. A further reform is the remuneration of SRD deposits at around 2 per cent from January 1998. This rate is currently the market rate of short-term papers, including Reserve Bank Notes, which were introduced in 1988 for mopping up excess liquidity. These notes, together with the increased use of treasury bills and promissory notes and market pricing of bonds, also opened up possibilities of greater use of indirect credit control measures, compared to the past reliance on direct control measures (Reserve Bank of Fiji 1997).

The Reserve Bank of Fiji indicator interest rate, which is the 91-day Reserve Bank Note rate, has emerged as an important influence on short-term market interest rates. The Bank does not directly control interest rates but only indirectly influences conditions in the money market. It is expected that with the development of a secondary market and greater competitive conditions, the transmission mechanism in regard to monetary policy changes would be facilitated considerably (Reserve Bank of Fiji 1998).

Exchange rate management

Periodical adjustment of the fixed exchange rate is now regarded as important for maintaining the competitiveness of Fiji's exports—previously it was primarily used for insulating the economy from external inflation. Greater flexibility in the exchange rate, leading to the concept of a managed float, has been recognised as an important tool for bringing the nominal exchange rate into alignment with the real exchange rate (Jayaraman 1997, 1999). Severe exchange controls were imposed to stem capital outflows soon after the military coups in 1987. Although these have been gradually relaxed over the last ten years with a view to attracting foreign investment, the capital account has not yet been totally liberalised.

Increased competition

Increased competition and encouragement of entry of financial institutions, including foreign commercial banks, steadily contributed to the maintenance of a liberal atmosphere. Attempts to develop a capital market with the enactment of an enabling legislation in late 1996 are primarily designed to encourage the emergence of various financial instruments. These are expected to encourage greater substitutability of deposits and securities which were previously confined only to those issued by the public sector. Fiji also witnessed the introduction of credit cards and use of automatic teller machines as well as greater use of electronic communications for domestic and international transactions. These reforms and innovations are expected to have had a substantial impact on the efficacy of monetary policy, since the channels of transmission of monetary policy measures are influenced by the depth of financial markets, the flexibility of interest and exchange rates and the degree of external capital mobility (Tseng and Corker 1991, Dekle and Pradhan 1997).

Importance of regulatory measures

As noted by Garcia-Herrero (1997), Gavin and Hausmann (1996) and Goldstein and Turner (1996), financial sector reforms without adequate preparation in terms of better accounting procedures, improved supervision, and the necessary legal framework and disclosure requirements have led to financial and banking crises in Brazil, Chile, Mexico and several Nordic countries. These studies have shown that relaxation of controls on interest rates and discontinuance of credit ceilings and entry of new banks (foreign and domestic) encouraged lending booms and increased pressure on banks to engage in riskier activities.

Fortunately for Fiji, the financial liberalisation measures did not seriously test the vulnerability of the institutional and regulatory environment. The near failure of the government-owned National Bank of Fiji in 1995 was more due to poor management, including insider loans as well as bad debts and inefficient loan supervision. However, timely injection of capital and rehabilitation measures, including revamping of top management by the government, restored the confidence of depositors. It was an aberration, and not due to any financial sector-wide mismanagement—other banks, all foreign-owned, did well during this period.

The much-expected lending booms which preceded the financial and banking crises in the mid 1980s did not take place in Fiji. On the other hand, the poor investment climate and weak investor confidence resulting from the coups in 1987, continued throughout the later 1980s and the 1990s until now, leading to excess liquidity in the system. However, during this period, the authorities improved the regulatory system and supervision over the banks and other financial sector institutions. They also took advantage of the international assistance offered by the Pacific Financial Technical Assistance Center in Suva.

The model

The modeling methodology used here takes into consideration past studies on Fiji's monetary sector. These include the United Nations Economic and Social Commission for Asia and Pacific macroeconomic model for Fiji (UNESCAP 1982), the International Monetary Fund study of Fiji's financial system (IMF 1982), Luckett (1987) and Narube (1987).

Model specification

Earlier studies modeling the demand function of money have been based on cash-in-advance or money-in-utility approaches in which either permanent income, disposable income or consumption as a proxy for income is used as an independent variable along with others. However, as there is insufficient data for Fiji, this study relies on simpler models along the lines of empirical studies conducted in developing economies with similar data deficiencies.

In accordance with these studies (Deadman 1995, Dickey et al. 1994, Ghatak 1995, Goldfield and Sichel 1990, Hendry and Ericsson 1991, and various IMF studies on Asia and Africa, notably Tseng and Corker 1991, Dekle and Pradhan 1997), the demand for money is hypothesised to be a function of a scale variable (measured or permanent income) and other variables such as interest rate. It is also assumed that economic agents do not suffer from any money illusion and the demand for money function is homogenous of degree one with respect to income.

Appropriate variables representing money as the dependent variable and income and other dependent variables have been sought. In the context of financial reforms including deregulation of interest rates and emergence of financial assets, as well as increased substitutability between different forms of assets (which have features of both investment and liquidity), the distinction between M1 and M2 becomes blurred. Consequently, there is the possibility of greater volatility in a narrow aggregate. For these a broader definition of money, M2, is more appropriate (Tseng and Corker 1991). In keeping with the theory of demand, in which the dependent variable is expressed in real terms, the real interest rate (a representative nominal interest minus annual inflation) would be one of the candidate variables. In general, it is postulated that changes in the real interest rate would inversely affect the demand for money and a rise in the real interest rate would induce a shift from non-interest earning cash and money assets to interest earning and financial assets.

In the estimation of demand for narrow money (M1), there might be a clear inverse relationship discernible between the interest rate and M1. However, in the case of demand functions fitted for broad money (M2), if the quasi-money component (saving and time deposits) is a large proportion of M2, the observed relationship between the interest rate and M2 would be positive, as the offsetting direct influence of the interest rate on the demand for quasi-money would be much greater than its negative impact on narrow money. In Fiji quasi-money represents nearly 70 per cent of M2, and there are limited alternative financial assets for wealth owners to hold in portfolios; hence a positive relationship is equally plausible.

In the demand function, inflationary expectations (rate of inflation lagged by one period) could be an appropriate variable for consideration as an independent variable. The reasoning behind its inclusion is that the agents holding real balances would, in the face of inflation, anticipate further reductions in the purchasing power of their holdings and would therefore switch to real assets, such as land and other physical assets, and in the process reduce their existing real balances.

In addition to these two variables, increasing importance is now being attached to the influence of changes in the real exchange rate on money demand in open economies which have adopted a managed float system. It is held that if money holders expect a depreciation of domestic currency in the near future, they prefer to increase their holdings of foreign currencies by way of substitution and hence the demand for domestic currency declines (Bahmani-Oskooee and Malixi 1991). On the other hand, it might be argued that when the domestic currency depreciates, the value of domestic securities held by foreigners would decline and there would be an increase in the value of foreign securities held by domestic residents. This would result in an increase in the domestic monetary base which would, in turn, lead to a decrease in domestic interest rates and an increase in the quantity of money demanded (Arango and Nadiri 1981).

It might also be argued that with an expected real depreciation, domestic interest rates would rise, given the uncovered interest parity condition, and in that case inclusion of the interest rate in the functional relationship along with the real exchange rate would not be appropriate on the grounds that changes in the interest rate would also reflect movements in real exchange rate. This argument is valid as long as the following conditions apply: capital mobility; and domestic and foreign currency denominated deposits are perfect substitutes (Mishkin 1998).

Fiji has still a long way to go in terms of perfect capital mobility. Exchange controls, especially in regard to the capital account in the balance of payments, are still in place. Further, foreign currency denominated deposits and Fiji dollar denominated deposits have yet to become perfect substitutes from the overseas investors' point of view. So interest rate variations would have an impact on short-term capital flows. Furthermore, the exchange rate is not freely floating. Therefore, it is in order to include both the interest rate and the real exchange rate in the functional relationship.

Accordingly, a static equilibrium specification of the money demand function can be expressed as

$$LRM2_t = \beta_1 + \beta_2 LRGDP_t + \beta_3 RR_t + \beta_4 LREER_t + \beta_5 INF_t + v_t \qquad (1)$$

where

LRM2 = logarithm of broad money supply in constant prices

LRGDP = logarithm of GDP in constant prices

RR = real interest rate in per cent

INF = rate of inflation in per cent

LREER = logarithm of real effective exchange rate index.

A description of the data set and its sources are given in the Appendix.

Empirical modeling strategy

Equation 1 depicts the hypothesised money demand function in a long-run equilibrium state. However, as the data are time-series, in order to avoid any spurious regression errors, it is essential to check whether these time series are non-stationary and if so, whether they are all integrated of the same order (and are cointegrated) before estimating the model. Accordingly, Dickey-Fuller unit root tests were conducted for each series, both in levels and in first differences (Table 1). These tests, along with all other econometric analyses, were carried out in MicroFit version 4.0 (Pesaran and Pesaran 1997).

The order of the lags for the test equations was determined through use of the Schwarz Bayesian Criterion (SBC). With the exception of INF, the test results for 'levels' refer to test equations with an intercept but not a trend, the intercept and trend specification having been previously accepted. In 'first differences', rejection of the unit root hypothesis occurred in test equations having intercepts and linear trend terms. All tests were carried out using the 5 per cent significance level.

These tests show that the hypothesis of a unit root in the levels of LRM2, LRGDP, RR and LREER cannot be rejected at the 5 per cent significance level, but can be rejected for the first differenced form of these four series. However, the INF series appears to be stationary in levels. As a necessary condition for two or more nonstationary times series to be cointegrated is that they all be integrated

Table 1 **Augmented Dickey-Fuller unit root tests**

Series	Levels			First differences		
	ADF(t)	Lags	5% c.v.	ADF(t)	Lags	5% c.v.
LRM2	-0.2026	0	-2.9023	-7.8697	0	-2.9029
LRGDP	0.1398	0	-2.9048	-6.4433	1	-2.9035
RR	-1.9649	3	-2.9042	-4.7605	2	-2.9042
LREER	-1.1576	1	-2.9029	-6.0456	0	-2.9029
INF	-4.1214	2	-3.4749	n.a.		

Source: Authors' calculations.

to the same order. INF is not considered further.

In the Engle-Granger two-step approach to testing for cointegration, the residuals from the OLS regression of the equilibrium model given in Equation 1 are tested for a unit root, the rejection of which indicates cointegration of the series. Here, however, we follow the more modern approach promulgated in Hendry (1995) and Hendry and Ericsson (1991). That is, we first estimate (OLS) a dynamic short-run adjustment specification, derive the long-run equilibrium coefficients, and then test the resulting 'residual' series for a unit root. The dynamic adjustment model used here (an autoregressive distributed lag, denoted as ARDL) is specified as

$$LRM2_t = \mu + \alpha LRM2_{t-1} + \sum_{i=0}^{1} \delta_{1i} LRGDP_{t-i} + \sum_{i=0}^{1} \delta_{2i} RR_{t-i} + \sum_{i=0}^{1} \delta_{3i} LREER_{t-i} + u_t \qquad (2)$$

where the unitary lag length was selected as being the shortest common lag length for which the residuals were serially uncorrelated.

The derived long-run equilibrium solution to Equation 2 is given by

$$LRM2_t^* = \hat{\phi}_0 + \hat{\phi}_1 LRGDP_t + \hat{\phi}_2 RR_t + \hat{\phi}_3 LREER_t$$

where the long-run equilibrium coefficients are computed from the following relations

$$\hat{\phi}_0 = \frac{\hat{\mu}}{(1-\hat{\alpha})}; \ \hat{\phi}_1 = \frac{(\hat{\delta}_{10} + \hat{\delta}_{11})}{(1-\hat{\alpha})};$$

$$\hat{\phi}_2 = \frac{(\hat{\delta}_{20} + \hat{\delta}_{21})}{(1-\hat{\alpha})}; \ \hat{\phi}_3 = \frac{(\hat{\delta}_{30} + \hat{\delta}_{31})}{(1-\hat{\alpha})}$$

The 'residual' disequilibrium term $ZD_t = (LRM2_t - LRM2_t^*)$ is then tested for a unit root.

The individual coefficient values (Table 2) are not of particular interest due to multicollinearity amongst the lagged variables, but the diagnostic tests suggest that the ARDL(1,1,1,1) model is not critically mis-specified. Hence, these results are used to derive the long-run equilibrium coefficients $\hat{\phi}_j$ and their asymptotic variances (Table 3).

As expected, long-run money demand has a positive relationship with real income, and a negative relationship with the real exchange rate. The coefficient of the latter variable is statistically significant, whilst the coefficient of LRGDP is statistically significant at the 10 per cent level. The long-run relationship between money demand and the real interest rate is significantly positive, suggesting that bank depositors may have considered the rate of interest on the quasi-money component of M2 as the rate of return on money balances. Quarterly estimates of the long-run equilibrium demand for M2 $(LRM2_t^*)$ and the corresponding long-run disequilibrium residual term (ZD_t) are computed as follows

$$LRM2_t^* = \sum_{j=1}^{4} \hat{\phi}_j X_{jt} \text{ where } X_{1t} = LRGDP_t \text{ etc}$$

$$\text{and } ZD_t = LRM2_t - LRM2_t^*$$

Turning to the issue of cointegration, we test whether these long-run coefficients represent a valid cointegrating vector by testing the computed error correction term, ZD_t, for a unit root following the usual augmented Dickey-Fuller testing procedure. Table 4 shows the results obtained from an ADF(1) test equation without trend or constant terms.

The ratio of the coefficient of the ZD_{t-1} term to its standard error is -2.73 with a p-value of 0.08, but as this ratio does not have the standard t-distribution we compare it to the simulated values given in MacKinnon (1996) (Table 4). According to the MacKinnon results, -2.73 has a p-value of 0.352 indicating that the ADF test does not find strong evidence against the null hypothesis of no cointegration. However, the Representation Theorem of Engle and Granger (1987) states that the existence of a valid error correction model (ECM) implies cointegration. An appropriate ECM representation of the adjustment process for the four series of interest is

Table 2 **OLS results for the ARDL(1,1,1,1) model**

Dependent variable is LRM2, 72 observations (1979Q2–1997Q4)

Regressor	Coefficient	S.E.	T-Ratio	[Prob]
LRM2(-1)	0.8915	0.0383	23.2985	[.000]
LRGDP	0.4905	0.2523	1.9438	[.056]
LRGDP(-1)	-0.3833	0.2577	-1.4876	[.142]
RR	0.0058	0.0041	1.4240	[.159]
RR(-1)	-0.0033	0.0040	-0.8401	[.404]
LREER	0.0610	0.1256	0.4857	[.629]
LREER(-1)	-0.1928	0.1346	-1.4325	[.159]
INPT	0.5138	0.4738	1.0846	[.182]
RSQ	0.9887		adjRSO	0.9875

F-stat (7,63) 790.11 LLF 159.11

Residual sum of squares 0.0471

S.E. of regression 0.0273 Durbin's h -0.3869

Diagnostic tests

Test statistics	LM version	F version
Serial correlation[a]	CHSQ(1) = 0.5965[.440]	F(1,62) = 0.5253[.471]
Functional form[b]	CHSQ(1) = 0.8043[.370]	F(1,62) = 0.7103[.403]
Normality[c]	CHSQ(2) = 5.4972[.064]	n.a.
ARCH[d]	CHSQ(1) = 3.2995[.069]	F(1,62) = 3.0216[.087]

Notes: [a]Lagrange multiplier test of residual serial correlation
[b]Ramsey's RESET test using the square of the fitted values
[c]Based on a test of skewness and kurtosis of residuals
[d]Based on the regression of squared residuals on lagged squared residuals
Source: Authors' calculations.

Table 3 **Estimated long-run coefficients from ARDL(1,1,1,1) Model**

Dependent variable is LRM2, 71 observations (1979Q1–1996Q4)

Regressor	Coefficient	S.E.	Asymptotic T-ratio	[Prob]
LRGDP	0.9873	0.7403	1.3337	[.187]
RR	0.0224	0.0109	2.0481	[.045]
LREER	-1.2147	0.2423	-5.0140	[.000]
INPT	4.7352	5.1076	0.9271	[.357]

Source: Authors' calculations.

Table 4 **ADF test for a unit root in the ZD error correction term**

Ordinary least squares estimation: dependent variable is ΔZD_t , 70 observations (1979Q3 to 1996Q4)

Regressor	Coefficient	Standard error	T-ratio[prob]
ZD_{t-1}	-0.15465	0.05657	-2.7338[.008]
ΔZD_{t-1}	0.29120	0.11025	2.6412[.010]

Source: Authors' calculations.

Table 5 **OLS results for the unrestricted ECM Model**

Dependent variable is ΔLRM2 72 obs (1979Q2–1997Q4)

Regressor	Coefficient	S.E.	T-Ratio	[Prob]
ΔLRGDP	0.43436	0.22478	1.9324	[.058]
ΔRR	.00416	.00361	1.1513	[.254]
ΔLREER	.05386	.11335	0.4752	[.636]
ZD(-1)	-0.06673	0.01726	-3.8658	[.000]

RSQ 0.19190 adj RSQ 0.15571

F-stat(3,67) 5.3034[.000] LLF 157.704

Residual sum of squares 04887

S.E. of regression 0.027008 DW-stat 2.094

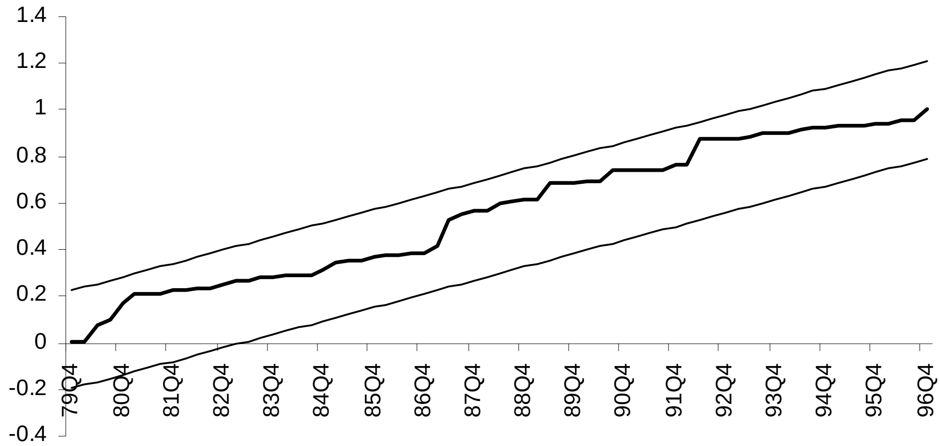
Squared correlation between actual and fitted 0.467

Diagnostic tests

Test statistics	LM version	F version
Serial correlation	CHSQ(1) = 0.6869[.061]	F(1,66) = 0.6447[.452]
Functional form	CHSQ(1) = 0.0288[.630]	F(1,66) = 0.2164[.643]
Normality	CHSQ(2) = 2.5401[.281]	n.a.
ARCH	CHSQ(1) = 3.0061[.083]	F(1,66) = 2.9127[.092]

Notes: [a]Lagrange multiplier test of residual serial correlation
[b]Ramsey's RESET test using the square of the fitted values
[c]Based on a test of skewness and kurtosis of residuals
[d]Based on the regression of squared residuals on lagged squared residuals
Source: Authors' calculations.

Figure 1 **Plot of cumulative sum of squares of recursive residuals, 1979Q2–1996Q4**



Note: The straight lines represent critical bounds at 5 per cent significance level.
Plot of cumulative sum of squares of recursive residuals, 1979Q2–1996Q4
Source: Authors' calculations.

$$\Delta LRM2_t = \gamma_1 \Delta LRGDP_t + \gamma_2 \Delta RR_t + \gamma_3 \Delta LREER_t + \lambda ZD_{t-1} + \varepsilon_t \quad (3)$$

For Equation 3 to qualify as a valid ECM, it must be the case that ($-1 < \lambda < 0$). Hence Equation 3 is estimated with OLS and the t-statistic for $\hat{\lambda}$ is used to test the null hypothesis of no cointegration. Outliers occurred in 1991Q1 and 1993Q1, at the start and end of the period during which overseas debt was being repaid (Figure 1). To account for this, two dummy variables were added to Equation 3 and the estimation results are displayed in Table 5.

On the whole, the results of the diagnostic tests do not suggest critical inadequacies in the model. In Table 5 the coefficients of ΔRR and ΔLREER are statistically indistinguishable from zero suggesting that the real interest rate and exchange rate do not significantly affect money demand in the short run (although they do have important effects in the long run). Joint zero restrictions on the parameters of these two variables to zero were not rejected (Table 6).

Deletion of these two variables produces a more parsimonious model, the OLS results for which are displayed in Table 7.

Table 6 **Joint test for deletion of ΔRR and ΔLREER**

Lagrange multiplier statistic	CHSQ(2)	1.6518[.438]
Likelihood ratio statistic	CHSQ(2)	1.6713[.434]
F-statistic	F(2,67)	0.7979[.454]

Source: Authors' calculations.

For the parsimonious model none of the diagnostic tests indicates statistical inadequacy in the estimated ECM model, and using the Newey-West standard errors the ratio of the coefficient of ZD_{t-1} to its standard error is large in absolute value. However, this ratio does not have the standard t-distribution but Banerjee, Dolado and Mestre (1992:Table 4) have tabulated critical values for a variety of specifications of the cointegrating vector. For a vector consisting of three series plus a constant, with 100 observations, the critical values are -3.82 (5 per cent) and -3.47 (10 per cent). Hence the computed t-statistic of -3.866 provides substantial evidence that the parsimonious money demand model does have a valid error correction representation.

The usefulness of the estimated money demand model for forecasting and policy analysis requires that the parameters be constant over time and across regimes. Two tests for the structural stability of the estimated parsimonious model are carried out, namely both versions of the Chow test as well as the CUMSUM and CONSUMSQ tests (Table 8).

The null hypothesis of structural stability across the pre-reform and post-reform periods is not rejected by either of the Chow tests (Table 8).

Moreover, the CUSUMSQ test results provide evidence that the money demand function is stable over the two policy regimes (Figure 1).

Summary and conclusions

Econometric exercises were undertaken to estimate a demand function for money in Fiji. In the context of financial reforms and

Table 7 **OLS Results for parsimonious ECM model**

Dependent variable is $\Delta LRM2_t$ 72 obs (1979Q2 - 1997Q4)

Regressor	Coefficient	S.E.	T-Ratio	[Prob]
ΔLRGDP	0.45761	0.22208	2.0606	[.043]
ZD_{t-1}	-0.06673	0.01726	-3.8658	[.000]

RSQ 0.17265 adj RSQ 0.16006

F-stat(1,69) 14.3987[.000] LLF 156.905

Residual sum of squares .050034

S.E. of regression .026928 DW-stat 2.0616

Squared correlation between actual and fitted 0.4327

Diagnostic tests

Test statistics	LM version	F version
Serial correlation[a]	CHSQ(1) = 0.4658[.495	F(1,68) = 0.4491[.505]
Functional form[b]	CHSQ(1) = 0.0288[.865]	F(1,68) = 0.0276[.868]
Normality[c]	CHSQ(2) = 1.8696[.393]	n.a
ARCH[d]	CHSQ(1) = 2.3116[.128]	F(1,68) = 2.2885[.135]

Notes: [a]Lagrange multiplier test of residual serial correlation
[b]Ramsey's RESET test using the square of the fitted values
[c]Based on a test of skewness and kurtosis of residuals
[d]Based on the regression of squared residuals on lagged squared residuals.
Source: Authors' calculations.

Table 8 **Chow tests for structural break**

Chow test[a]	CHSQ(2) = 0.2599[.878]	F(2,67)	0.12999[.878]
Predictive failure[b]	CHSQ(36) = 22.9967[.954]	F(36,33)	0.63880[.905]

Notes: [a]Test of stability of the regression coefficients (Chow's first test)
[b]Test of adequacy of predictions (Chow's second test)
Source: Authors' calculations.

emergence of assets displaying greater substitutability of investment and liquidity, a broader definition of money was used. Further, the relative openness of the economy was also required to be considered in the estimation function. Accordingly, while the broad money aggregate (M2) in real terms was employed as the dependent variable, the independent variables included real exchange rate, real income, real interest rate and expected rate of inflation. The analysis utilised the quarterly data during a 18-year period (1979–96).

Unit root tests for testing whether the variables in levels or logs were nonstationary were conducted with a view to avoiding any spurious regressions. The tests established that all the variables except the expected rate of inflation were integrated of the same order. The cointegration methodology was adopted to determine whether there was any long-term relationship between money and income, real exchange rate and real interest rate. The tests demonstrated that real demand for broad money in log form, and real income and real exchange rate index, both in log forms and the real interest rate in level were found to be cointegrated. The estimated coefficients results were also found to be statistically significant at the one per cent level.

Fiji's long-run income elasticity of demand was found to be close to unity. In regard to real interest rates, the estimated coefficient was positive and significant at the one per cent level. The results confirmed that positive real interest rates contributed to growth in the quasi component of money. As regards the real exchange rate, the sign of the coefficient was negative and significant, confirming the expectations that depreciation of the currency would lead to preference for foreign currency holdings and a decrease in the demand for money.

The tests for stability of the demand function across two periods, the periods before and after financial liberalisation, concluded that there were no structural breaks between 1979–87 and 1988–95. This means that the introduction of financial reforms did not have any impact on the stability of the long-run demand function. The existence of a long-run demand for money function indicates that there is still a potential for achieving price stability by controlling the growth rate of money supply, although the Reserve Bank of Fiji has moved away from the monetary aggregate target towards interest rate targeting.

Since the dependent variable used in the analysis is M2, it is confirmed that the aggregate for monetary targeting in Fiji should be the broad monetary aggregate. The liquidity management policies adopted in the recent past and the success obtained in controlling inflationary tendencies would also confirm that the role of monetary policy is more suitable for promoting price stability than for stabilisation and growth as money and capital markets are still weak and there are institutional constraints on flexibility of monetary instruments.

Appendix

Fiji's data relating to money supply (M2) and consumer price index are available on a quarterly basis now for more than two decades. However, the quarterly data on REER are available only from 1979. Since the economy-wide liberalisation measures including financial reforms, were initiated from 1988, the analysis utilising REER data from 1979 allows a reasonable period of nine years prior to 1988 for consideration. As regards income data, consistent with other empirical studies on developing economies (Tseng and Corker 1991), it is decided to employ the measured income as a scale variable in the place of permanent income. However, as the country's GDP data are only available on an annual basis, quarterly data for real GDP were interpolated from the annual data using a cubic spline function. While inflationary expectations are proxied by the lagged inflation variable by one period, and the exchange rate is represented by the real effective exchange rate. All series are quarterly, seasonally unadjusted. The data set is available from the authors on request. The computer programme used for the empirical analysis is Microfit 4.0.

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