The causality between Budget Deficits and Interest Rates in ASEAN Countries

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Abstract

This paper investigates the correlation between budget deficits and interest rates across countries of varying income levels across Southeast Asia using the Granger-causality econometric model. It consists of a time series analysis of budget deficits (local currency unit) and real interest rates in Indonesia, Malaysia, Thailand, the Philippines and Singapore from 1990 to 2011.This analysis concludes that budget deficits and interest rates do not cause one another in the countries under consideration.

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Introduction

A budget deficit is a situation in which a government's spending exceeds its revenue. It is also referred to as fiscal deficit or federal deficit depending on the country in question. A budget deficit indicates that the government of that country had to borrow money from non-fiscal sources, meaning it is in debt. The real interest rate is the expected return on an investment. It is calculated by subtracting inflation from the nominal interest rate.

While some economists claim that budget deficits and interest rates have a correlation, others are strongly against this view. In a blog post for the New York Times, Paul Krugman (2009) criticizes the view of fellow economist J. Bradford DeLong (2009) that budget deficits cause interest rates to soar. DeLong (2009) is of the opinion that budget deficits cause governments to borrow more, which in turn causes interest rates to increase. Thus, budget deficits are inversely proportional to interest rates. Krugman (2009) explains this relationship by pointing out that a weak economy drives up deficits and decreases the demand for funds, whereas a booming economy does just the opposite by generating surpluses and increasing the demand for loans.

One reason why interest rates may increase following a budget deficit is the crowding out effect. If the private sector's rate of buying government bonds does not keep up with the rate of increase in the budget deficit, the government will be forced to borrow more money. This would leave less money for the private sector to borrow, causing interest rates to rise (Nelson and Buol, 2004).

My contribution to previous studies done on the causality of these two macroeconomic variables is the different selection of countries. While most studies done on the subject have focused on developed countries, I decided to choose a mix of countries of varying levels development within geographic proximity of each other.

A large number of studies have been conducted on the relationship between budget deficits and interest rates in the past two decades. This paper investigates the causality between budget deficits and interest rates in 5 ASEAN economies from 1990 to 2011 using data from the World Development Indicators on the World Bank website.

Trend

Figure 1: Fiscal Surplus/ Deficit and Long-term Interest Rate in the United States

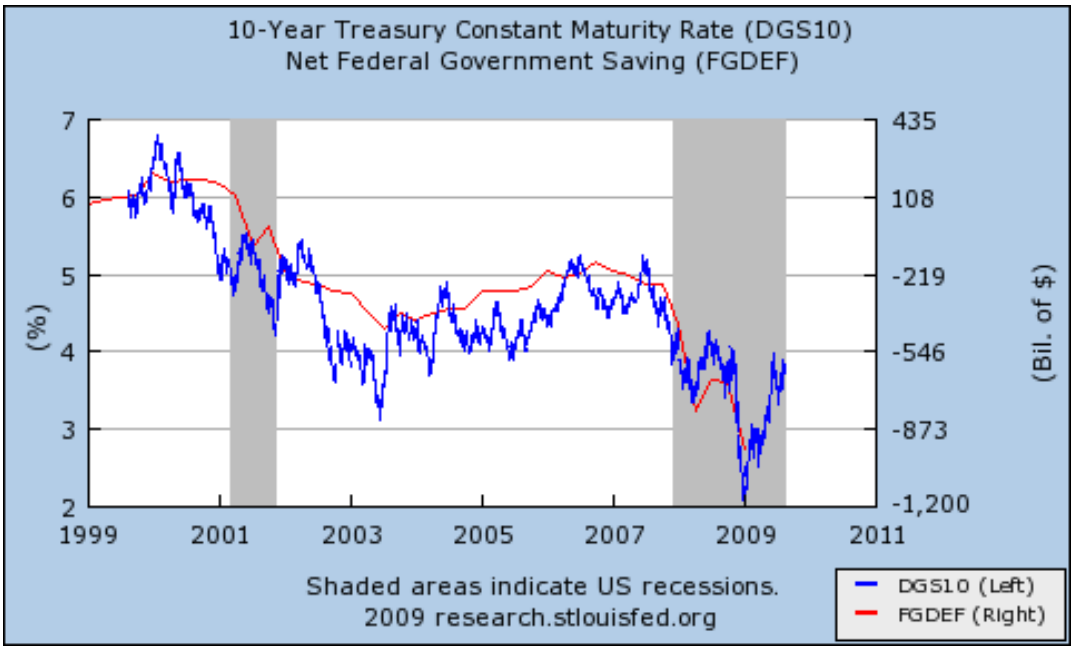

Figure 1 shows the apparent correlation between the fiscal balance (red) and the long-term interest rate (blue) in the United States. Krugman (2009) uses this figure in one of his blog posts for the New York Times. This figure supports the view of DeLong (2009) who states that fiscal deficits lead to higher interest rates. However, Krugman (2009) contradicts DeLong's (2009) theory by stating that recessions (shaded in gray) cause both variables to drop independently. For instance, interest rates tend to drop during recessions due to low consumer spending. Also, governments of countries in recession are very likely to spend more and earn less, leading to large budget deficits.

Figure 2: Budget Balances and Long-Term Interest Rates Averages in G-7 Countries from 1998 to 2000

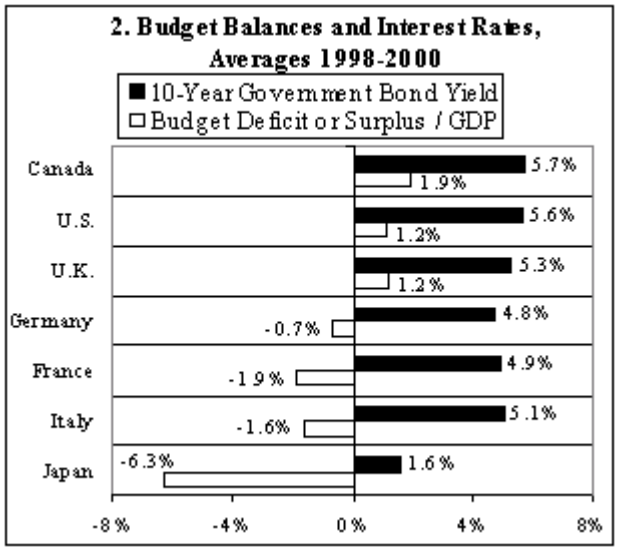

Figure 2 is taken from a study of the G-7 economies conducted by Reynolds (2002), a Senior Fellow at the Cato Institute. As seen in the figure, there is no relationship observed between budget balances and interest rates across these seven economic powerhouses. Reynolds (2002) points out that Japan has the lowest interest rate despite having the highest budget deficit. He concludes that interest rates should not determine future government policies regarding taxes.

Literature Review

Budget deficits indicate the condition of their respective economies. If an economy undergoes deficits for a prolonged period of time, it will have to borrow funds from other countries, causing it to be indebted to them. Thus, although deficit ultimately causes debt, they are not to be confused with one another.

Real interest rates determine the actual return that one is expected to receive on their investments in the economy. It is also the proportion of borrowed money debtors would have to pay on their loans. Inflation is taken into account when measuring real interest rates. This makes them a good measure of expected return, or interest.

The rising budget deficits of countries across the globe became the focus of many econometricians in the 1990's and 2000's. As a result, numerous studies were conducted on the potential causes of these deficits. One factor that was often linked to increasing fiscal deficits was the interest rate in the economy. While some studies focused on long-term interest rates, others took short-term interest rates into account.

Akinboade (2006) conducts two separate tests in order to determine the reason behind South Africa's high budget deficit. First, he conducts the London School test with variables such as long-term interest rate, budget deficit, short-term interest rate, depreciation, real per capita income, inflation and balance of payments. Then, he conducts the Granger Causality test between budget deficit and both long-term and short-term interest rates. The results of both his tests show that there is no causality between the budget deficit and interest rate of South Africa.

Cheng (1998) applies the Engle-Granger two-step procedure to the budget deficit and interest rate in Japan. He provides four possible scenarios concerning budget deficits interest rates. The first one is the classical loanable funds hypothesis: A rising budget deficit would lead to more government borrowing, resulting in the supply of bonds and higher interest rates. The second one is the Keynesian liquidity preference or ISLM framework: An expansionary fiscal policy will raise interest rates in the economy. The third scenario is the crowding-out effect, similar to the one explained by Nelson and Buol (2004). The final scenario is the Ricardian equivalence theorem: A budget deficit would correspond to higher private saving and balance out the effect

of the deficit. This would leave interest rates unaffected. On conducting his tests, Cheng (1998) concludes that neither budget deficits, short-term interest rates and prices in one model nor budget deficits and long-term interest rates in the other model are co-integrated.

Studies similar to those of Akinboade (2006) and Cheng (1998) were conducted by Cebula (2003) on Germany and the United States. The study on Germany concludes that a long-term positive relationship between nominal interest rate and central government budget deficits exists. This finding lends credibility to other studies investigating the impact of budget deficits on longer-term interest rates. Cebula's (2003) Error Correction Method (ECM) on the United States finds that the federal budget deficit acts to elevate the long-term rate of interest; but the direction of the causality is unclear.

A country-specific study by Farajova (2011) sheds light on the correlation between interest rates and budget deficits in Azerbaijan. On testing for ARDL Cointegration and Granger causality, Farajova finds that there exists a short-run causality running from current account and interest rate to budget deficit. However, no short-run causality running from interest rate to budget deficit exists.

Tests for relationships between budget deficits and interest rates have been conducted for groups of countries as well. Hauner and Kumar (2011) investigate whether budget deficits affect interest rates in G7 countries, and whether financial globalization has changed this relationship. They find that deficits have a significant but small effect on long-term rates, but this result depends on the fiscal concept used.

Overall, it appears that there is little to no causality between interest rates and budget deficits in the above mentioned studies.

Data and Empirical Methodology

Data

The data for this study was obtained from the World Development Indicators website of the World Bank. It is annual data from 1990 to 2011, which is available to the general public on the aforementioned website. Data was collected on two variables: the cash surplus/ deficit (in local currency unit) and the real interest rate in Indonesia, Malaysia, the Philippines, Singapore and Thailand. Refer to Appendix A for variable description.

Initially, this study was meant to focus on the Asean 5, namely Indonesia, Malaysia, the Philippines, Thailand and Vietnam. However, data on the budget deficit of Vietnam going back to 1990 was unavailable on the World Development Indicators website, and inaccessible on websites such as the International Monetary Fund (IMF) statistics website. Thus, Vietnam was dropped from the list of countries and Singapore, a developed country in Southeast Asia, was added instead.

Empirical Methodology

The names of the ASEAN countries have been abbreviated into three-letter forms for the purpose of this study. These abbreviations can be seen in the table below:

Table 1: Country abbreviations

Country	Abbreviation
Indonesia	IDN
Malaysia	MYS
The Philippines	PHL
Singapore	SGP
Thailand	THA

Cash surplus/ deficit (local currency unit) will be denoted by CASH _LCU and real interest rate will be denoted by INT_RT. The abbreviation for the country under consideration will precede the variable. For instance, the real interest rate and cash surplus/ deficit (LCU) for Indonesia will be given by IDN_INT_RT and IDN_CASH _LCU respectively.

The following are the steps to conduct a Granger Causality test:

1. Conduct an Augmented Dickey-Fuller (ADF) Test to check for the presence of a unit root. Look for the first difference.

2. Eliminate countries with one stationary and one non-stationary variable.

3. Run Granger Causality between variables from the same country.

All tests in the study are conducted using statistical software E-views 7.

There are four possible outcomes of this granger causality test:

1. Unidirectional causality: CASH_ LCU → INT_RT
   In this scenario, budget deficit granger causes real interest rate, but real interest rate does not granger cause budget deficit.

2. Unidirectional causality: INT_RT → CASH _LCU
   In this scenario, real interest rate granger causes budget deficit, but budget deficit does not granger cause real interest rate.

3. Bidirectional causality: CASH _LCU → INT_RT & INT_RT → CASH _LCU
   In this case, both variables granger cause each other.

4. Independence: no causality exists between INT_RT and CASH_ LCU
   In this case, the variables do not granger cause each other. This is the expected outcome of this study since previous studies between budget deficits and interest rates have concluded independence between the variables.

Empirical Results

Table 2: Output of Pairwise Granger Causality Tests between Cash Surplus/ Deficit and Real Interest Rate

Causality Tested (Null Hypothesis)	F-statistic	Probability	Conclusion
IDN_INT_RT does not granger cause IDN_CASH _LCU	3.98611	0.0576**	Reject
IDN_CASH_ LCU does not granger cause IDN_ INT_RT	0.15291	0.8604*	Accept
MYS_INT_RT does not granger cause MYS_CASH _LCU	0.58994	0.5768*	Accept
MYS_CASH_LCU does not granger cause MYS_INT_RT	1.14647	0.3649*	Accept
PHL_ INT_RT does not granger cause PHL_CASH _LCU	5.51111	0.0709**	Reject
PHL_CASH _LCU does not granger cause PHL_ INT_RT	0.59369	0.5946*	Accept
SGP_INT_RT does not granger cause SGP_CASH_LCU	2.35888	0.1286*	Accept
SGP_CASH_LCU does not granger cause SGP_INT_RT	3.01010	0.0796**	Reject
THA_INT_RT does not granger cause THA_CASH_LCU	0.20163	0.8196*	Accept
THA_CASH_LCU does not granger cause THA_INT_RT	0.00926	0.9908*	Accept

Note: ** and * denotes significance at the 5% and 10% level respectively

At the 10% level, 3 of these null hypotheses may be rejected. So, at the 10% level, the real interest rates of Indonesia and the Philippines Granger cause their respective cash surplus/ deficit. Also, the cash surplus/ deficit of Singapore Granger causes its real interest rate.

However, at the 5% significance level, the null hypothesis is accepted for all granger causalities tested. In other words, there is no granger causality between budget deficits and interest rates at the 5% significance level.

Conclusion

As determined by the empirical results of the Granger causality tests between budget deficits and interest rates, it appears that overall there is no causality between the two variables in Indonesia, Malaysia, the Philippines, Singapore and Thailand. The exceptions are that the real interest rates of Indonesia and the Philippines seem to Granger cause their budget deficits, and Singapore's budget deficit seems to Granger cause its real interest rate. This behavior of Singapore supports DeLong's (2009) theory that budget deficits put pressure on the domestic loan market, causing interest rates to skyrocket. Yet, the rest of the ASEAN countries do not exhibit such behavior. Going along with Krugman's (2009) explanation for this phenomenon observed in the United States, a booming economy tends to have a fiscal surplus and a higher interest rate; while economies in recession tend to do the opposite. In the case of Indonesia, the apparent causality from real interest rates to budget deficits may be explained by the political changes that took place in the country in the past two decades.

Since no clear pattern of causality has been observed through this study, governments should not rely on interest rates to shape their policies regarding taxation and borrowing from other countries. Although balancing the budget is a realistic goal for many economies, it should be based on criteria that have a greater effect on it than interest rates (Reynolds, 2002).

Appendix A: Variable Description and Data Sources

Variable	Description	Source
IDN_CASH_LCU	Cash surplus/ deficit (LCU) of Indonesia	World Development Indicators (WDI), the World Bank
IDN_INT_RT	Real interest rate of Indonesia	World Development Indicators (WDI), the World Bank
MYS_CASH_LCU	Cash surplus/ deficit (LCU) of Malaysia	World Development Indicators (WDI), the World Bank
MYS_INT_RT	Real interest rate of Malaysia	World Development Indicators (WDI), the World Bank
PHL_CASH_LCU	Cash surplus/ deficit (LCU) of the Philippines	World Development Indicators (WDI), the World Bank
PHL_INT_RT	Real interest rate of the Philippines	World Development Indicators (WDI), the World Bank
SGP_CASH_LCU	Cash surplus/ deficit (LCU) of Singapore	World Development Indicators (WDI), the World Bank
SGP_INT_RT	Real interest rate of Singapore	World Development Indicators (WDI), the World Bank
THA_CASH_LCU	Cash surplus/ deficit (LCU) of Thailand	World Development Indicators (WDI), the World Bank
THA_INT_RT	Real interest rate of Thailand	World Development Indicators (WDI), the World Bank

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