

## **A MODEL OF INFLATION FOR SRI LANKA**

*Arusha Cooray\**

*This paper uses two models: an open economy model and a closed economy model to estimate a price equation for Sri Lanka. The results suggest greater support for the open economy model. Consistent with previous studies for Sri Lanka, supply side factors appear to be important in influencing the general price level in Sri Lanka.*

**JEL Classification:** E31, E64, C51, C52.

**Keywords:** Sri Lanka, inflation, price, nested – non nested models, cointegration, error correction.

### **INTRODUCTION**

The purpose of this study is to empirically investigate the factors influencing the rate of inflation in Sri Lanka using annual, quarterly and monthly data spanning the 1978-2006 period. Two alternative models, a closed economy model and an open economy model are used for this purpose and policy implications are drawn on the basis of the better specification. Studies on inflation in Sri Lanka include those by Nicholas (1990), Nicholas and Yatawara (1991), Luintel (2002), Gunasinghe (2005) among others. While Nicholas and Nicholas and Yatawara highlight the importance of supply side factors in influencing the general level of prices in Sri Lanka, no empirical investigation is undertaken by them. Luintel examines the role played by the money stock in controlling for inflation in South Asia including Sri Lanka, and concludes that inflation cannot be controlled via the money stock in South Asia. Gunasinghe concludes that while excess money supply causes inflation in the short run in Sri Lanka, that monetary factors are not the main source of inflation in Sri Lanka. While these studies emphasise the importance of supply side factors in influencing the general level of prices, a distinction is not made between the closed economy and open economy. Price increases in Sri Lanka continue to be high giving rise to concern by policy makers on the sources of and need for controlling inflation. This study is an attempt to develop a simple model of inflation for Sri Lanka by taking into account the possibility of two alternative cases: a closed economy and an open economy. The better specification is selected on the basis of non-nested modeling and tested empirically using different data frequencies.

In the wake of economic deregulation Sri Lanka experienced a steady rise in the rate of inflation as measured by the Colombo Consumer Price Index (CCPI). Inflation which averaged 2.2% in the 1960's increased from 12.1% in 1978 to 26.1% by 1980. Although due in part, to

---

\* School of Economics, University of Wollongong, Northfields Ave, NSW, 2522, Australia, *E-mail: arusha@uow.edu.au*

the oil price shock of 1979, the governments policy of deficit budgeting, increased demand for credit by the private sector under the liberalized economic policy, the relaxation of price controls, removal of subsidies and continuing exchange rate depreciation were contributory factors. The demand management policies employed by the government to contain inflation, were successful in bringing down the rate of inflation to a single digit level from 1985-1987. The late 1980's however, saw an acceleration in the rate of inflation again which reached a peak of 21.5% in 1990. Exchange depreciation, the upward revision in the guaranteed price of paddy, and rise in fuel prices due to the Gulf crisis were contributory factors. From 1991 onward there was a decline in inflation and by 1995 the rate of inflation averaged 7.7%.

One of the many explanations for the continuing increase in price level, is the monetarist theory of the excessive growth in money supply. A consequence of financial deregulation in Sri Lanka has been the growth in all monetary aggregates. Money supply as defined by M2 which rose threefold during the 1965-1977 period, rose 23 fold during the 1978-1996 period. The lack of fiscal restraint has been a prime factor underlying this monetary expansion. The large scale investment programmes that were primarily deficit financed and the eruption of the ethnic crisis in 1983 led to a progressive increase in the size of the budget deficit. The adoption of liberalized trade and payment policies together with the introduction of a floating exchange rate system added further pressure on prices.

A notable feature of the Sri Lankan economy has been its heavy reliance on international trade. International trade which accounted for 55% of the GDP at independence, declined considerably during the ensuing period with attempts at import substitution. With the removal of import and exchange controls during the post liberalization period, imports began to gain greater significance in affecting prices. By 1987, external trade accounted for 57% of GDP the difference between the 1950's and post liberalization periods being that imports had come to account for a larger share of the GDP than exports. In 1977 November, the Sri Lankan rupee was devalued and allowed to float against a basket of currencies. Over the years, the rupee has progressively depreciated against the major currencies. With imports beginning to gain greater importance in price determination, the impact of exchange rate movements on the rate of inflation has also come to acquire greater significance. The Institute of Policy Studies (Sri Lanka) and the IMF highlight the importance of cost push factors, in particular, import prices and the exchange rate (see Nicholas and Yatawara 1991) as factors contributing to inflation in Sri Lanka in the post deregulation period. Furthermore, Alexius (1997) in a study of inflation in Sweden finds that in a small open economy such as Sweden, that the nominal exchange rate and import prices are important factors in influencing prices. Therefore, the exchange rate is also included as a likely explanatory variable in the empirical study that follows.

Given the above mentioned factors, two models are examined:

1. a closed economy model based on the monetarist explanation of inflation modified to incorporate the time lags in the adjustment of prices to changes in money supply<sup>1</sup>, and
2. an open economy model which incorporates in addition to the variables in (1), the import price index and foreign exchange rate<sup>2</sup>.

The rest of the paper is structured as follows. Section 2 examines the data. Section 3 estimates two price equations for Sri Lanka for the closed and open economy models. Section 4 summarizes the conclusions.

### DATA

All data are from the annual reports and monthly bulletins of the Central Bank of Sri Lanka and International Financial Statistics. The empirical analysis makes use of annual, quarterly and monthly data. The annual data covers the period 1978-2006, comprising in sum a total of 29 observations. The sample size is clearly very small, however, this is the longest time period for which data are available given that exchange rates are floating. Due to the limited number of annual observations, quarterly and monthly data for the period 1978-2006 are also used. This test involves estimating the effects of money supply, real GNP, import prices and exchange rate on the Colombo Consumer Price Index (CCPI). Data on the CCPI, money supply, real GNP and import price index are used for this purpose. Real GNP figures are available only for the 1982-2006 period with 1982 as the base year. For the period before 1982, the figures are approximated by deflating nominal GNP by the CCPI. Due to the lack of quarterly and monthly data on real GNP, quarterly and monthly series are constructed subject to the constraint that real GNP grows at a constant rate each quarter/month throughout the year. A similar procedure is used for the construction of quarterly and monthly series for import prices.

### THE ESTIMATION OF A SUITABLE PRICE EQUATION FOR SRI LANKA

#### A Preliminary Test

This section attempts to analyse the main factors influencing the rate of inflation in Sri Lanka. Two models are estimated, a closed economy model and an open economy model.

The closed economy price equation is given by<sup>3</sup>,

$$P_t = a_1 + a_2 M_t + a_3 M_{t-1} + a_4 P_{t-1} + a_5 GNP_t + u_t \quad (1)$$

the open economy price equation is given by;

$$P_t = a_1 + a_2 M_t + a_3 M_{t-1} + a_4 P_{t-1} + a_5 GNP_t + a_6 IMP_t + a_7 ER_t + u_t \quad (2)$$

where,

$P_t$  = Colombo Consumer Price Index

$M_t$  = Money supply ( $M_2$ )

$P_{t-1}$  = Colombo Consumer Price Index lagged by one period

$GNP_t$  = Real Gross National Product

$IMP_t$  = Import price index

$ER_t$  = Official exchange rate Rupee/US Dollar

$u_t$  = random error term

All variables are expressed in terms of their logarithms and are expected to have a positive effect on the rate of inflation.

A number of alternative specifications of equations (1) and (2) are estimated using OLS arriving at the final model. Of the specifications estimated, two alternative specifications appear promising for Sri Lanka. Panel 1 of Table 1 reports the estimated regression coefficients for the

closed economy model, and panel 2 reports the estimated regression coefficients for the open economy model. The  $t$ -statistics are reported within parentheses. The goodness of fit of all the regression equations are perfect.

**Table 1**  
**Factors Influencing the Rate of Inflation in Sri Lanka**

Data Frequency	Dependent Variable	Constant	Independent Variables				$R^2$	Diagnostic Tests	
			$M_t$	$M_{t-1}$	$P_{t-1}$	$GNP_t$	$IMP_t$	$ER_t$	
<i>Closed Economy Model</i>									
Annual	$P_t$	6.82 (2.8)	0.65 (3.7)		0.49 (2.1)	-0.90 (-2.5)			.996 $\chi^2_{sc} = 0.11$ $\chi^2_{ff} = 0.08$ $\chi^2_n = 1.12$ $\chi^2_{hc} = 0.47$
Quarterly	$P_t$	-0.13 (-0.5)	0.15 (1.2)		0.95 (15.6)				.998 $\chi^2_{sc} = 16.3$ $\chi^2_{ff} = 0.32$ $\chi^2_n = 0.84$ $\chi^2_{hc} = 4.5$
Monthly	$P_t$	0.18 (0.20)		0.17 (3.1)	0.87 (18.9)				.993 $\chi^2_{sc} = 30.1$ $\chi^2_{ff} = 0.18$ $\chi^2_n = 0.32$ $\chi^2_{hc} = 5.2$
<i>Open Economy Model</i>									
Annual	$P_t$	-0.32 (-1.16)	0.46 (6.7)				0.20 (2.8)	0.30 (1.9)	.987 $\chi^2_{sc} = 1.47$ $\chi^2_{ff} = 0.24$ $\chi^2_n = 1.40$ $\chi^2_{hc} = 2.58$
Quarterly	$P_t$	-1.99 (-2.2)			0.60 (6.0)	0.29 (2.6)	0.23 (4.3)	0.19 (2.4)	.997 $\chi^2_{sc} = 14.8$ $\chi^2_{ff} = 1.40$ $\chi^2_n = 2.85$ $\chi^2_{hc} = 4.16$
Monthly	$P_t$	0.11 (1.4)			0.78 (11.7)		0.14 (2.5)	0.27 (2.8)	.994 $\chi^2_{sc} = 41.9$ $\chi^2_{ff} = 0.01$ $\chi^2_n = 0.16$ $\chi^2_{hc} = 4.7$

$\chi^2_{sc}$  = lagrange multiplier test of residual serial correlation;  $\chi^2_{ff}$  = Ramsy's RESET test using the square of the fitted values;  $\chi^2_n$  = test of skewness and kurtosis of residuals;  $\chi^2_{hc}$  = based on the regression of squared residuals on squared fitted values.

In order to determine the best specification, diagnostic tests are carried out. The models are well specified on the basis of Ramsey's RESET test using the square of the fitted values ( $\chi^2_{ff}$ ). The Jarque-Bera test for normality ( $\chi^2_n$ ) confirm normality, and the regression of squared residuals on squared fitted values ( $\chi^2_{hc}$ ) denotes the absence of heteroscedasticity. The regression equation for the annual data indicates the absence of serial correlation on the basis of the  $LM$ -test for autocorrelation ( $\chi^2_{sc}$ ), however, there is evidence of residual autocorrelation of 4<sup>th</sup> and 12<sup>th</sup> order in the quarterly and monthly price equations respectively.

In order to determine the better specification of the two models, the  $J$ -test from Davidson and MacKinnon (1981) and  $JA$ -test from Fisher and MacAleer (1981) have been used to compare the alternative specifications. The non nested hypothesis tests are reported in Table 2.

It is observed that the open economy price equation performs better for all three data sets on the basis of the  $J$ -test and  $JA$ -test.

The time series properties of the variables are examined next. The Augmented Dickey Fuller (ADF) test for unit roots has been employed to detect the presence of unit roots. The lag length,  $k$ , for the  $ADF$ -test has been selected to ensure the absence of serial correlation on the basis of the  $LM$  statistic. A joint  $F$ -test of zero restrictions was carried out in order to see if a trend in mean was required or not. Overall results point to the inclusion of a trend term for the

levels of the series. Table 3 reports results of unit root tests for the levels and first differences of the series. All variables exhibit the presence of a unit root at the 10%, 5% and 1% levels. Therefore, *ADF*-tests have been carried out on the first differences of the variables. Inspection of the results indicate that with the exception of the import price index for monthly data, that all variables are *I*(1) series at the 1%, 5% or 10% levels of significance. Further differencing show import prices to be a *I*(2) series.

**Table 2**  
**Non Nested Hypothesis Tests**

<i>Annual Data</i>		
<i>Regressors for model M1: Constant <math>M_t P_{t-1} RGNP_t</math></i>		
<i>Regressors for model M2: Constant <math>M_t IMP_t ER_t</math></i>		
<i>Test Statistic</i>	<i>M1 against M2</i>	<i>M2 against M1</i>
<i>J-Test</i>	2.96 (.002)	0.716 (.470)
<i>JA-Test</i>	2.95 (.003)	0.584 (.540)
<i>Quarterly Data</i>		
<i>Regressors for model M1: Constant <math>M_t P_{t-1}</math></i>		
<i>Regressors for model M2: Constant <math>P_{t-1} RGNP_t IMP_t ER_t</math></i>		
<i>Test Statistic</i>	<i>M1 against M2</i>	<i>M2 against M1</i>
<i>J-Test</i>	4.67 (.000)	0.072 (.955)
<i>JA-Test</i>	0.76 (.435)	0.071 (.943)
<i>Monthly Data</i>		
<i>Regressors for model M1: Constant <math>M_{t-1} P_{t-1}</math></i>		
<i>Regressors for model M2: Constant <math>P_{t-1} IMP_t ER_t</math></i>		
<i>Test Statistic</i>	<i>M1 against M2</i>	<i>M2 against M1</i>
<i>J-Test</i>	2.18 (.031)	0.828 (.408)
<i>JA-Test</i>	2.15 (.031)	0.826 (.407)

**Table 3**  
**Unit Root Tests for Time Series**

<i>Data Frequency</i>	<i>Variable</i>	<i>k*</i>	$\tau_{ad}$	<i>Variable</i>	<i>k*</i>	$\tau_{ad}$
Annual	$PI_t$	0	-2.30	$\Delta PI_t$	0	-3.44**
	$M_t$	2	-2.41	$\Delta M_t$	0	-2.63*
	$IMP_t$	0	-1.42	$\Delta IMP_t$	0	-3.16**
	$ER_t$	0	-2.25	$\Delta ER_t$	0	-5.57***
Quarterly Data	$PI_t$	2	-2.71	$\Delta PI_t$	1	-4.67***
	$GNP_t$	3	-2.21	$\Delta GNP_t$	4	-2.78*
	$IMP_t$	1	-2.72	$\Delta IMP_t$	0	-3.01**
	$ER_t$	0	-2.14	$\Delta ER_t$	0	-8.80***
Monthly	$PI_t$	2	-3.16	$\Delta PI_t$	1	-7.48***
	$IMP_t$	1	-2.72	$\Delta IMP_t$	1	-2.34
	$ER_t$	1	-2.17	$\Delta ER_t$	0	-6.41***

Note: Significance levels: 1%, -4.07; 5%, -3.46; 10%, -3.16

Significance levels first differences: 1%, -3.51; 5%, -2.90; 10% -2.58 (Davidson and MacKinnon)

*k\** refers to the order of the autoregression used to calculate the ADF statistic.

Having established the time series properties of the variables, cointegration tests have been carried out to examine the existence of a long run relationship between the variables. The cointegrating regression equations take the following form;

Annual data,

$$P_t = \beta_0 + \beta_1 M_t + \beta_2 IMP_t + \beta_3 ER_t \quad (3)$$

quarterly data,

$$P_t = \delta_0 + \delta_1 GNP_t + \delta_2 IMP_t + \delta_3 ER_t \quad (4)$$

monthly data,

$$P_t = \eta_0 + \eta_1 ER_t \quad (5)$$

Table 4 reports results of cointegration tests using the Engle Granger method.

**Table 4**  
**Engle Granger Test for Cointegration**

Data Frequency	Dependent Variable	Constant	Independent Variables				ADF
			$M_t$	$IMP_t$	$ER_t$	$RGNP_t$	
Annual	$P_t$	-0.31	0.45	0.25	0.28	-	-5.06
Quarterly	$P_t$	-5.66	-	0.51	0.39	0.76	-4.69
Monthly	$P_t$	0.15	-	-	1.84	-	-3.93

Significance levels: 1%, -4.29; 5%, -3.74; 10%, -3.45 (Davidson and MacKinnon)

The unit root test for residuals indicate the existence of a long run relationship between the variables. The existence of a long run relationship between the variables calls for the use of an error correction model to correct for the likely disequilibrium that could arise between the variables in the short run. Hendry's (1986) general to specific modeling method has been employed to model the short run adjustment associated with the cointegrating relationships. Starting with a lag of two for each variable due to the limited number of observations, insignificant variables have been eliminated on the basis of the t statistic. The results for the optimal error correction models are reported below where  $EC_{t-1}$  is the error correction term.

Annual data;

$$\Delta P_t = .004 + .56 \Delta M_t - .12 \Delta IMP_t + .13 \Delta ER_t - 1.31 EC_{t-1} \quad (6)$$

(0.16) (3.99) (1.26) (0.86) (-5.30)

$$\chi_{sc}^2 = 2.04 \quad \chi_{ff}^2 = .79 \quad \chi_n^2 = 2.86 \quad \chi_{hs}^2 = .00$$

Quarterly data;

$$\Delta P_t = 0.02 - .78 \Delta RGNP_{t-1} - .40 \Delta P_{t-2} + .05 \Delta ER_t - .11 \Delta IMP_t - .52 EC_{t-1} \quad (7)$$

(3.05) (-1.96) (4.39) (-0.39) (0.83) (-5.98)

$$\chi_{sc}^2 = 5.96 \quad \chi_{ff}^2 = 0.17 \quad c_n^2 = 7.2 \quad \chi_{hs}^2 = 1.09$$

Monthly data;

$$\Delta P_t = 0.01 + .41 \Delta P_{t-1} - .24 \Delta P_{t-2} + .23 \Delta ER_t - .11 \Delta ER_{t-1} - .14 EC_{t-1} \quad (8)$$

(2.68) (3.94) (-2.15) (0.65) (-0.33) (-2.38)

$$\chi_{sc}^2 = 18.54 \quad \chi_{ff}^2 = .79 \quad \chi_n^2 = 10.30 \quad \chi_{hs}^2 = 0.56$$

The annual data indicates that money supply is important in affecting prices in the long run while the monthly data show that the lagged rates of inflation are more important in affecting prices in the short run. The exchange rate is positive in all cases, however, not significant. The error correction terms in all three equations are significant implying that approximately the entire disequilibrium in price level is corrected by the end of the first year, and 13% by the end of each month. Except the  $\chi^2$  statistic for normality in equation (8), the  $\chi^2$  statistics for serial correlation, functional form, normality and heteroscedasticity are insignificant at the 5% level implying that the models are correctly specified.

For purposes of comparison, Johansen's(1988) technique has also been applied to the quarterly and monthly data. The lack of sufficient observations precludes the use of this method for the annual data. Table 5 displays the test statistics and the estimated cointegrating vectors from the Johansen procedure for the quarterly data, where  $r$  denotes the number of cointegrating vectors.

Panel 1 reports the maximum eigenvalue test of the null hypothesis that there exist at most  $r$  cointegrating vectors against the alternative of  $r + 1$  cointegrating vectors. Starting with the null hypothesis of  $r = 0$  against the alternative of  $r = 1$ , the computed test statistic exceeds the 95% critical value, indicating the existence of one cointegrating vector. The null hypothesis of  $r \leq 1$  against  $r = 2$  cannot be rejected. Panel 2 reports the trace test of the null hypothesis that there at most  $r$  cointegrating vectors against the alternative that there are more than  $r$  cointegrating vectors. The null of  $r = 0$  against the alternative of  $r \geq 1$  is rejected, suggesting the existence of an unique cointegrating vector.

**Table 5**  
**Johansen Cointegration Tests for Quarterly Data**

*A. Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix*

---

*List of Variables included in the cointegrating vector:  $P_t, GNP_t, ER_t, IMP_t, Intercept$*

<i>Null</i>	<i>Alternative</i>	<i>Statistic</i>	<i>95% Critical Value</i>	<i>90% Critical Value</i>
$r = 0$	$r = 1$	39.5098	28.2700	25.8000
$r \leq 1$	$r = 2$	17.2370	22.0400	19.8600
$r \leq 1$	$r = 3$	9.6131	15.8700	13.8100
$r \leq 3$	$r = 4$	7.1321	9.1600	7.5300

---

*B. Cointegration LR Test Based on Trace of the Stochastic Matrix*

<i>Null</i>	<i>Alternative</i>	<i>Statistic</i>	<i>95% Critical Value</i>	<i>90% Critical Value</i>
$r = 0$	$r = 1$	73.4919	53.4800	49.9500
$r \leq 1$	$r = 2$	33.9821	34.8700	31.9300
$r \leq 1$	$r = 3$	16.7451	20.1800	17.8800
$r \leq 3$	$r = 4$	7.1321	9.1600	7.5300

---

*C. Estimated Cointegrated Vectors in Johansen Estimation (Normalized in Brackets)*

<i>Vector</i>	<i><math>P_t</math></i>	<i><math>GNP_t</math></i>	<i><math>ER_t</math></i>	<i><math>IMP_t</math></i>	<i>Intercept</i>
1	-1.5039 (-1.0000)	-.37097 (-.24668)	.74569 (.49585)	1.2958 (.86167)	6.6821 (4.4433)

Panel 3 presents the estimated cointegrating vector. The coefficients in parenthesis are normalized on the CCPI. The coefficients of real GNP, exchange rate and import price index have the expected sign and is of reasonable magnitude, providing evidence in support of a long run relationship between real GNP, exchange rates and import prices.

Table 6 presents the computed test statistics for the monthly data. The maximal eigenvalue and trace statistics indicate the existence of a unique cointegrating vector. The estimated coefficient exchange rate is correctly signed and is of reasonable magnitude. The results are therefore consistent with those obtained under the Engle Granger (1987) technique. The results point to the importance of the exchange rate in price level movements in Sri Lanka.

**Table 6**  
**Johansen Cointegration Tests for Monthly Data**

*A. Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix*

<i>List of Variables included in the cointegrating vector: <math>P_t, ER_t</math>, Intercept</i>				
<i>Null</i>	<i>Alternative</i>	<i>Statistic</i>	<i>95% Critical Value</i>	<i>90% Critical Value</i>
$r = 0$	$r = 1$	49.4800	15.8700	13.8100
$r \leq 1$	$r = 2$	8.5755	9.1600	7.5300

*B. Cointegration LR Test Based on Trace of the Stochastic Matrix*

<i>Null</i>	<i>Alternative</i>	<i>Statistic</i>	<i>95% Critical Value</i>	<i>90% Critical Value</i>
$r = 0$	$r = 1$	60.0555	20.1800	17.8800
$r \leq 1$	$r = 2$	8.5755	9.1600	7.5300

*C. Estimated Cointegrated Vectors in Johansen Estimation (Normalized in Brackets)*

<i>List of Variables included in the cointegrating vector: <math>P_t, ER_t</math>, Intercept</i>				
<i>Vector</i>	$P_t$	$ER_t$	<i>Intercept</i>	
1	.40387 (-1.0000)	-.66173 (1.6385)	-.26606 (.65877)	
2	2.8906 (-1.0000)	-5.1597 (1.7850)	-1.0680 (.36947)	

## CONCLUSION

The results of this study suggest the importance of supply side factors as affecting the general level of prices in Sri Lanka, consistent with the studies of Nicholas (1990) and Nicholas and Yatawara (1991). A long run relationship is found between the price level, real GNP, the exchange rate and import prices. With the opening up of the economy, import prices and exchange rate movements appear to have a significant impact on the general level of prices. Alexius (1997), studying the case of Sweden, finds that in a small open economy such as Sweden that the nominal exchange rate and import prices are central factors in influencing the level of prices. The effects of exchange rate movements on import prices are influenced by country size according to Alexius. The country size argument could also perhaps be applied to Sri Lanka. The results suggest the importance of money supply in influencing the general level of prices in the long run. In contrast to the studies of Gunasinghe (2005) and Luintel (2002), the present study implies

that the price level can be controlled via the money stock in the long run. The results also indicate that the current price level depends on the lagged price level in the short run. Hence the rate of interest can be used to control the rate of inflation in the short run.

### ACKNOWLEDGMENT

The author would like to thank two anonymous referees for valuable comments.

### NOTES

1. Monetarist models of inflation for less developed countries can be found in the works of Harberger (1963), Vogel (1974), Bomberger and Makin (1979), Saini (1982, 1984), and Rao, Fahimuddin and Bajpai (1996), Masih and Masih (1998).
2. Several studies on inflation have incorporated exchange rates and foreign prices as additional variables – Diz (1970), Lowinger (1978), Nugent and Glezakos (1979), Sheehey (1979), Saini (1984), Moser (1995) – in some cases primary explanatory variables. See Otani (1975), Aigbokhan (1991), Gali and Monacelli (2005).
3. The effects of changes in money supply are not instantaneously reflected in prices. Therefore  $M_{t-1}$  is designed to capture the lagged response of prices to money supply.  $P_{t-1}$  is incorporated to capture the lagged effects of prices on current prices. The limited number of observations precludes the use of too many lagged variables. Theoretical justification for the inclusion of lagged variables of money supply can be found in the works of Harberger (1963), Diz (1970), Saini (1982, 1984), Bomberger and Makin (1979).

### REFERENCES

- Aigbokhan B. E., (1991), "The Naira Exchange Rate Depreciation and Domestic Inflation", *Indian Journal of Economics*, **71**, 507-517.
- Alexius A., (1997), "Import Prices and Nominal Exchange Rates in Sweden", *Finnish Economic Papers*, **10**, 99-107.
- Bomberger W. A., and Makinen G. E., (1979), "Some Further Tests of the Harberger Inflation Model Using Quarterly Data", *Economic Development and Cultural Change*, **27**, 629-644
- Central Bank of Sri Lanka, *Annual Report: Various Issues*, Central Bank of Sri Lanka, Colombo.
- Davidson R., and MacKinnon J. G., (1993), *Estimation and Inference in Econometrics*, Oxford University Press: Oxford.
- Diz A. C., (1970), "Money and Prices in Argentina 1935-1962", In Meiselman D., (Ed), *Varieties of Monetary Experience*, University of Chicago Press: Chicago.
- Engle R. F., and Granger C. W. C., (1987), "Co-integration and Error Correction: Representation, Estimation and Testing", *Econometrica*, **55**, 251-276.
- Fisher G. R., and MacAleer M., (1981), "Alternative Procedures and Associated Tests of Significance for Non-Nested Hypotheses", *Journal of Econometrics*, **16**, 103-119.
- Gunasinghe W. I., (2005), "Does Excess Money Supply Generate Inflation in the Short Run? Money in the Utility Function Approach", *Sri Lanka Economic Journal*, **6**, 41-72.
- Harberger A. C., (1963), "The Dynamics of Inflation in Chile", In: Christ, C. *et al.*, (Eds), *Measurement in Economics: Studies in Mathematical Economics and Econometrics in Memory of Yehuda Grunfeld*, Stanford University Press: CA.

- International Monetary Fund, *International Financial Statistics*, IMF: Washington D.C.
- Johansen S., (1988), "Statistical Analysis of Cointegration Vectors", *Journal of Economic Dynamics and Control*, **12**, 231-254.
- Johansen S., and Juselius K., (1990), "Maximum Likelihood Estimation and Inference on Cointegration – with Applications to the Demand for Money", *Oxford Bulletin of Economics and Statistics*, **52**, 169-210.
- Lowinger T. C., (1978), "Domestic Inflation and Exchange Rate Changes: The Less-Developed Countries' Case", *Weltwirtschaftliches Archiv*, **114**, 85-99.
- Luintel K. B., (2002), "Exogeneity of Money and Its Policy Implications for Price Control: Evidence from South Asia", *Pacific Economic Review*, **7**, 505-17.
- Masih A. M. and Masih R., (1998), "Does Money Cause Prices, or the Other Way Around? Multi-country Econometric Evidence Including Error-Correction Modelling from South-East Asia", *Journal of Economic Studies*, **25**, 138-60.
- Moser G. G., (1995), "The Main Determinants of Inflation in Nigeria," *IMF Staff Papers*, **42**, 270-289,
- Nicholas H. V. B., (1990), "Inflation in Sri Lanka 1971-87: A Preliminary Study," *Macroeconomic Series*, **3**, Institute of Policy Studies: Colombo.
- Nicholas H. V. B. and Yatawara R. A., (1991) "Inflation in Sri Lanka in 1990", *Institute of Policy Studies Working Paper*, **2**, Institute of Policy Studies: Colombo.
- Nugent J. B. and Glezakos C., (1979), "A Model of Inflation and Expectations in Latin America," *Journal of Development Economics*, **6**, 431-446.
- Otani I., (1975), "Inflation in an Open Economy: A Case Study of the Philippines", *IMF Staff Papers*, **22**, 750-774.
- Rao B. B. Fahimuddin, and Bajpai D. K., (1997), "The Relationship Between the Price Level, Money and Output in India", Unpublished Manuscript.
- Saini K. G., (1982), "The Monetarist Explanation of Inflation: The Experience of six Asian Countries", *World Development*, **10**, 871-884.
- Saini K. G., (1984), "Can Monetary Growth Explain Inflation in India", *Indian Economic Journal*, **32**, 61-71.
- Sheehey E. J., (1979), "On the Measurement of Imported Inflation in Developing Countries", *Weltwirtschaftliches Archiv*, **115**, 68-79.
- Vogel R., (1974), "The Dynamics of Inflation in Latin America 1950-1969", *American Economic Review*, **64**, 102-114
- Weeresekera, (1992), "Inflation in Sri Lanka: A Causality Analysis", *South East Asian Central Banks Centre Staff Paper*, **46**: South East Asian Central Banks Research and Training Centre: Kuala Lumpur.