

FISCAL ADJUSTMENT AND DYNAMIC ECONOMICS PERFORMANCE: THE CASE OF MALAYSIA

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The main objective of this study is to identify the link between fiscal adjustment and dynamic economic performance in Malaysia using time series data for entire period of 1980-2009. To examine the long-run relationship between fiscal adjustment and economic performance, this study has employed the Gregory-Hansen cointegration approach to capture the endogenous structural breaks in long-run equilibrium relationship with three different specifications. The finding of this study indicates that there is long-run positive cointegration relationship between fiscal adjustment and economic performance in Malaysia. Therefore, the finding of this study clearly shows that the dynamic and continuous economic performance is a key element of the successful stability of Malaysia's economic in Southeast Asian region, although have faced several economic crisis.

Field of Research: Fiscal adjustment, Economic performance, Gregory-Hansen

1. Introduction

Malaysia's leading challenge today is to lessen the inflation rate, poverty level and external debt as a part of nation's agenda toward sustainable economic performance. As many countries in the Asian region, Malaysia has accumulated a number of external debt (Loganathan et al., 2010). External sources needed to develop the internal financial budgetary and fulfill the gap of domestic resources of financial supports to development the nations economic targets. Borrowing money from abroad can be defined as external debt and the increases in term of external debt may also burden the countries fiscal adjustment; and economic performance in long term. In order to finance the Malaysia's fiscal deficit, the Malaysian government has borrowed from internal or external sources or by creating money through debt monetization. Most of the time, the Malaysian government financed the deficit through borrowing rather than through money creation. This scenario has an indirect effect on Malaysia's sustainability for the past 2 decades. After facing the optimal debt level, the government is unable to borrow from public or from abroad to finance its deficit. This condition may cause macroeconomic crisis such as debt trap and hyperinflation.

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Identically, developing countries are no exception, where most the countries experienced problem with external debts in the early 1980s. Figure 1 provides details of selected indicator of macroeconomics performance for Malaysian economics for the past 2 decades.

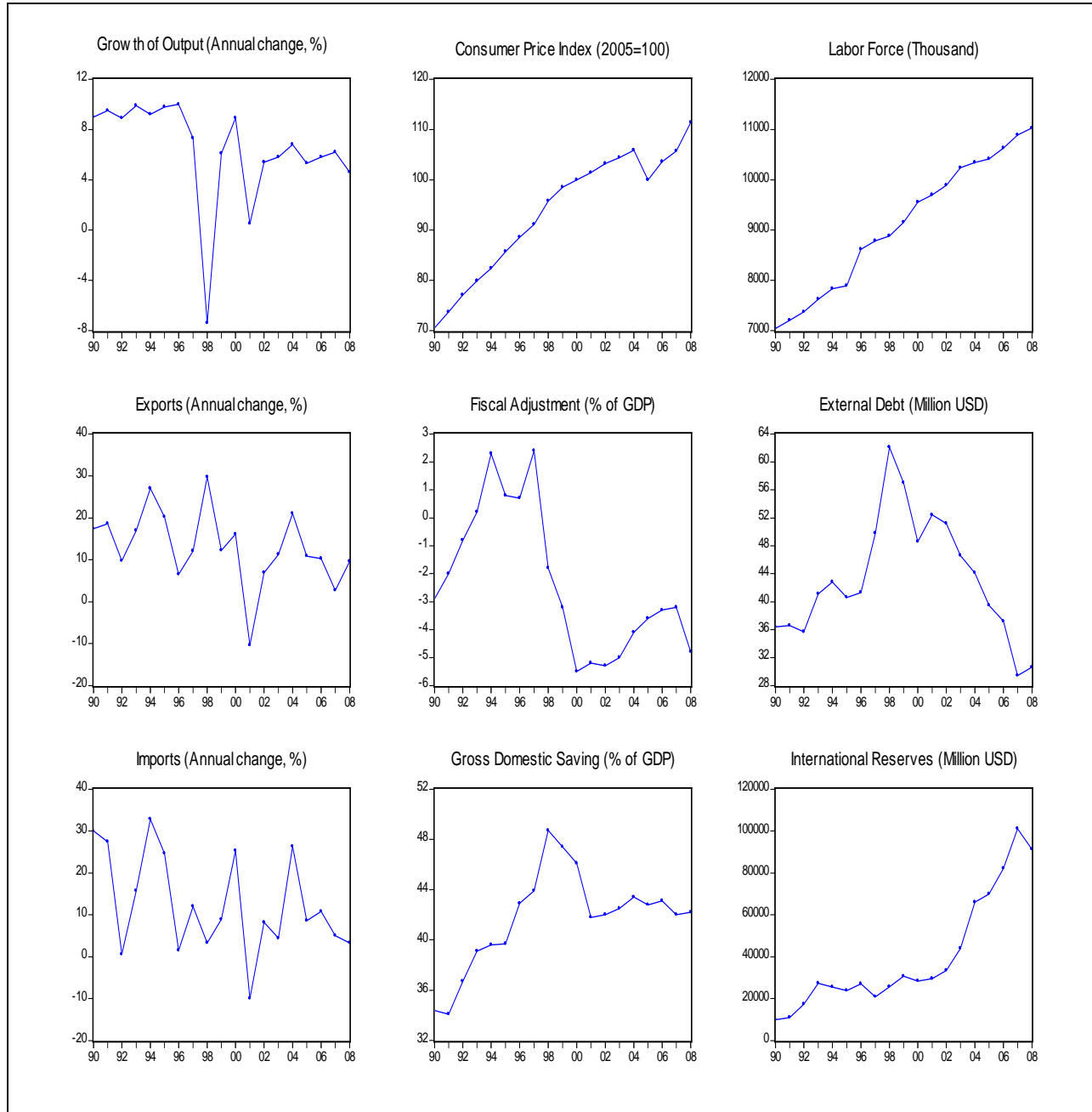


Figure 1: Malaysia's Macroeconomics Performance, 1990-2008

Source: Central Bank of Malaysia, 2010

The growth of outputs as an annual change clearly shows and unstable trends, where the Asian financial crisis has caused a downturn of the growth rate within the period of 1997 until 2000. The consumer price index (CPI) and labor force indicate an upward trend. Although the CPI has increased, but the percentages are in the stable mode compared to other Southeast Asian countries. Surprisingly, the trends of annual change of imports and exports in Malaysia were in the same mode. As a consequence, Malaysia's trade balance was not so divergent although it faces economic crises in the middle of the 1990s. In terms of gross domestic saving as a percentage of GDP, Malaysia has reached a good standing when facing the economic downturn in 1997-1998 with special fiscal and monetary treatment done by the federal government. Therefore, Malaysia was able to recover smoothly from the economic crisis compared to other countries in the Southeast Asian region. The remaining situation also has caused a decline in Malaysia's total international reserve. The amount of international reserve kept on increasing for the last 2 decades and this indicates that the Malaysian government has looked forward to stabilize the sustainability of economic growth in the future without any 'rescue packages' from the IMF or other sources of rescue funds.

2. Literature Review

A large number of studies have focused their discussion on fiscal adjustment, debt and foreign deficit sustainability with theoretical econometrics modeling. Hojman (1986) investigated a basic investment equation and production function application on the external debt contribution to output, employment, productivity and consumption in Chile between 1960 and 1982. The theoretical framework derived the contribution of external indebtedness to the stock of capital and the effects of foreign capital movement as net of debt service to the capital formation. More specifically, in order to identify the external debt contribution, the author used a foreign-capital-dependent investment equation to generate a capital stock series, towards estimating a non-homogeneous variable elasticity of substitution production function. The empirical results show a significant negative relationship between net foreign capital movements and domestic savings. A low marginal product of capital is estimated that represents minimal external debt contributions to output, employment and productivity. However, factor price distortions, capacity under-utilization, preferences for current consumption, short planning horizons combined with huge debt, unrealistically rigid assumptions of previous work and model limitations, all suggest substantial direct consumption costs of default or repudiation and through them, indirect output and income costs.

In terms of economic performance indicator, Hameed et al. (2008) has analyzed the long-run and short-run relationships between external debt and economic growth of Pakistan. They have examined the dynamic effect of GDP, debt service, capital stock and labor force on the economic growth by fitting the production function using annual data for the entire period of 1970-2003. The basic model is derived from the neoclassical production function by incorporating the external debt service variable as suggested by Cunningham (1993). The results show that debt servicing has a negative effect on the productivity of labor and capital; and the debt service ratio tends to affect negatively GDP and thereby the rate of economic growth in the long run, which in turn,

reduces the ability of the country to service its debt. The estimated error correction term shows the existence of a significant long-run causal relationship among the specified variables. While in the short run, unidirectional causality is reported from debt service to GDP. These suggested that debt as an important factor in overall debt scenario in Pakistan. Economic theory also postulates that reasonable levels of borrowing promote economic growth through factor accumulation and productivity growth. Therefore, it is important to the government in sustaining the debt level. Economic sustainability has three important elements; firstly, the government needs enough resources to ensure its ability to carry out its functions; secondly, the implications for other macroeconomic variables; and thirdly, relates to the issue of affordability (Jha and Sharman, 2004).

Koo (2005) has test the fiscal sustainability for Korea and examines the discernible change in the behavior of government debt following the Asian financial crisis. The empirical analysis indicates that the levels of government debt are not sustainable in Korea and it is also shows that the crisis contributes significantly to push the government debt in excess of its sustainable level. Hamilton and Flavin (1986) has also examined whether the present value borrowing constraints holds for the United States and their found that the stationary of discounted debt would indicate towards a sustainable fiscal policy. On the other hand, Wilcox (1989) have used Hamilton and Flavin's data and examined the sustainability in the presence of a structural break and found that for the period prior to 1974 there is no evidence of the violation of the budget constraint but the stationary of the deficit process did not hold for the period after 1974 and hence concludes that the recent structure of fiscal policy is not sustainable.

Meltzer and Richard (1981) indicate bidirectional causality between government spending and taxation. Through this study, government revenue and spending are decided simultaneously in relation to other economic considerations. Olekalns and Cashin (2000), has examined the issue of sustainability of budgetary deficits at the level of centre government in India over the period of 1951-1998. Their study seeks to examine if the budget constraint is breached for India using real revenues and expenditures and does not find any cointegration indication either with Engle-Granger test or Gregory-Hansen procedure. These unexpected results show that India's fiscal policy is not sustainable though the size of the fiscal deficit as a proportion of gross domestic product has fallen in 1991.

Meanwhile, Gounder et al. (2007) has found a strong evidence of fiscal adjustment for Fiji in the long-run and implying that expenditure decision are actually not made in isolation from revenue decision. This study attempts to analyze the long run relationship between fiscal adjustment and economic performances of Malaysia using Gregory-Hansen cointegration technique. The plan of this study is as follows. Section 3 will present the model specification and empirical findings and section 4, we briefly discussed conclusion remarks.

3. Model Specifications and Empirical Findings

This study mainly used annual time series data for the entire period of 1980-2009 and all of the data were driven from Central Bank of Malaysia. The data used in this study are the fiscal adjustment and gross domestic product. The basic linear equation of both variables is as stated in equation (1) and prior to the analysis; both variables are transformed into logarithm form:

$$FA_t = \alpha + \beta EP_t + \mu_t \quad (1)$$

Where, FA_t refers to fiscal adjustment; EP_t is gross domestic product with year 2000 as based year; α is the intercept term; β is the long-run offset efficient; and μ_t represents the error term. Unlike the Engle-Granger procedure to identify the long-run relation between variables, the Gregory-Hansen approach allows for an endogenous break in the cointegration relationship (Mandal and Payne, 2007). Basically, equation (1) indicates the Engle-Granger bivariate co-integration equation and it is used to test whether the residuals, mainly the error term are stationary in level using ADF or PP stationary tests. The Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) stationary statistic result is equal to -1.87 and -1.85. This indicates an unstable results to reject the null hypothesis of long-run no co-integration between FA and EP as shown in equation (2):

$$FA_t = 0.97 + 0.45EP_t \quad (2)$$

$$ADF(\tau) = -1.87 \quad PP(Z_\tau) = -1.85$$

a) Stationary tests

It is important to determine the characteristics of the individual series before conducting the co-integration analysis. Many studies have shown that majority of macroeconomics variable time series are not stationary, rather stationary with a deterministic trend (Taha and Loganathan, 2008). This creates a problem for econometricians since in the conditions of non-stationary data the normal properties t-statistics and Durbin Watson statistics and measures such as R-squares break results. To test the order of integrations, we used ADF and PP stationary tests. It is widely acknowledged that ADF and PP tests are command stationary tests applied in macroeconomics variable studies recently. The regression equation for the ADF test can be written as follows:

$$\Delta Y_t = \alpha_t + \beta_t t + \rho Y_{t-1} + \sum_{i=1}^q \delta \Delta Y_{t-1} + \varepsilon_t \quad (3)$$

Where, the t symbol denotes time trend, Y is the variable in estimation procedure, ε represent the distributed random error tem with zero value of mean and constant variance. In this study Aikaike Information Criteria (AIC) has been used to select the optimal lag length. The PP statistic may be computed for the same function forms as been discussed earlier to overcome the weakness ADF stationary test modeling.

$$Y_t = \delta_t + \gamma_0 Y_{t-1} + \gamma_1 \Delta Y_{t-1} + \dots + p \Delta Y_{t-p} + \mu_t \quad (4)$$

Table 1 summarizes the outcome of the ADF and PP tests with trend on both variables in this study. The null hypothesis tested is that the variable under investigation has a unit root against the alternative that it does not. In the first half of Table 1, the null hypothesis that each variable has a unit root cannot be rejected by both ADF and PP tests. However, after applying the first difference, both ADF and PP tests reject the null hypothesis. Since the data appear to be stationary by applying the ADF and PP tests in first differences, no further tests are performed (Loganathan et. al., 2010). The null hypothesis that each variable is integrated of order in the same order, which is in $I(1)$:

Table 1: Result for Stationary Tests

| Variables | ADF (τ) | | PP (Z_τ) | |
|-----------|----------------|-----------------|-----------------|-----------------|
| | Level | First Different | Level | First Different |
| FA | -1.63(2) | -3.77(1)* | -1.62[0] | -3.73[0]* |
| EP | -1.68(0) | -4.78(0)* | -1.64[2] | -4.79[1]* |

Note: Figures in () and [] indicate the lag length based on the AIC and Newey-West using Kernal Bandwidth values. Asterisks (*) denote statistically significant at 1% significance levels

Once both variables seems to be stationary in $I(1)$, we employ the Gregory-Hansen (1996) framework which able to capture endogenous determined break with three alternative forms for a structural break; level shift, level shift with trend and regime shift. These three specifications are as illustrate in equation (5):

$$FA_t = \alpha + \alpha_1 DUM + \beta EP_t + \mu_t \quad (5a)$$

Where, DUM is a dummy variable denotes the timing of change, and α_1 denotes the change in the intercept coefficient at the time of the shift:

$$FA_t = \alpha + \alpha_1 DUM + \alpha_2 \gamma + \beta EP_t + \mu_t \quad (5b)$$

In equation (5b), γ represent time trend and it included in cointegrating equation (5a). Meanwhile equation (5c) represents the regime shift model:

$$FA_t = \alpha + \alpha_1 DUM + \beta EP_t + \beta_1 (DUM \times EP_t) + \mu_t \quad (5c)$$

The β_1 slope represents the cointegrating equation, and α_1 indicate the changes in the intercept coefficient. With this specification, cointegration is present only with the break in year 1997 for three of the Gregory-Hansen models. Basically, the Gregory Hansen estimation technique starts with a simple regression equation where a constant term (μ_t) is included similar to the one in Engle-Granger approach. Table 2 shows the Gregory-Hansen estimation results:

Table 2: Gregory-Hansen Cointegration Tests

| Model Specification | ADF | H ₀ of no Cointegration |
|---|------------|------------------------------------|
| <i>a) Model I: Level shift</i> | | |
| $FA_t = 0.18 - 0.09DUM + 0.38EP_t$ <p style="text-align: center;">(0.08)* (0.02)* (0.12)*</p> | -4.21 [2]* | Reject |
| <i>b) Model II: Level shift with trend</i> | | |
| $FA_t = 0.18 - 0.10DUM + 0.01\gamma + 0.35EP_t$ <p style="text-align: center;">(0.01)* (0.02)* (0.18) (0.84)*</p> | -4.10 [4]* | Reject |
| <i>c) Model III: Regime shift</i> | | |
| $FA_t = 0.19 - 0.04DUM + 0.56EP_t + 0.21(DUM \times EP_t)$ <p style="text-align: center;">(0.01)* (0.01)* (0.04)* (0.07)*</p> | -4.88 [1]* | Reject |

Note: Standard errors are reported in parentheses. Asterisks (*) and (**) denote statistically significant at 1% and 5% level. Figure in [] indicates the lag length based on the AIC for ADF test

Model I in Table 2 reports the results of Gregory-Hansen long-run cointegration procedure in level shift effects. Since the ADF result is equal to -4.21, therefore the null hypothesis of no cointegration at 1% level with an endogenous break of 1997 is rejected. The dummy coefficient is equal to -0.09 and statistically significant at 1% level. Meanwhile, the long-run coefficients is equal 0.38 and also rejects the null hypothesis, which indicates that EP coefficient is positively cointegrated with FA in the long-run. Using the same endogenous break year in Model II, the ADF statistic is -4.10 and significant at 1% level. While the intercept coefficient is -0.10 and significant at 1% level; and the long-run coefficient is equal to 0.35 with 1% significant level. However, the time trend coefficient is insignificant level through this study. Finally, Model III presents the results for regime shift which also indicates ADF with 1% significant level (-4.88). While the intercept coefficient is -0.04; β is equal to 0.56; and β_1 is equal to 0.21. All of these coefficients are significant at 1% level with different level of β_1 slopes.

4. Conclusion

This study investigates whether there are structural breaks in cointegrating vectors of the Malaysia fiscal adjustment and economic performance function between 1980 and 2009. Several interesting finding has been achieved through this study. First, the Engle-Granger cointegration test failed to reject the null hypothesis of no integration between fiscal adjustment and economic performance. Secondly, once endogenous structural break used via Gregory-Hansen cointegration procedure, the long-run relationship between fiscal adjustment and economic performance appears in this study. The empirical Gregory-Hansen long-run cointegration findings from the ADF integration tests suggest that all three model became $I(0)$ after the stationary conducted. The Gregory-Hansen tests reveal that there exist structural breaks in the cointegrating vectors of the Malaysian long-run fiscal adjustment and economic performance function. Thus, the Malaysian evidence seems to suggest that economic performance viable sustainable tools for fiscal adjustment stability. The choice of Gregory-Hansen (1996) through this study is propelled by its superiority to other long-run cointegration techniques, especially the residual based Engle-Granger approach (1987), Johansen and Juselius (1990), Pesaran and Shin (1998), Pesaran and Smith (1995) and Pesaran et al. (2001). All these alternative models fail to capture the endogenous structural breaks in long-run equilibrium relationship and Gregory-Hansen cointegration estimation approach has fulfilled the gap with three different specifications.

REFERENCES

- Central Bank of Malaysia. (2010). *Monthly Bulletin Statistics*. Kuala Lumpur: Central Bank of Malaysia.
- Cunningham, R. T. (1993). The effects of debt burden on economic growth heavily indebted nations. *Journal of Economic Development*, **18**(1), 115-126.
- Engel, R. F. and Granger, C. W. J. (1987). Cointegration and error correction: representations, estimation and testing. *Econometrica*, **55**(2), 251-276.
- Gregory, A.W. and B.E. Hansen (1996). Residual-based tests for cointegration in models with regime shifts. *Journal of Econometrics*, **70**, 99-126.
- Gounder, N., Narayan, P. K. and Arti Prasad. (2007). An empirical investigation of the relationship between government revenue and expenditure: the case of Fiji Islands. *International Journal of Social Economics*, **34**, 147-158.
- Hameed, A., Ashraf, H. and Chaudhary, M. A. (2008). External debt and its impact on economic and business growth in Pakistan. *International Research Journal of Finance and Economics*, **20**, 132-140.
- Hamilton, J. D. and Flavin, M. A. (1986). On the limitations of government borrowing: a framework for empirical testing. *American Economic Review*, **76**, 808-819.
- Hojman, D. E. (1986). The external debt contribution to output, employment, productivity and consumption: a model and an application to Chile. *Economics Modeling*, **3**(1), 53-68.
- Jha, R. and Sharman, A. (2004). Structural breaks, unit roots and cointegration: a further test of the sustainability of the Indian fiscal deficit. *Public Finance Review*, **32**, 196-219.

- Johansen, S. and Juselius, K. (1990). Maximum likelihood estimation and inference on co-integration with applications on the demand for money. *Oxford Bulletin of Economics and Statistics*, **52**(2), 169-210.
- Koo, Chung-Moo. (2008). Fiscal sustainability and its implication for fiscal policy in Korea. *The Journal of Korean Economy*, **9**(3), 497-521.
- Loganathan, Nanthakumar, Muhammad Najit Sukemi and Nur Azura Sanusi. (2010). External debt and macroeconomics performance in Malaysia: sustainable or not? *Global Economy and Finance Journal*, **3**(2), 122-132.
- Meltzer, A. and Richard, S. F. (1981). A rational theory of the size of government. *Journal of Political Economy*, **89**, 914-927.
- Olekalns, N. and Cashin, P. (2000). An examination of the sustainability of Indian fiscal policy, University of Melbourne, Department of Economics, Working Paper No. 748, May 2000.
- Pesaran, H. M. and Shin, Y. (1998). An autoregressive distributed lag modeling approach to cointegration analysis, In: Steiner, S. (Ed) *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, Cambridge University Press: Cambridge, 371-413.
- Pesaran, H.M., Smith, R.J., (1995), Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, **68**, 79-113.
- Pesaran, H. M., Shin, Y., Smith, R. J., (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, **16**, 289-326.
- Taha, R. and Loganathan, N. (2008). Causality between tax revenue and government spending in Malaysia. *The International Journal of Business and Finance Research*, **2**(2), 63-73.
- Wilcox, D. W. (1989). The sustainability of government deficits: implications of the present value borrowing constraint. *Journal of Money, Credit and Banking*, **21**, 291-306.