Journal of Sustainability Science and Management
Volume 7 *Number* 1, June 2012: 94-102
ISSN: 1823-8556

THE SUSTAINABILITY OF TERENGGANU FISCAL ADJUSTMENT AND DYNAMIC ECONOMICS PERFORMANCE

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Abstract: This study identifies sustainability between expenditure and revenue of the Terengganu state government. Two hypotheses have been proposed to explain the sustainability between expenditure and revenue - *spend-revenue hypothesis* and *revenue-spend hypothesis*. To determine those hypotheses, econometrical time-series method consisting of cointegration and vector autoregressive (*VAR*) tests were applied in this study. The cointegration test results show that there is no long-run stability between revenue and expenditure. However, the results of the *VAR* tests indicate sustainability between revenue and expenditure does exist. This study concludes that, for the state of Terengganu, *spend-revenue hypothesis* is relevant. In other words, growth in expenditure influences the growth in total revenue.

KEYWORDS: sustainability, revenue, expenditure, GDP

Introduction

The state of Terengganu is located on the east coast of Peninsular Malaysia with an area of 12,955 square kilometres and beach length of 244 kilometres. In the 1970s and 1980s, the major products were agricultural-based including fisheries and timber. However, in recent years, agriculture has taken a back seat with crude oil, liquefied natural gas, petrochemical products and steel dominating the state economy. Most of Terengganu's financial resources are generated from direct-tax revenue. Indirect-tax revenue, non-tax revenue and others contribute only a small percentage of the state income. The revenues collected are allocated to government expenditure which comprises of operating and development expenditures. Based on the 2006 annual budget, Terengganu is apparently on a deficit budget. Data gathered for this study showed a deficit budget trend for 1980 - 2004 period, meaning that government expenditure has exceeded revenue.

Data on expenditure, revenue and GDP for Terengganu between 1975 and 2006 shows a specific trend between expenditure and revenue. Government expenditure and revenue were positively correlated. For example, revenue increased from RM152.68 million in 1980 to RM269.71 million in 1981 but expenditure also increased from RM212.87 to RM378.8 million in the respective years. Increase in revenue has also influenced state GDP which increased from RM2177.1 million to RM2272.4 million in the same period. In 1988, government revenue and expenditure kept increasing with revenue amounting to RM259.29 million, expenditure RM485.5 million and GDP RM 2482 million, respectively.

During the 1983-1988 period, instability was found between revenue and expenditure. Government expenditure decreased to 0.17 percent in 1984 from 1.67 percent in the previous year while government revenue increased 18.1 percent in 1984 compared to 25.45 percent increase in 1983. This unstable situation continued in the following years. Nevertheless, the questions that emerge are, what is the sustainability between government expenditure and revenue? Does the sustainability exist in the long run? The aim of this study is to identify sustainability between expenditure and revenue of the Terengganu state government.

Received: 11 May 2011 / Accepted: 11 Oktober 2011

An efficient fiscal policy is needed to stimulate the domestic economic balances such as price ceiling, economy growth and manpower. Therefore, understanding the long-run sustainability between expenditure and revenue is important in order to assess the unbalanced fiscal phenomenon. Based on the 1975 - 2006 data, the increase in government revenue was slower than the growth in expenditure. Thus, for 30 years, the state has experienced a budget deficit. Lack of proper information storage and poor updating of data makes analysis difficult. However, using time-series analysis techniques may be useful in explaining the phenomenon.

Fiscal Adjustment Hypothesis

The sustainability of government fiscal adjustment in the long run is based on the "spend-revenue" hypothesis and "revenue-spend" hypothesis. "Spend-revenue" hypothesis means that a government commits expenditure first and then increases its revenue or receives support from financial spending, or precisely government increases its capital or fund first before making its financial expenditure (Carneiro *et al*., 2004). Peacock & Wiseman (1979) and Barro (1974) stated "spend-revenue" hypothesis as a situation where a government estimates its expenditure and then increase its revenue to pay for the expenditure. Peacock & Wiseman (1979) also stated that the increase in taxes by the government is to cover the rise in expenditure. This is done in order to avoid the public from viewing government expenditure increase as a burden that needs to be shared collectively. Thus, "spend-revenue" hypothesis has a clear policy implication in the sense that government expenditure needs to be controlled to lessen deficit in the budget. Besides, it is also fiscal structuring hypothesis that suggests a government to decide on revenue and spending at the same time (Musgrave, 1966; Meltzer & Richard, 1981).

On the other hand, "revenue-spend" hypothesis means if direction of cause-effect is due to "revenue to spend" hypothesis, expenditure level will be adjusted to change in revenue collection (Zulkefly *et al*., 2003). "Revenue- spend" hypothesis also means that government increases its revenue first before commiting on its expenditure (Friedman, 1978; Buchanan & Wagner, 1978). Friedman (1978) estimated tax and spend model based on a situation where a government has to spend all its revenue and the resulting tax increase will show that government expenditure has also increased. In the short-term, increase in government expenditure is due to increase in tax while in a longer term, decrease in government expenditure shows that tax revenue will also decrease due to fiscal strength. Vedder *et al*., (1978) indicated that a tax increase will make a higher increase in expenditure within the same year. In his empirical analysis, Vedder *et al*., (1978) not only tested cause relation between tax and expenditure, it also assumpts that tax increase is also the reason for expenditure increase as basic for statistic model. This statistic model then decides how expenditure change will increase tax with an assumption that tax does influence expenditure.

Majority of researchers use their own methods to study the sustainability relation between government revenue and expenditure. The methods include Wagner Law method (Zulkefly *et al.*, 2003), Vector Autoregressive estimation model (VAR) (Koren & Stiassny, 1998), cointegration test and Granger causality test (Narayan, 2005) and others including panel data estimation. It is apparent that the method employed depends on the type of data used by the researchers. Although, hypothetically, the analytical method differs, all studies consider short-term and long- term sustainability relation between revenue and expenditure and the fiscal policy experienced by the government. In a Malaysian case study, Zulkefly *et al.*, (2003) reported the causality direction between fiscal variables (government expenditure) and tax revenue collection. The researcher used time-series econometrical method such as varians decomposition and reaction function to study spend-revenue and revenue-spend hypotheses. Zulkefly *et al*., (2003) reported that two-directional causality supported the direction hypotheses. They also reported findings from other studies including Koren and Stiassny (1998). The study determined authentication of

two hypotheses - "tax and spend" and "spend and tax" using data of nine industrial countries including Germany, Australia, France, Holland, United Kingdom, United States of America, Italy, Malaysia and Africa.

Koren and Stiassny (1998) used the VAR model in a three variables structure namely expenditure, revenue and income aggregate. Impulse response function was used to identify cause-effect relation between revenue and expenditure. The results of the study supported spend and tax view in budgetary decision process. This expenditure dominated budgetary process was found in the case of Italy, Australia and France. In contrast, tax and spend hypothesis existed in United Kingdom, Holland, Germany and United States of America. This shows that budgetary planning is dominated by revenue collection before spending decision is made. Zulkefly *et al*., (2003) focused on determining authentication of Wagner Law inMalaysia. The study supported Wagner hypothesis that public spending growth is faster than economic growth. A one percent economic growth would result in more than one percent growth in expenditure.

Jin and Zou, (2005) used a different method to determine the relation between fiscal distribution and economic growth in China through two phases. The first phase was under fiscal system and the second phase was under tax system. Fiscal distribution is one of the policies implemented by the government to stabilise the economy. Using panel-data analysis, the researcher reported theorically- and empirically- proven results of previous studies. Oates (1972) theoretically explained that fiscal power can help economic growth. If some public goods involve externality, government will be more efficient in the production and distribution of such goods. Government expenditure then appears to be more responsive towards domestic interest and needs, leading to effectiveness. Revenue decentralisation from federal government to local government will in a way encourage intergrity. The revenue collected will also meet government expenditure needs.

Jin and Zou (1999) showed that revenue and expenditure distribution can help to increase economic growth. The results also indicated that economic growth was influenced by local authorities' expenditure and revenue which is consistent with principle theory for federalism fiscal policy. Narayan (2005) determined the cointegration relation and causality between government revenue and expenditure for nine Asian countries. The researcher used cointegration test method to identify long-term sustainability relation between government revenue and spending. Granger causality test was also utilised to determine the influence of revenue on expenditure. Data sources were based on International Financial Statistic from World Bank Data and IMF. It was found that long-term revenue in the first cointegration test shows that government expenditure for Indonesia and Sri Lanka are statistically significant on government revenue using bound test. In the second test for Nepal, it was found that increase in government revenue was statistically cointegrated to government expenditure with a positive relation. In the third test, Granger causality in short term for Indonesia, Sri Lanka and Nepal indicate various direction relations between government revenue and expenditure. While in longer term, Granger causality showed that relation between government expenditure and revenue for Indonesia and Sri Lanka was consistent with spend-revenue hypothesis.

Following Narayan, (2005) and Garcia, (1999) also studied the relation between government revenue and expenditure using time- series analysis. As a consequence of debt increase among OECD countries which led to budget deficit, Garcia (1999) tried to explain whether fiscal adjustment strategy (increasing tax and decreasing expenditure) could produce an effective method to achieve a balanced budget. This author uses Granger causality, Johansen cointegration and VECM model to determine the direction of long-term and short-term causality between government revenue and expenditure.

Result of this study shows that in the long-term there is at least one cointegrated vector which indicates a significant long-term sustainability relation between government revenue and

expenditure. The Granger causality test results suggest that tax or revenue impulse is more stable than government expenditure impulse. Results of Garcia (1999) is consistent with those of Alesina and Perotti (1996). As reported by Garcia (1999), Alesina and Perotti (1995), budget adjustment depends on two conditions. First, decrease in government expenditure is more effective in achieving a balanced budget; second, tax or revenue impulse continues longer than expenditure impulse.

With regards to the previously mentioned studies, most of the researchers concentrated on relation between government revenue and expenditure. However, Kollias (2004) focused on relation between military spending and EU 15 member increase in the period of 1961-2000. The researcher used cointegration test method and Granger causality test. Result from empirical study shows first, there is no bi-directional cause in three countries that are Australia, Belgium and Portugal. Second, in uni-directional situation there exist causality relation between members increase and military expenditure in Denmark, France and Luxemborg. Third, Granger causality relation shows that 7 countries, namely Germany, Greece, Italy, the Netherlands, Spain, Sweden and United Kingdom have uni-directional causality relation between members increase and military expenditure. Fourth, bi-directional relation for countries like Australia, Luxembourg, Belgium, Denmark, France, Ireland and Portugal show that there is no causality relation between membership and military expenditure.

Methodology

Current study uses annual data from year 1975 to 2006 that cover the span of 32 years. Each variable's data, namely expenditure (EXP), revenue (REV) and Gross Domestic Production (GDP) for Terengganu is obtained from state Economic Planning Unit (EPU). Data analysis can be shown through an estimation model as follows:

$$REV_t = \beta_0 + \beta_1 EXP_t + \beta_2 GDP_t + \mu_t \quad (1)$$

Unit Root Test

Normally, unit root test is used to determine stationarity and this test can be explained using the following equation:

$$Y_t = \rho Y_{t-1} + \mu_t \quad (2)$$

where, μ_t is error term and fulfil all Ordinary Least Square (OLS) assumption, that is zero mean, constant variance (σ^2) and non auto-colerated. This type of error normally is known as white- noise error term. Then, OLS is run on equation (2) above. If value $\rho=1$, we can say that stochastic variable Y_t has a nonstationary problem. To solve this problem, differentiation on the variable must be done until it becomes stationary.

Hypothesis involved in this test is H_0: $\rho = 1$ (*nonstationary*) and H_1: $\rho \neq 1$ (*stationary*). According to this hypothesis, statistic value used is known as τ. While critical value is the same with that prepared by Fuller (1976). It is also known as MacKinnon critical value. If statistical τ value is bigger than MacKinnon critical value, H_0 will be rejected. This means that the time series is stationary. Otherwise, if statistical τ value is smaller than MacKinnon critical value, then H_0 will not be substracted. This means that time series is non-stationary and first-order differentiation should be done.

Augmented Dickey Fuller Test (ADF)

There are several type of test used to determine integrated degree for each time series. One of them is *Augmented Dickey Fuller Test* (ADF) which was introduced by Said and Dickey (1984). This ADF method can be run using regression equations as follows:

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \sum_{i=1}^{L} \delta_i \Delta Y_{t-i} + \nu_t \quad (3a)$$

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 T + \sum_{i=1} \delta_i \Delta Y_{t-i} + \varepsilon_t \quad (3b)$$

Where, ΔY_t is first differentiation for time series Y_t which is $(Y_t - Y_{t-1})$. β_0 is intercept, $\boldsymbol{\nu}_t$ and $\boldsymbol{\varepsilon}_t$ are error terms. t is time-flow trend and *i* refers to lag period from 1 to L. To ensure that the error term for each of the above is only white noise, optimum lag-length period should be fixed. Optimum lag length can be fixed using Akaike Information

Criteria (AIC) proposed by Akaike (1997). The formula for AIC is as follows:

$$AIC = \sigma^2 \exp[2S / N] \quad (4)$$

where, σ^2 is variance for residual sum of square. S is number of variables in the right hand side of the equation including intercept and N is sample size. Null hypothesis that is involved to test equations (3a) and (3b) is Y_t series that include non-stationary unit factor that is H_0: $Y_t = 1$ and alternative hypothesis is Y_t series that include stationary unit factor, that is H_1: $Y_t \neq 1$. Null hypothesis will be rejected if β_1 is negative and significant. Acceptance or rejection of H_0 is based on tau statistical value as previously mentioned in current study. Critical value for this test is used from Fuller (1976).

Philip-Perron Test (PP)

Philip-Perron Test (PP) can also confirm integration degree for each time series. Introduced by Philips and Perron (1988), PP test involves the following equations:

$$\Delta Y_t = u_1 + \alpha_1 Y_{t-1} + \varepsilon_t \quad (5a)$$

$$\Delta Y_t = u_1 + \alpha_1 Y_{t-1} + \alpha_2 t + \varepsilon_t \quad (5b)$$

where, ΔY_t is Y series first differentiation and t is time trend. In equation (5a), for Y_t to be stationary, the tau statistical value ($\tau_{\alpha\mu}$) must be negative and significant and differs from zero. For Y_t to be stationary in equation (5b), tau statistic ($\tau_{\alpha\tau}$) must be negative and significant and differ from zero. For this PP test, critical value is obtained from MacKinnon (1991).

Cointegration Test

After the stationary test, the next step is to determine cointegration or long-term relation between variables involved - expenditure (EXP), revenue (REV) and Gross Domestic Production (GDP). Cointegration test was introduced by Johansen and Juselius (1990) to study long-term relation between variables. Gonzalo (1994) viewed this Johansen method as the best.

Result from Johansen test is obtained with respect of special characteristic of time series for data involved. This method also gives estimation for all cointegration vectors that exist in a time- series system and is a suitable statistic test. Besides, Johansen method also enables a hypothesis test to be done on coefficient in cointegration vector. Equation drawn will be as follows:

$$x_t = A_0 + A_1 x_{t-1} + A_2 x_{t-2} + A_3 x_{t-3} + A_4 x_{t-4} + \varepsilon_{1t} \quad (6a)$$

$$x_t = A_0 + A_1 x_{t-1} + e_{2t} \quad (6b)$$

where:
x_t = (n×1) variable vector
A_0 =(n×1) intercept term matrix
A_i =(n×n) coefficient matrix
e_{1t} and e_{2t} = (n×1) vector for error term

It is assumed that equation (6a) & (6b) will have four lags for each variable in each equation and $\sum_4$ in equation (6c) is matrix variance terms or covariance for residual. While equation (6b) & (6c) is assumed to only use one lag for each variable in each equation and $\sum_1$ in equation (6c) is residual term for variance matrix or covariance. However, for non-stationary variable result, statistical ratio is based on Sims (1980).

$$(T - c)(\log|\sum_1| - \log|\sum_4|) \quad (6c)$$

where:
T = Number of observations
c = Parametre number in limited system
$\log|\sum_i|$ = Natural logarithm for decider $\sum_i$

According to Sims, distribution of χ^2 with significance level that is equal to number of limited coefficients because for each A_i involves coefficient n^2, where $A_2 = A_3 = A_4 = 0$ involves limit 3 n^2. Alternatively, lag length p can be chosen using complete multivariate from AIC or SBC.

Vector Autoregressive Test (VAR)

If long-term relation between government expenditure and revenue is found to be non-existant, a VAR prediction model should be made. Koren and Stiassny (1998), who used VAR model, found that the result supported spend and tax view in budgetary decision process. In this VAR model, impulse-response function was used to identify causality relation between revenue and expenditure.

When a variable cannot be said to be exogenous, symmetrically-additional function analysis is done for each variable. However, in cases that involve two variables, time for REV_t can be shown as current situation and previous situation. The same applies for EXP_t.

$$REV_t = \beta_0 + \beta_1 EXP_t + \beta_2 REV_{t-1} + \beta_3 GDP_t + \mu_t \quad (7a)$$

$$EXP_t = \beta_0 + \beta_1 EXP_t + \beta_2 REV_{t-1} + \beta_3 GDP_t + \mu_t \quad (7b)$$

$$GDP_t = \beta_0 + \beta_1 EXP_t + \beta_2 REV_{t-1} + \beta_3 GDP_t + \mu_t \quad (7c)$$

Analysis and Results

OLS Regression

In this study, three variables were considered. The dependent variable was represented by revenue (REV) while independent variables comprised expenditure (EXP) and Gross Domestic Production (GDP). Referrring to regression-model formation in equation (1), regression result shows perfect equation as the following equations:

REV_t = 9.1554 + 0.6533 EXP + 0.0007 GDP
Std. Error (13.423) (0.0354) (0.0031)
Stat t (0.6821) (18.4643) *** (0.2314)
R^2 = 0.9484 Adj.^{2}= 0.9447 Durbin Watson = 1.5931
*Note: *** significant at 1%*

Regression analysis was conducted to identify the relation between dependent and independent variables. It was found that revenue has positive relation with expenditure and GDP. A unit increase in expenditure resulted in 0.6533 units increase in revenue. Similarly, a one unit increase in GDP resulted in 0.0007 units increase in revenue. In this regression, R^2 is the variation between REV which can be explained by EXP and GDP, 95 percent of the variation in REV can be explained by EXP and GDP. Also, t-statistic test is applied to identify significance of each independent variable in influencing dependent variables. Based on the t-statistic value, the relation between EXP and REV is positively significant at 1% significance level.

Next, Durbin-Watson test was also used to detect correlation problem in the study. Through this analysis, the study found that result of Durbin-Watson is bigger than R^2. Regression result shows that R^2 that is bigger than the Durbin-Watson value is in non-stationary state. This is normal and often occurrs in time-series data. Therefore, to solve this problem, a stationary test should be carried out to identify the stationarity of the data. In model prediction that uses time-series data, unit root test needs to be done to each variable to identify non-stationary problem. Stationarity for each variable should be determined to avoid false regression problem and the variable's stationarity is determined using Augmented Dickey Fuller (ADF) test introduced by Said & Dickey (1984) & Philip-Perron (PP) test introduced by Philips & Perron (1988).

Unit Root Test

Result of the test shows that GDP variable data is stationary at second-order differentiation for non-intercept case at 1 percent significance level. For intercept case, GDP is stationary at first-order differentiation at which significance level is 1 percent. Whereas, trend and intercept of GDP variable is stationary at first-order differentiation with 10 percent significance level. This indicates that, generally, GDP is stationarity at I(I). For EXP, in case of non-intercept, the variable is stationary at first-order differentiation with 1 percent significance level. Besides, EXP variable is stationary at first-order differentiation with 5 percent significance level for intercept. For trend and intercept, EXP is stationary at 1 percent significance level for first-order differentiation.

For REV, in non-intercept case, it is found significant at second-order differentiation with 5 percent significance level. In intercept case, REV is stationary at second-order differentiation. Next, for trend and intercept, REV is stationary at first- order differentiation with 1 percent significance level for both. Other than ADF Unit Root Test, Philip Perron Unit Root test (PP) was also carried out. The three variables GDP, EXP and REV are also differentiated at three orders: level-order, first-order and second-order. Variables also include consideration on non-intercept, with intercept and with trend and intercept cases.

GDP variable is stationary at first-order differentiation with 5 percent significance

Table 1: ADF Unit Root Test Result.

Variable	Augmented Dickey-Fuller (ADF)		
	I(0)	I(1)	I(2)
GDP			
Without intercept	2.8313	-0.2565	-5.0615***
Intercept	2.3793	-4.3197***	-4.9229***
Trend & intercept	-0.3901	-3.3827*	-3.6328**
EXP			
Without intercept	-0.4148	-3.4314***	-6.5617***
Intercept	-2.1300	-3.4546**	-6.4395***
Trend & intercept	-2.3509	-3.4584*	-6.3168***
REV			
Without intercept	-0.1093	-1.3698	-2.158**
Intercept	-1.6571	-1.3179	-4.7975***
Trend & intercept	-1.7179	-4.8488***	-4.7276***

*, ** and *** refer to 10%, 5% and 1% significance level.

Table 2: PP Unit Root Test Result.

Variable	Phillips Perron (PP)		
	I(0)	I(1)	I(2)
GDP			
Without intercept	6.4074	-2.3236**	-9.4882***
Intercept	5.9453	-3.4977**	-9.7431***
Trend & intercept	-0.6912	-5.4011***	-9.3017***
EXP			
Without intercept	0.0131	-3.4092***	-10.2866***
Intercept	-1.7241	-3.3536**	-9.8643***
Trend & intercept	-1.3834	-3.2077	-10.2932***
REV			
Without intercept	-0.1227	-4.3775***	-9.7653***
Intercept	-1.7473	-4.3963***	-9.6444***
Trend & intercept	-2.0146	-4.2882**	-9.6294***

*, ** and *** refer to 10%, 5% and 1% significance level.

Table 3: Johansen Cointegration Test Result.

Null Hypothesis	λ trace	5% Critical Value	1% Critical Value
r = 0	25.37	29.68	35.65
r ≤ 1	7.26	15.41	20.04
r ≤ 2	0.44	3.76	6.65
Null Hypothesis	**λ max**	**5% Critical Value**	**1% Critical Value**
r = 0	18.11	20.97	25.52
r ≤ 1	6.82	14.07	18.63
r ≤ 2	0.44	3.76	6.65

level. As for intercept case, GDP variable is found to be stationary for first-order differentiation at 5 percent critical level. For trend and intercept case, GDP variable is stationary at first-order differentiation with critical level of 1 percent. As for EXP, in non-intercept case, it is stationary at first-order differentiation with critical level of 1 percent. As for EXP, in non-intercept case, it is stationary at first-order differentiation with critical level at 1 percent. In intercept case, EXP variable is stationary at first-order differentiation with 5 percent critical level.

Other than GDP and EXP variables, REV was also tested through the same phase. In case of non-intercept, REV is found to be stationary for first-order differentiation with both critical levels of 1 percent. In intercept case, REV variable also sustained stationarity at first-order differentiation with critical level at 1 percent. Lastly, for trend and intercept case, REV variable is stationary at first-order differentiation with critical level 1 percent.

Thus, all variables are found to be stationary at first-order differentiation. Subsequently, after carrying out stationary test using ADF and PP unit root test, Johansen Cointegration Test was carried out to determine existence of long-term relation between revenue and expenditure.

Result of Cointegration Test

Johansen Cointegration Test which was introduced by Johansen & Juselius (1990) is carried out to determine existence of long-term relation between government revenue and its expenditure. Results obtained from Johansen Cointegration Test take into consideration of time-series' special features for data involved. This method also predicts all existing cointegration vectors in a time series and a suitable statistic test. Also, this method enables a hypothesis test to be carried out on coefficient and cointegration vector. This method is based on maximum likelihood estimation and cointegration vector that exist among time series.

This cointegration test is based on two statistical values namely trace statistic test (λ trace) and max statistic test (λ max). This statistic value test will be compared to critical value obtained. Based on Table 3, the result of Johansen Cointegration Test suggest

that both statistic test λ trace and λ max values are not significant and hypothesis null that state no cointegration could not be set aside. This indicates that long-term relation between variables does not exist.

Result of Vector Autoregressive Test

Based on Johansen Cointegration Test result, in the long run there is no relation between revenue and expenditure. Therefore, VAR estimation model must be set-up.

$$EXP_t = 97.48 + 1.42\ EXP_{t-1} - 0.56\ EXP_{t-2} - 0.03\ GDP_{t-1} + 0.04\ GDP_{t-2} - 0.36\ REV_{t-1} + 0.29\ REV_{t-2}$$

$$GDP_t = 71.55 + 0.90\ EXP_{t-1} - 1.32\ EXP_{t-2} + 1.29\ GDP_{t-1} - 0.28\ GDP_{t-2} - 0.77\ REV_{t-1} + 2.12\ REV_{t-2}$$

$$REV_t = 74.78 + 2.86\ EXP_{t-1}** - 0.33\ EXP_{t-2} - 0.02\ GDP_{t-1} + 0.03\ GDP_{t-2} - 0.11\ REV_{t-1} + 0.12\ REV_{t-2}$$

EXP equation shows that when EXP is a dependent variable, a one unit increase in GDP_{t-1} will result in fall of 0.03 unit in EXP and one percent increase in REV_{t-1} will result in 0.36 unit fall in EXP. Result of the study found that there is no short-term relation between GDP, REV and EXP. For GDP equation where GDP is dependent variable the result shows that expenditure has no relation with GDP. As for REV equation, result shows that one unit increase in EXP_{t-1} will lead to 2.86 unit increase in current REV. This shows that EXP and REV are significantly related based on t statistic value at 5 percent significance level.

Conclusion and Policy Implications

The result of the study shows that the trend for government expenditure and revenue is positively related. Using cointegration and VAR tests the result shows that long-term sustainability relation between government expenditure and revenue does not exist. However, the results of VAR test suggest otherwise. Based on these results, it can be concluded that the Terengganu state government spending significantly influences its revenue. This result is in agreement with studies by Koren and Stiassny (1998) which employed VAR model in three variables structures, namely expenditure, revenue and aggregate income (GDP).

The finding of this study supports the "spend and tax" view in budgetary decision-making process. With expenditure dominating the budgetary process, the state government will plan its expenditure first before planning its strategy to collect revenue. On the other hand, "expenditure- revenue" hypothesis can be used, meaning that the government will first spend and then increase tax revenue or receive support from financial spending. In other words, the government will first increase its capital or fund and then proceed to commit financial expenditure (Carneiro *et al*., 2004). In addition, Peacock & Wiseman, (1979) and Barro (1974) introduced "spend-revenue" hypothesis - a government predicts its expenditure and proceeds to increase its revenue to finance the expenditure. Peacock & Wiseman, (1979) also stated that the government increases its tax revenue to cover increase in its expenditure based on the belief that the citizens regard an increase in government expenditure as a burden that has to be shared. Therefore, "spend-revenue" hypothesis has a clear policy implication - government expenditure needs to be controlled to lessen deficit in budget. Also, it is fiscal adjustment hypothesis that suggested the government should decide on government revenue and expenditure simultaneously (Musgrave, 1966; Meltzer & Richard, 1981).

The results of this study show that state government expenditure growth leads to growth in revenue collection. As such, there is a possibility that government budget will be in deficit if total revenue could not support expenditure. Hence, the budgetary strategy should be modified by planning to collect revenue first and then decide on expenditure. Using this strategy will enable the government to control expenditure with existing sources, probably leading to a budget surplus or a balanced one. Fasano and Wang (2002) also supported revenue-spend hypothesis where this budgetary

strategy will cement fiscal policy effectiveness as expenditure budget does not depend on existing tax revenue.

Planning the revenue collection first and then decide on budget strategy would facilitate the government to plan its budget with existing fiscal revenue resources. If the government uses the strategy of planning expenditure first and then collects revenue, there is possibility of overspending and budget deficit. This is because fiscal revenue experiences change according to economic cycles. When an economy rises the fiscal revenue would increase but during recession, tax collection will also fall. Therefore, it can be said that deficit budget is caused by budget strategy that stresses on expenditure, not revenue. The results of this study could help the government in devising a favourable state budget in the future.

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