

**IMMEDIATE  
ATTENTION**

SM/14/208

July 9, 2014

To: Members of the Executive Board

From: The Secretary

Subject: **Sri Lanka—Selected Issues**

This paper provides background information to the staff report on the 2014 Article IV consultation and second post-program monitoring discussion with Sri Lanka (EBS/14/90, 7/9/14), which is being considered on a lapse of time basis. At the time of circulation of this paper to the Board, the authorities of Sri Lanka have indicated that they need more time to consider whether they will consent to the Fund's publication of this paper. Publication will only proceed upon the receipt by the Fund of the member's explicit consent. Any requests for modifications for publication are expected to be received two days before the Board concludes its consideration.

Questions may be referred to Mr. Jonas (ext. 38674) and Mr. Ghazanchyan (ext. 37689) in APD.

Unless the Documents Section (ext. 36760) is otherwise notified, the document will be transmitted, in accordance with the procedures approved by the Executive Board and with the appropriate deletions, to the WTO Secretariat on Thursday, July 17, 2014; and to the Asian Development Bank, the Food and Agriculture Organization, the United Nations Development Programme, and the World Food Programme, following its consideration by the Executive Board.

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## SRI LANKA

### SELECTED ISSUES

July 9, 2014

### EXECUTIVE SUMMARY

The first chapter on monetary policy transmission examines the channels through which innovations to policy variables—policy rate or monetary aggregates—affect such macroeconomic variables as output and inflation in Sri Lanka. The effectiveness of monetary policy instruments is judged through the prism of conventional policy channels (money/interest rate, bank lending, exchange rate, asset price channels) in VAR models, and the timing and magnitude of these effects are assessed using impulse response functions, and through the pass-through coefficients from policy to money market and lending rates.

Our results show that (i) interest rate channel (money view) has the strongest Granger effect on output with 0.6 percent decrease in output after the second quarter and a cumulative 0.5 percent decline within a 3 year period in response to innovations in the policy rate; (ii) the contribution from the bank lending channel is statistically significant (adding another 0.2 percentage points to the baseline effect of policy rates) in affecting both output and prices but with a lag of about 5 quarters for output and longer for prices; (iii) the exchange rate and asset price channels are inoperative and do not have Granger effects on either output or prices.

The second chapter takes a fresh look at the public debt reduction strategy. It asks two questions: (i) what has been driving the increase and subsequent decline in Sri Lanka's public debt? (ii) Is Sri Lanka's public debt too high, and if yes, how much, how fast and how should it be reduced?

The chapter finds that, until recently, favorable interest rate-growth differential reflecting the combination of relatively high real GDP growth and low real interest rates on public debt has worked to reduce the debt ratio, even as primary deficits and occasional currency depreciation pushed the ratio in the opposite direction. More recently, however, the average borrowing costs began to increase, reflecting the reduced role of concessional financing and increased resort to market borrowing. Thus, debt reduction became more dependent on real growth and stronger primary balance, and this trend is likely to continue. The chapter documents that Sri Lanka's public debt is one of the highest among the emerging economies, particularly when measured against the relatively low revenues, and suggests that the authorities target its gradual reduction to 50 percent of GDP, relying mainly on revenue measures. This target is more ambitious than the authorities' medium-term objective of reducing the debt ratio to 60 percent of GDP, but it is considered by staff as prudent.

Approved By  
Asia and Pacific  
Department

Prepared By Manuk Ghazanchyan, Jiri Jonas, and Todd Schneider.

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# MONETARY POLICY TRANSMISSION MECHANISM IN SRI LANKA<sup>1</sup>

## A. Background

**1. Recent experience with monetary policy easing in Sri Lanka has focused attention on the efficacy of monetary transmission channels.** Emphasis has been put on a more accommodative monetary stance to support growth, but at the same time there has been a slow pass-through from policy rates to lending rates, and private credit growth has steadily declined. In this context, the concern is how effective are adjustments to monetary policy instruments in effecting changes to such macroeconomic variables as aggregate output and prices. Questions arise on two fronts: (i) which transmission channels or combination of them (money/interest rate, bank lending, exchange rate, asset price channels) are likely to be most effective in transmitting policy changes to output and prices; and (ii) what is the timing and magnitude of the effects of policy changes on macroeconomic variables given the strength of the transmission mechanism.

**2. This paper builds on previous work (Annex I) and investigates monetary transmission mechanisms in Sri Lanka, and discusses possible policy ramifications.** The paper adopts the following approach.

- Section II examines the first steps in the transmission mechanism—relating changes in the policy rate to changes in money market and lending and deposit rates<sup>2</sup>.
- Section III assesses the role of each channel by using a Vector Autoregressive (VAR) model which includes a specific variable for that channel (Annex II). For example, to assess the role of bank lending channel, the stock of bank credit or bank lending rate is amongst the endogenous variables in the VAR. The significance (and timing effects) are tested both in a Granger causality set-up and through Impulse Response Functions (IRF)<sup>3</sup>.
- Section IV adopts an alternative simulation by comparing IRFs for two models of monetary policy impact on output and prices. In one, each channel of monetary transmission is permitted to respond endogenously to a monetary policy shock. In the other, the monetary transmission mechanism will be treated as an exogenous variable<sup>4</sup>. The difference between the two IRFs provides a measure of the quantitative strength of each transmission channel.

<sup>1</sup> Prepared by Manuk Ghazanchyan and Todd Schneider with helpful discussions and comments by Jiri Jonas. Qianqian Zhang and Xingwei Hu provided outstanding support.

<sup>2</sup> Mishra, Montiel and Spilimbergo (2010), Mishra and Montiel (2013).

<sup>3</sup> Augmented by Toda-Yamamoto (1995) technique to accommodate uncertainty about the correct order of integration.

<sup>4</sup> Ramey (1993); Disyatat and Vongsinsiriku (2003).

- Section V uses a 8-variable VAR model to try to explain the scope of the bank lending channel in neutralizing the policy signals on output and the role of T bill rates in inflation formation.
- Section VI concludes with a brief discussion of policy implications.

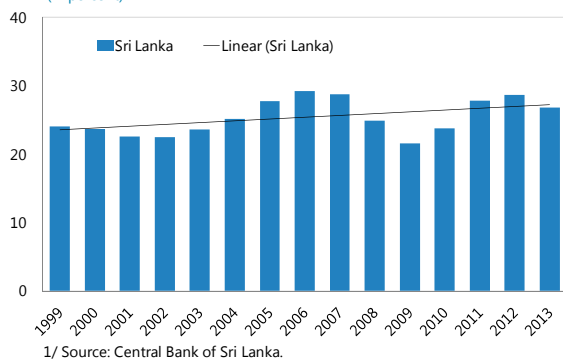
**3. The main results of this exercise are as follows: (i) no other channel is as strong as the interest rate channel in Sri Lanka.** In particular, the exchange rate and asset price channels are inoperative and do not have Granger effects on either output or prices; (ii) the bank lending channel in its impact on output is operational but with a lag of about 5 quarters; and (iii) the bank lending channel can explain inflation dynamics in Sri Lanka. The impact of bank lending on inflation is strongest within 5–10 quarters.

## B. Current Challenges

**4. Banks are the dominant financial intermediaries in Sri Lanka. This suggests that the bank lending channel should be the main vehicle for monetary policy transmission. However, rigidities limit the effectiveness of bank lending in servicing the economy's demand for capital.** The core problem (highlighted both by the monetary authorities and empirical studies) is imperfect links between policy rates and domestic and international capital markets. The decision making process by private agents is confounded by imperfect signals in the term structure of interest rates and in the money and capital markets. Also, a lack of effective competition inhibits the effectiveness of bank lending channel. The following factors are particularly important:

- **The presence of “excess liquidity” can interfere with monetary policy transmission.** Excess liquidity hinders the pass-through from policy rate adjustments to bank lending because the marginal increase in the policy rate may not tempt banks to raise their lending rates. The ratio of bank loans to GDP has not changed significantly during the period of study (the average has remained close to 25 percent over time) though the post-war average ratio is slightly higher reaching 27 percent (Figure 1).

**Figure 1. Sri Lanka: Bank loans to GDP**  
(In percent)



**Figure 2. Sri Lanka: Selected Financial Indicators**

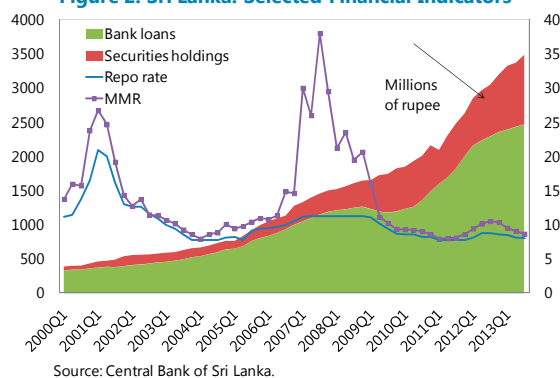


Figure 3. Sri Lanka: Banks' Liquid Asset Holdings

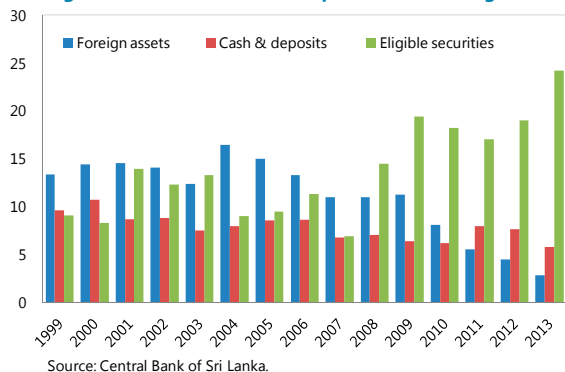
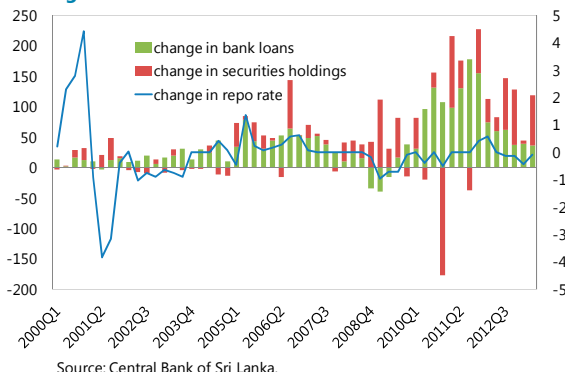
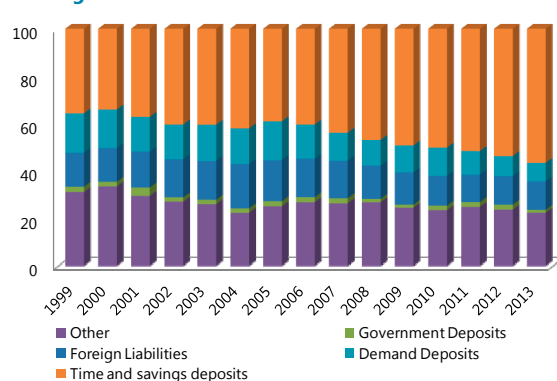


Figure 4. Sri Lanka: Selected Financial Indicators



- Banks' asset composition has shifted from loans to liquid assets (securities) hindering an effective response from the banking sector to monetary policy signals (Figures 2, 3 and 4).** Over the past 10 years, banks' composition of assets shifted toward holding government securities. This situation can also be described as one of "excess liquidity" insofar as banks (owing to moral suasion and a guaranteed rate of return rather than assuming the risk of new assets) choose not to lend at higher rates and instead maintain higher levels of securities. Figure 4 shows that the change in securities holdings prevails even after changes in the policy rate. Only significant increases in policy rates that would also adjust upwards the money market and bond yields would require the banks to revert to financing themselves with deposits and increase deposit rates.
- Only significant increases in policy rates that would also adjust upwards the money market and bond yields would require the banks to revert to financing themselves with deposits and increase deposit rates.** This is also evidenced with banks using increasingly other forms of funding—bond market and foreign borrowing. Figure 5 shows that the share of deposits has not much increased in the last 15 years while the share of demand deposits in total deposits has significantly declined recently.
- There is a weak correlation between central bank policy actions and money market and bank lending and deposit rates in Sri Lanka.** Both money market and lending and deposit rates react slowly to policy changes, thus hindering an effective transmission

Figure 5. Sri Lanka: Banks' Liabilities





mechanism<sup>5</sup> (Tables 1a and 1b and Table 2)<sup>6</sup>. For example, an increase in the policy rate by one percentage point increases the money market rate by only 0.35 percentage points, and an increase in the money market rate by one percentage point increases lending and deposit rates by only 0.68 and 0.19 percentage points, respectively. By contrast, in Malaysia an increase in the policy rate by one percentage point increases the money market rate by about 0.94 percentage points, and an increase in the money market rate by one percentage point increases lending and deposit rates by 0.96 and 0.98 percentage points, respectively. However, the longer-term effects of policy changes on lending rates can be more significant in Sri Lanka, because the spread narrows over time (Figure 5).

- **The impact of policy and money market rates on long-term bond yields is weak.** We have also calculated both contemporaneous and longer term effects of policy and money market rates on bond yields for 3, 5 and 10 year maturities (Table 3). Results show that there is some perverse contemporaneous relationship between the policy rates and bond yields although this dissipates when using money market repo rate (see footnote 6). Regardless of the definition of repo rates, there is only long-run meaningful impact of policy and money market rates on bond yields.

<sup>5</sup> Following Mishra and Montiel (2010), we calculated the speed and magnitude of pass-through from policy rates to money market and lending rates as follows:

$$Y_{it} = \alpha y_{it-1} + \beta y_{it-2} + \gamma x_{it} + \delta x_{it-1} + \eta x_{it-2} + \epsilon_{it}$$

Where  $y$  is change in the affected rate and  $x$  the change in the impact rate. The short run effect is measured with  $\gamma$  and the long run impact by  $(\gamma + \delta + \eta)/(1 - \alpha - \beta)$ . Contemporaneous correlations are in the first column of Tables 1, 2 and 3. Coefficients in the tables show the pass-through from a one percentage point change in impact rates to affected rates. We analyze both the pass-through of changes in policy rates to money market rates and the pass-through from money market rates to lending and deposit rates.

<sup>6</sup> In Table 1b, we recalculated both contemporaneous and longer term correlations of money market rates following changes in money market repo rates as Sri Lankan authorities suggested. We find those correlations even weaker and thus our baseline inference did not change. In addition, the longer term impact of money market repo rates on bond yields is much weaker compared to the effects of policy repo rate (Table 3).

**Table1a. Sri Lanka: Correlations Between Changes in Repo Rate and Changes in Money Market and Securities Returns**

|                              | Contemporaneous | Short-term | Long-term |
|------------------------------|-----------------|------------|-----------|
| Change in repo rate          |                 |            |           |
| Change in call market rate   |                 |            |           |
|                              | 0.4343          | 2.5904     | 1.5013    |
| Change in repo rate          |                 |            |           |
| Change in WALR 1/            |                 |            |           |
|                              | 0.5515          | 0.8300     | 1.1278    |
| Change in repo rate          |                 |            |           |
| Change in prime lending rate |                 |            |           |
|                              | 0.6565          | 1.3707     | 1.1339    |
| Change in repo rate          |                 |            |           |
| Change in 3 month T bill     |                 |            |           |
|                              | 0.6198          | 0.7358     | 0.9649    |
| Change in repo rate          |                 |            |           |
| Change in 6 month T bill     |                 |            |           |
|                              | 0.6265          | 0.7586     | 0.9390    |
| Change in repo rate          |                 |            |           |
| Change in 12 month T bill    |                 |            |           |
|                              | 0.6290          | 0.5005     | 0.9369    |
| Change in repo rate          |                 |            |           |
| Change in deposit rate       |                 |            |           |
|                              | 0.3852          | 0.2063     | 0.8416    |

1/ Weighted average lending rate.

Source: IMF staff estimates.

**Table1b. Sri Lanka: Correlations Between Changes in Repo Rate and Changes in Money Market and Securities Returns 1/**

|                              | Contemporaneous | Short-term | Long-term |
|------------------------------|-----------------|------------|-----------|
| Change in repo rate          |                 |            |           |
| Change in call market rate   |                 |            |           |
|                              | 0.0739          | 0.1989     | 0.6556    |
| Change in repo rate          |                 |            |           |
| Change in WALR 2/            |                 |            |           |
|                              | 0.8838          | 0.5178     | 1.1988    |
| Change in repo rate          |                 |            |           |
| Change in prime lending rate |                 |            |           |
|                              | 0.4683          | 0.7779     | 1.1431    |
| Change in repo rate          |                 |            |           |
| Change in 3 month T bill     |                 |            |           |
|                              | 0.3890          | 0.5111     | 1.1735    |
| Change in repo rate          |                 |            |           |
| Change in 6 month T bill     |                 |            |           |
|                              | 0.5167          | 0.6527     | 1.1977    |
| Change in repo rate          |                 |            |           |
| Change in 12 month T bill    |                 |            |           |
|                              | 0.5336          | 0.6368     | 1.1952    |
| Change in repo rate          |                 |            |           |
| Change in deposit rate       |                 |            |           |
|                              | 0.3351          | 0.0611     | 0.7065    |

1/ Market repo rate is used for policy rate.

Data is available from 2004:3.

2/ Weighted average lending rate.

Source: IMF staff estimates.

**Table 2. Sri Lanka: Correlations Between Changes in the Money Market Rates and Changes in the Lending and Deposit Rates**

|                                  | Contemporaneous | Short-term | Long-term |
|----------------------------------|-----------------|------------|-----------|
| Change in call market rate       |                 |            |           |
| Change in prime rate             | 0.5915          | 0.4079     | 0.7449    |
| Change in call market rate       |                 |            |           |
| Change in WALR 1/                | 0.1989          | 0.1493     | 0.8240    |
| Change in call market rate       |                 |            |           |
| Change in deposit rate           | 0.0968          | 0.0228     | 0.3010    |
| 1/ Weighted average lending rate |                 |            |           |

Source: IMF staff estimates.

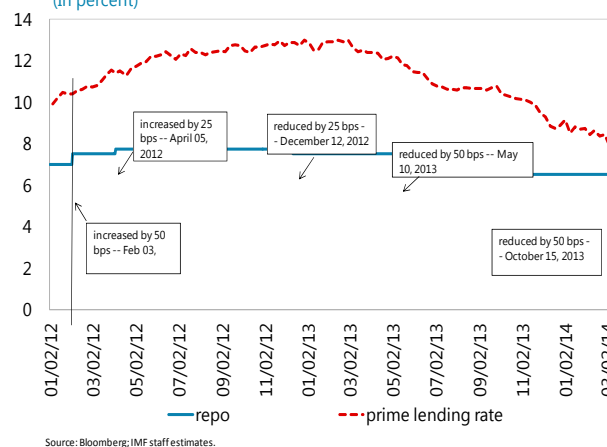
**Table 3: Impact of policy and money market rates on long-term domestic rates**

|                    | Repo rate and bond rates    |         |         |
|--------------------|-----------------------------|---------|---------|
|                    | 3 year                      | 5 year  | 10 year |
| Contemporaneous    | 0.7197                      | -0.0262 | -0.0398 |
| Short-term effects | 2.3665                      | 1.7195  | 1.5991  |
| Long-term effects  | 2.7527                      | 2.2041  | 1.7484  |
|                    | Market repo rate bond rates |         |         |
|                    | 3 year                      | 5 year  | 10 year |
| Contemporaneous    | 0.5444                      | 0.5176  | 0.4122  |
| Short-term effects | 0.8861                      | 0.6587  | 0.4188  |
| Long-term effects  | 1.1992                      | 0.9441  | 0.7022  |
|                    | Call market and bond rates  |         |         |
|                    | 3 year                      | 5 year  | 10 year |
| Contemporaneous    | 0.5708                      | 0.5347  | 0.4511  |
| Short-term effects | 0.5362                      | 0.4343  | 0.3354  |
| Long-term effects  | 0.7649                      | 0.7099  | 0.4241  |

Source: IMF staff estimates.

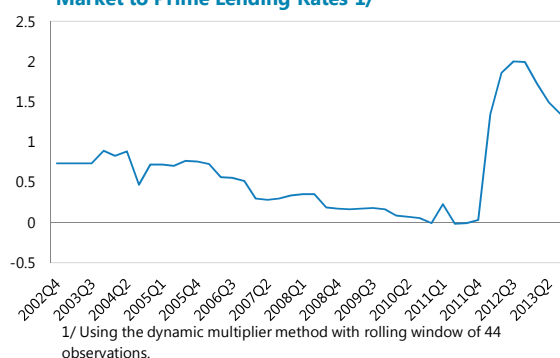
- **There have been significant shifts recently in the pass-through from policy rates to money market rates and lending and deposit rates in Sri Lanka (Figures 6 and 7).** The impact of money market rates on the spread between the lending and deposit rates has also been magnified recently, which only confirms our earlier observation that even though eventually the money market rates might move the lending rate, the change in the deposit rate is negligible as banks have abundant excess liquidity to counteract the policy change and have no short-term funding needs (Figures 8 and 9).

**Figure 6. Sri Lanka: Repo and Prime Lending Rate (In percent)**

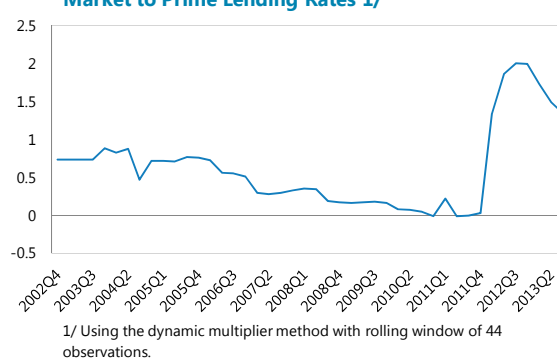


Source: Bloomberg; IMF staff estimates.

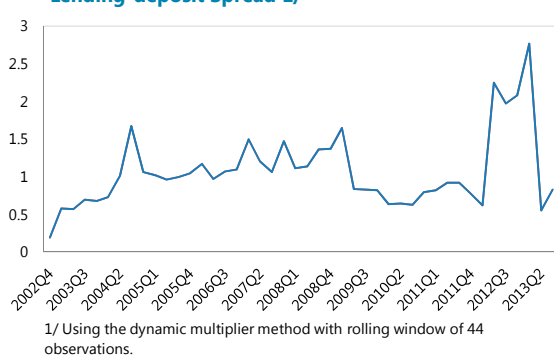
**Figure 7. Sri Lanka: The Pass-through from Money Market to Prime Lending Rates 1/**



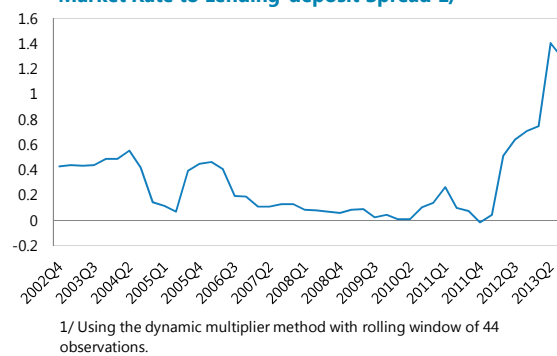
**Figure 8. Sri Lanka: The Pass-through from Money Market to Prime Lending Rates 1/**



**Figure 9. Sri Lanka: Pass-through from Repo Rate to Lending-deposit Spread 1/**



**Figure 10. Sri Lanka: Pass-through from Money Market Rate to Lending-deposit Spread 1/**



- In cross-country perspective, the weak contemporaneous impact of monetary policy adjustments is striking (Table 4 and Table 5).** Looking at ASEAN4 countries, India, and Vietnam, it is evident that almost in all cases (excluding India), the contemporaneous responses of market and lending rates to policy changes are very high, and for all rates the coefficients of pass-through for Sri Lanka are below average. Another interesting observation is that in all comparator countries, most of the pass-through from changes in the policy rates occurs contemporaneously, and then the impact fades away. In Sri Lanka the opposite appears true—the longer effects dominate.

Table 4. Selected Asian Countries. Correlations Between Changes in Repo Rate and Changes Money Market and Securities Returns

| India                      |            |           | Indonesia                  |            |           | Malaysia                   |            |           | Philippines                |            |           | Thailand                   |            |           | Vietnam                    |            |           | Average                    |            |           |
|----------------------------|------------|-----------|----------------------------|------------|-----------|----------------------------|------------|-----------|----------------------------|------------|-----------|----------------------------|------------|-----------|----------------------------|------------|-----------|----------------------------|------------|-----------|
| Contemporaneous            | Short-term | Long-term | Contemporaneous            | Short-term | Long-term | Contemporaneous            | Short-term | Long-term | Contemporaneous            | Short-term | Long-term | Contemporaneous            | Short-term | Long-term | Contemporaneous            | Short-term | Long-term | Contemporaneous            | Short-term | Long-term |
| Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           |
| Change in call market rate |            |           | Change in call market rate |            |           | Change in call market rate |            |           | Change in call market rate |            |           | Change in call market rate |            |           | Change in call market rate |            |           | Change in call market rate |            |           |
| 0.5265                     | 1.7019     | 1.2082    | 0.8336                     | 1.4617     | 1.1907    | 0.9905                     | 0.7196     | 1.0067    | 0.6580                     | 0.4204     | 0.3201    |                            |            |           |                            |            |           | 0.7521                     | 1.0759     | 0.9314    |
| Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           |
| Change in 3 month T bill   |            |           | Change in 3 month T bill   |            |           | Change in 3 month T bill   |            |           | Change in 3 month T bill   |            |           | Change in 3 month T bill   |            |           | Change in 3 month T bill   |            |           | Change in 3 month T bill   |            |           |
| 0.7843                     | 0.6396     | 1.0430    | 0.8360                     | 0.1867     | 0.2403    | 0.9390                     | 0.7937     | 0.9856    | 0.7272                     | 0.0225     | 0.4650    | 0.9835                     | 0.7249     | 0.9971    | 0.4119                     | 0.5218     | 0.4387    | 0.7803                     | 0.4815     | 0.6949    |
| Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           |
| Change in 6 month T bill   |            |           | Change in 6 month T bill   |            |           | Change in 6 month T bill   |            |           | Change in 6 month T bill   |            |           | Change in 6 month T bill   |            |           | Change in 6 month T bill   |            |           | Change in 6 month T bill   |            |           |
| 0.9222                     | 1.5566     | 1.1637    | 0.7570                     | 1.1999     | 0.9127    | 0.9489                     | 1.2848     | 1.1729    | 0.8489                     | 2.3765     | 1.0747    | 0.9943                     | 0.8536     | 0.9875    |                            |            |           | 0.8942                     | 1.4543     | 1.0623    |
| Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           |
| Change in 12 month T bill  |            |           | Change in 12 month T bill  |            |           | Change in 12 month T bill  |            |           | Change in 12 month T bill  |            |           | Change in 12 month T bill  |            |           | Change in 12 month T bill  |            |           | Change in 12 month T bill  |            |           |
| 0.8167                     | 0.5655     | 0.9777    | 0.8643                     | 1.5358     | 1.2294    |                            |            |           | 0.9239                     | 2.7643     | 1.7389    | 0.9926                     | 2.8410     | 2.7922    |                            |            |           | 0.8994                     | 1.9267     | 1.6846    |
| Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           | Change in repo rate        |            |           |
| Change in deposit rate     |            |           | Change in deposit rate     |            |           | Change in deposit rate     |            |           | Change in deposit rate     |            |           | Change in deposit rate     |            |           | Change in deposit rate     |            |           | Change in deposit rate     |            |           |
| 0.5862                     | 0.1854     | 0.6772    | 0.8865                     | 0.4185     | 1.2896    | 0.9033                     | 0.7422     | 0.7478    | 0.8856                     | -0.1239    | -0.0040   | 0.2919                     | 0.2602     | 0.4544    | 0.7133                     | 0.4913     | 0.2466    | 0.7111                     | 0.3289     | 0.5686    |

Source: IMF staff estimates.

Table 5. Selected Asian Countries. Correlations Between Changes in the Money Market Rates and Changes in the Lending and Deposit Rates 1/

| India                        |            |           | Indonesia                    |            |           | Malaysia                     |            |           | Philippines                  |            |           | Thailand                     |            |           | Vietnam                      |            |           | Average                      |            |           |
|------------------------------|------------|-----------|------------------------------|------------|-----------|------------------------------|------------|-----------|------------------------------|------------|-----------|------------------------------|------------|-----------|------------------------------|------------|-----------|------------------------------|------------|-----------|
| Contemporaneous              | Short-term | Long-term | Contemporaneous              | Short-term | Long-term | Contemporaneous              | Short-term | Long-term | Contemporaneous              | Short-term | Long-term | Contemporaneous              | Short-term | Long-term | Contemporaneous              | Short-term | Long-term | Contemporaneous              | Short-term | Long-term |
| Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           |
| Change in prime lending rate |            |           | Change in prime lending rate |            |           | Change in prime lending rate |            |           | Change in prime lending rate |            |           | Change in prime lending rate |            |           | Change in prime lending rate |            |           | Change in prime lending rate |            |           |
| 0.6578                       | 0.0368     | 0.1491    |                              |            |           | 0.9709                       | 0.6320     | 0.6740    | 0.4983                       | 0.0112     | -0.0311   |                              |            |           |                              |            |           | 0.7090                       | 0.2267     | 0.2640    |
| Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           |
| Change in WALR 2/            |            |           | Change in WALR               |            |           | Change in WALR               |            |           | Change in WALR               |            |           | Change in WALR               |            |           | Change in WALR               |            |           | Change in WALR               |            |           |
|                              |            |           | 0.9193                       | 0.2113     | 0.3437    | 0.8869                       | 0.6061     | 0.7103    | 0.4341                       | -0.0253    | 0.0917    |                              |            |           |                              |            |           | 0.7468                       | 0.2641     | 0.3819    |
| Change in money market rate  |            |           | Change in money market rate  |            |           | Change in money market rate  |            |           | Change in money market rate  |            |           | Change in money market rate  |            |           | Change in money market rate  |            |           | Change in money market rate  |            |           |
| Change in WALR               |            |           | Change in WALR               |            |           | Change in WALR               |            |           | Change in WALR               |            |           | Change in WALR               |            |           | Change in WALR               |            |           | Change in WALR               |            |           |
|                              |            |           |                              |            |           | 0.8898                       | 0.6111     | 0.7124    | 0.9247                       | 0.3246     | 0.9117    | 0.6918                       | 0.3356     | 0.4642    |                              |            |           | 0.8355                       | 0.4237     | 0.6961    |
| Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           | Change in call market rate   |            |           |
| Change in deposit rate       |            |           | Change in deposit rate       |            |           | Change in deposit rate       |            |           | Change in deposit rate       |            |           | Change in deposit rate       |            |           | Change in deposit rate       |            |           | Change in deposit rate       |            |           |
| 0.5740                       | 0.0384     | 0.2565    | 0.8933                       | 0.1890     | 0.6814    | 0.9791                       | 0.8171     | 0.8558    | 0.4102                       | -0.0892    | -0.0418   |                              |            |           |                              |            |           | 0.7142                       | 0.2389     | 0.4380    |

1/ Data for Indonesia is not available.

2/ Weighted average lending rate

Source: IMF staff estimates.

## C. Baseline VAR and Channels of Monetary Policy Transmission

### *Interest Rate Channel (money view)*

**5. According to the money view, regardless of the presence of the bank lending channel, the reduction of the quantity of money supply by the authorities (and increasing the policy rate) reduces investment and hence output.** The interest rate channel affects firms' spending on investment through the cost of capital and household spending on durable goods<sup>7</sup>. The change in interest rate also affects aggregate demand through the inter-temporal profile of household consumption, which depends on the degree of inter-temporal substitution in consumption and the prevalence of credit rationing in the financial system. The strength of this channel depends on a correctly aligned expectation mechanism and hence a normal yield curve, as well as on the speed of adjustment of long-term yields to changes in the short-term interest rates. These links were tested as shown below.

**6. The policy rate has significant predictive value for output in Sri Lanka and money supply has weak Granger effects for prices (Table 6)**<sup>8</sup>. Output declines by about 0.6 percent in the second quarter and by about 0.5 percent during the entire period of nearly 3 years after innovations to the repo rate<sup>9</sup>. The effect of repo rate on prices by about 0.2 percent is through the money market rate though with a lagged response embedded in the nominal interest rate (price puzzle)<sup>10</sup>. Policy variables jointly have significant predictive value for both output and prices.

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<sup>7</sup> Mishra, Montiel, and Spilmergo (2010).

<sup>8</sup> Using market repo rates in lieu of announced repo rates for the period from 2004:q3 to 2013: q3, where the data for money market repo rates was available, does not reduce the impact of the interest rate channel though significantly increases the impact of direct money supply on output versus the policy rate itself.

<sup>9</sup> Including the US refinancing rate in the model reduces the impact of the policy rate on output by about 0.2 percentage point, making the total impact at 0.3 percent during the 3 year period.

<sup>10</sup> We have also run the baseline VAR with core inflation (data is available from 2003q1 to 2013q3) as the weight of food in CPI is about 41 percent, and our tests show that oil price shock has a significant impact on inflation. In particular, a one percent shock to oil price will increase the price level by about 0.9 percent within 10 quarters. Our results did not differ significantly.

Table 6. Sri Lanka: Baseline Model

**Granger causalities**  
**Sri Lanka****Impact on output**

|                          | F-stat   | p-values |
|--------------------------|----------|----------|
| Money supply 1/          | 0.32     | 0.57     |
| Interest rate (repo)     | 11.78*** | 0.00     |
| Exchange rate            | 0.09     | 0.77     |
| Policy variables jointly | 7.72***  | 0.00     |

**Impact on prices**

|                          | F-stat  | p-values |
|--------------------------|---------|----------|
| Money supply             | 4.79**  | 0.03     |
| Interest rate (repo)     | 2.44    | 0.13     |
| Exchange rate            | 1.66    | 0.20     |
| Policy variables jointly | 5.92*** | 0.00     |

p values show the significance of lagged monetary-policy variables for output and prices

F statistic at (1, 47)

Critical values are 7.17 at 1% level; 4.03 at 5% level and 2.76 at 10% level

\*\*\*significant at 1%

\*\*significant at 5%

\*significant at 10%

Notes.(i) The optimal lag is selected based on LR=1

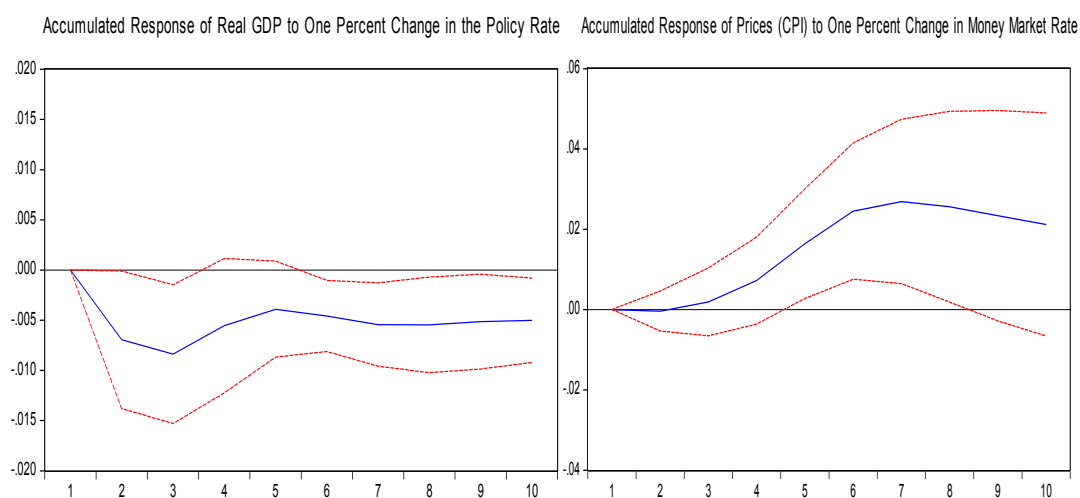
F statistic for joint significance is at (4, 48)

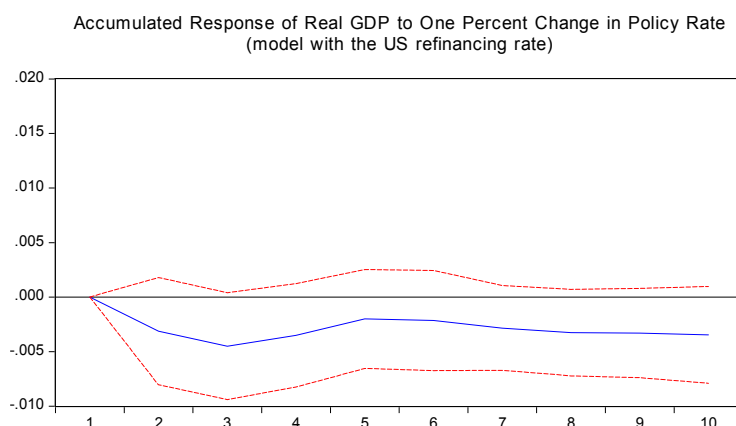
Critical values are 3.72 at 1% level, 2.56 at 5% level and 2.01 at 10% level

1/ Defined as broad money (M2b). We have retested the model with reserve money and the significance of repo rate affecting output fades away.

Source: IMF staff calculations.

**7. The variance decomposition shows that almost 6 percent of the change in GDP is explained by the variance in the policy rate within a 3 year period. For inflation, money supply explains about 4 percent of fluctuations and rest is explained by inflation inertia.**





### ***Bank Lending Channel (component of the credit view)***

**8. The bank lending channel (proxied by the lending rates and private credit) comes as a contributing channel to the traditional money view.** It can be described as banks' response—by changing the supply of loanable funds—to the changes in the supply of funds (deposit base) or changes in the policy rate by the monetary authorities. Competition among banks would be expected to cause an increased supply of funds to reduce bank lending as well as to increase the availability of bank credit for bank loan-dependent borrowers (the impact on the real economy would depend on the share of firms without an alternative forms of financing or the substitutability of loans in investor's portfolios), who, in their turn, will increase spending affecting the aggregate demand<sup>11</sup>.

**9. The bank lending channel contributes to policy innovations that affect output, weakly and with a significant lag.** Several observations are worth considering in this model.

- Private credit does not strongly Granger-cause output, but the prime lending rate does (Tables 7 and 8)<sup>12</sup>.
- Private credit contributes to the interest rate channel by about 0.2 percent starting in quarter two but only in the model with exchange rates. This means that a policy tightening will reduce output by 0.7 percent starting from second quarter when the reduction of private credit is also associated with real exchange appreciation.

<sup>11</sup> The bank lending channel is one component of the credit view on which there is a focus in this paper. The general credit view also includes the balance sheet channel (or financial accelerator mechanism (Bernanke et al (1995)) together with the notion of agency problems arising from asymmetric information and costly enforcement of contracts in the financial market. The asymmetry of information makes internal finance of new investment projects cheaper than external finance.

<sup>12</sup> We have simulated the same exercise with the weighted average lending rate and the inference was that only prime lending rate has a significant impact on output.



- The prime rate has a significant Granger effect on output and reduces it by about 0.1 percent more after about 5 quarters. Consistent with the results, the variance decomposition shows that about 8 percent of GDP shocks are explained by the prime lending rate, about 6 percent by the policy rate and about 7 percent by the private credit.
- No impact on both core and headline inflation is visible in the bank lending channel model. Policy variables jointly Granger-cause both output and prices.

**10. The effectiveness of the bank lending channel depends also on the speed of pass-through and the level of competition.** As seen earlier, pass-through is slow in Sri Lanka, which explains the initially unstable and lagged impact of lending rates on output. As to why the supply of bank loans does not increase and in response to rate changes, the arguments usually refer to banks' ability to attract external funds. Further, banks may simply purchase more securities rather than undertake higher lending. The degree of competition amongst banks also determines the response of banks' lending rate to banks' cost of funds. In a non-competitive environment banks will not pass on their reduced costs of funding to their loan rates.

Table 7. Sri Lanka: Credit Channel

| Granger causalities<br>Sri Lanka |                  |          |
|----------------------------------|------------------|----------|
|                                  | Impact on output |          |
|                                  | F-stat           | p-values |
| Money supply                     | 1.21             | 0.31     |
| Interest rate (repo)             | 3.18*            | 0.05     |
| Exchange rate                    | 0.15             | 0.86     |
| Private credit                   | 2.82*            | 0.07     |
| Policy variables jointly         | 3.7***           | 0.00     |
|                                  | Impact on prices |          |
|                                  | F-stat           | p-values |
| Money supply                     | 1.42             | 0.25     |
| Interest rate (repo)             | 2.15             | 0.13     |
| Exchange rate                    | 0.18             | 0.84     |
| Private credit                   | 0.47             | 0.63     |
| Policy variables jointly         | 2.64**           | 0.06     |

p values show the significance of lagged monetary-policy variables for output and prices  
F statistic at (2, 40)

Critical values are 5.18 at 1% level; 3.23 at 5% level and 2.44 at 10% level

\*\*\*significant at 1%

\*\*significant at 5%

\*significant at 10%

Notes.(i) The optimal lag is selected based on LR=2

F statistic for joint significance is at (10, 41)

Critical values are 2.80 at 1% level, 2.08 at 5% level and 1.70 at 10% level

1/ Defined as broad money (M2b). We have retested the model with reserve money and with no significant difference in our findings. In addition, the impact of reserve money on private credit has proven to be highly significant.

Source: IMF staff calculations.

Table 8. Sri Lanka: Credit Channel

| Granger causalities<br>Sri Lanka |                  |          |
|----------------------------------|------------------|----------|
|                                  | Impact on output |          |
|                                  | F-stat           | p-values |
| Money supply 1/                  | 1.21             | 0.31     |
| Interest rate (repo)             | 3.18*            | 0.05     |
| Prime lending rate 1/            | 3.58**           | 0.04     |
| Private credit                   | 2.82*            | 0.07     |
| Policy variables jointly         | 3.7***           | 0.00     |
|                                  | Impact on prices |          |
|                                  | F-stat           | p-values |
| Money supply                     | 1.42             | 0.25     |
| Interest rate (repo)             | 2.15             | 0.13     |
| Prime lending rate               | 0.77             | 0.47     |
| Private credit                   | 0.47             | 0.63     |
| Policy variables jointly         | 2.64**           | 0.06     |

p values show the significance of lagged monetary-policy variables for output and prices  
F statistic at (2, 40)

Critical values are 5.18 at 1% level; 3.23 at 5% level and 2.44 at 10% level

\*\*\*significant at 1%

\*\*significant at 5%

\*significant at 10%

Notes.(i) The optimal lag is selected based on LR=2

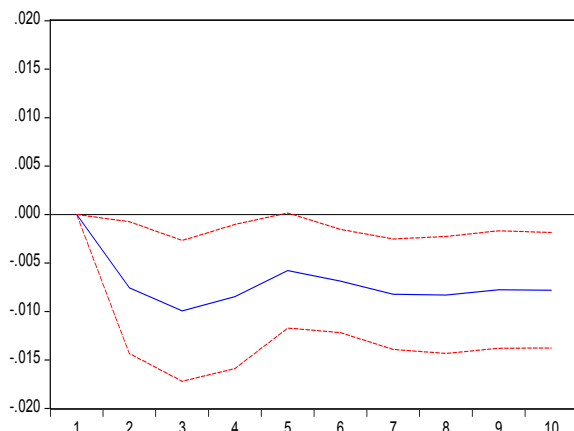
F statistic for joint significance is at (10, 41)

Critical values are 2.80 at 1% level, 2.08 at 5% level and 1.70 at 10% level

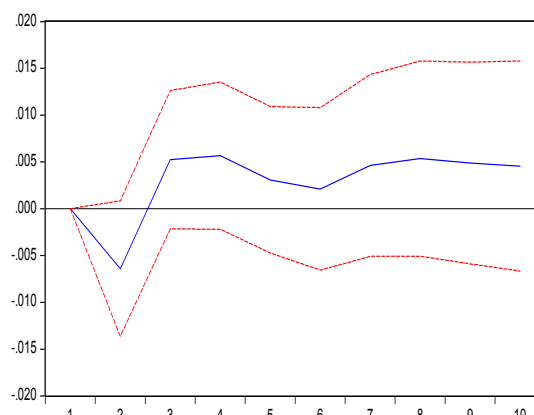
1/ Tests with reserve money have not changed our findings.

2/ Only the prime lending rate has a Granger effect on output and with the private credit variable included in VAR, the test with weighted average lending and money market rate was not significant at any conventional level.

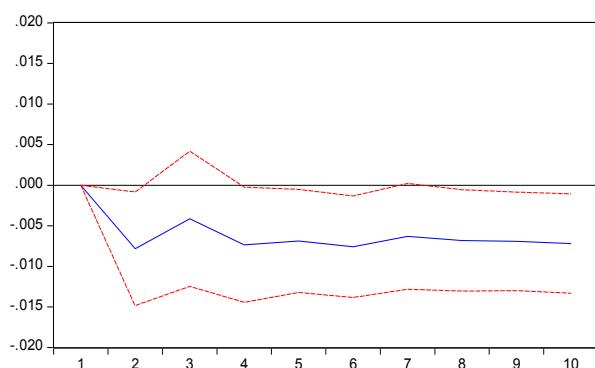
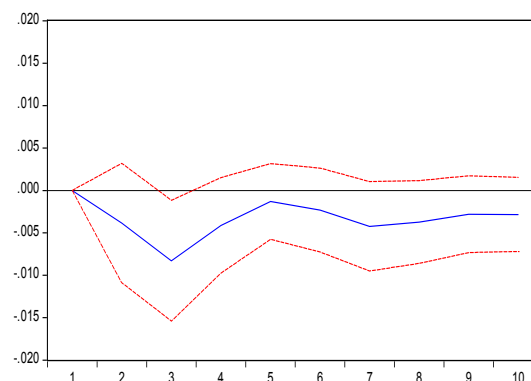
Source: IMF staff calculations.

Accumulated Response of Real GDP to One Percent Change in Policy Rate  
(with contribution from Credit channel)

Accumulated Response of Real GDP to One Percent Change in Private Credit



Accumulated Response of Real GDP to One Percent Change in Prime Rate

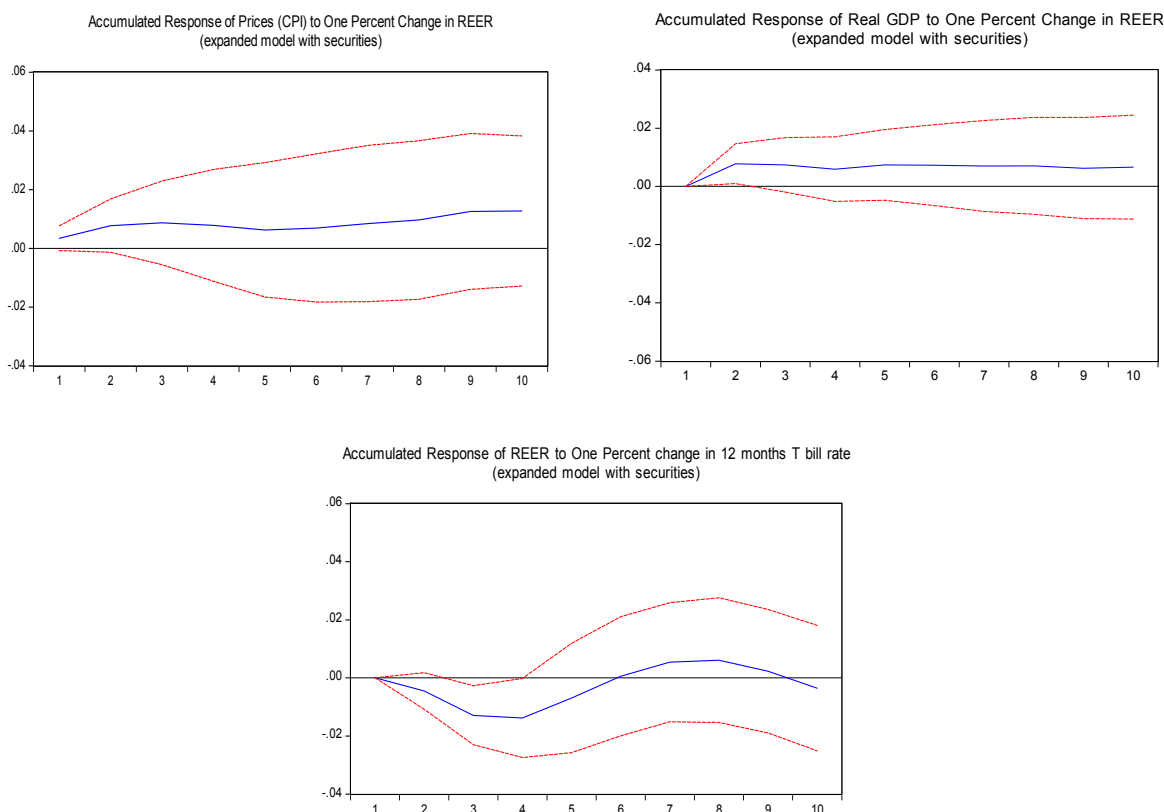
Accumulated Response of Real GDP to One Percent Changes in the Policy Rate  
(with contribution from Credit Channel and Prime Rate included in VAR)

### Exchange Rate Channel

**11. The exchange rate channel kicks in when the policy rate changes trigger changes in short term market and lending and deposit rates including on government securities.** Under a floating regime and perfect capital mobility, changes in the nominal and (with sticky prices) real exchange rates induce expenditure switching between domestic and foreign goods and affect aggregate demand through net exports. A number of factors may be limiting the exchange rate channel, including: (i) continued management of the exchange rate during periods of volatility (i.e., a managed as opposed to free float); (ii) the degree of capital mobility in Sri Lanka is limited both jurisdictionally and in practice; (iii) the growing importance of short-term external borrowing and potential currency mismatch with negative expenditure reduction effects offsetting expenditure switching effects on output.

**12. The exchange rate channel (proxied by the nominal exchange rate, the NEER and REER) is weakly contributing to other channels but has no significance on its own.** There is no Granger effect of exchange rate on either output or on prices. However, the presence of the

exchange rate in the model with the bank lending channel augments its influence on output by about 0.2 percent, and variance decomposition shows that about 8 percent of output fluctuations are explained by the changes in the exchange rate. Also, the exchange rate responds to changes in short term rates on government bonds<sup>13</sup>. The cumulative effect fades after about 4 quarters, and the impact on output even sooner.



### Asset Price Channel

**13. The mechanics of the asset price channel (proxied by the stock market index) in the workings of the monetary transmission mechanism are as follows:** An increase in the policy rate (monetary tightening) can reduce equity prices by making equity relatively less attractive compared to bonds, as well as worsening the earnings outlook for firms (since household spending declines). Lower equity prices lead in turn to a drop in the both the financial wealth of households and firms. Hence, households reduce consumption, and for firms, their market value relative to the replacement cost of capital declines and this delays new investment (Tobin's q effect).

<sup>13</sup> For the exchange rate channel, we have experimented VAR specifications with different interest rates on government securities (3,6,12 months T bill rates) and money market rates (overnight call market and other money market rates). The strongest impulse on REER is received from the model with 12 months T bill rate.

**14. The asset price channel (proxied by the index of the Colombo stock exchange) has no meaningful impact on output and prices.** Previous results where the policy rate significantly Granger-causes output and reduces it by about 0.5 percent during the entire shock period did not change with the asset price channel included in the model (Table 9).

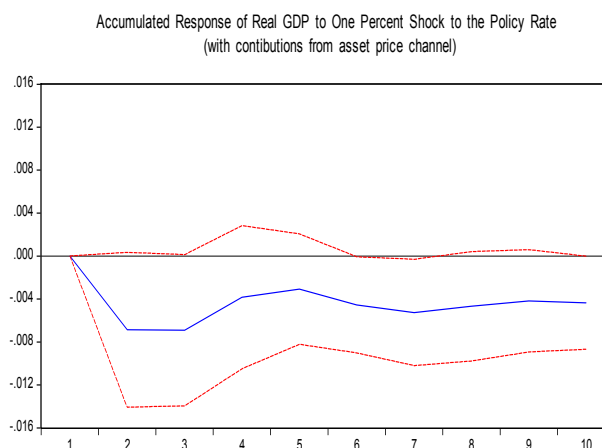
Table 9. Sri Lanka: Asset Price Channel

| Granger causalities      |                  |          |
|--------------------------|------------------|----------|
| Sri Lanka                |                  |          |
|                          | Impact on output |          |
|                          | F-stat           | p-values |
| Money supply 1/          | 0.32             | 0.57     |
| Interest rate (repo)     | 11.78***         | 0.00     |
| Exchange rate            | 0.09             | 0.77     |
| Stock market index       | 0.30             | 0.59     |
| Policy variables jointly | 1.72*            | 0.19     |
|                          | Impact on prices |          |
|                          | F-stat           | p-values |
| Money supply             | 1.42             | 0.25     |
| Interest rate (repo)     | 2.43*            | 0.12     |
| Exchange rate            | 1.66             | 0.20     |
| Stock market index       | 1.36             | 0.25     |
| Policy variables jointly | 2.23**           | 0.03     |

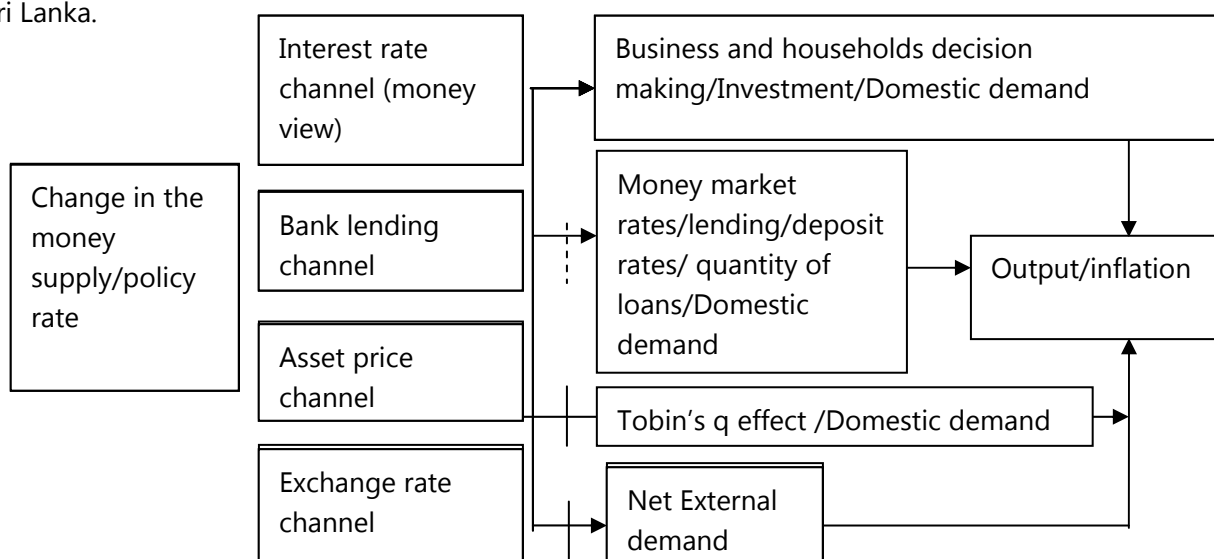
p values show the significance of lagged monetary-policy variables for output and prices  
F statistic at (2, 40)  
Critical values are 5.18 at 1% level; 3.23 at 5% level and 2.44 at 10% level  
\*\*\*significant at 1%  
\*\*significant at 5%  
\*significant at 10%  
Notes: (i) The optimal lag is selected based on LR=2  
F statistic for joint significance is at (10, 41)  
Critical values are 2.80 at 1% level, 2.08 at 5% level and 1.70 at 10% level

1/ Defined as broad money (M2b). We have retested the model with reserve money and with no significant difference in our findings.

Source: IMF staff calculations.

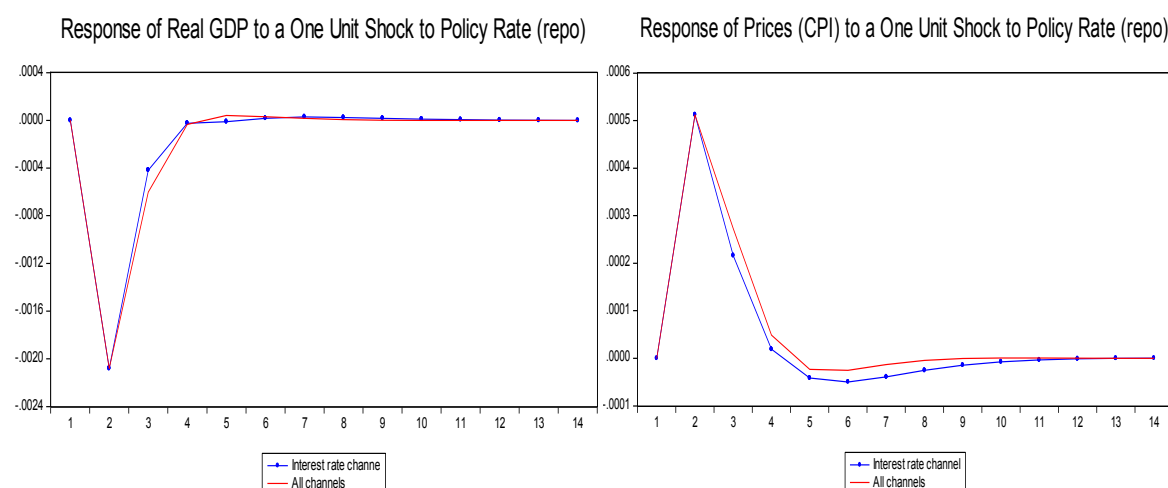


**15. The following chart summarizes the monetary transmission dynamics discussed above for Sri Lanka (with vertical lines showing that the channel is inoperative).** The dashed line for the bank lending channel indicates its partial significance in the monetary transmission channel in Sri Lanka.



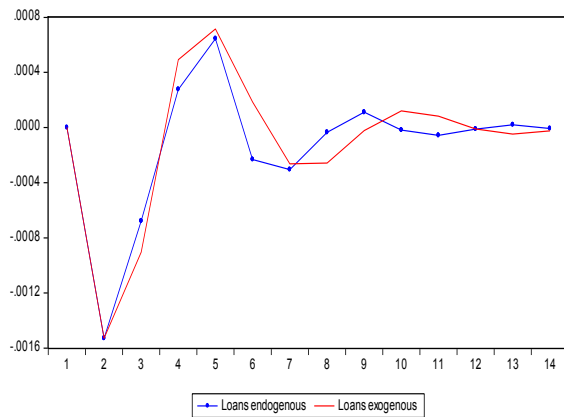
## D. More on the Channels of Monetary Policy Transmission

**16. Exogeneity tests provide further evidence on the impact and timing of various transmission channels.** In this section, the impact of various channels on output and prices using the approach suggested by Disyatat and Vongsinsirikul (2002) is assessed. In particular, each monetary policy channel is evaluated with, and without, being endogenized for the baseline period of study from 2000q1 to 2013q3<sup>14</sup>. The output and price responses are evaluated with each channel blocked off in the VAR and compared when it is part of the model. The IRFs of both models are plotted below with the differences indicating the strength of each channel. The interest rate channel is compared with all other channels combined. The results are as follows: (i) the strongest monetary policy channel in Sri Lanka is the interest rate channel; (ii) the bank lending channel is operational on its impact on output (5 quarters) and prices (5-10 quarters) but with a significant lag. The contribution of the bank lending channel to the policy rate in affecting inflation is strongest among all other channels. This observation on the timing also echoes earlier results of a longer term convergence of policy rates and money market and other interest rates.

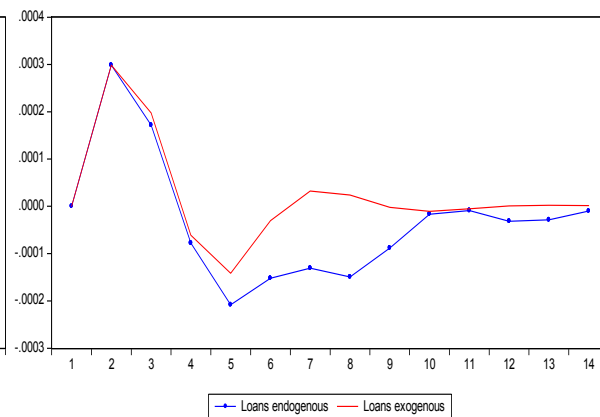


<sup>14</sup> The exercise also covers the period from 1995q1 to 2013q3 with no major differences in the results.

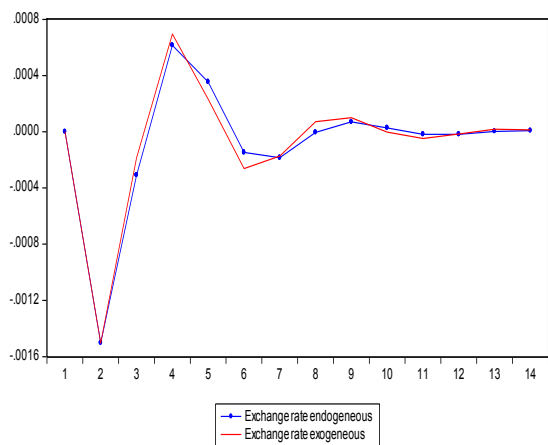
Response of Real GDP to a One Unit Shock to Policy Rate (repo)



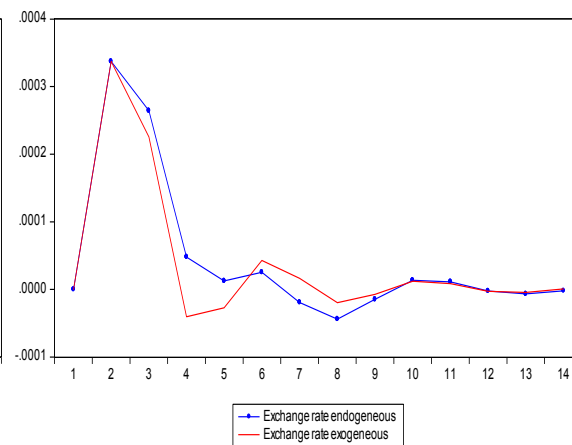
Response of Prices (CPI) to a One Unit Shock to Policy Rate (repo)



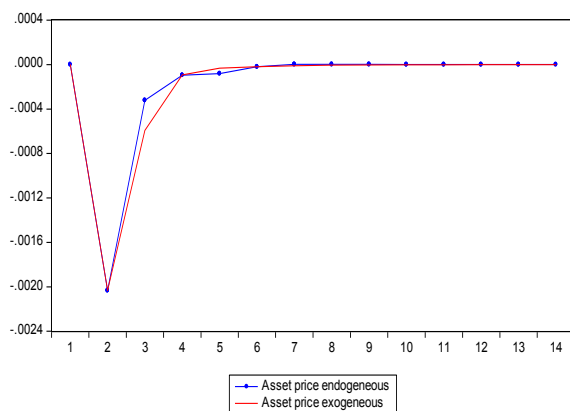
Response of Real GDP to One Unit Shock to Policy Rate (repo)



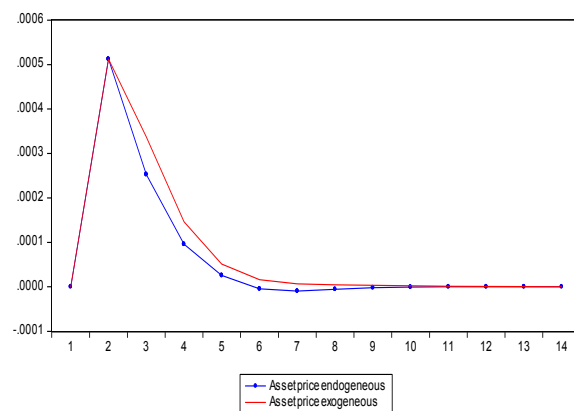
Response of Prices (CPI) to One Unit Shock to Policy Rate (repo)



Reponse of Real GDP to One Unit Shock to Policy Rate (repo)



Reponse of Price (CPI) to One Unit Shock to Policy Rate (repo)



## E. VAR Model-issue of Excess Liquidity, Output, and Inflation

### 17. The securitization of bank portfolios could be a drag to monetary policy transmission and the impact of T bill rates on inflation is much stronger than the role of the policy rate.

Two expanded VAR models are used to assess this assumption. They include real GDP, CPI, money supply (alternating with reserve money with no change in results), policy interest rate, outstanding deposits (in the first model, Table 10) and securities in the banking system (in the second model, Table 11), 12-month T bill rate (alternating with differing terms with no significance the 6 months rates), exchange rate and private credit.

**18. The impact of policy rates on output can be dampened when the bank lending channel becomes muted and the impulses from policy rates land in the securities market.** The interesting confirmation of this result is the significant Granger effect of policy rate when the deposits are available and the lack of any Granger effect from the policy rate (although money supply still weakly Granger causes output) without deposits in the model. More importantly, the 12 months T bill rates Granger cause prices (a one percent reduction in the 12 months T bill rate will increase prices by about 0.2 percent within 2 quarters). This is an important observation as any purchase of securities by banks will, in effect, increase liquidity.

**19. Consistent with the results, almost 20 percent of variance in GDP and inflation are explained by the changes in the money supply (12 percent) and 12 months T bill rate (8 percent).** Interestingly, given (i) the longer convergence between the changes in the policy and other rates, and the fact that (ii) T bill and money market rates significantly affect inflation, and (iii) that the bank lending channel is important for price formation (see next section), it can be inferred that the impact of policy rates or money supply on inflation is not observable until the later periods when all rates converge.

Table 10. Sri Lanka: Expanded VAR Model

| Granger causalities<br>Sri Lanka |  | Impact on output |          | Impact of policy rate on |      |
|----------------------------------|--|------------------|----------|--------------------------|------|
|                                  |  | F-stat           | p-values |                          |      |
| Money supply 1/                  |  | 1.21             | 0.31     |                          |      |
| Interest rate (repo)             |  | 3.18*            | 0.05     |                          |      |
| Exchange rate                    |  | 0.15             | 0.86     |                          |      |
| Securities                       |  | 0.20             | 0.82     | 0.21                     | 0.81 |
| Private credit                   |  | 2.82*            | 0.07     | 1.89                     | 0.16 |
| Deposits                         |  | 0.93             | 0.40     | 0.02                     | 0.98 |
| Policy variables jointly         |  | 1.62             | 0.12     |                          |      |
| Impact on prices                 |  | F-stat           | p-values |                          |      |
| Money supply 1/                  |  | 1.42             | 0.25     |                          |      |
| Interest rate (repo)             |  | 2.15             | 0.13     |                          |      |
| Exchange rate                    |  | 0.18             | 0.84     |                          |      |
| Securities                       |  | 1.63             | 0.21     |                          |      |
| Private credit                   |  | 0.47             | 0.63     |                          |      |
| Deposits                         |  | 0.13             | 0.88     |                          |      |
| Policy variables jointly         |  | 1.57             | 0.13     |                          |      |

p values show the significance of lagged monetary-policy variables for output and prices  
F statistic at (2, 36)  
Critical values are 5.28 at 1% level; 3.26 at 5% level and 2.46 at 10% level  
\*\*\*significant at 1%  
\*\*significant at 5%  
\*significant at 10%  
Notes.(i) The optimal lag is selected based on LR=2  
F statistic for joint significance is at (14, 37)  
Critical values are 2.62 at 1% level, 1.97 at 5% level and 1.69 at 10% level

1/ Defined as broad money (M2b). We have retested the model with reserve money and with no significant difference in our findings.

Source: IMF staff calculations.

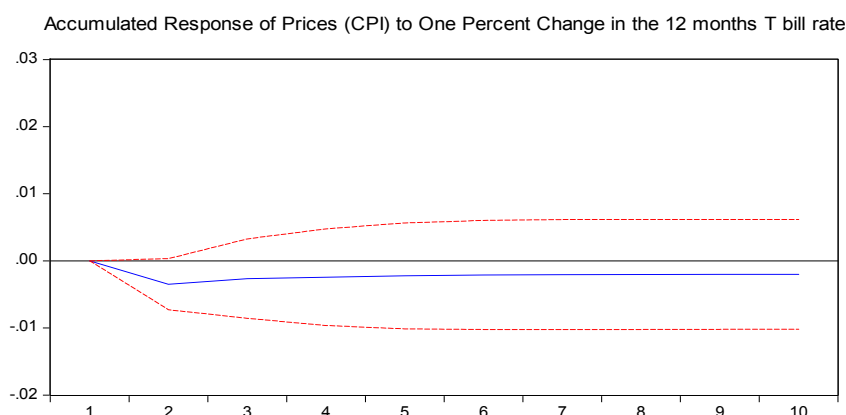
Table 11. Sri Lanka: Expanded VAR Model with 12 Months T-bill Rate

| Granger causalities<br>Sri Lanka |  | Impact on output |          | Impact of Policy rate on |      |
|----------------------------------|--|------------------|----------|--------------------------|------|
|                                  |  | F-stat           | p-values |                          |      |
| Money supply 1/                  |  | 3.08**           | 0.04     |                          |      |
| Interest rate (repo)             |  | 1.47             | 0.24     |                          |      |
| Exchange rate                    |  | 0.78             | 0.51     |                          |      |
| Securities                       |  | 0.36             | 0.78     | 2.04                     | 0.12 |
| Private credit                   |  | 2.12             | 0.11     | 1.51                     | 0.23 |
| TB 12                            |  | 0.41             | 0.75     | 5.85***                  | 0.00 |
| Policy variables jointly         |  | 3.22***          | 0.01     |                          |      |
| Impact on prices                 |  | F-stat           | p-values |                          |      |
| Money supply 1/                  |  | 0.97             | 0.41     |                          |      |
| Interest rate (repo)             |  | 2.32*            | 0.09     |                          |      |
| Exchange rate                    |  | 0.51             | 0.68     |                          |      |
| Private credit                   |  | 1.32             | 0.28     |                          |      |
| TB 12                            |  | 4.08**           | 0.01     |                          |      |
| Policy variables jointly         |  | 2.82***          | 0.01     |                          |      |

p values show the significance of lagged monetary-policy variables for output and prices  
F statistic at (3, 28)  
Critical values are 4.57 at 1% level; 2.95 at 5% level and 2.29 at 10% level  
\*\*\*significant at 1%  
\*\*significant at 5%  
\*significant at 10%  
Notes.(i) The optimal lag is selected based on LR=3  
F statistic for joint significance is at (21, 29)  
Critical values are 2.58 at 1% level, 1.95 at 5% level and 1.69 at 10% level

1/ Defined as broad money (M2b). We have retested the model with reserve money and with no significant difference in our findings.

Source: IMF staff calculations.



## F. Conclusions

**20. The interest rate channel is the most important transmission channel in Sri Lanka as it directly affects the decision making of economic agents.** However, the role of bank lending, exchange rate and asset price channels should be strengthened going forward. Our results showed that each of these channels, if fully operational, can significantly contribute to the effectiveness of the monetary policy transmission mechanism in Sri Lanka. For example, bank lending channel adds another 0.2 percentage points to the baseline 0.5 percent decrease in output in response to innovations in the policy rate. Also, the contribution of the exchange rate channel through real appreciation in the model with private credit adds another 0.2 percent additional reduction of output to the increase in the policy rate.

**21. To address the weakness of the bank lending channel as well as to increase the short run pass-through between the policy rates and market and lending rates, a more competitive banking system should be encouraged.** Some potential measures in this regard include: (i) enhancing competition in the banking sector including through developing alternative sources of financing, such as the capital market; (ii) reducing the role of state banks in the financial system; (iii) creating avenues to connect the bank financing with the real economy.

**22. To bring forward the exchange rate channel, the authorities need to limit the interventions in the foreign exchange market to exclusively excessive fluctuations and allow the rupee to free float.** Together with this, the authorities could increase the degree of capital mobility and allow more transparent and active foreign participation in domestic secondary securities and deposit markets. Further development of a competitive export base, would significantly increase the value added of the exchange rate channel.

**23. To make the asset channel operational, the authorities should adopt necessary institutional reforms to increase the transparency and entry into equity and property markets for both residents and nonresidents.** As economic agents participate more actively in the asset markets, and non-banking assets grow in portions of their total wealth, dependence on bank financing may decrease. Allowing the asset price channel to work will enhance the market allocation of wealth and sustain the efficiency of the transmission mechanism.



## Annex I. Comparison with Previous Work

**Our findings are broadly in line with the previous work on the monetary transmission mechanism in Sri Lanka except the impact of policy innovations on inflation.** Previous studies (Perera and Wickramanayake (2013); IMF SM/04/06) have argued that interest rate and credit channels—whereby the central bank’s monetary decision influences economic activities through its policy rate and, hence, through the market and lending interest rates—are the dominant monetary policy channels in Sri Lanka with IMF SM/04/06 downplaying the relative importance of the bank lending channel. We agree with this and we believe that the investment channel whereby the policy rates affect the decision making process of the economic agents is the strongest in Sri Lanka.

**On the other hand, the importance of the monetary shocks in affecting inflation has been controversial.** The IMF SM/04/06 argued that “shocks to output and inflation (roughly in equal proportion) explain most of its variability rather than monetary shocks”. The lack of high impact of policy measures on prices is explained by the higher weight of food in the price index and the inflation inertia—by the backward looking wage formation in the government sector. With a larger sample (from 1995 to 2013) (Perera and Wickramanayake (2013) found prices to be responsive to monetary shocks though the presence of “price puzzle” overshadowed true inference on how prices respond to monetary shocks. We encountered this problem too. Ratnasiri (2009) found that money growth has effects on inflation in the long-run but the output gap has no significance in explaining inflation.

**In our paper, we found no difference between the results with CPI and core inflation.** Second, we found that money growth does in fact weakly Granger cause inflation and, in the expanded model with securities and T bill rates, almost 20 percent of inflation is explained by changes in the money growth and T bill rates.

**Finally, based on our initial results of exogeneity tests on bank lending channel and significant impact of T bill and money market rates on inflation, we believe that the banks’ behavior in responding to policy signals can alter the direction of these signals from output to inflation.** In particular, banks may be tempted to neutralize any policy action by counteractive transactions in the government securities market thereby affecting inflation dynamics in Sri Lanka. Having said this, it is also possible that owing to slow adjustment of money and other rates to changes in the policy rates, the long run impact on inflation is visible only through those rates rather than directly from the policy variables and the previous studies did not capture it as did not study the timing effects of the convergence between the rates.

## Annex II. Methodology for Baseline VAR

**The standard methodology proposed by Sims (1972) in using Granger causality is followed to describe the relationship between monetary policy variables and both output and prices in Sri Lanka, where policy variables are ordered after non-policy variables.** This procedure implies that policy variables are determined based on the knowledge of contemporaneous shocks to output and prices, but that output and prices respond to changes in policy variables with a lag. Although having known shortcomings, this approach has several advantages.

- First, it provides a basis for characterizing the stylized facts about relationships between policy variables and output and prices in Sri Lanka.
- Second, it requires minimal assumptions about underlying economic relationships, which is useful given the uncertainties about the evolving structures of Sri Lankan economy in the post-war period. No a priori presumption as to which variables have more influence on output and prices is made and hence all three measures of monetary policy tools (money supply, interest rate and exchange rate) are included into the VAR.

**The VAR model above is estimated using the following five variables from 2000q1 and 2013q3:** output, prices, money supply, interest rates, and exchange rates expressed in levels or first-differences of the variables inferred from stationarity tests (due to space limitations we omitted the tables with the results of unit root, block exogeneity and Johansen co-integration tests, but they are available upon request).

**In addition, to accommodate uncertainty about the correct order of integration, we use the modifications of the Granger-causality test proposed by Toda and Yamamoto (1995), which are robust to the order of integration of the variables.** Specifically, suppose that we assume the true lag length of the VAR to be  $p$ ; the standard Granger method tests the hypothesis that lags 1 through  $p$  of the  $i$ th variable are jointly insignificant in the equation for the  $j$ th variable. The Toda–Yamamoto test makes use of the fact that, although the order of integration of the endogenous variables may be uncertain, the upper bound is usually known. Taking the maximum order of integration of the variables in the VAR to be  $k$ , the Toda–Yamamoto test estimates a VAR with  $p + k$  lags and then tests whether the first  $p$  lags of the variable  $i$  are significant in the  $j$ -th equation. As with the standard Granger-causality tests, the test statistic has a  $\chi^2$  asymptotic distribution but the disadvantage is that including the  $k$  additional lags of the endogenous variables reduces the power of the test.

**Whereas the Toda-Yamamoto tests provide a scalar measure of the significance of policy variables in predicting future movements in output and prices, the direction and timing of effects can be characterized using impulse response functions computed from VAR models.** We follow the approach discussed in detail by Christiano et al (1999). We estimate a reduced-form VAR and identify monetary-policy shocks through assumptions about variable ordering. Formally, the reduced form VAR is written as:

$$Y_t(1) = A_0 + A_1 Y_{t-1} + \dots + A_k Y_{t-k} + u_t$$

where  $Y_t$  is a vector of policy and non-policy variables,  $A_0$  is a vector of constants,  $A_{t-j}$  is a matrix of coefficients on variables lagged  $j$  periods,  $u_t$  is a vector of serially uncorrelated disturbances that have mean zero and variance–covariance matrix  $\Sigma_u^2$ , and  $k$  is the number of lags. Because this is a reduced-form representation of a structural model in which some variables may affect others contemporaneously, the error terms are composites of underlying shocks to variables in the system according to the following specification:

$$\begin{bmatrix} u_{1t} \\ u_{2t} \\ \dots \\ u_{jt} \end{bmatrix} = \begin{bmatrix} 1 & \theta_{12} & \theta_{13} & \dots & \theta_{1j} & \varepsilon_{1t} \\ \theta_{21} & 1 & \theta_{23} & \dots & \theta_{2j} & \varepsilon_{2t} \\ \dots & \dots & \dots & \dots & \dots & \dots \\ \theta_{j1} & \theta_{j2} & \theta_{j3} & \dots & 1 & \varepsilon_{jt} \end{bmatrix}$$

**As an example, the time- $t$  innovation to a monetary-policy variable,  $u_t$ , reflects not only the exogenous shock to that variable,  $\varepsilon_{it}$ , but it may also include adjustments made in response to contemporaneous exogenous shocks to other variables in the system.** To identify the underlying shocks to monetary policy, the matrix  $\theta$  is assumed to be lower triangular, i.e., by the Choleski decomposition, and policy variables are ordered in the VAR after non-policy variables. This procedure implies that policy variables are determined based on the knowledge of contemporaneous shocks to output and prices, but that output and prices respond to changes in policy variables with a lag. The ordering of the policy variables goes as follows: money supply is ordered first followed by policy rate and exchange rate to reflect their respective likely degrees of endogeneity to economic conditions in Sri Lanka. We also experimented with alternative orderings and also replaced broad money with reserve money definitions with the sensitivities explained in the paper.

## References

- Anil Perera, Deborah Ralston, Jayasinghe Wickramanayake, "Off Balance Sheet Banking and Its Implications For Monetary Transmission: Evidence from South Asia with a Special Focus on Sri Lanka". Conference Paper presented at Central Bank of Sri Lanka International Research Conference, 2012.
- Anil Perera and J. Wickramanayake, "Monetary Transmission in the Emerging Country Context", Central Bank of Sri Lanka International Research Conference, 2013.
- M. Smal and S de Jager, "The monetary transmission mechanism in South Africa", OP 16, September 2001, South African Central Bank.
- Ben Bernanke, "Credit in the Macroeconomy", FRBNY, Quarterly Review/Spring 1992-93.
- Ben Bernanke and Mark Gertler, "Inside the Black Box: The Credit Channel of Monetary Policy Transmission", NBER Working Papers 5146, National Bureau of Economic Research, Inc, 1995.
- Ben Bernanke and A. S. Blinder, "Credit, Money, and Aggregate Demand", American Economic Association (May, 1988), pp. 435-439.
- Ben Bernanke and A. S. Blinder, "The Federal Fund's Rate and the Channels of Monetary Transmission", The American Economic Review, Volume 82, Issue 4 (Sep., 1992), 901-921.
- Ben Bernanke "A Conference Panel Discussion: What Do We Know About How Monetary Policy Affects the Economy", Review, Vol. 77, Number 3.
- Christiano, Lawrence, Eichenbaum, Martin, Evans, Charles, 1999. Monetary policy shocks: What have we learned and to what end? In: Woodford, Michael, Taylor, John B. (Eds.), The Handbook of Macroeconomics, vol. I. North-Holland, Amsterdam, pp. 65-148.
- G. Hubbard, "Is there a "Credit Channel" for Monetary Policy?", Review, Vol. 77, Number 3.
- Gert Peersman and Frank Smets, "The Monetary Transmission Mechanism in the Euro Area: More Evidence from VAR analysis", Working Paper N91, December 2001.
- M. Gertle and S. Gilchri, "The Role of Credit Market Imperfections in the Monetary Transmission Mechanism: Arguments and Evidence", Scand. J. of Economics 95 (1), 43-64, 1993
- "Monetary Policy Transmission in the Euro Area, a Decade after the Introduction of the Euro", ECB Monthly Bulletin, 2010.

Kenneth N. Kuttner and Patricia C. Mosser, "The Monetary Transmission Mechanism: Some Answers and Further Questions", *Economic Policy Review*, May 2002.

Mark Gertler and Simon Gilchrist, "The Role of Credit Market Imperfections in the Monetary Transmission Mechanism: Arguments and Evidence", *The Scandinavian Journal of Economics*, Vol. 95, No. 1 (Mar., 1993), pp. 43-64.

Martha Starr, "Does money matter in the CIS? Effects of monetary policy on output and prices", *Journal of Comparative Economics* 33 (2005) 441–461.

Matteo Ciccarelli, Angela Maddaloni and José-Luis Peydró, "Heterogeneous transmission mechanism Monetary policy and financial fragility in the Euro area", March 2010.

Monetary Policy Department, Bank of Thailand, "Changes in the monetary transmission mechanism in Thailand", BIS Papers No 35.

Peter N. Ireland, "The Monetary Transmission Mechanism", Federal Reserve Bank of Boston, November 2005.

Pierre Perron, "The Great Crash, the Oil Price Shock, and the Unit Root Hypothesis", *Econometrica*, Vol. 57, No. 6 (Nov., 1989), pp. 1361-1401.

Prachi Mishra and Peter Montiel, "How Effective Is Monetary Transmission in Low-Income Countries? A Survey of the Empirical Evidence", WP/12/143, 2012.

Prachi Mishra, Peter J. Montiel, and Antonio Spilimbergo, "Monetary Transmission in Low Income Countries", WP/10/223, 2010.

Rakesh Moha, "Monetary policy transmission in India", BIS Papers No 35.

S. Cecchetti "Distinguishing Theories of the Monetary Policy Transmission", *Review*, Vol. 77, Number 3.

Sims, Christopher, "Money, income and causality", *American Economic Review* 62 (4), 540–542, 1972.

Sims, Christopher, "Macroeconomics and reality", *Econometrica* 48 (1), 1–48, 1980.

Sri Lanka, *Selected Issues and Statistical Appendix*, SM/04/48, 02/2004.

Thanabalasingam Vinayagathan, "Monetary Policy and the Real Economy: A Structural VAR Approach for Sri Lanka", 2013.

Tobias Adrian and Hyun Song Shin, "Prices and Quantities in the Monetary Policy Transmission Mechanism", Staff Report no.396, October 2009.

Toda, Hiro Y., Yamamoto, Taku, 1995. Statistical inference in vector autoregressions with possibly integrated processes. *Journal of Econometrics* 66 (1-2), 225–250.

Valerie A. Ramey, "How Important is the Credit Channel in the Transmission of Monetary Policy?", NBER Working Papers 4285, National Bureau of Economic Research, Inc, 1993.

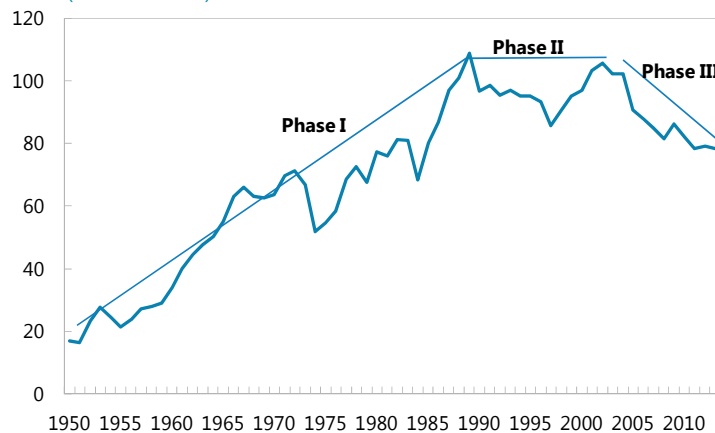
Yi Gang, "The monetary policy transmission mechanism in China", BIS Papers No 35.

# PUBLIC DEBT IN SRI LANKA: TOO HIGH?

## A. Introduction

**1. Sri Lanka's public debt is one of the highest among the emerging economies.** The history of public debt evolution can be split into three separate phases (Figure 1). During the first phase, between mid-1950s and 1990, with few temporary interruptions, the public debt has been growing steadily, from 20 percent to 100 percent of GDP. During the second phase, from 1990 to mid-2000s, the public debt ratio stopped growing and hovered around 100 percent of GDP. The third phase, from mid-2000s till now, saw a gradual decline in the public debt ratio, to below 80 percent of GDP, the lowest level since late 1980s. However, at this level, public debt remains still very high and poses risks to the economy. Therefore, further reduction in the debt-to-GDP ratio is advisable.

**Figure 1. Sri Lanka: Government Debt, 1950–2013**  
(Percent of GDP)



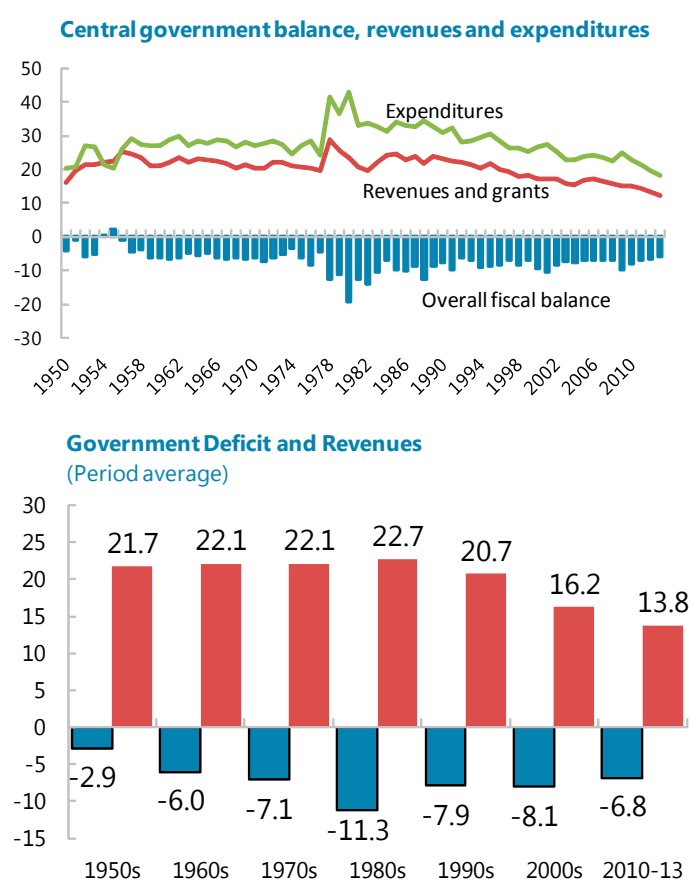
Sources: Ministry of Finance and Planning, staff calculation.

**2. The authorities have recognized that the debt is too high and needs to be reduced further.** The 2003 Fiscal Management (Responsibility) Act (FMRA) stipulated that the debt should be reduced to 60 percent of GDP by end-2013, and the 2013 revision of the Act stipulated that the public debt should be reduced to 65 percent of GDP by 2016 and to 60 percent of GDP by 2020. This paper asks two questions: (i) what has been driving the increase and subsequent decline in Sri Lanka's public debt? (ii) Is Sri Lanka's public debt too high, and if yes, how much, how fast and how should it be reduced?

## B. What Drives Public Debt in Sri Lanka?

**3. What has been driving the initial increase and the subsequent decline in Sri Lanka's debt ratio?** Looking at the data back to 1950, Sri Lanka's history of persistent high fiscal deficits is apparent (Figure 2). With the exception of two years (1954 and 1955), government budget always recorded a deficit, averaging 7.2 percent of GDP during 1950–2013. Ten-year average deficit peaked during the 1980s, when it exceeded 11 percent of GDP, before falling to around 8 percent of GDP during the 1990s and the 2000s, and to 6.8 percent in 2010–13. Recently, the deficit has been falling for four years in a row, from 9.9 percent of GDP in 2009 to 5.9 percent of GDP in 2013. Since 1950, the deficit never fell for four consecutive years. Another salient feature of fiscal developments in Sri Lanka has been the gradual but persistent decline in government (mainly tax) revenues. During the first four decades, revenues averaged around 22–23 percent of GDP. However, during the 1990s, the average fell to 20.7 percent of GDP, and then collapsed to 16.2 percent of GDP during the 2000s, and to 13.8 percent of GDP during 2010–13, reaching historical low of 12.4 percent in 2013. However, even as average revenues fell by almost 7 percent of GDP between 1990s and 2010–13, the average deficit remained broadly unchanged, as a result of lower expenditures, and government debt began to decline. As can be seen from figure 3, lowering of expenditures was accomplished to a large extent by reducing capital spending, as evidenced by a sharp drop in share of capital spending in total spending.<sup>1</sup>

**Figure 2. Sri Lanka: Fiscal Developments, 1950–2013**  
(Percent of GDP)



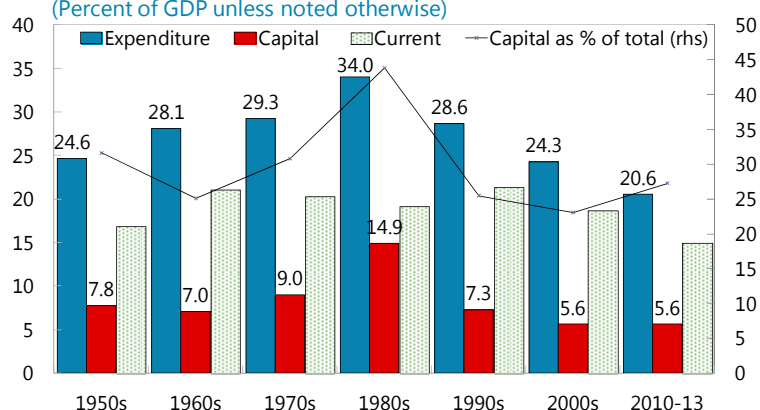
Source: Ministry of Finance and Planning, staff calculation.

<sup>1</sup> However, as revenues continued to decline in recent years and room for further reduction in capital spending became more limited, current spending has been reduced more sizably as well, including security spending.



**Figure 3. Sri Lanka: Central Government Expenditures, 1950–2013**

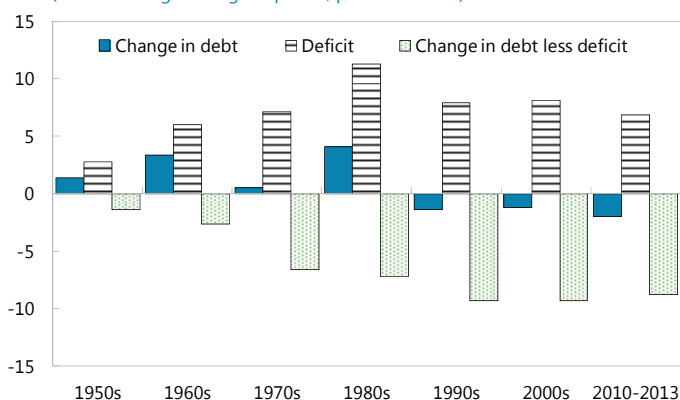
(Percent of GDP unless noted otherwise)



Sources: Ministry of Finance and Planning, staff's calculations.

**4. Figure 4 summarizes the relationship between fiscal deficit and changes in the government debt ratio.** Two distinctive periods could be identified. During the 1950s and 1960s, the deficit was an important factor driving the changes in the debt ratio: the difference between the average annual change in debt ratio and the deficit was relatively small. In the second period, starting in the 1970s, the relationship between the deficit and changes in the debt ratio has markedly weakened: other factors became more important in affecting the debt ratio, and the difference between the average annual change in debt ratio and the deficit increased significantly, to around 10 percent of GDP during the 1990s and 2000s.

**Figure 4. Sri Lanka: Debt Changes and Deficits, 1950–2013**  
(Annual average during the period, percent of GDP)



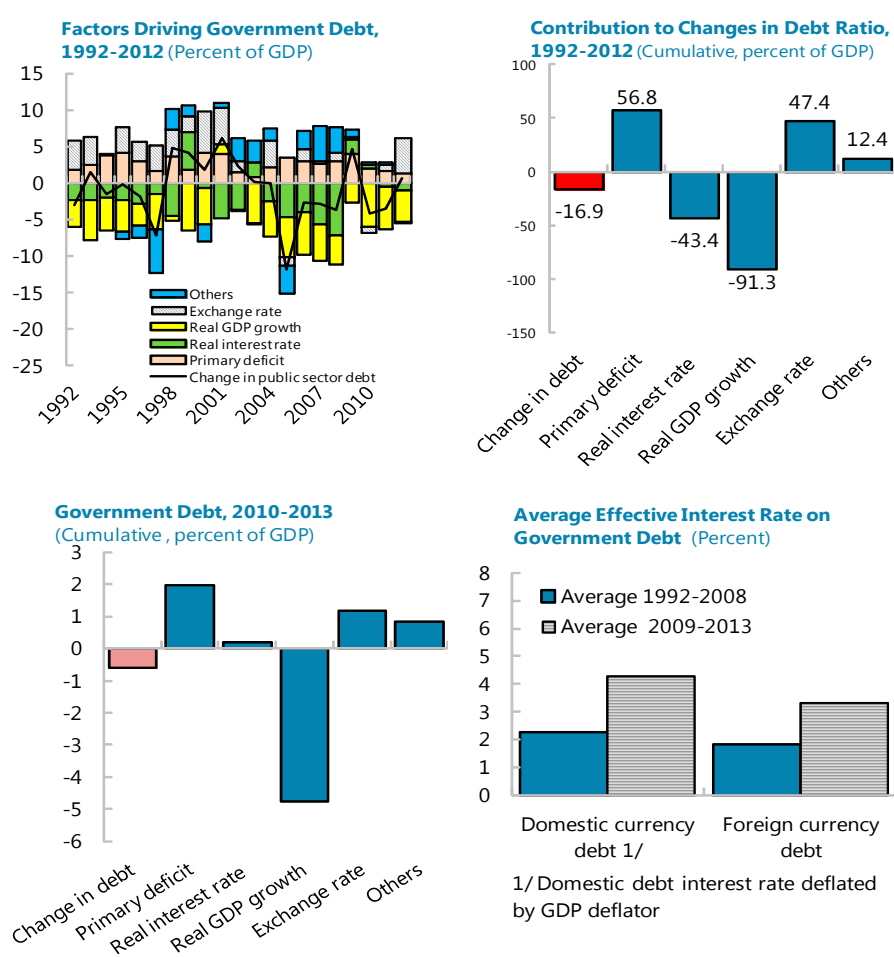
Sources: Ministry of Finance and Planning, staff's calculation.

**5. To investigate the role of these other factors, we use the standard debt sustainability analysis to separate the contribution of primary fiscal balance, growth, currency movements, interest rates and other factors to the evolution of the debt ratio.** Because of the data availability, we examine the evolution of government debt in the last two decades, between 1992 and 2013.

**6. During 1992–2013, the debt-to-GDP ratio fell by 17 percentage points.** The analysis reveals a key role played in the debt dynamics by rapid real growth: during this period, real GDP growth averaged 5.3 percent, and turned out to be the dominant factor driving the debt dynamics. The rapid growth was accompanied by relatively low real interest rates during the period, which leveraged the effect of rapid growth. This resulted in a very favorable interest rate-

growth differential, which during 1992–2013 amounted to negative 7.3 percent. The combination of rapid growth and low interest rate thus allowed reducing the debt ratio even as average primary deficit remained close to 3 percent of GDP and the currency depreciated by almost 200 percent in nominal terms against the US dollar, thus increasing significantly the domestic currency value of the foreign-currency denominated debt.<sup>2</sup> However, looking at the evolution of debt dynamics over time, important change could be observed in recent years. While robust real GDP growth has continued to exert a positive effect on debt dynamics even in the more recent period 2009–13 (see third chart in the panel), the positive contribution from real interest rate has disappeared, as average interest rate increased for both domestic currency debt and debt denominated in foreign currency.

**Figure 5. Sri Lanka: Government Debt**



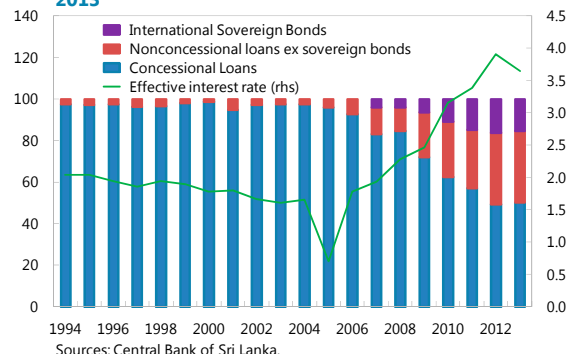
Source: Ministry of Finance and Planning; staff's estimates.

<sup>2</sup> Using the rupee rate against the dollar provides only a rough estimate. To calculate the effect of the currency movements on the debt ratio more accurately, one would have to consider the currency composition of the foreign currency debt and the corresponding currency movements.

**7. The gradual increase in the costs of government borrowing affects both domestic and foreign currency borrowing,** and reflects a number of factors. Domestic borrowing costs (adjusted for inflation measured by GDP deflator) have been increasing even as inflation has been declining, and the authorities' borrowing strategy began to focus more on extending debt maturities. Average time to maturity (ATM) of domestic currency debt rose from 2.25 years in 2009 to 3.23 years in 2012, and to close to 5 years

in 2013. Higher costs of borrowing in foreign currency reflect the diminishing role of concessional financing and increased reliance on market borrowing (figure 6). The share of concessional debt in total public external debt fell from almost 100 percent as recently as 2005 to less than 50 percent in 2012, partly reflecting the launch of international sovereign bond issuance in 2007. By 2013, these bonds amounted to 16 percent of total public external debt.<sup>3</sup> As the share of nonconcessional debt began to increase, so did the average interest on external debt, from less than 2 percent in 2007 to almost 4 percent in 2012.

**Figure 6. Sri Lanka: Government External Debt, 1994–2013**



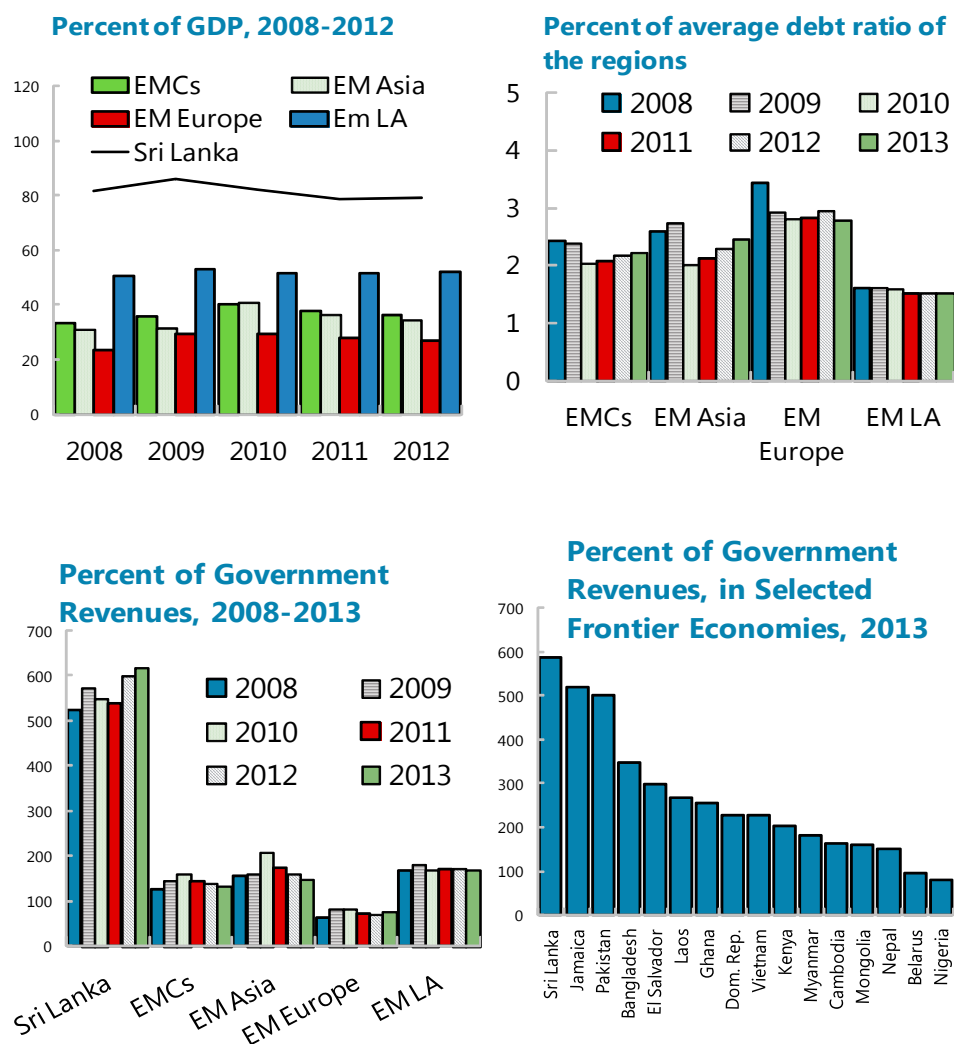
### C. Debt Reduction: How Much, How Fast and How?

**8. The previous analysis suggests that Sri Lanka's public debt is too high and needs to be reduced.** This is also the policy of the authorities. The latest medium-term fiscal plan unveiled in connection with the presentation of the 2014 budget targets the reduction of the government debt to 65 percent of GDP by 2016. However, while it is easy to make the case that Sri Lanka's public debt is too high and should be reduced, it is more difficult to provide a specific answers to the question "how much and how fast to reduce the debt"?

#### *How Does Public Debt in Sri Lanka Compare to other Emerging Market Countries?*

**9. A good place to start is to look at how Sri Lanka's public debt compares to other emerging market countries.** Even though Sri Lanka's public debt-to-GDP ratio has declined from its peak in early 2000s by about 25 percentage points, it still remains well above the average public debt ratio in the emerging market countries. In 2013, it was more than twice as high as the average debt ratio in the emerging market countries overall and in Asia, and about three times as high as the ratio of emerging market countries in Europe. Moreover, even though Sri Lanka's debt ratio has been declining in recent years, debt ratios in the other EMCs have on average been falling even faster. As a result, of Sri Lanka's public debt-to-GDP ratio relative to the average ratio in the EMCs (and to that of EM Asia) has been growing since 2010.

<sup>3</sup> With additional \$1.5 billion international sovereign bonds (6.6 percent of foreign government debt at the end-2013) issued in 2014, this share has increased further.

**Figure 7. Sri Lanka: Government Debt in Comparison**

Source: Fiscal Monitor Database, October 2013; staff estimates.

**10. Moreover, Sri Lanka's public debt appears even more worrisome when compared to the government revenues.** For a given debt-to-GDP ratio, higher government revenue as a proportion of GDP would indicate also higher capacity to service the government debt. For this reason, comparing the ratio of government debt to revenues also provides an important insight. Figure 7 shows that Sri Lanka's government debt-to-revenues ratio is well above the average ratio for the emerging economies as a group. Sri Lanka's debt-to-revenue ratio also exceeds by a large margin the ratio of its Asian peers. The picture is similar when we replace regional averages with individual countries: Sri Lanka's debt-to-revenue ratio is the highest among the frontier economies. Finally, given the above-noted recent trend of falling revenues, it is not surprising that, unlike in the other EMCs, Sri Lanka's debt-to-revenue ratio has continued to increase in recent years.

### ***What Debt Ratios Countries Target?***

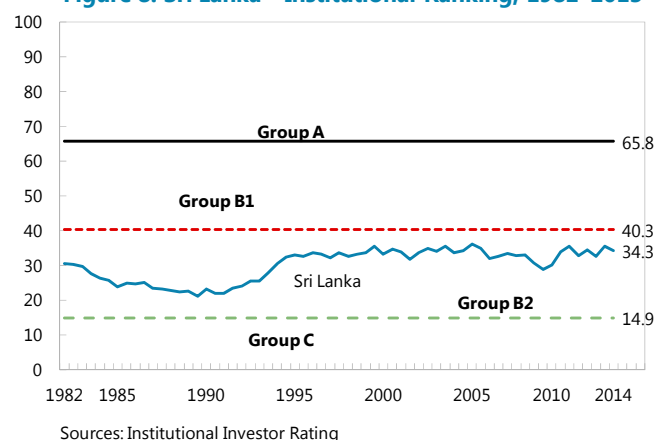
**11. Next, we can look at what debt ratio countries target.** A number of countries have introduced a fiscal rule in the form of debt ceiling. While some of these debt targets were set on basis of different considerations than debt sustainability (e.g., the Maastricht 60 percent debt ceiling for EMU members was based on the average debt ratio at the time when the rule was introduced), we can assume that in general, these targets reflect a judgment about the maximum level of debt that should not be exceeded because doing so would entail economic costs. Below is an overview of national and supranational debt rules. Most rules target the debt-to-GDP ratio between 40–60 percent of GDP.

|   |  |
|---|--|
| Armenia   | 60 percent   |
| Bulgaria  | 60 percent   |
| Cape Verde                                      | 60 percent   |
| Central African Economic and Monetary Community | 70 percent   |
| Ecuador   | 40 percent   |
| Eastern Caribbean Currency Union                | 60 percent of GDP by 2020                            |
| Indonesia                                       | 60 percent   |
| Kenya   | 45 percent   |
| Kosovo  | 40 percent   |
| Malaysia  | 55 percent   |
| Maldives  | 60 percent by 2016 (including government guarantees) |
| Mauritius                                       | 60 percent until 2017, 50 percent from 2018.         |
| Namibia   | 25–30 percent  |
| Pakistan  | 60 percent   |
| Panama  | 40 percent by 2015                                   |
| Serbia  | 45 percent   |
| West African Economic and Monetary Union        | Public debt should not exceed 70 percent of GDP      |

### Debt Intolerance Approach

**12. Following the approach of debt intolerance outlined in Di Bella and applied by Everaert (2008) to Kenya, we can estimate the public debt level at which Sri Lanka becomes more debt tolerant.** Debt tolerance is proxied by *Institutional Investor* rating (ranging from 0 to 100, with higher number indicating higher attractiveness as investment destination). Countries are divided into four groups: group A has higher rating than the sample mean plus one standard deviation; group B1 (B2) falls within the range mean plus (minus) standard deviation, and group C includes least debt tolerant countries with rating less than mean minus one standard deviation. Since the 1980s, Sri Lanka has been consistently in group B2. We can apply the coefficient from group B2 cross-country regression to estimate how much Sri Lanka's debt ratio would have to fall to graduate to B1 group. Applying the coefficient (-0.14), to improve the ranking from 34.3 to 40.3 would require  $6/0.14 = 43$  percentage point reduction of the debt-to-GDP ratio, from 78.3 percent to 35.3 percent. This is similar to the results obtained for Kenya (35 percent).

Figure 8. Sri Lanka - Institutional Ranking, 1982–2013



### Literature on Public Debt

**13. While the extensive literature on public debt does not specify the optimal level of public debt,** it offers numerous estimates of threshold levels of public debt that—when crossed—could bring about adverse consequences. However, what these consequences would be and what is the likelihood that they will entail, too, is a matter of an ongoing debate. By looking at these possible costs, one can identify different approaches to public debt thresholds.<sup>4</sup>

- **Interest Rates and Growth.** There are a number of channels through which high public debt could harm growth. The standard theory of crowding out postulates that increased government borrowing pushed up interest rates and 'crowds out' more productive investment. In addition to higher interest rates and crowding out, high debt also increases the future uncertainty about taxes and other policy parameters, with potentially adverse consequences for investment. IMF (2013a) summarizes the results of a number of empirical studies examining the impact of public debt on interest and growth. The results show that a 1 percentage point increase in the public debt-to-GDP ratio increases long-term interest rates by 1–7 basis points (the impact appears to be more significant for

<sup>4</sup> The discussion here follows closely Topalova and Nyberg (2010).

emerging market economies and in times of high global risk aversion). Similarly, a 10 percentage point increase in the public debt-to-GDP ratio beyond a certain threshold (ranging from 77 percent to 96 percent of GDP) reduces average annual growth by 0.17–0.59 percentage points.<sup>5</sup> The relationship between debt and growth could be non-linear, with debt increase at higher debt level having a greater negative impact on growth than the same debt increase at lower debt level. Reinhart and Rogoff (2010) claimed that countries with debt above 90 percent of GDP saw significant weakening of growth, and Kumar and Woo (2010) find similar nonlinearity at this debt level. Pescatori, Sandri and Simon (2014) failed to find such threshold, and instead conclude that at high debt levels, the relationship between debt and growth becomes weaker, but they also found that higher debt could result in more growth volatility, and that the debt trajectory matters as well – countries with high but declining debt growing faster than countries with similar but not declining debt. In case of Sri Lanka, the adverse effect of high public debt in real interest rates and growth is not apparent. High public debt has co-existed for an extended period of time with periods of low real interest rates and solid growth.

- **Debt sustainability and debt distress.** High level of public debt could result in debt distress and eventually into debt default, with potentially serious economic costs. Therefore, it is of importance to know at what level the debt becomes unsustainable and debt distress more likely. However, the numerous studies found it difficult to identify a robust debt sustainability threshold. Different approaches have been tried. One is to estimate a maximum sustainable debt level beyond which debt distress events become likely. For the EMs, the range estimated in the 2003 WEO is from 35 to 77 percent of GDP, and updated estimates for the period 1993–2009 give a range of 63–78 percent. Looking at the response of primary balance, the 2003 WEO (and Abiad and Ostry, 2005, Mendoza and Ostry, 2008) identify a threshold of 50 percent, beyond which the primary balance fails to respond in a manner consistent with debt sustainability. Hemming et al (2003) applied the signal approach developed by Kaminsky et al (1998), consisting of identifying the most effective indicators of debt distress and identifying optimal debt thresholds that minimize noise-to-signal ratios of these indicators. The threshold for EMs using this approach is at 77 percent. As part of its vulnerability assessment and crisis prevention role, the IMF has been strengthening its focus on public debt sustainability (IMF (2011, 2013b)). It used the signal approach to derive debt burden benchmarks for applying a more intense DSA scrutiny: gross government debt of 50 percent of GDP and gross public sector financing requirements of 10 percent of GDP (to be conservative, calculated benchmarks of 60 percent and 15 percent, respectively, were adjusted downward). Again, while its public debt has been near of or above these thresholds for

<sup>5</sup> Panizza and Presbitero (2012) question these results and argue while higher public debt is negatively correlated with economic growth, there is no convincing evidence of a causal link between debt and growth, and that such a causal link does not exist.

an extended period, Sri Lanka did not experience episodes of serious debt distress.

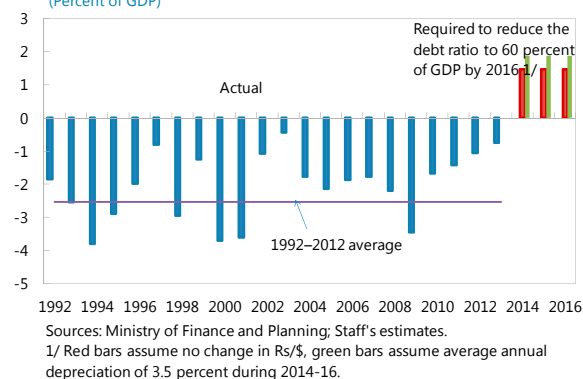
- **Buffers for shock absorption and countercyclical fiscal policy.** Countries with lower public debt have more room to use fiscal policy to absorb shocks and pursue their macroeconomic objectives. As the recent crisis has demonstrated, even countries with a relatively low level of (explicit) public debt could be hit by a shock that results in a significant increase in public debt ratio. In case of private sector deleveraging, low public debt provides a greater freedom to run fiscal deficit, increase public sector leverage and thus mitigate the impact of private deleveraging on economic activity (Turner, 2014). As noted by Topalova and Nyberg (2010), the average costs to the government of systemic banking crises in the past three decades averaged 16 percent of GDP. Again, Sri Lanka's relatively high public debt does not appear to have seriously restrained the authorities' freedom to implement fiscal policy, though the shock-absorbing capacity of fiscal policy was not yet properly tested.

**14. Two points need to be added to the above-discussed analysis.** First, the results are the averages, and individual countries' thresholds could be very different, depending on countries' specific circumstances (including its history of debt servicing, inflation, debt structure, investors' composition etc.), but also on the time-specific situation in global financial markets and global economy. Second, and related, in such a complex system as the modern global economy, it is not possible to quantify with accuracy the level at which the debt ratio would result in sharp, non-linear escalation of economic costs—be it higher borrowing costs, slower growth or debt distress, including default. Thus, it is a matter of policy judgment to weigh the costs and benefits of changing the debt path.

## D. Debt Reduction: Authorities' Plan

**15. The authorities' latest plan is to reduce the debt ratio to 65 percent of GDP by 2016, from the 2013 debt ratio of 78.3 percent of GDP.** This is less than the earlier-formulated (2003) target of reducing the debt ratio to 60 percent, but the authorities did not indicate that the 65 percent ratio is the ultimate level to which they would like to reduce the debt. How realistic is the objective of 65 percent debt ratio by 2016? That would imply reducing the debt ratio by 13 percent of GDP over three years—an ambitious target. But since 1990, there were several episodes when the debt-to-GDP ratio fell by a similar amount, so it is not impossible. As discussed above, there are a number of factors that affect the debt-to-GDP ratio, and assessing the feasible speed of debt reduction thus requires making realistic assumptions about fiscal policy (primary fiscal balance), growth, inflation, interest rates and the exchange rate. To assess the realism of the authorities'

**Figure 9. Sri Lanka: Primary Fiscal Balance, 1992-2016**  
(Percent of GDP)





debt reduction projection, we use staff's macroeconomic assumptions about growth, inflation (GDP deflator) and interest rate on government debt, to calculate the primary budget balance that would need to be maintained, on average, during 2014–2016 to reduce the debt ratio to 65 percent of GDP.<sup>6 7</sup>

**16. Assuming no change in the nominal exchange rate (and thus abstracting from its impact on the foreign currency-denominated part of the government debt),** the average 2014–16 primary fiscal balance would need to reach a surplus of 1.5 percent of GDP (figure 9, red bars). This compares with the 2013 primary fiscal deficit of 0.75 percent of GDP, and with the average 1992–2013 primary deficit of 1.9 percent of GDP. To illustrate the impact of changes in the currency value, if we assume a 3.5 percent average annual depreciation of the rupee against the U.S. dollar (our macro framework current projection), then other things being unchanged, the primary surplus would have to reach 1.9 percent of GDP to bring the debt ratio down to 65 percent by 2016.<sup>8</sup> This would mean a 2.65 percent of GDP stronger primary balance on average during 2014–16 than in 2013. Maintaining, on average, a primary fiscal surplus of these magnitudes for three years is not impossible, but it would represent a prominent departure from past fiscal policy, and thus require significant fiscal measures yet to be identified.<sup>9</sup>

## E. Debt Reduction: Suggested Strategy

**17. In this section, we provide a broad outline of possible debt reduction strategy.**

While an ambitious fiscal consolidation plan is desirable when a country is under market pressure and financing costs are high, this is not presently the case in Sri Lanka. Therefore, a case could be made that its fiscal adjustment strategy should be: (i) gradual (ii) sustained and credible; (iii) revenue-based; and (iv) growth-friendly.

**18. Avoiding a sharp fiscal adjustment should be preferable because it could be less costly in terms of growth.** Pennings and Pérez Ruiz (2013) note that there are a number of reasons why fiscal multipliers can vary with growth, and find that fast fiscal consolidations tend to have higher multipliers than more *gradual adjustments*. As Gupta et al (2013) argue, the case for a gradual and balanced adjustment is particularly apt in a situation of financial constraints

<sup>6</sup> Average real GDP growth during 2014–16 is projected to be 6 2/3 percent, well above the 1992–2013 average of 5.35 percent.

<sup>7</sup> See Escolano, 2010.

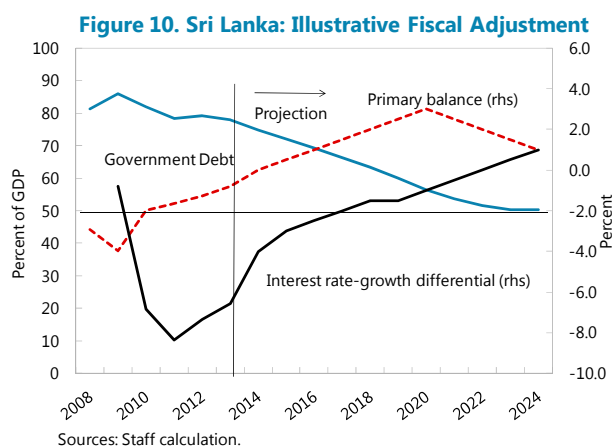
<sup>8</sup> In contrast, with a similar average annual appreciation of the currency, a primary deficit close to the actual 2013 level would be sufficient to bring the debt ratio down to the targeted level.

<sup>9</sup> The authorities project a higher average real GDP growth of 8.1 percent during 2014–16. Other things being equal, and assuming no change in the currency value, that would allow to reach the targeted reduction in the debt-to-GDP ratio by 2016 with a primary surplus of 0.5 percent of GDP, a 1 percent of GDP weaker fiscal balance than using the staff's more conservative assumption, but would still require on average a 1.25 percent of GDP stronger primary balance in 2014–16 compared to 2013.

when private sector is not borrowing. At the same time, though, it is important that fiscal adjustment is *sustained*, so as to avoid undermining the credibility that would fuel market doubts about the eventual attainability of fiscal targets. Particularly when the size of the targeted adjustment is substantial, avoiding repeated slippages is important. Otherwise, credibility would suffer, which could entail higher borrowing costs, particularly in cases like Sri Lanka where market-based borrowing becomes more important as concessional financing ebbs. Finally, numerous studies have demonstrated that to improve the chances of success, fiscal adjustment needs to be *growth-friendly*. IMF (2012) brings all these features together when it looks at the history of successful fiscal consolidations in advanced economies during the past century, and identifies three elements: (i) policy mix that supports growth; (ii) emphasis on persistent structural reforms to public finance over temporary or short-lived measures; and (iii) fiscal institutions that can help sustain and lock in the adjustment.

**19. The following fiscal adjustment strategy containing the above-discussed elements could be considered for Sri Lanka:**

- The long-term objective could be to reduce the debt ratio to 50 percent of GDP. While Sri Lanka has been able to sustain a significantly higher debt ratio for extended period of time, without any financing problems and large economic costs, the increased reliance on market financing, and the eventual tightening of global financial conditions points to the desirability of reducing the debt to a more prudent level. In addition, in the literature review, debt ratio of 50 percent appears to be an important threshold beyond which further debt accumulation could more likely have adverse consequences. This is also recognized in the DSA framework for market access countries (MAC) which identifies the 50 percent as the threshold beyond which more scrutiny is needed. Finally, at 50 percent, Sri Lanka's public debt would still remain well above the historical average of the EMs (41.3 percent for 1998–2012). As shown in table 1 below, a combination of primary surplus of 0.5 percent of GDP and interest rate-growth differential of 1 percent would stabilize the debt at 50 percent.*
- The reduction of the debt ratio to 50 percent should be based on a realistic projection of interest rate-growth differential, and on an ambitious yet feasible and sustainable adjustment to primary balance. Figure 10 provides an example of such an adjustment. It assumes that the changes in the debt ratio are driven only by primary balance and interest rate-growth differential. The primary balance gradually strengthens from a 0.75 percent of GDP deficit in 2013 to a surplus of 3 percent of GDP by 2020, and*



thereafter, it converges to the long-term 0.5 percent of GDP surplus by mid-2020s.<sup>15</sup> Reflecting the gradual increase in borrowing costs discussed above, the interest rate-growth differential moves from negative values to a positive 1 percent by mid-2020s.<sup>16</sup> Under these assumptions, the debt ratio would converge to 50 percent by 2023 and remain at that level thereafter. Table 1 summarizes the debt level ratios that could be sustained with different combinations of primary balance and interest rate-growth differential.

**Table 1. Stable Public Debt-to-GDP Ratio: Sensitivity to Primary Surplus and Interest-Growth Differential**

|                                     |     | Discount factor (r-g) |     |     |    |     |    |
|-------------------------------------|-----|-----------------------|-----|-----|----|-----|----|
|                                     |     | 0.5                   | 1   | 1.5 | 2  | 2.5 | 3  |
| Primary Surplus<br>(percent of GDP) | 0.2 | 40                    | 20  | 13  | 10 | 8   | 7  |
|                                     | 0.4 | 80                    | 40  | 27  | 20 | 16  | 13 |
|                                     | 0.6 | 100                   | 50  | 33  | 25 | 20  | 17 |
|                                     | 0.8 | 120                   | 60  | 40  | 30 | 24  | 20 |
|                                     | 1   | 160                   | 80  | 53  | 40 | 32  | 27 |
|                                     | 1.2 | 200                   | 100 | 87  | 50 | 40  | 33 |

- *The gradual strengthening of the primary balance should be accomplished in a growth-friendly way.* The usual conclusion in the literature is that successful sustained large fiscal adjustments relied more on spending cuts (Tsibouris et al, 2006). However, the evidence also shows that in countries with low revenue-to-GDP ratios, revenue-based adjustments were more likely. Given the low levels of tax revenues, limited room for further compression of current spending and undesirability of cuts in public investment (already comparatively low in Sri Lanka) the improvement in primary balance will have to rely mainly on higher tax revenues. IMF (2010) provides a summary of theory and experience with increasing the tax ratio and offers tax policy options to increase tax revenue in the most effective way.
- *Finally, to boost the sustainability and credibility of the fiscal adjustment strategy,*

<sup>15</sup> During 1991–2012, emerging market economies primary balance averaged a surplus of ¼ percent of potential GDP (based on data from Fiscal Monitor database).

<sup>16</sup> This is broadly equal to the average interest rate-growth differential based on marginal real interest rate for a sample of emerging market countries for period 1998–2008, as reported on Topalova and Nyberg (2010). It is also equal to estimated marginal real interest rate for Sri Lanka based on the WEO projections of US 10Y bond yield and CPI, staff's real growth projection for Sri Lanka and assuming a conservative 450 basis points Sri Lanka's EMBIG spread.

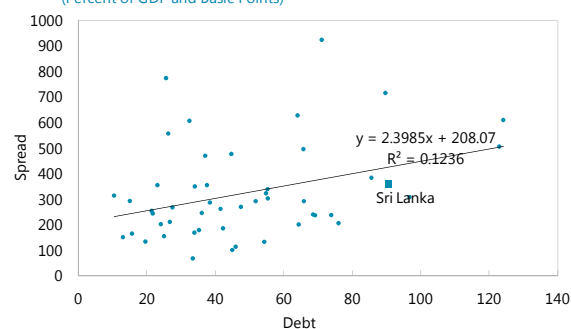
consideration could be given to the strengthening of institutional framework of fiscal policy conduct. One option would be introducing numerical limits on budgetary aggregates, such as debt or fiscal balance that would impose long-lasting constraints on fiscal policy conduct. Second—possibly complementary—option would be to set up some external fiscal watchdog (fiscal council), to foster accountability through analysis, information, and advice. They also complement simultaneous reforms of PFM systems, notably by providing a permanent anchor to medium-term budgetary frameworks. Sri Lanka's original 2003 FMRA set out the target of reducing the debt ratio to 60 percent by 2013, but it was missed by a wide margin. The FMRA never really represented a constraint that would shape fiscal policy decisions and guide annual budget preparations. These were not enforced and observed. Thus, a more formal mechanism could be envisaged to make the debt reduction target more binding and thus more credible.

## F. Conclusions

### 20. This paper argues that Sri Lanka's public debt is too high and needs to be reduced.

It offers an illustrative scenario of adjustment that would, in the course of the next decade, bring the government debt-to-GDP ratio down to 50 percent, from the current almost 80 percent. Sri Lanka has already made a significant progress in recent years in reducing the debt ratio by about 20 percentage points. At the same time, it appears that the elevated debt level did not pose a serious threat of debt distress, and did not appear to have had a lasting adverse impact on growth. the government was able to finance its large borrowing needs without serious problems, and at a cost that were not higher than in a number of countries with lower debt ratios (Figure 11). This reflects the history of servicing its debt, avoidance of large inflation to reduce the debt, and also favorable borrowing terms, due to concessional financing and captive domestic borrowers. However, to rely on a continued favorable interest rate-growth differential to keep the debt-to-GDP ratio from increasing would not be prudent. Recently, as the share of concessional budget financing declined, the effective costs of borrowing have already been increasing—a trend that is likely to continue with the increasing reliance on borrowing at market terms. Therefore, it would appear to be prudent to bring the debt ratio further down, to avoid ballooning servicing costs, crowding out of private investment and increased vulnerability to rollover risks and adverse shocks.

**Figure 11: Government Debt and EMBI Spread 1/**  
(Percent of GDP and Basic Points)



Sources: Fiscal Monitor Database, Bloomberg, staff's calculations.  
1/ Average Debt 1992–2012 or as available; spreads as of March 5, 2014

### 21. A strategy based primarily on increasing the revenue-to-GDP ratio would be called for, given the relatively low revenue collection compared to Sri Lanka's peers and history.

At the same time, a more robust institutional framework possibly based on numerical fiscal rules and a more robust enforcement mechanism could be considered to strengthen fiscal policy's credibility.

## References

- Abiad, Abdul and Jonathan D. Ostry, 2005, "Primary Surpluses and Sustainable Debt Levels in Emerging Market Countries," IMF Policy Discussion Paper 05/6. Washington, D.C.
- Akyüz, Yilmaz, 2007, Debt Sustainability in Emerging Markets: A Critical Appraisal. DESA Working Paper No. 61, UNCTAD, New York.
- Baldacci, Emanuele, Sanjeev Gupta and Carlos Mulas-Granados, 2013, "Debt Reduction, Fiscal Adjustment, and Growth in Credit-Constrained Economies," IMF Working Paper 13/238, (Washington, D.C.).
- Belhocine, Nazim and Salvatore Dell'Erba, 2013, The Impact of Debt Sustainability and the Level of Debt on Emerging Market Spreads. IMF Working Paper 13/93, Washington, D.C.
- Chalk, Nigel and Richard Hemming, 2000, "Assessing Fiscal Sustainability in Theory and Practice," IMF Working Paper 00/81, (Washington, D.C.)
- Di Bella, Gabriel, 2008, "A Stochastic Framework for Public Debt Sustainability Analysis," IMF Working Paper 08/58. Washington, D.C.
- Escolano, Julio, 2010, A Practical Guide to Public Debt Dynamics, Fiscal Sustainability, and Cyclical Adjustment of Budgetary Aggregates. Technical Notes and Manuals 10/02.
- Everaert, Greetje, 2008, Public Debt Thresholds for Kenya, Selected Issues Paper, Kenya, Article IV Report, 2008.
- Hemming, Richard, Michael Kell, and Axel Schimmelpfennig, 2003. Fiscal vulnerability and financial crises in emerging market economies. IMF Occasional Paper No. 218 (Washington: International Monetary Fund).
- International Monetary Fund, 2002, "Assessing Sustainability" (Washington). Available via the Internet: <http://www.imf.org/external/np/pdr/sus/2002/eng/052802.htm>.
- International Monetary Fund, 2003, *World Economic Outlook*: September, Chapter III, (Washington, DC: International Monetary Fund).
- International Monetary Fund, 2010, From Stimulus to Consolidation: Revenue and Expenditure Policies in Advanced and Emerging Economies. (Washington, D.C.).
- International Monetary Fund, 2011, Modernizing the Framework for Fiscal Policy and Public Debt Sustainability Analysis. (Washington, D.C.)

International Monetary Fund, 2012, *World Economic Outlook*: October, Chapter III, (Washington, DC: International Monetary Fund).

International Monetary Fund, 2013a, *Fiscal Monitor: April*, (Washington, DC: International Monetary Fund).

International Monetary Fund, 2013b, Staff Guidance Note for Public Debt Sustainability Analysis in Market-Access Economies. (Washington, D.C.)

Jarmuzek, Mariusz and Yanliang Miao (2014), A Primer on Estimating Indicative Debt Thresholds, IMF Working Paper (forthcoming).

Kaminsky, Graciela., Saul Lizondo and Carmen S. Reinhart, 1998. Leading Indicators of Currency Crises. International Monetary Fund Staff Papers 45, 1–48. (Washington, D.C.)

Kumar, Manmohan S. and Jaejoon Woo, 2010, "Public Debt and Growth," IMF Working Paper 10/174, (Washington, D.C.).

Mendoza, Enrique J., Jonathan D. Ostry, 2007, International Evidence on Fiscal Solvency: Is Fiscal Policy "Responsible"? NBER Working Paper No. 12947, Cambridge, Massachusetts.

Ostry, Jonathan D., Atish R. Ghosh, Jun I. Kim and Mahvash S. Qureshi, 2010, "Fiscal Space," IMF Staff Position Note, 10/11, (Washington, D.C., International Monetary Fund).

Panizza, Ugo and Andrea F. Presbitero, 2012, Public Debt and Economic Growth: is there a casual effect? Money and Finance Research Group Working Paper No. 65.

Pennings, Steven and Esther Pérez Ruiz, 2013, Fiscal Consolidation and Growth: Does Speed Matter? IMF Working Paper 13/230. Washington, D.C.

Pescatori, Andrea, Damiano Sandri and John Simon, 2014, Debt and Growth: Is There a Magic Threshold? IMF Working Paper 14/34. Washington, D.C.

Reinhart, Carmen, Kenneth Rogoff and Miguel Savastano, 2003, Debt Intolerance. Brookings Papers on Economic Activity, 2003 (1), 1–74.

Reinhart, Carmen, Kenneth Rogoff, 2010, "Growth in a Time of Debt," American Economic Review, American Economic Association, vol. 100(2), pages 573–78, May.

Topalova, Petia and Dan Nyberg, 2010, What Level of Public Debt Could India Target? IMF Working Paper 10/7. Washington, D.C.

Tsibouris, Geroqe C., Mark A. Horton, Mark J. Flanagan and Wojciech S. Maliszewski, 2006, "Experience with Large Fiscal Adjustments," IMF Occasional Paper 246, (Washington, D.C.).

Turner, Adair, 2014, "Wealth, Debt, Inequality and Low Interest Rates: Four Big Trends and Some Implications. Speech presented on March 24, 2014, at Cass Business School, London.