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Assessing Fiscal Sustainability for Malaysia: Fiscal Sustainability Indicators

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ABSTRACT

This paper aims to assess fiscal sustainability in Malaysia using two fiscal sustainability indicators i.e. primary gap indicator and recursive algorithm indicator. Using annual data from 1981 to 2014, both indicators indicated that Malaysia's current fiscal policy is weakly unsustainable. The current tax ratio is inadequate to cover the government spending in the medium and long term with medium term gap indicator showing unsustainable fiscal policy since 1997 and recursive algorithm approach detected unsustainable fiscal policy since 1998. Malaysia government needs to achieve primary surplus either by spending cuts or tax increases to ensure fiscal sustainability for Malaysia and also address any long term issues that could affect fiscal sustainability such as population ageing and rising contingent liabilities.

Key words: Fiscal sustainability, fiscal sustainability indicators, primary gap indicators, recursive algorithm indicators, fiscal policy

ABSTRAK

Kajian ini bertujuan untuk menilai kemapanan dasar fiskal di Malaysia menggunakan dua indikator kemapanan fiskal iaitu indikator jurang utama dan indikator algoritma rekursif. Menggunakan data tahunan dari tahun 1981 hingga 2014, kedua-dua indikator menunjukkan dasar fiskal semasa adalah secara lemah tidak mapan. Nisbah cukai semasa adalah tidak memadai untuk menampung perbelanjaan kerajaan bagi tempoh jangka masa sederhana dan jangka masa panjang dengan indikator jangka masa sederhana menunjukkan dasar fiskal yang tidak mapan semenjak tahun 1997 dan kaedah algoritma rekursif berjaya mengesani dasar fiskal yang tidak mapan semenjak tahun 1998. Kerajaan Malaysia perlu mencapai lebihan primari samada melalui pengurangan perbelanjaan atau peningkatan cukai serta menangani mana-mana isu jangka panjang yang boleh memberi kesan kepada kemapanan fiskal seperti populasi menua atau hutang kontijensi yang semakin meningkat.

Katakunci: Kemapanan fiskal, indikator kemapanan fiskal, indikator jurang utama, indikator recursive algorithm, dasar fiskal

INTRODUCTION

Fiscal sustainability has become an important issue for most advanced economies especially after the global financial crisis in 2008 as it that could affect economic growth and financial stability. Thus, assessing fiscal sustainability is an integral component of fiscal sustainability to ensure adequate measures are taken to avert any fiscal insolvency. The main popular fiscal sustainability indicators

used to assess fiscal sustainability are primary gap indicators (Blanchard, 1990) and recursive algorithm indicator (Croce & Ramon, 2003). Many studies have been done on developed countries (Cruz-rodriguez, 2014; Krejdl, 2006) but not many researchers have been conducted on developing countries such as Malaysia using these two indicators to assess fiscal sustainability.

There is an increasing concern on the fiscal policy sustainability for Malaysia as Malaysia has been recording fiscal deficit for the past seventeen years since the Asian Financial Crisis in 1998. Furthermore, the Global Financial Crisis in 2008 had caused the debt ratio to increase by 27% from 39.8% in 2008 to 50.8% in 2009. This was as a result of the largest economic stimulus package unveiled by the government to mitigate the impact of the crisis at RM67 billion[1] or 9.9% of the GDP causing the deficit to increase to 6.7% of GDP in 2009 from 4.6% in 2008. Debt ratio continued to increase until it reached 53% in 2013 before reduced slightly to 52.7% in 2014 still almost reaching the statutory public debt limit of 55% of GDP. Consequently, this would limit the fiscal space for Malaysia to come up with any economic stimulus package to counter any future economic shock and making fiscal policy ineffective to stimulate economic growth during time of recession. Adding to the current concern, future fiscal pressure is expected from the rising ageing population (population aged 65 years and above) from 5% of the total population in 2010 to 6.8% of total population in 2020 and 11% of total population in 2040. The ageing population is expected to have a fiscal impact especially in increasing the cost of public healthcare and public pension.

The federal government is currently addressing the concern on fiscal sustainability by ensuring compliance to the fiscal rules which consist of among others the debt ratio doesn't exceed the debt limit of 55% of GDP and borrowing for development purposes only. This is achieved by embarking on fiscal consolidation programme since 2009 by reducing the fiscal deficit from a high of 6.7% in 2009 to 3.4% in 2014 and is targeted to be reduced further to achieve fiscal balance by 2020. The Government is also determined to reduce the current debt ratio of 52.7% in 2014 to 45% by 2020 under the Eleventh Malaysian Plan (11MP). In order to achieve lower debt ratio the government had introduced the Goods and Sales Taxes (GST) in April 2015 to widen the source of revenue and thus reducing the dependence on crude oil revenue as well as reducing the deficit. The current approach used by the policy makers to assess fiscal sustainability that is by ensuring compliance to fiscal rules of debt limit below 55% of GDP and borrowing for development purposes only is inadequate as it doesn't address the long term fiscal sustainability issue such as population ageing and the debt limit set is arbitrary and not based on any theoretical framework. Assessing fiscal sustainability using fiscal sustainability indicators is important to ensure current fiscal policy is adequate to address future fiscal issues and the target debt should be based on certain criteria that could be compared internationally. Studies have shown that the two fiscal sustainability indicators of primary gap indicator and recursive algorithm indicator are able to address long term fiscal issues such as population ageing and indicate if current primary balance is adequate to achieve target debt ratio.

This study contributes to the existing literature on fiscal sustainability in several ways. First, the application of fiscal sustainability indicators in Malaysia using the two indicators, primary gap indicator (Blanchard, 1990) and recursive algorithm indicator (Croce and Ramon, 2003) although a study has been conducted on using the recursive algorithm method but using data before the Global Financial Crisis in 2009 (Cruz-rodriguez, 2014). Secondly, not many studies have been done on comparing various fiscal sustainability indicators especially between the two indicators used. Third, to improve the current literature on fiscal sustainability assessment for Malaysia which consist of mainly on the cointegration approach and unit root test (Abdullah, Muszafarshah, & Dahalan, 2012). Fourth, this paper would contribute to the literature on fiscal consolidation in Malaysia especially in measuring its effectiveness in improving fiscal sustainability. Fifth, this paper also contributes on the literature on population ageing in Malaysia by analyzing the impact of population ageing to future fiscal sustainability in Malaysia. Finally, not many studies used recursive algorithm indicator to identify fiscal regimes in Malaysia as most studies had used the fiscal reaction function or markov switching fiscal rule method to identify fiscal regimes.

The main objectives of the present study are to assess the fiscal sustainability for Malaysia using the fiscal sustainability indicator method focusing on primary gap and recursive algorithm

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[1] There are two Fiscal Stimulus Packages with total cost of RM67 billion, first package totaling RM7 billion for infrastructure projects in 2008 and second package in 2009 totaling RM60 billion which consists of RM15 billion fiscal injection, RM25 billion for Guaranteed Fund, RM10 billion for equity investment, RM7 billion for Private Financing Initiative (PFI) and off budget, and RM3 billion for tax incentive.

indicator and provide suggestion and recommendation for policy recommendation. For the remainder of this article, a review on extant of researches done on the topic of assessing fiscal sustainability will be conducted focusing on fiscal sustainability indicators. Next, the theoretical framework and methodology used in this study is explained. After that, the results of the study will be reported. Finally, in the conclusion part, the main findings of the study are presented as well as the policy recommendation.

LITERATURE REVIEW

Fiscal policy sustainability is quite a difficult economic concept to define as not all economists would agree on one common definition. The definition given can be mainly categorized into two concepts, stationarity and solvency. The concept of stationarity of debt or non-ever increasing debt ratio was first introduced by Domar (1944), and was further elaborated by Buiter (1985), which defined fiscal policy sustainability is when fiscal policy is able to stabilize public sector net worth or return to its initial level. As public sector net worth is quite difficult to measure, Blanchard (1990) would replace public sector net worth with gross public debt to GDP ratio. Meanwhile Croce and Ramon (2003) would define fiscal policy sustainability when fiscal policy is able to achieve solvency that is the ability of the government to service its debts and avoid defaults as well as returning the debt ratio towards its target debt ratio. Generally fiscal policy is sustainable when its debt ratio is well managed by not forever increasing and the government is able to pay its current debt in the future. Fiscal policy sustainability is also defined as when current public debt is equal to present value of future primary surpluses according to the theory of government intertemporal budget constraint (Croce and Ramon, 2003, Krejdl, 2006).

From the definition given by the theory of government intertemporal budget constraint several fiscal sustainability indicators can be constructed to assess fiscal policy sustainability. Two of the main fiscal sustainability indicators are the primary gap indicator (Blanchard, 1990) and recursive algorithm (Croce and Ramon, 2003). The primary gap indicator (Blanchard, 1990) used gap in sustainable tax rate to the current tax rate to indicate sustainability of fiscal policy in short, medium and long term. The focus of this study is on future sustainability of fiscal policy using forecast fiscal and macroeconomic data to assess the impact of population ageing on long term future sustainability. The weakness of this approach it has to forecast GDP and interest rate for medium and long term independently. Another fiscal sustainability indicator use recursive algorithm that build upon government fiscal reaction which doesn't require forecast of fiscal and macro data but rely on past data to produce the sustainable primary balance required to return to target debt ratio (Croce and Ramon, 2003). This indicator's weakness is that it doesn't specify the policy action needed for fiscal sustainability compared to the first approach. All the methods produced valid results but the sustainable primary gap indicator is much more preferred by policy makers in advanced countries such as EU and OECD as it's able to provide long term assessment future fiscal sustainability and policy action needed to return to sustainable path. These two indicators have been used by various studies to assess fiscal policy sustainability due to its simplicity and reliability.

Studies that used the primary gap indicators (Blanchard, 1990) and recursive algorithm (Croce and Ramon, 2003) to assess fiscal policy sustainability can be divided into multiple country analysis and specific country analysis. The multiple country analysis using the primary gap indicators consist of work done by Blanchard (1990) on OECD countries, Aristovnik, (2014) on Eastern European and Former Soviet Union and Langenus (2006) on selected European countries. While, multiple country analysis for recursive algorithm (Croce and Ramon,2003) consist of study done by Cruz-rodriguez (2014). Only one study has been conducted for a specific country that is Czech using the primary gap indicator (Krejdl, 2006). Blanchard (1990) studied the fiscal sustainability for eighteen OECD countries from 1983 to 1989. The study found out that in 1983 a large fiscal adjustment occurred and fiscal sustainability improved from then. Larger long term gap indicating fiscal unsustainability is expected due to the impact of higher public healthcare and pension caused by population aging and a larger real interest rate growth differential would require higher primary surplus to achieve fiscal sustainability. Langenus (2006) also found out that population ageing would impact long term fiscal sustainability for euro areas countries and suggested specific policy design for Spain, Belgium and Italy that focus on pre-financing strategy to fund future rise in cost of ageing. Assessing the impact of population ageing on the fiscal sustainability of transition economies is not the focus of study done by Aristovnik (2014) instead the focus is to improve current fiscal policy unsustainability due to the high fiscal deficit and debt by achieving high economic growth and more competitive interest rates in the future.

Next, Cruz-Rodriguez (2014) assesses the fiscal policy sustainability of 18 countries mainly developing and emerging countries using the recursive algorithm method. The study found out that most of the country were fiscally unsustainable due to the primary deficits occurred and having a dollarized economy doesn't improve the country's fiscal sustainability. Finally, the only study done on a specific country fiscal sustainability used the primary gap indicator approach (Krejdl, 2006). The result from the study showed that Czech fiscal policy is not sustainable with long term tax gap of 7.0%. The current sustainable primary balance is 0.4% of GDP and the government need to reduce spending or increase tax by 3% of GDP to ensure fiscal sustainability. Overall, the findings of the studies done have found out that many countries in the studies has an unsustainable fiscal policy that requires fiscal adjustment.

Besides various studies that used the two fiscal sustainability indicators to assess fiscal sustainability, there are studies that used the two indicator to forecast budget sustainability (Csaba, Toth, 2014) and to predict future fiscal crisis (Cruz-Rodríguez, 2013). Csaba, Toth (2014) assess the predicting power of five fiscal sustainability indicators; primary gap, stationarity test for; public debt and first differential public debt, public revenue and expenditure cointegration and fiscal reaction function. Only the primary gap indicator has the predictive power to forecast budget sustainability due to the use of non-fiscal indicators and highlight the need for new indicators, the fiscal vulnerability index and fiscal stress index as an early warning system before any fiscal crisis (Baldacci, Mchugh, & Petrova, 2011). Meanwhile, Cruz-Rodríguez, (2013) assess whether a Fiscal Sustainability Indicator (FSI) can be used to predict probability of a fiscal crisis occurring using FSI developed by Croce and Ramon (2003). The study found out that FSI has the ability to predict future fiscal crisis. From these two studies it has been found out the FSI not only able to assess fiscal policy sustainability but also for forecasting budget sustainability and predicting future crisis.

Not many studies have been done on assessing fiscal sustainability specifically for Malaysia using the fiscal sustainability indicator method. Most of the studies used the unit root test or cointegration test method to assess fiscal sustainability in Malaysia (Abdullah et al., 2012 and Baharumshah & Lau, 2007). According to Abdullah et. all (2012) Malaysian fiscal policy is sustainable while according to Baharumshah & Lau (2007) it is not sustainable. The difference conclusion can be attributed to the difference time frame and method. The first paper used annual data from 1990 to 2007 while the second paper used the quarterly data from 1975 to 2003. Both papers used the single-equation unit root test and multivariate cointegration test. But, the second paper extend the analysis to include Gregory and Hansen cointegration test and Granger Causality test. Unit root test or cointegration test is unable to assess future fiscal sustainability and if current fiscal stance is on the path towards target debt ratio. The use of fiscal sustainability indicators such as primary gap indicator and recursive algorithm indicator in this study would able to fill this gap. In addition, this study also hope to fill the literature gap on the impact of ageing population on the future fiscal sustainability for Malaysia as it has been lacking compared to the advanced economies (Blanchard, 1990 and Langenus, 2006).

METHODOLOGY

Fiscal Sustainability Indicator: Primary Gap Indicator (Blanchard,1990)

The first step of understanding fiscal sustainability is to understand government intertemporal budget constraint. The government intertemporal budget constraint is written as follows in nominal terms:

$$\Delta B_t = G - T + iB_{t-1} \tag{1}$$

Where on the left side of the equation ΔB_t is change in nominal value of debt or new debt created, depends on the right side of the equation which consist of G which is the total government spending minus T be taxes or revenue plus iB_{t-1} which is total interest payments from nominal interest rate (i) multiple by previous debt (B_{t-1}). The government spending minus total revenue is also called primary deficit and denoted by D.

When the government intertemporal budget constraint is written in terms of ratio to nominal GDP to capture growing economy, the equation (1) becomes:

$$\Delta b = g - t + (r - \theta)b = d + (r - \theta)b_{t-1} \tag{2}$$

Equation (2) stated that change in ratio of nominal debt to GDP (Δb) on the left side of the equation is equal to right side of the equation which consist of ratio of nominal government spending over nominal GDP (g) minus ratio of nominal total revenue over nominal GDP (t) plus ratio of interest payments which consist of growth adjusted real interest rate from real interest rate (r) minus real GDP growth rate (θ) multiple with previous debt to GDP ratio b_{t-1}. The ratio of government spending (g) minus ratio of government revenue (t) is denoted as d or ratio of primary deficit to GDP.

After understanding the concept of government intertemporal budget constraint, a definition of fiscal policy sustainability can be constructed that is a fiscal policy that would return the debt to GDP ratio back to its initial level or b_0. The first step is to construct the changes to debt from initial debt to any time given. So the debt to GDP ratio at any time given n is equal to

$$b_n = b_0 exp(r-\theta)n + \int_0^n d_s \, exp(r-\theta)(n-s)\,ds \tag{3}$$

The debt ratio at any time of n denoted by b_n is equal to initial debt ratio b_0 growing at exponential rate of difference of real interest rate and real growth rate multiple by n $(exp(r-\theta)n)$ plus the total sum of value of primary deficits (d_s) growing at similar rate to initial debt.

In order to derive the fiscal sustainability equation from equation (3), three steps are required. First, premultiplied both side of the equation (3), with $exp-(r-\theta)$, which would discount both sides to time zero, resulting:

$$\int_0^n d_s exp-(r-\theta)s\,ds = -b_0 + b_n exp-(r-\theta)\,n \tag{4}$$

Second, taking the limit of equation (4) as n goes to infinity would produce the definition of sustainability. As discussed earlier for a fiscal policy to be sustainable its debt ratio b_n needs to return to initial level b_0 and as n goes to infinity the discounted value of debt equals to zero.

$$\lim_{n\to\infty} b_n - (r-\theta)n = 0 \tag{5}$$

Step three would combine equations (4) and equation (5) to produce the second fiscal policy sustainability equation that is:

$$\int_0^n d_s \, exp-(r-\theta)s\,ds = -b_0 \tag{6}$$

Equation (6) stated that fiscal policy is sustainable when total sum of future value of discounted ratio primary deficit to GDP is equal to negative value of current level of debt to GDP. In other words, current level of debts must be equal to the discounted value of total primary balance expected to incur in the future. This would mean that a government which currently has a debt outstanding need to achieve primary budget surpluses that is large enough to satisfy equation (6).

In order to arrive at the sustainable tax rate t^* , the d or deficit to GDP in equation (6) is replaced with g-t and solving for constant sustainable tax rate t^* would result in:

$$t^* = (r-\theta)\left[\left(\int_0^n (g)exp-(r-\theta)s\,ds\right) + b_0\right] \tag{7}$$

Sustainable tax rate or ratio t* is equal to annuity value future expected government spending (g) plus the difference between ex ante interest rate and growth rate $(r-\theta)$times current debt b_0.

Index of fiscal sustainability is given by t*(sustainable tax ratio)-t (current tax ratio)

If sustainable tax ratio is higher than current tax ratio (t*-t)>0 then there is a need for adjustment either by increasing future tax rate or reduce in spending. If this happens that the fiscal policy is determined as fiscally unsustainable. The size of adjustment needed is the gap between sustainable tax rate and the current tax rate (t*-t).

The above equation is for infinite time horizon. For producing the finite time horizon equation (4) is manipulated to derive the finite sustainable tax rate or t_n^*

$$t_n^* = (r-\theta)[b_0 + [(1 - exp - (r-\theta)n]^{-1}][\int_0^n g\, exp - (r-\theta)s\, ds] \quad (8)$$

The equation (8) would state that the sustainable tax rate must be able to cover $(r-\theta)b_0$ that is the amount needed to ensure debt ratio remains constant without primary deficit and also cover the discounted value of total government spending in period time 0 and time n or average government spending during the period.
When n goes to infinity t_n^* converges to t^*, similar to equation (7). When n goes to zero, the sustainable tax rate becomes $t_0^* = g + (r-\theta)b$. Then, the index of fiscal sustainability become

$$t_0^* - t = g - t + (r-\theta)b = d + (r-\theta)b \quad (9)$$

Index of fiscal sustainability or Fiscal Sustainability Indicator of sustainable tax rate gap $(t^* - t)$ is equal to primary deficit (d) plus the difference between real interest rate and real growth rate multiple with the debt to GDP ratio. From the equation (9) three type of indicators can be constructed based on time horizon; (1) short term gap (one year), (2) medium term gap (five years) and (3) long term gap (more than five years).

Fiscal Sustainability Indicator: Short term, medium term and long term gap

Short term gap

$$d + (r-\theta)b_0 \quad (10)$$

Medium term gap

$$\left[(average\ over\ next\ 5\ years\ of\ g) + avearge\ 5\ years\ of (r-\theta)b_0\right] - t \quad (11)$$

Long term gap

$$[(average\ over\ long\ term\ period\ more\ than\ five\ years\ ;e.g\ 25\ years\ g) + avearge\ long\ term\ period\ period\ more\ than\ five\ years\ ;e.g.\ 25\ years\ (r-\theta)b_0] - t \quad (12)$$

Fiscal Sustainability Indicator: An Operational Recursive Algorithm (Croce and Ramon, 2003)

Based on the paper by Croce and Ramon (2003), assessment of fiscal sustainability must be according to the concept of the government intertemporal budget constraint. The government intertemporal budget constraint would indicate that the financing needs of the public sector are defined as:

$$PSBR_t = (D_t - D_{t-1}) = PD_t + i_t D_{t-1} \quad (13)$$

The public sector budget requirement $(PSBR_t)$ or new debt issued is equal to the difference between current debt (D_t) and previous debt (D_{t-1}). The new debt is needed to finance the primary deficit (PD_t) plus interest payments on debt $(i_t D_{t-1})$. Primary surplus equation (14) is derived by transforming equation (13) by multiplying with -1:

$$PS_t = i_t D_{t-1} - (D_t - D_{t-1}) \quad (14)$$

Primary surplus (PS_t) of the government or public sector equals interest payments minus new debt issued. We would arrive at the law of motion of the debt to GDP ratio or debt ratio by dividing equation (14) with GDP and rearranging the terms.

$$d_t = \beta_t d_{t-1} - ps_t \quad (15)$$

Equation (15) would explain that the current debt ratio (d_t) is equal to growth discounted interest rate(β_t) derived from (1+r_t)/(1+θ_t) and multiply with previous debt (d_{t-1}) and negative of primary surplus (ps_t). r_t is the real interest rate and θ_t is the real growth rate.
The equation for fiscal solvency (16) is obtained by solving equation (15) forward recursively for N period and assuming that the growth discounted interest rate is constant

$$d_t = \beta^{-1}ps_{t+1} + \beta^{-2}ps_{t+2} + \cdots \beta^{-N}ps_{t+N} + \beta^{-N}d_{t+N} \tag{16}$$

The equation (16) would state that the fiscal policy is solvent when the current debt ratio is equal to the total present value of future primary surplus ratio or present discounted value of future primary surpluses is equal to the value of outstanding stock of debt. For this to happen d_{t+N} = 0 meaning at the end of the period there should not be any outstanding government debt and primary balance need to be positive and equal to the current total outstanding of debt.

A less strict condition for solvency would be d_{t+N} = d^*, where 0< d^*<d_t. Using this definition the present value of expected primary surplus ratios will reduce the debt ratio below the current level of debt ratio. The operational recursive algorithm would use this concept to assess fiscal sustainability.
The framework to produce the Fiscal Sustainability Indicator to assess fiscal sustainabily would integrate three equations, first the law of motion debt ratio (15), second, the target variables (17) and third the government reaction function (18) are combined to produce equation (19) from which the indicator of fiscal sustainability (20) is derived.
The law of motion debt ratio is given by equation (15), which stated that current debt $d_t$is a result of past debt, d_{t-1} times the real interest rate discounted by real growth β_t (discount factor) minus current primary surplus ps_t.

Target variables, which are specified by the equation (17) below, indicate the target primary surplus ratio ps^* that is the primary surplus ratio that is needed to achieve for the debt ratio to return to the target debt ratio d^* (lowest debt ratio in period) with the mean of discount factor of the period β^*.

$$ps^* = (\beta^* - 1)d^* \tag{17}$$

From Equation (17) we can arrive that the target primary surplus ps^* is equal to mean sample of the period growth discounted interest rate minus 1 and multiply with target debt ratio d^* . The government reaction function or fiscal rule is given in equation (18) below.

$$ps_t = ps^* + \lambda_t(d_{t-1} - d^*) \tag{18}$$

Where the equation explains that the current fiscal stance or fiscal policy represented by ps_t is determined by the target variables ps^* and the intensity of policy response λ_t towards the gap between previous debt ratio $d_{t-1}$and target debt ratio d^*.Combining equation (15), (17 and (18), the law of motion of debt ratio now includes the policy reaction parameterλ_t.

$$d_t = (\beta_t - \lambda_t)d_t - (\beta^* - \lambda_t - 1)d^* \tag{19}$$

The law of motion of debt now d_t is determined by the difference of two components first the difference between current discount factor $\beta_t$or real growth discounted real interest rate and current policy reaction parameter λ_t multiple with the current debt ratio d_t and the second component the difference of mean discount factor β^* or real growth discounted real interest rate and that the current policy reaction parameter λ_t and 1 then multiple with the target debt ratio d^*. The current debt ratio d_t would only converge to target debt rate d^* when only$|\beta_t - \lambda_t| < 1$. From this $(\beta_t - \lambda_t)$ now becomes the indicator fiscal sustainability (IFS). With the assumption that previous debt ratio is higher than target debt ratio $d_{t-1} > d^*$.

Indicator of Fiscal Sustainability (IFS) in equation (12) is given as the difference between discount factor and the policy reaction parameter $(\beta_t - \lambda_t)$.

$$IFS_t = (\theta_t - \lambda_t) = \left[\frac{1+r_t}{1+g_t} - \frac{ps - ps^*}{d_{t-1} - d^*}\right] \quad (20)$$

Fiscal sustainability is indicated by the value of IFS below one and fiscal unsustainability by the value of IFS larger and equal to one.

EMPIRICAL RESULTS

Primary Gap Indicators

These short and medium term gap estimates are also shown graphically in Chart 1, against gross public debt to GDP. The chart showed the dramatic turnaround in fiscal policy since the Asian Financial Crisis in 1998, the short term gap turned from negative gap indicating fiscal sustainability to positive gap indicating fiscal unsustainability in 1998 and medium term gap in 1997. The short term gap then returned to negative gap in 2005 before the gap becoming positive again in 2008. The Global Financial Crisis (2008) had increased the positive short term gap to the highest level since 1998 in 2009 at 6.4%. In 2014 short term gap had become negative for the first time since 2007 at -0.3% indicating fiscal sustainability and a small positive for medium term gap indicating small fiscal sustainability at 0.7%. The chart has also shown that Malaysian fiscal sustainability has improved since 2009. The medium term gap recorded positive gaps for Malaysia since 1997.

From Table 1, the only period where short term and medium term gap was negative indicating fiscal sustainability was in the period from 1991 to 1995. During this period overall and primary fiscal balance was in surplus. Short term gaps were sustainable for three periods from 1986 to 1990, 1990 to 1995 and 1995 to 2000 as certain years in this period recorded primary fiscal surplus. The most recent period 2011 to 2014, showed the most improved performance of fiscal sustainability for both short (0.3) and medium term gap (1.1) at the smallest gap since period of 1996 to 2000. In all the periods under study except for 1981 to 1986 the difference of real interest rates and growth rates has always been negative indicating higher real growth rate compared to real interest rates. The highest difference of negative 5.3 was registered in the period of 1991 to 1995, which is the period of the most sustainable fiscal policy. While, the only period where positive differential was recorded (0.8) was in the period of 1981 to 1986 that is the period of the most unsustainable fiscal policy indicated by the highest gap for short term and medium term.

The comparison between short-term and medium term gaps shows major differences except for the most recent period of 2011 to 2014 where the difference is less than one. This in contrast to the findings in Blanchard, Chouraqui, Hagemann, & Sartor, (1990) where OECD countries short term and medium term gaps does not show major differences. This can be attributed to the high volatility in growth rates for Malaysia compared to the OECD countries in the period concerned.

The Long Term Gap

The long term gap for Malaysia in this study used time equivalent of 25 periods. Only long term gaps in 2014 are constructed based on projections of spending for the period 2015-2040. The long term challenge that has been identified that could impact long term sustainability of fiscal policy is the population ageing in Malaysia. Population ageing forecast is obtained from the Statistic Department of Malaysia, (2012). Simulated pension spending and was constructed with the assumption that the ratio of public pension expenditure to GDP changes in accordance to the population ageing. Growth of the healthcare spending is based on Malaysia following the trend of OECD countries from 2020 in term of growth of public healthcare spending from 2020 to 2040. For the period from 2015 to 2020 the projection would follow the projection by the Ministry of Health, Malaysia for the Eleventh Malaysian Plan.

Table 2 indicate that Malaysia would see an increase in total spending by 21 percent due to the impact of population ageing on public pension and healthcare. This is because share of population aged 65 to the total population and above is expected to increase from 5% in 2010 to 11% in 2040. While Table 3 reflect the implied long-term gaps for Malaysia, at negative 0.5% for pensions only compared to medium term gap of negative 1.1% but when included with healthcare the gap become positive at 1.23%. This number specifies the size of adjustment either in taxes or spending that has to be changed to overcome the fiscal implications of ageing. This assumption was based on the continued growth rate of 6% in 2014 until 2040.

Fiscal Sustainability Indicator Using Recursive Algorithm

Indicators of fiscal sustainability using recursive algorithm is a backward looking indicator compared to the primary gap indicator before which is a forward looking indicator and thus it is more robust with the actual data especially in terms of similarity with overall deficit trend. From Chart 2, Malaysian fiscal regime could be divided into three fiscal regimes according to each year FSI. In Fiscal Regime 1 from 1981 to 1991 all the IFS showed value above or 1 indicating fiscal unsustainability. In Fiscal Regime 2 from 1992 to 1997 all the IFS produced value below one demonstrating fiscal sustainability and in fiscal regime 3 from 1998 to 2014 all the IFS calculated being above 1 again returning to fiscal unsustainability. From the chart 2 the impact of each crisis on the FSI can be observed in 1985, 1998, 2001 and 2009 can be. Each crisis would cause the FSI to spike before declining afterwards. In Table 4 a comparison is made between the various fiscal regimes in terms of the indicator and explanation

According to Croce and Ramon (2003), Malaysia can be categorized as a country with enduring problems of fiscal sustainability during the period of 1981 to 2014 as the IFS was above the threshold of 1 at 82% of the time with 29 period out of 34 period (fiscal unsustainability for countries the IFS was above threshold at least 75% of the period).

Policy Lessons

- The IFS can be considered a good fiscal sustainability indicator to monitor fiscal stance for Malaysia due to its robustness that is its similarity with actual data especially fiscal stance or primary balance.
- The IFS was able to be reduced from 1.15 in 2009 to 1.03 in 2014 indicating improved fiscal sustainability. This can be attributed to the effectiveness of the fiscal consolidation effort started in 2010 until 2014 to reduce the overall deficit.
- Improving the primary balance either by increase in revenue or reduce in spending would enhance the IFS algorithm and better fiscal sustainability
- The IFS can assist in enhancing fiscal transparency by improving the formulating and communicating of fiscal policy objective and result (Croce and Ramon, 2003).

SUMMARY AND CONCLUSION

In summary, this paper studies the suitability of using fiscal sustainability indicator method to assess fiscal sustainability in Malaysia. This paper finds that; firstly, fiscal sustainability indicator method using the primary gap indicator and recursive algorithm indicator were able to assess fiscal sustainability in Malaysia using annual data from 1981 to 2014. In addition, both of the indicators are based on the concept of government intertemporal budget constraint. Secondly, the population ageing has a moderate effect on future fiscal sustainability in Malaysia compared to advanced economies due to smaller ageing population. Thirdly, the primary gap indicators is better than recursive algorithm in term of assessing future fiscal sustainability while recursive algorithm is better than primary gap indicators in analyzing past fiscal sustainability and determining if the current fiscal policy is on the path towards achieving target debt ratio. Thirdly, economic shock such as economic crisis has a significant effect on Malaysian fiscal sustainability due to the adverse effect on the fiscal stance of Malaysia. As a conclusion, both of the fiscal sustainability indicators should be adopted by the policy makers to improve the current fiscal sustainability analysis as each of the indicators has its own strength and weaknesses and would give a more comprehensive assessment compared to just one indicator. Having a better fiscal sustainability assessment would improve the fiscal transparency and increase public confidence in fiscal policy management in Malaysia. For Malaysia to improve its current fiscal sustainability it needs to further reduce its spending or increase its revenue and thus the current fiscal consolidation effort needed to be continued and even intensified to ensure adequate fiscal space for any incoming future economic shock.

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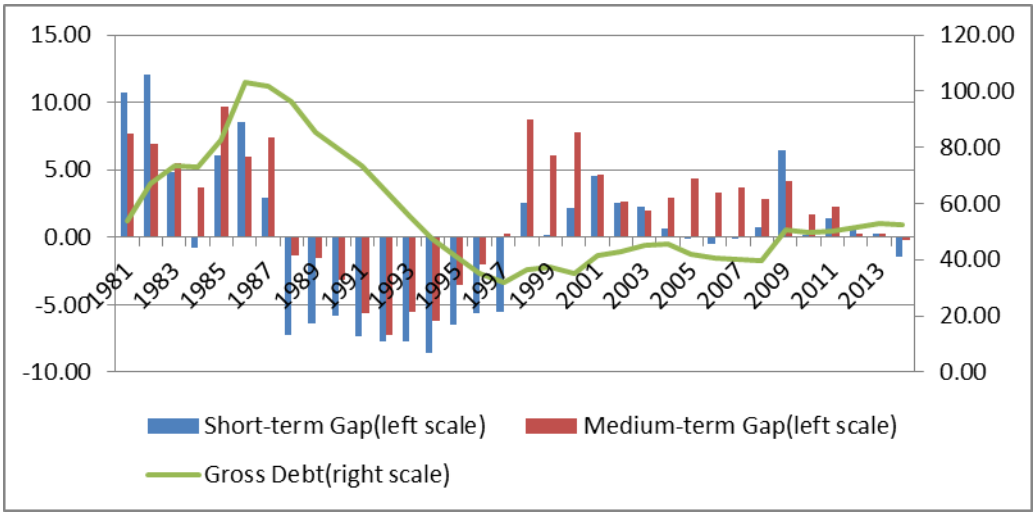


Source: author's own calculation

CHART 1: Fiscal Sustainability Indicator and Public Debt in Malaysia (Per cent of GDP)

TABLE 1: Alternative Indicators of Fiscal Policy Sustainability: Malaysia 1981-2014

Period	Debt/GDP ratio (a)	Real GDP Growth Rate (b)	Real Interest Rate (c)	Difference (c)- (b)	Short term gap	medium term gap
Average						
1981-1985	69.9	5.2	6.0	0.8	6.6	7.9
1986-1990	93.3	6.9	6.5	-0.4	-1.6	2.7
1991-1995	56.4	9.5	4.2	-5.3	-7.6	-5.1

1996-2000	35.2	5.0	4.8	-0.2	-1.3	3.5
2001-2005	43.4	4.8	4.5	-0.3	2.0	3.6
2006-2010	44.2	4.5	1.7	-3.8	1.4	3.5
2011-2014	51.8	5.4	2.0	-3.4	0.3	1.1

Source: BNM website and author's calculation

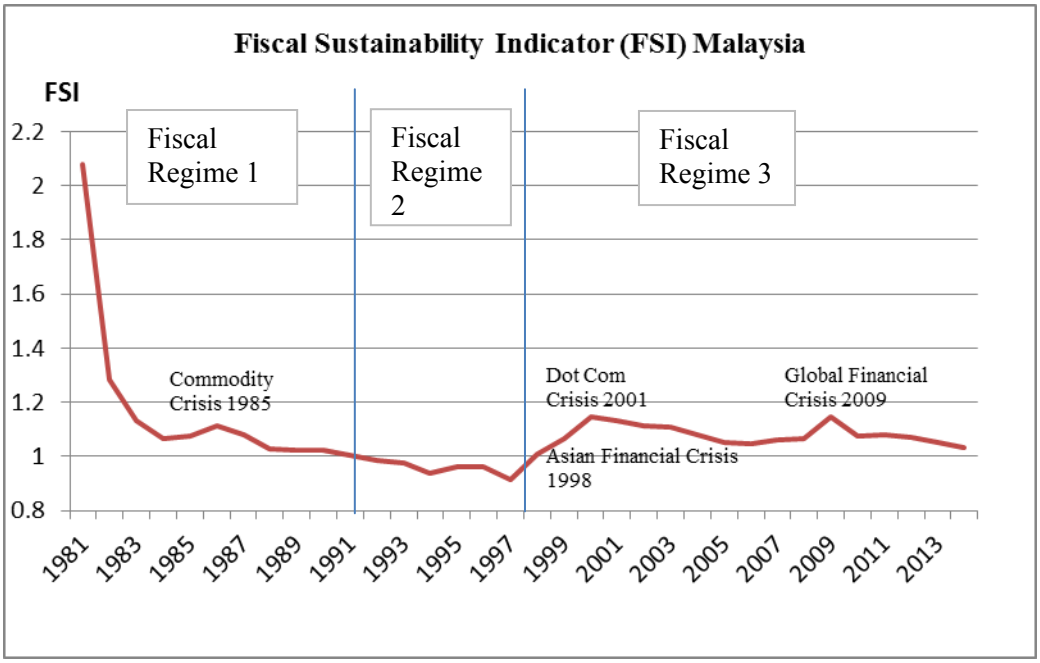
TABLE 2: Future Growth in General Government Non-Interest Spending (As per cent of nominal GDP)

	Non-interest spending as percent of GDP in 2014	Ratio of share non interest spending in GDP in 2040 in share in 2014 accounting potential growth in	
		Pension Spending	Pension and healthcare spending
Malaysia	21.26	1.08	1.23

TABLE 3: Sustainability of Fiscal Policy in the Long-Run
Long Term Gaps Based on Projected Growth of General Spending on Pensions and Healthcare
(As per cent of nominal GDP**)**

	Pensions only[a]	Gap based on growth in: pension and health
Malaysia	-0.49	1.29

a)Defined as the difference between on the one hand, general government receipts required on average over the current and next 27 years in order to return debt ratio to its initial level and on the other current receipts, taking into account the potential growth of public pensions associated with rising old-age dependency ratio
b) Same as footnote a) but taking into account the effects of ageing on public health care spending
Source: authors own calculation



Source: author's own calculation

CHART 2: Fiscal Sustainability Indicator Recursive Algorithm
Target debt ratio d* = 31%

TABLE 4: Comparisons Between Various Fiscal Regimes In Malaysia (1981-2014)

	Period	Indicator	Explanation
Fiscal Regime 1	1981-1991	IFS 1.17	The fiscal balance has worsened to the lowest point at deficit of 16.5% in 1982 to finance the Heavy Industrial Policy (1981) and Look East Policy (1981). Debt ratio also increased from 54% in 1981 to 72.8% in 1984. Then, Malaysia experienced its first economic recession since independence in the electronic crisis in 1985 that lead to contraction of 1.0% of GDP. Furthermore, as a result of the Plaza Accord in 1986, the value of yen was sharply appreciated and this has caused the debt ratio to increase to 103.4% in 1986 from 82.5% in 1985. While the overall fiscal balance further drop from deficit of 5.7% in 1985 to 10.5% in 1986.
Fiscal Regime 2	1992-1997	IFS 0.96	Malaysia achieved the most robust growth rate during this period with an average growth of 9.2%. Primary surplus was at 4% due large role of the private sector. This was attributed by the large FDI inflow received due to the successful effort in attracting FDI through fiscal incentive and implementation of the first Industrial Master Plan (1985-1995).
Fiscal Regime 3	1998-2014	IFS 1.08	During this period, Malaysia recorded two economic recessions in 1998 and 2008. In the Asian Financial Crisis in 1998 caused by financial speculators, Malaysia experienced its worst economic recession of 7.4% in 1998 from growth of 7.3% in 1997. The overall fiscal balance deteriorates from surplus of 2.4% in 1997 to deficit of 1.8% in 1998. Consequently, debt ratio increased from 31.9% in 1997 to 36.4% in 1998. Then in 2008, the Global Financial Crisis hit Malaysia which was started by the subprime mortgage crisis in US had caused the Malaysian GDP to contract by 1.5% in

			2009 from growth of 4.8% in 2008. Deficit was at the highest level since 1987 at 6.7% in 2009 due to the largest fiscal stimulus package rollout to counter the impact of the crisis. Debt ratio was badly affected by the crisis as it increased to 50.8% in 2009 from a low of 39.8% in 2008. As a result of the stimulus measures implemented to overcome the crisis in 2009, growth recovered in 2010 at 7.4% from recession of -1.5% in 2009. The path of fiscal consolidation started in 2010 and continued until 2014 with deficit declined from 6.7% in 2009 to 3.4% in 2014. This is in accordance with the government's aim to achieve fiscal balance by 2020 and debt ratio of 45%. Debt ratio reached its highest level since 1994 at 53% in 2013 before declined slightly at 52.7% in 2014. Growth during this period was at an average of 5.7% from 2010 to 2014.