Are Fiscal and Monetary Expansion Effective in Sri Lanka?

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Abstract: Based on an extended Mundell-Fleming model, this article finds that fiscal expansion reduces output and leads to real appreciation of the rupee whereas monetary expansion raises output and results in real depreciation of the rupee. Hence, except for the effect of fiscal expansion on output, the predictions of the Mundell-Fleming model are applicable to Sri Lanka.

JEL Classification: F41, E52, E62

Keywords: fiscal policy, monetary policy, exchange rates,Mundell-Fleming model

Introduction

Sri Lanka's economy exhibited both strengths and concerns. The growth rate of real GDP has been greater than 3.0% since 2002. After the global financial crisis, the growth rates of real GDP were greater than 8.0% during 2010-2012, suggesting that its economy recovered rapidly. The inflation rate went as high as 22.56% in 2008 but declined to a low of 2.14% in 2018 mainly because the Central Bank of Sri Lanka has adopted flexible inflation targeting (FIT) to pursue price stability. The rupee-US dollar exchange rate has shown a long-term rising trend from 16.53 rupees per U.S. dollar in 1980 to 162.46 rupees per U.S. dollar in 2018, suggesting that the rupee has become weaker versus the U.S. dollar and that exports would increase due to less expensiveexported products.The central government of Sri Lanka has engaged in expansionary fiscal and monetary policy to stimulate its economy when it is needed. For example, during the global financial crisis in 2008-2009, the central government increased deficit spending from 6.13% of GDP in 2008 to 8.61% of GDP in 2009. Its government debt as a percent of GDP rose from 71.1% in 2008 to 75.2% in 2009. Monetary easing caused the lending rate to drop from 19.17% in 2008 to 11.12% in 2009. M2 money also rose 19.85% during 2008-2009 to provide more liquidity to the market.

This paper attempts to examine whether the Mundell-Fleming model (Mundell, 1963, 2001; Fleming, 1962; Frenkel and Razin, 1987; Obstfeld, 2001;

Frankel, 2005) may be applicable to Sri Lanka. The Mundell-Fleming model predicts that under a floating exchange rate system, fiscal expansion does not affect output whereas monetary expansion raises output and that fiscal expansion leads to real appreciation whereas monetary expansion results in real depreciation. The Mundell-Fleming model also predicts that under a fixed exchange rate, fiscal expansion raises output whereas monetary policy does not affect output. Sri Lanka has adopted a floating exchange rate system since 2001 (Central Bank of Sri Lanka, 2019).It would be interesting to testempirically if these predictions may be applicable to Sri Lanka. The unique features of this paper are to extend the IS-LM model by incorporating the real exchange rate in the money demand function and the stock market index in the IS^* and LM^* functions and to treat output and the real exchange rate as endogenous variables (Romer, 1996; Mankiw, 2019). The real exchange rate may affect real money demand due to the substitution effect and the wealth effect (Arango and Nadiri, 1981). A higher stock value tends to increase consumption and investment spending due to the wealth effect, the balance sheet channel and Tobin's q theory (Mishkin, 1995).

Literature Survey

Several recent studies have applied the Mundell-Fleming or other macroeconomic models to examine the impacts of fiscal policy, monetary policy and other policies on output and other macroeconomic variables for Sri Lanka and related countries.

Based on a sample of 44 countries including many developed and developing countries, Ilzetzki, Mendoza, and Végh (2010) revealed that the effect of fiscal expansion depends on the exchange rate regime, government debt, trade openness, and the development stage. The fiscal multiplier was zero under a floating exchange rate, relatively large under a predetermined exchange rate, negative in countries with a high level of debt, and greater in closed economies than in open economies. The effect of fiscal expansion was greater in industrialized countries than in developing countries.

Based on a sample of 61 countries including Sri Lankaduring 1951-2007 and using the panel data technique including the fixed effect and the random effect, Karras (2011) found that the estimated long-run fiscal multiplier ranged from 1.21 to 1.53 in the full sample, from 1.44 to 2.43 for countries with fixed exchange rates, and from 0.98 to 1.39 for countries with floating exchange rates. Hence, fiscal multipliers were more effective under fixed exchange rates than under floating exchange rates. Based on a sample of 179 developing and developed countries including Sri Lanka during 1970-2011, Karras (2014) also showed that the domestic multiplier was much higher in the least open economies than in the most open economies whereas

the spillover effect was much greater in the most open economies than in the least open economies. These results suggest that there would be a tradeoff between the domestic multiplier and the spillover effect in the least open and most open economies.

Tang, Liu and Chung (2013) investigated fiscal multipliers for 5 ASEAN countries based on different models. The impact of a tax cut on GDP ranged from 0.09 to 1.40 whereas the impact of government spending on GDP ranged from -0.42 to +0.42. These results suggest that a tax cut worked better and that more government spending may help or hurt output.

Jeong, Kang and Kim (2017) investigated the effect of fiscal expansion on output, the exchange rate and the trade balance based on an extended Mundell-Fleming model. According to their findings, fiscal multipliers were much greater than 1. Expansionary fiscal policy has become more effective in Korea and Japan than China. China's multiplier was larger than Japan's multiplier. Higher fiscal multipliers were affected by monetary policy, the exchange rate policy and institutional factors. Under a flexible exchange rate, fiscal expansion caused real depreciation and improved the trade balance.

Kesavarajah (2017) examined the effect of government deficits on economic growth in Sri Lanka based on a sample during 1970-2015. He found that more government deficits reduced economic growth mainly because of unproductive government spending on subsidies, interest payment, etc. and because of its impacts on interest rates, inflation and exchange rates. More government deficits resulted in a higher interest rate, a higher inflation rate if it is monetized by the central bank, and appreciation of the rupee, which would reduce private spending and exports. Therefore, policymakers need to reduce government deficits in order to pursue higher economic growth.

Ghazanchyan (2014) examined the transmission mechanisms of monetary policy in Sri Lanka. The policy rate or the monetary aggregate was the instrument for the central bank to use. The interest rate channel had the strongest impact after two quarters. The bank lending channel had a significant effect on output and prices with lags of five or more quarters. The exchange rate channel was ineffective in changing output and prices. These results suggest that the interest rate and banking lending channels were effective in affecting output and/or inflation.

Applying time series techniques and based on a sample during 2002-2014, Maitra and Debnath (2015) found that more money supply raised output and prices, a higher interest rate reduced output and stabilized prices, depreciation of the rupee caused output to decline and prices to rise. Hence, monetary policy was effective.

Using the restricted and unrestricted VAR model and a sample during 1990.M1 – 2012.M12, Perera (2016) examined the impacts of monetary policy variables such as M1 money and the monetary policy rate on real GDP and the CPI in Sri Lanka. He found that monetary policy was pretty effective in affecting real GDP and the CPI and that bank credit, asset prices and exchange rates were the transmission channels through which monetary policy affected target variables.

In studying the impacts of monetary policy in Sri Lanka based on a sample during 2003-2012, Abeygunawardana, Amarasekara and Tilakaratne (2017) found that there was a strong transmission of the policy rate into government securities yields and money market rates. The transmission was slower and smaller in the bank interest rate. The transmission into the real sector and the general price level was relatively weak. The weak transmission was mainly due to accommodation of monetary policy to fiscal expansion, shallow financial markets, a large informal sector, and less flexible interest rates on loans and deposits.

The Theoretical Model

Suppose that real GDP is a function of real income, government taxes, government spending, the real interest rate, the value of financial stocks and the real exchange rate and that real money demand is influenced by the nominal interest rate, real GDP, the real exchange rate and the value of financial stocks. The goods market and money market equilibrium can be expressed as:

$$Y = x(Y, T, G, R - \pi^e, S, \varepsilon) \tag{1}$$

$$M/P = w(R, Y, \varepsilon, S) \tag{2}$$

where

Y = real GDP in Sri Lanka,

T = government tax revenue,

G = government spending,

R = the nominal interest rate,

π^e = the expected inflation rate,

S = the stock market index,

ε = the real exchange rate measured as the units of the rupee per U.S. dollar,

M = nominal money supply, and

P = the price level.

Solving for Y and ε simultaneously, we have:

$$\overline{Y} = \overline{Y}(G - T, M/P, R - \pi^e, S) \tag{3}$$

$$\overline{\varepsilon} = \overline{\varepsilon}(G - T, M/P, R - \pi^e, S) \tag{4}$$

The Jacobian for the two endogenous variables can be written as:

$$|J| = [-w_\varepsilon(1 - x_Y) - w_Y x_\varepsilon) < 0 \; if \; w_\varepsilon > 0. \tag{5}$$

The partial derivative of $\overline{Y}$ with respect to $G - T$ is given by:

$$\partial \overline{Y}/\partial G - \partial \overline{Y}/\partial T = [-w_\varepsilon x_G - (-w_\varepsilon x_T)]/|J| > 0 \; if \; w_\varepsilon x_G > w_\varepsilon x_T. \tag{6}$$

The partial derivative of $\overline{Y}$ with respect to M can be expressed as:

$$\partial \overline{Y}/\partial M = -P^{-1} x_\varepsilon /|J| > 0. \tag{7}$$

The respective effects of a change in (G – T) and M on $\overline{\varepsilon}$ are:

$$\partial \overline{\varepsilon}/\partial G - \partial \overline{\varepsilon}/\partial T = (x_G - x_T)w_Y /|J| < 0 \; if \; x_G > x_T. \tag{8}$$

$$\partial \overline{\varepsilon}/\partial M = -P^{-1}(1 - x_Y)/|J| > 0. \tag{9}$$

These analyses indicate that fiscal expansion may raise output and lead to real appreciation under certain conditions and that monetary expansion tends to raise output and result in real depreciation.

Empirical Results

The data were collected from the *International Financial Statistics*, the *World Economic Outlook*, the Federal Reserve Bank of St. Louis, and the Central Bank of Sri Lanka. Real GDP is measured in million rupees. Government borrowing as a percent of GDPis chosenfor fiscal policy (G – T). Real M1 money measured in million rupees is selected to represent real money supply. The government bond yield minus the expected inflation rate is used for the real interest rate.The lagged inflation rate is used to measure the expected inflation rate. The Colombo stock exchange index is selected to measure the stock price. The sample consists of annual data ranging from 1995 to 2018. Earlier data for the stock market index and M1 money are not unavailable.

An analysis of Figure 1 seems to indicate that more government borrowing as a percent of GDP caused real GDP to decline during the sample period. Figure 2 appears to suggest that more real M1 money raised real
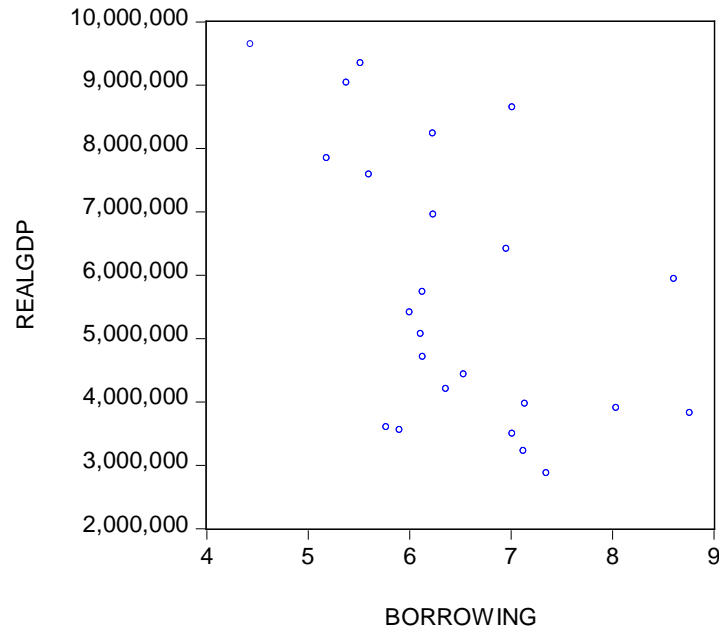
Figure 1: Scatter Diagram between Real GDP (REALGDP) and government borrowing as a percent of GDP (BORROWING)
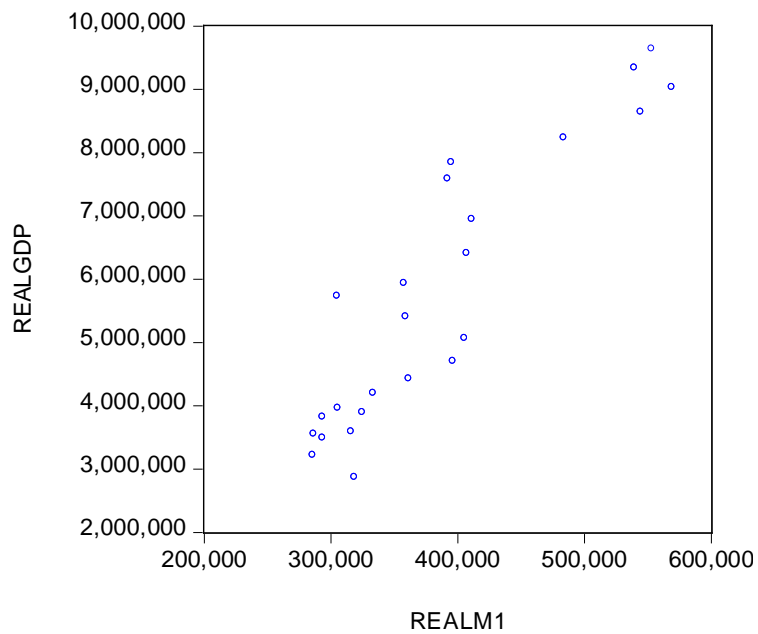

Figure 2: Scatter Diagram between Real GDP (REALGDP) and Real M1 money (REALM1)

GDP during 1995-2018. These relations will be formally tested when controlled variables are included in the regression analysis.

Table 1 presents estimated regressions and related statistics. Real GDP, the real exchange rate, real M1 money, and the stock market index are measured on a log scale to avoid a high degree of multi collinearity. Government borrowing as a percent of GDP and the real interest rate are not transformed to the log scale due to actual or potential negative values before or after the transformation. To correct for potential autoregressive conditional heteroskedasticity, the GARCH process is employed in empirical work. The coefficients of the variance equation are significant at the 1% level, suggesting that the GARCH process is appropriate. In the estimated regression for real GDP, approximately 91.41% of the change in real GDP can be explained by the four exogenous variables. The estimated coefficients are significant at the 1% level. Real GDP is negatively associated with government borrowing as a percent of GDP and the real interest rate and positively influenced by real M1 money and the stock market index. These results suggest that fiscal expansion is ineffective in raising real GDP whereas monetary expansion is effective in increasing real GDP. The negative and significant coefficient of government borrowing as a percent of GDP may suggest that the negative crowding-out effect overwhelms the positive effect of increased deficit-financed government spending. The positive significant coefficient of the stock value suggests that a higher stock value would increase consumption and investment spending due to the wealth effect, the balance sheet channel and Tobin's q theory.

In the estimated regression for the real exchange rate, the four right-hand side variables can explain 68.09% of the variation in real GDP. All the estimated coefficients are significant at the 1% level. The real exchange rate has a negative relation with government borrowing as a percent of GDP,the real interest rate and the stock market index and a positive relation with real M1 money.The negative significant coefficient of the real interest rate indicates that a higher real interest rate in Sri Lanka tends to attract international capital inflows, increase the demand for the Rupee, and cause real appreciation. These findings imply that fiscal expansion causes real appreciation of the rupee whereas monetary expansion leads to real depreciation of the rupee.

To sum up, empirical results in this study are consistent with the predictions of the Mundell-Fleming model under a floating exchange rate system except that fiscal expansion reduces output whereas the Mundell-Fleming model predicts that fiscal expansion does not affect output. The major reason for the different results is that this paper assumes that the real

Table 1
Estimated Regressions for Real GDP and the Real Exchange Rate

	Log (Real GDP)	Log (Real Exchange Rate)
Constant	7.5572	2.9238
	(73.6791)	(3.5599)
Government borrowing as a percent of GDP	-0.0206	-0.0243
	(-26.6795)	(-6.1332)
Log (Real M1 money)	0.4794	0.2919
	(52.0527)	(3.9348)
Real interest rate	-0.0011	-0.0069
	(-3.2988)	(-2.9226)
Log (Stock market index)	0.2489	-0.2108
	(93.0438	(-9.8801)
R-squared	0.9141	0.6809
Adjusted R-squared	0.8960	0.6137
Akaike information criterion	-1.4070	-2.3402
Schwarz criterion	-1.0634	-1.9476
Sample period	1995-2018	1995-2018
Number of observations	24	24

Notes:　An increase in the real exchange rate means real depreciation of the rupee.

Numbers in the parentheses are z-statistics. All the coefficients are significant at the 1% level.

exchange rate tends to affect real money demand whereas the Mundell-Fleming model postulates that real money demand is not affected by the real exchange rate. In comparison, the results for fiscal policy in this study are consistent with Ilzetzki, Mendoza, and Végh (2010) and Kesavarajah (2017), and the findings for monetary policy are in line with Maitra and Debnath (2015) and Perera (2016).

Summary and Conclusions

This paper has examined whether the predictions of the Mundell-Fleming model would apply to Sri Lanka based on a sample during 1995-2018. Under a floating exchange rate system, the Mundell-Fleming model predicts that fiscal expansion is ineffective in increasing output and tends to cause real appreciation of the rupee and that monetary expansion is effective in raising output and tends to cause real depreciation of the rupee. The findings of this paper support the predictions of the Mundell-Fleming model except that fiscal expansion reduces output.

There are several policy implications. Sri Lanka may need to pursue fiscal discipline in considering increasing the government deficit as it tends

to reduce output and cause real appreciation of the rupee, which would reduce exports and job opportunities in that sector.

In comparison, monetary expansion seems to yield better outcomes as it tends to increase output and cause real depreciation of the rupee, which would stimulate exports and create more job opportunities in that sector. The stock market plays important roles. As the stock value rises, household wealth increases, consumers tend to spend more due to the wealth effect, and output would increase. A higher stock price tends to encourage businesses to invest more through the balance sheet channel and Tobin's q theory. A higher stock price tends to cause real appreciation of the rupee, which would increase international capital inflows and aggregate demand.

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