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Balancing Budget in Selected Asian Countries: Tax Increases or Expenditure Decreases

Khong Wye Leong Roy[*]
Tan Siow Hooi[**]
Chong Lee Lee[**]

Abstract

Budget deficit has been considered as one of the causes of many economic problems. Hence, many developed and developing countries have tried to balance the budget through expenditure reduction and/or increasing taxes. The purpose of this paper is to examine the causal relationship between government revenue and spending in eight Asian countries. Utilising the Johansen-Juselius (1990) co-integration test and error correction modelling, the evidences indicate that the expenditure and tax hypothesis is supported by Malaysia, Nepal, Sri Lanka and Thailand. In the case of Korea, government decisions on tax and sxpenditure are simultaneous, while there is no causal ordering between government spending and revenue for India, Pakistan and the Philippines.

1. Introduction

For the last thirty years, most Asian countries have been experiencing persistent budget deficit (see Annex Table 1). In certain countries, the budget deficit has been growing and this may have a negative effect on the economy. External deficits (Bachman, 1992; Dibooglu, 1997; Normandin, 1999; Vamvoukas, 1999), currency depreciation (Karras, 1993; Rahman *et al.*, 1996; Knot, 1998), inflationary pressure (Metin, 1998; Darrat, 2000), rising interest rates (Cebula, 1998a, 1998b, 1998c, 2000), which may cause crowding out effect (Al-Saji, 1993; Cebula and Rhodd, 1993; Ewing and Yanochik, 1999) and reduction in economic growth (Fischer, 1993; Gani, 1998) are some of the negative consequences of budget deficits.

* Lecturer, Faculty of Business and Law, Multimedia University, Jalan Ayer Keroh Lama, 75450 Melaka, Malaysia. Email: wlkhong@mmu.edu.my (Corresponding author).
** Lecturer, Faculty of Management, Multimedia University, Jalan Multimedia, 63100 Cyberjaya, Selangor, Malaysia.

Hence, policy makers and economists are concerned with these phenomena and have attempted to analyse and suggest means of resolving budget deficits. Some economists view that an increase in taxes may resolve this problem, while others believe that tax increases will worsen the budget deficit and the imbalance can be corrected only through cut in expenditure. Thus, the causal nexus between government revenue and expenditure may shed some light on this issue.

However, previous empirical studies have focused more on developed countries (see for example, Anderson *et al.*, 1986; Joulfaian and Mookerjee, 1991; Baghestani and McNown, 1994; Owoye, 1995; Katrakilidis, 1997; Payne, 1997; Koren and Stiassny, 1998; Hatemi-J and Shukur, 1999; Kollias and Makrydakis, 2000). Moreover, the literature on Asian countries are generally limited and focused on a few Asian countries such as China (Li, 2001), India (Bhat *et al.*, 1993), Japan (Joulfaian and Mookerjee, 1991; Owoye, 1995), Malaysia (Mithani and Goh, 1999) and Taiwan (Huang and Tang, 1992).

Thus, the present paper will compliment the existing literature and address the same issue of fiscal adjustment through government tax and/or expenditure. The rest of the paper is organised as follows. Section 2 of this paper will discuss the testing procedures. The empirical results are shown in Section 3. In Section 4, some concluding remarks are presented.

2. Methodology

In this study, the Johansen and Juselius (1990) cointegration tests are utilised to investigate the long-run relationship between government revenue and expenditure. This method requires the estimation of the following equation:

$$\Delta Xt=\alpha + \Gamma 1\ \Delta Xt\text{-}1 + \Gamma 2\ \Delta Xt\text{-}2 + \Gamma 3\ \Delta Xt\text{-}3 + \ldots.+ \Gamma k\text{-}1\ \Delta Xt\text{-}k+1+\Pi k\ Xt\text{-}k + \nu t \quad (1)$$

where X_t is a (p×1) vector of integrated variables, ν_t is a (p×1) vector of i.i.d. error terms and Π_k represents information on cointegrating relationship between variables. Thus, if the rank of Π_k is full or equal zero, then the variables in X_t are not cointegrated. In this study, X_t consists of real government expenditure, real government revenue and real gross domestic product[1].

Two common procedures of maximum eigenvalue and trace test are employed to determine the number of cointegrating vectors in Π_k. The trace test is based on the following statistic equation:

$$L_{trace} = -T \sum_{i=r+1}^{p} \ln(1-\lambda_i) \qquad (2)$$

where $\lambda_{r+1}, \lambda_{r+2}, \ldots\ldots, \lambda_p$ are the smallest p-r squared canonical eigenvalue. The null hypothesis is at most r cointegrating vector against a general alternative. On the other hand, the maximum eigenvalue test is given as below:

$$L_{max} = -T \times \ln (1- \lambda_{r+1}) \qquad (3)$$

1 To avoid mis-specification problem, output is incorporated into the VAR model. See for example Joulfaian and Mookerjee (1991) and Payne (1997).

where λ_{r+1} is the largest squared canonical eigenvalue. The null and alternative hypotheses are r cointegrating vectors and r+1 cointegrating vectors, respectively.

In the presence of cointegration, at least one channel of Granger-causality exists, either through significant lagged differences or significant error correction terms. Thus, the short-run dynamic relationship between government revenue and expenditure is examined using the error correction model.

In this paper, government expenditure, government revenue, gross domestic product and consumer price index for eight Asian economies are collected from *International Financial Statistics* published by International Monetary Fund. The data are annual due to the unavailability of data in quarterly or monthly basis. The data cover the periods ranging from 1950 to 2001 with the minimum of forty observations. Sample periods are 1950-2000 for India, 1954-1999 for Korea, 1960-1999 for Malaysia, 1958-1999 for Nepal, 1956-1999 for Pakistan, 1957-2001 for the Philippines, 1950-2000 for Sri Lanka and 1950-2001 for Thailand. All data are deflated by using consumer price index and are transformed into natural logarithms.

3. Empirical Results

Prior to testing of long-run relationship, the time series properties of each series are examined through Augmented Dickey-Fuller and Phillips-Perron unit root tests. In general, the results as shown in Annex Table 2 indicate that each series is integrated of order one.

To test for multiple cointegrating vectors, the Johansen-Juselius procedure is employed. Annex Table 3 reports the maximum eigenvalue and trace test statistics for the Johansen and Juselius cointegration test. The results provide evidences of at least one cointegrating vectors except for Malaysia. In other words, long-run relationship exists among government revenue, government expenditure and output for all the countries except Malaysia.

Given the presence of cointegration in these seven countries, the short-run dynamics between government revenue and expenditure are also investigated by using vector error correction model, while vector autoregressive is used for Malaysia. The results are summarised in Annex Table 4. Interestingly, the results indicate that causality relationship is running unidirectionally from expenditure to revenue for Malaysia, Nepal, Sri Lanka and Thailand. Such evidences are supportive of spend and tax hypothesis, whereby increased revenue occurs in response to increase in government expenditure.

In addition, the results also suggest feedback causal relationship for Korea, where tax and expenditure will influence each other. However, government spending and revenue are independent of each other in the case of India, Pakistan and the Philippines.

4. Conclusions

The paper investigates the tax and spend causal nexus for eight Asian countries. The results for Malaysia, Nepal, Sri Lanka and Thailand support the spend and tax hypothesis.

Thus, attempts to reduce budget deficit should come from cuts in government expenditure. On the other hand, the fiscal synchronization behavior of Korea suggests that when formulating fiscal policy, government should consider both its revenue and expenditure together. Hence, the ignorance of government to the interdependence relationship between revenue and spending may cause more harms. Finally, in the case of India, Pakistan and the Philippines, the decision on collecting revenue and allocating expenditure are independent within the government. Thus, reduction in expenditure and/or increase in government revenue are able to correct any short-run fiscal imbalance.

Annex Table 1. Central Government Overall Budget of Selected Asia Countries (% of GDP)

Country	1971-1980 (Average)	1985	1990	1995	2000
India	-3.0	-4.6	-8.3	-1.0	-5.1
Korea	-2.2	-1.3	-0.9	0.3	1.1
Malaysia	-8.3	-7.4	-3.0	0.8	-5.5
Nepal	-4.4	-11.8	-10.0	-4.8	-3.9
Pakistan	-8.9	-7.8	-6.5	-5.6	-6.5
Philippines	-1.3	-1.8	-3.5	0.6	-4.1
Sri Lanka	-9.5	-11.9	-9.7	-10.1	-9.8
Thailand	-2.7	-4.4	4.9	3.0	-2.2

Source: Asian Development Bank, Asian Development Outlook, various issues.

Annex Table 2. Augmented Dickey-Fuller and Phillips-Perron Unit Root Tests Results

	Augmented Dickey-Fuller Test		Phillips-Perron Test	
	Level	First Differences	Level	First Differences
India				
GE	-2.2462 (4)	-5.2219** (3)	-2.8846 (3)	-6.4318** (3)
GR	-3.3696 (1)	-5.6340** (1)	-2.9924 (3)	-6.8128** (3)
GDP	-0.4108 (4)	-4.9756** (3)	-2.3752 (3)	-11.2139** (3)
Korea				
GE	-2.1661 (2)	-7.2319** (1)	-2.9603 (3)	-6.7035** (3)
GR	-2.5449 (1)	-4.8238** (3)	-1.8056 (3)	-5.0611** (3)
GDP	-1.4610 (1)	-1.9323 (4)	-1.2546 (3)	-4.6502** (3)
Malaysia				
GE	-1.7267 (1)	-4.1331** (1)	-1.4906 (3)	-4.4146** (3)
GR	-1.1604 (1)	-3.8163** (1)	-1.1662 (3)	-5.6089** (3)
GDP	-3.0709 (1)	-5.4949** (1)	-3.0641 (3)	-5.7880** (3)

Nepal				
GE	-1.4032 (2)	-10.7212** (1)	-3.2786 (3)	-6.8151** (3)
GR	-1.8869 (1)	-5.0078** (1)	-1.7527 (3)	-6.8454** (3)
GDP	-1.3709 (2)	-7.8833** (1)	-2.3284 (3)	-7.8837** (3)
Pakistan				
GE	-1.4281 (1)	-4.9389** (1)	-2.0082 (3)	-8.2720** (3)
GR	-2.6460 (3)	-6.0837** (1)	-2.9308 (3)	-8.4587** (3)
GDP	-2.9588 (4)	-3.9485** (1)	-1.6527 (3)	-5.8082** (3)
Philippines				
GE	-3.3006 (1)	-4.4792** (4)	-4.4516** (3)	-9.9043** (3)
GR	-2.6190 (1)	-5.6539** (1)	-2.9254 (3)	-7.6321** (3)
GDP	-1.5623 (2)	-6.0745** (1)	-1.8471 (3)	-5.7765** (3)
Sri Lanka				
GE	-1.9897 (1)	-4.9760** (2)	-2.6218 (3)	-7.4142** (3)
GR	-2.7749 (1)	-5.6310** (2)	-2.9742 (3)	-7.0360** (3)
GDP	-2.0763 (4)	-4.4060** (1)	-1.6867 (3)	-6.7921** (3)
Thailand				
GE	-3.7110* (3)	-4.5865** (3)	-2.9599 (3)	-5.4657** (3)
GR	-2.1088 (1)	-3.8231** (1)	-1.8240 (3)	-4.9692** (3)
GDP	-2.5566 (1)	-4.1213** (1)	-1.9029 (3)	-4.4083** (3)

Notes: * and ** indicate statistical significant at 5% and 1 % respectively. The values in parentheses are the optimum lag. For augmented Dickey-Fuller unit root test, the optimum lag is based on Perron (1989) criteria, while the optimum lag for Phillips-Perron unit root test is based on the Newey and West (1987) rule. GR, GE and GDP represent government revenue, government expenditure and gross domestic product respectively.

Annex Table 3. Johansen-Juselius Cointegration Test Results

		λmax			λtrace	
H0	r = 0	r = 1	r = 2	r = 0	r ≤ 1	r ≤ 2
HA	r = 1	r = 2	r = 3	r > 0	r > 1	r > 2
India (k=5)	37.9194*	9.1255	5.5885	52.6333*	14.7139	5.5885
Korea (k=4)	42.1868*	18.6230*	8.7276	69.5374*	27.3056*	8.7276
Malaysia (k=3)	18.8889	8.4720	5.7359	33.0968*	14.2079	5.7359
Nepal (k=2)	26.4840*	13.8352	4.4847	44.8039*	18.3199	4.4847
Pakistan (k=3)	22.5501*	8.5496	5.5863	36.6860*	14.1360	5.5863
Philippines (k=3)	25.8159*	13.8666	2.8133	42.4958*	16.6799	21.833
Sri Lanka (k=2)	28.1788*	17.0757*	6.0849	51.3394*	23.1606*	6.0849
Thailand (k=2)	22.1512*	15.6848	3.5664	41.4025*	19.2513	3.5664

Notes: The VAR order is based on the Akaike's Information Criteria (AIC). * denotes statistically significant at 5%.

Annex Table 4. Granger Causality Results Based on Vector Error Correction Model

Null Hypothesis	Lag	Lagged Differences (χ^2 Statistics)	ECT1 (T Ratio)	ECT2 (T Ratio)	R^2
India					
GR does not cause GE	4	5.9222	-0.8462	-	0.5334
GE does not cause GR	4	3.2336	-0.9275	-	0.2826
Korea					
GR does not cause GE	4	15.8128**	-1.4178	-0.0278	0.8172
GE does not cause GR	4	25.2432**	-2.4960*	-2.9324**	0.7402
Malaysia[a]					
GR does not cause GE	1	1.9769	-	-	0.2614
GE does not cause GR	3	10.3323*	-	-	0.8990
Nepal					
GR does not cause GE	4	1.0583	-1.4405	-	0.3049
GE does not cause GR	2	6.8404*	-0.9547	-	0.2213
Pakistan					
GR does not cause GE	1	1.0018	-1.6838	-	0.1881
GE does not cause GR	3	3.2288	-0.8697	-	0.4865
Philippines					
GR does not cause GE	1	0.1952	-0.9529	-	0.2093
GE does not cause GR	1	1.2457	-1.0332	-	0.0600
Sri Lanka					
GR does not cause GE	3	6.4715	-2.2487*	0.0947	0.7713
GE does not cause GR	3	10.1868*	-5.8676**	-2.9622**	0.7902
Thailand					
GR does not cause GE	4	2.2497	-1.8864	-	0.4132
GE does not cause GR	4	17.5705**	-1.8950	-	0.5954

Notes: The optimum lag is based on the Akaike's Information Criteria (AIC). * and ** denote statistically significant at 5% and 1% respectively. GR and GE represent government revenue and government expenditure. [a] = The result for Malaysia is based on Vector Autoregressive (VAR).

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