Effectiveness of Monetary and Fiscal Policies: Empirical Investigation for the Case of Thailand

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Abstract

In this research work, we attempted to examine the effectiveness of monetary and fiscal policies on the real output of Thailand. Related quarterly data were collected, covering the period from 2005: Q1 to 2018: Q4. The ARDL (Auto-Regressive Distributed Lags) model was employed to find a long-run equilibrium relationship and short-run dynamics between policy variables and real output. The estimation results can be summarized as follow: 1) There exists a long-run equilibrium relationship between government spending, policy interest rate and real output. 2) The short-run adjustment under the Error Correction framework shows that the coefficient of the error correction term is – 0.1559. This means that, after the system gets hit by an external shock, it will revert to its long-run equilibrium path in subsequent periods at the rate of 15.59% of the size of the initial deviation. 3) In terms of the effectiveness of the policies on real output, it is found that, in the long-run, the only policy interest rate has a negative effect on real output growth. In the short-run, per contra, both government spending and policy interest rate have an impact on changes in real output with delay by 2-4 lags. From these results, it is suggested that both monetary and fiscal policies be pursued in order to stabilize the economy in the short run.

Keywords**:** *Monetary policy, Fiscal policy, Stabilization, ARDL model, Error Correction model, Cointegration*

1. Introduction

In macroeconomics, the fluctuation of real output or real GDP (Gross Domestic Product), sometimes called “Business Cycles” is undesirable because it represents the uncertainty in income and employment for the economy as a whole. In theory, the fluctuation in output is seen as a short-run deviation from the long-run equilibrium path. Therefore, proper stabilization policy should be implemented to contain the economic system to move smoothly within the pre-determined band. Leaving the business cycles unattended might result in the economy to swing out of hand and might end up getting exploded or collapsed into a crisis state.

For Thailand, the stabilization policy called “Inflation Targeting” has been put into use since 1999, two years after the “Asian Financial Crisis 1997”. The aim of Inflation Targeting policy is mainly to contain the inflation rate to stay within the target range, which is normally set in the band of (0.5 - 3.0) per cent. It is hoped that having inflation under control will result in the real output being stabilized as well. The tool for inflation targeting is the overnight interbank lending rate, sometimes called “REPO” or “RP” 1-day rate. This is a monetary policy tool for stabilization purpose that is operated under the supervision of the Bank of Thailand.

Fiscal policy, that is, government spending, in particular, may also play a significant role in stabilization policy. It is aimed to have a direct impact on real output. Especially in an economic downturn, we will see an increase in government spending in order to prop up the economy to move along the equilibrium path.

Nonetheless, the success of the implementation of the stabilization policy is not guaranteed. As can be witnessed during the past decade that the global economic slowdown continues to drag on up to the present time, no matter how much and how often the monetary and fiscal policies were put into use by many countries experiencing an economic downturn. In some countries such as Japan and the EU, the reduction of policy interest rate, even down to zero, did not help recover the economy up from the bottom.

As for fiscal policy, its role as a policy tool is limited by the public debt ceiling of each country. Therefore, the effectiveness of fiscal policy for stabilization purpose is still questionable due to government budget limitation.

As mentioned above, in practice, monetary and fiscal policies may not be effective in stabilizing real output as suggested by the theory. This has drawn much attention from many researchers to perform an empirical test on the subject of the effectiveness of stabilization policy.

Jain-Chandra and Unsal (2014) used a VAR framework to examine the effectiveness of monetary policy transmission mechanisms for emerging economies in Asia. They found that short-term interest rate was an effective monetary policy tool, though the impact was weak during the period of capital inflows. Incekara and Amanov (2018) employed Cointegration and Error Correction approach to investigate the effectiveness of monetary policy channels for the Turkish economy. They found that credit and exchange rate had a significant impact on the price level, while the policy interest rate did not affect the price. Nisa & Hayati, (2018) used the VECM model to examine the effectiveness of monetary channels for the case of the Indonesian economy. The result indicates that the most effective channel is inflation expectation. Hwee (2004) analyzes the effectiveness of monetary policy for the case of Singapore. VAR model was employed for this purpose. The result of the study reveals that the exchange rate has a strong influence on the change of real output, while the interest rate does not have any effect. Özer & Karagöl (2018) used ARDL approach to test the effectiveness of monetary and fiscal policies on real output growth and found that the monetary policy is effective in the short-run, while fiscal policy has an impact on growth in the long-run. Jiranyakul (2007) estimated the long-run relationship between government expenditure and GDP growth using ARDL framework. It is found that no cointegration exists between the two variables even though the test found the uni-directional causality running from government expenditure to economic growth.

The results from existing literature seem to be inconclusive in term of policy effectiveness. In this research work, we will examine the effectiveness of monetary and fiscal policy for the case of Thailand. The quarterly data for real output (or real GDP), government spending, and policy interest rate were collected from the databases of the Office of the National Economic and Social Development Council and the Bank of Thailand, respectively. The data covers the periods from 2005: Q1 to 2018: Q4. During this time, Thailand has implemented “Inflation Targeting” monetary policy and “Managed Float” exchange rate regime for the whole period. This will ensure that our data will be free from any distortions due to structural or institutional changes during the period under investigation.

2. Objectives

The objective of this study is to investigate the effectiveness of monetary and fiscal policy being used to stabilize the growth of real output. As for monetary policy, although is used principally for targeting inflation, the real out is also considered to be another ultimate target that is of particular concern for the central bank The time series data for Thailand during the period 2005-2018 will be used for the estimation. The ARDL model is employed to find the long-run relationship and the short-run dynamics of real output, also the government spending and policy interest rate.

3. Materials and Methods

The conceptual framework for examining the effectiveness of monetary and fiscal policies with respect to changes in real output can be viewed from the figure below.

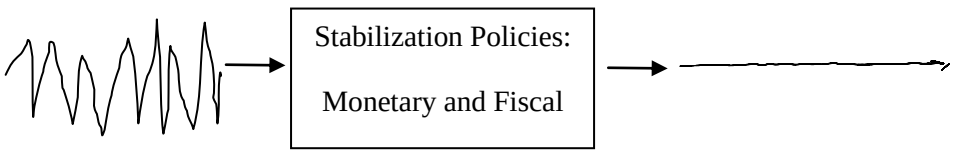

Figure 1: (Short-run Stabilization Process) Highly volatile real GDP is expected to come out as a smooth series after it passes through stabilization mechanisms enforced by monetary and fiscal policy tools.

As can be seen from Figure 1 above, the monetary policy tool (such as short-term interest rate) and fiscal policy tool (such as government spending) will be applied to smooth out the movement of real GDP. If the policy is effective, then we will see the real GDP to move within the target band. However, in practice, the policy may not be so effective as suggested by the theory. The ineffectiveness may be due to the limitation or the availability of the policy itself, such as the case of interest rate that already reaches the floor or the public debt that already reaches the ceiling. In some countries, this will limit the availability of policy tools for the authority to act. In other cases, the policy ineffectiveness may be due to economic, social or political structure of the economy that make the real GDP neutral or inactive to changes in policy variables being implemented.

The purpose of this research work is to find the relationship between real output (i.e., real GDP) and monetary policy (i.e., policy interest rate) and fiscal policy (i.e., government spending). The relationship can be written in linear form as follow:

$$rgdp = b_0 + b_1(porate) + b_2(gov) + \varepsilon_t \quad (1)$$

Where, rgdp is real output or real GDP

porate is the policy interest rate. (For Thailand, the REPO or RP 1-day is being used by the Bank of Thailand as a principle monetary policy tool.

gov is government spending, being used as a fiscal policy tool by the Ministry of Finance.

ε_t is the error or residual term.

b_0, b_1, b_2 are coefficients to be estimated from the data. Each estimated coefficient is used to measure the magnitude of the impact or effectiveness of policy variables on the change of real GDP.

The quarterly time series data for the three variables above were collected, covering the period from 2005: Q1 to 2018: Q4. All data are seasonally adjusted.

The sequence of the operation to be performed on the data is as follow:

1. Unit Root Test. This test will be applied to every single time-series data. The purpose of this test is to examine the stationarity of the data. The Augmented Dickey-Fuller (ADF) test will be applied for this purpose. If the data is stationary at the level, we call this series as being Integrate of Order zero, or I (0). But if the data is stationary at the first difference, we call it as being Integrate of Order one, or I (1).
2. Cointegration Test. This is the test to see whether the long-run equilibrium relationship among real output, monetary policy and fiscal policy exists or not. If the long-run equilibrium relationship exists, then we can proceed further to estimate the short-run dynamics using ECM framework as per step 4) below. Note that a cointegration test is an appropriate approach only when all variables involved are I (1). Equation (1) above is the representation of the cointegration relationship.
3. Auto-Regressive Distributed Lags (ARDL) Model. Developed by Pesaran and Shin (1999) this model is used as an alternative approach to cointegration test as mentioned above. The case that is suitable for ARDL framework is when the variables involved are the mixture of I (0) and I (1). The ARDL model will include both the long-run relationship and short-run dynamics in one single equation. The following form of an equation is the representation of the ARDL model.

$$\Delta\log(rgdp)_t = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta\log(gov)_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta(porate)_{t-i} + \theta_1 \log(gov)_{t-1} + \theta_2 porate_{t-1} + \theta_3 \log(rgdp)_{t-1} + \eta_t \quad (2)$$

The null hypothesis of no-cointegration for Equation (2) is

$$H_0: \theta_1 = \theta_2 = \theta_3 = 0$$

4. Error Correction Model (ECM). This model is used to estimate the short-run adjustment among the variables involved. It will also show how fast the system can error correct itself or revert to its long-run equilibrium path after it deviates from equilibrium due to external shock. The following form of the equation is the representation of the ECM model.

$$\Delta \log(rgdp)_t = b_0 + \sum_{i=1}^{p} \phi_i \, \Delta \log(gov)_{t-i} + \sum_{i=1}^{p} \psi_i \, \Delta(porate)_{t-i} + \zeta_t \qquad (3)$$

The effectiveness of stabilization policy is attained when the coefficients of policy variables (i.e., policy interest rate and government spending) are significantly different from zero.

4. Results and Discussion

4.1 Unit Root Test

Table 1 ADF Unit Root Test

Null Hypothesis:	Critical Value	t-statistic	Prob.	Integrate
D(LOG(GOV)) has a unit root	-3.498692	-6.982564	0.0000*	I (1)
LOG(RGDP) has a unit root	-3.493692	-4.055697	0.0123*	I (0)
PORATE has a unit root	-3.495295	-3.523242	0.0469*	I (0)

*Significant at 5% level.

The results show that the log of real GDP and policy interest rate is stationary at the level (I0), while the log of government spending is stationary at the first difference (I (1). Therefore, it is appropriate to use the ARDL approach to estimate long-run equilibrium relationship and short-run adjustment for these three variables.

4.2 ARDL Bounds Test

Table 2 Null Hypothesis: No long-run relationships exist

Critical Value		F-statistic
Lower bound	3.79	
Upper bound	4.85	< 5.1296*

The ARDL Bounds test confirms that there exists a long-run relationship for these three variables.

4.3 ARDL Cointegrating and Long Run Form

Table 3 ARDL Cointegrating and Long Run Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PORATE	-0.100709	0.050104	-2.009996	0.0535*
*LOG(GOV)	0.303918	0.211826	1.434756	0.1617

EC = LOG(RGDP) - (-0.1007*PORATE + 0.3039*LOG (GOV))

*Significant at 10% level

The estimated output indicates that there exists a long-run equilibrium relationship between real output, government expenditure and the policy interest rate. It shows that only the policy rate has a significant impact on long-run growth of real output, while government spending has no significant effect. The negative sign of the impact of the policy rate indicates the inverse effect of monetary policy. That is, the reduction of the policy rate is effective in stimulating the growth rate of real GDP.

The insignificance of government spending, particularly for the case of Thailand, maybe due to the fact that most of the government budget is destined for household consumption. Only a small portion of the budget is allocated for investment in infrastructures that is necessary for stimulating economic growth in the long run.

4.4 Sort Run Adjustment

Table 4 ECM Regression, Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.729588	0.424263	4.076686	0.0003
DLOG (RGDP (-1))	-0.304435	0.125144	-2.432670	0.0212
D (PORATE)	0.012125	0.007837	1.547212	0.1323
D (PORATE (-1))	-0.003785	0.008620	-0.439150	0.6637
D (PORATE (-2))	0.001133	0.008216	0.137876	0.8913
D (PORATE (-3))	-0.012812	0.007741	-1.655028	0.1083
D (PORATE (-4))	0.014185	0.007695	1.843337	0.0752
D(PORATE (-5))	-0.000615	0.007546	-0.081517	0.9356
D(PORATE (-6))	0.025628	0.007126	3.596460	0.0011
D(PORATE (-7))	0.012844	0.007220	1.778956	0.0854
DLOG (GOV)	0.159757	0.071570	2.232182	0.0332
DLOG (GOV (-1))	-0.106414	0.087827	-1.211629	0.2351
DLOG (GOV (-2))	-0.230682	0.083366	-2.767099	0.0096
DLOG (GOV (-3))	-0.131189	0.084534	-1.551899	0.1312
DLOG (GOV (-4))	-0.302823	0.078769	-3.844454	0.0006
CointEq (-1)*	-0.155985	0.038500	-4.051517	0.0003

The focus of short-run adjustment is on the estimated coefficient of the “Error Correction” term i.e., CointEq (-1), which is equal to -0.155985. It tells us that the system will adjust back to its long-run equilibrium path at the rate of 15.59% of the size of the initial deviation on the subsequent period. This means that it will take approximately 7 quarters for the system to complete the process of error correction.

Notice that, both policy rate and government spending have a significant impact on the change in real output growth in the short-run, even though the immediate impacts seems to be less effective than the lagged ones. This means that it may take some time for the policy tools to be materialized in the market. From this finding, it is recommended that the authority use both policy rate and government spending for short-run stabilization purpose.

Note also that the data under study covers the period of Subprime Crisis (2008 and after). Although this might have been the cause of concern, it is very difficult to ascertain the overall impact of this data irregularity on the statistical results. Therefore, at this stage, we will rely on the ARDL Bound Test which confirmed that the long-run relationship among these three variables does exist.

5. Conclusion

In this research work, we employed the ARDL approach to finding the cointegration (or the long-run equilibrium relationship) and the short-run adjustment between real output, government spending and the policy interest rate. The estimation results show that the long-run equilibrium relationship exists based on the ARDL Bounds Test with 5% level of significance. The monetary policy (i.e., the overnight interbank rate) has a significant negative impact on real output growth in the long-run. This means that the reduction in the policy interest rate may help stimulate GDP growth through an increase in bank lending and investment channels. As for the short-run adjustment, both monetary policy and fiscal policy seem to have an impact on output growth with the delay by 2-4 lags.

In term of short-run adjustment, the coefficient of the error correction term is equal to 0.1559. This means that the system will correct itself back to the long-run equilibrium path at the rate of 15.59% of the size of the initial deviation that occurred due to external shock.

Overall, the result shows that both policies are effective for short-run stabilization. In the long-run, however, the monetary policy is effective, while the fiscal policy is not. The ineffectiveness of fiscal policy may be due to the limitation of the government budget, which generally requires that the government budget be balanced in the long-run.

For future research work, it is recommended that the exchange rate should also be included, among other related variables, in the testing of policy effectiveness. The role of the exchange rate as a policy channel is obvious because Thailand depends so much on export as a major source of national income.

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