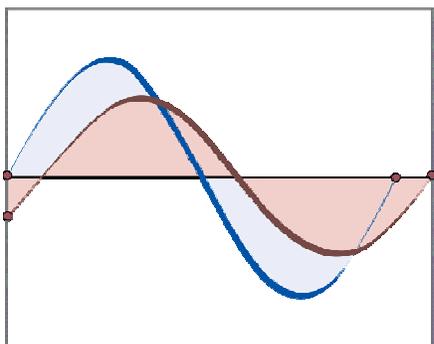




CENTRAL BANK OF
TRINIDAD & TOBAGO

Working Papers

WP 12/2013 April 2013



Measuring the Cyclically Adjusted and Structural Balances in Trinidad and Tobago

Joseph Jason Cotton, Kevin Finch and Rekha
Sookraj
Research Department

This paper estimates the cyclical and structural fiscal balances in Trinidad and Tobago. These indicators correct the conventional fiscal balance for the effects of the business cycle and one-off or temporary revenue or expenditure items. The results reveal that in resource dependent economies like Trinidad and Tobago it may be useful to estimate the structural fiscal balance which considers the permanent component of natural resource revenue to get a clearer picture of the underlying fiscal position and the effect of fiscal policy on aggregate demand. In general, the paper indicates that the energy sector provides most of the impetus for changes in aggregate demand. However, there have also been signs of an improved fiscal impulse from the non-energy sector since 2009. Additionally, the analysis shows that fiscal policy in Trinidad and Tobago has been predominantly pro-cyclical and the fiscal impulse weakened in the post crisis period (2009-2011) compared with earlier years.

JEL Classification Numbers: E61, E62

Keywords: cyclically adjusted balance, structural fiscal balance, fiscal impulse, Trinidad and Tobago.

The Working Papers Series includes papers that are primarily written by Central Bank of Trinidad and Tobago research economists in order to solicit comments from interested readers and to stimulate discussion. The views expressed are those of the authors and not necessarily those of the Central Bank. Please send comments to commentsWP@central-bank.org.tt.

© Central Bank of Trinidad and Tobago, 2013

Measuring the Cyclically Adjusted and Structural Balances in Trinidad and Tobago

Joseph Jason Cotton

Kevin Finch

Rekha Sookraj

1. Introduction

The global economic slowdown caused the fiscal accounts of most Caribbean countries to weaken in 2009. This combined with high debt levels and generally limited external reserves, constrained the scope for countercyclical macroeconomic policies. Nonetheless, the regional experience suggests that countries that applied prudent fiscal frameworks prior to 2009 and particularly those with a large share of commodity related fiscal revenues entered the crisis better prepared (IMF 2009). Prudent fiscal frameworks often involve policy formulation that takes into account not only current fiscal outcomes but also fiscal performance over the business cycle or the medium to long term—the so-called ‘cyclical’ and ‘structural’ fiscal balances. In particular, the focus on structural fiscal balances has been at the forefront of policy design in commodity-exporting countries that have strengthened their fiscal performance and created space to implement countercyclical policies.

This paper examines the cyclical and structural fiscal balances as tools to strengthen policy formulation in Trinidad and Tobago. Using these indicators can assist in two ways: first, they will serve as a guide to medium-term policy formulation and as such open up space for countercyclical policies to mitigate the impact of future shocks; and second, they will correct the conventional fiscal-balance measure for the effects of the economic cycle and provide a better gauge of whether fiscal policy decisions are adding to or subtracting from aggregate demand pressures in the economy.

The paper is organized as follows: Section two provides a background and will (i) explain the rationale for the paper; (ii) review the main economic theories that explain the relationship between fiscal policy and aggregate demand; and (iii) discuss some of the economic indicators used to gauge the fiscal impact on the economy. Section three will provide details on the methodology. Section four discusses the results and its policy implications and the paper will conclude in Section five.

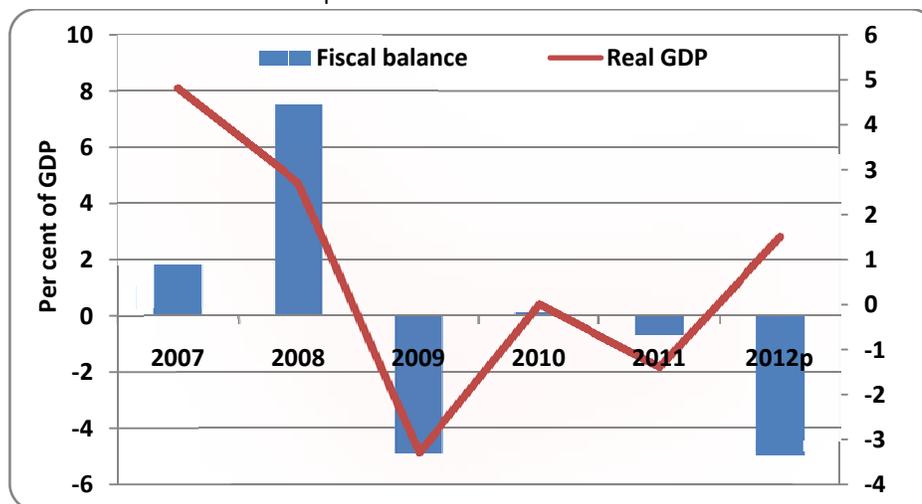
2. Background and Literature Review

2.1 Rationale

The Central Government of Trinidad and Tobago's fiscal accounts recorded successive deficits between fiscal years¹ 2008/2009 to 2011/2012. Budget data suggest that the deficit is likely to be approximately 4.6 per cent of Gross Domestic Product (GDP) in 2012/2013. Despite these sustained deficits, and the high levels of government expenditure (averaging 33.3 per cent of GDP) during 2009 to 2011, aggregate demand in Trinidad and Tobago remains weak. Since 2008, the domestic economy has struggled to return to growth and although the Central Bank forecast for 2013 indicates that growth should be around 2.5 per cent, there are downside risks to this estimate (See Graph 1).

These fiscal developments prompted this paper to investigate why the sustained deficits on the fiscal accounts have not caused a contemporaneous rise in aggregate demand. This research question can be further subdivided into four parts: (i) how has fiscal policy influenced aggregate demand in Trinidad and Tobago? (ii) is fiscal policy in Trinidad and Tobago pro-cyclical or counter-cyclical? (iii) what was the policy response of the fiscal authority to the financial crisis? and (iv) what can the fiscal authority do to restore growth in the domestic economy?. This paper focuses on questions (i) and (ii) respectively.

Graph 1: Fiscal Balance and Real GDP



Source: Central Bank of Trinidad and Tobago.

¹ The fiscal year represents the period October to September.

2.2 Economic Theories

Various economic theories explain the relationship between fiscal policy and aggregate demand. Four of these theories are: the Keynesian², the Classical, the Modern Synthesis³ and the New Economic Consensus. The Keynesians propose that fiscal policy is a tool capable of reducing fluctuations in aggregate demand. They argue that the government should engage in discretionary and countercyclical policy to "fine-tune" the economy over the business cycle. Therefore, according to the Keynesians rather than balancing its budget annually, the government should plan budget deficits when the economy is weak and budget surpluses when strong demand threatens to cause inflation.

Classical economists do not endorse the Keynesians' reliance on fiscal policy to stimulate the economy, arguing that fiscal policy is ineffective in influencing output, employment or interest rates. Additionally, they assert that deficit financing merely substitutes higher future taxes for lower current taxes and thus budget deficits affect the timing of taxes but not their magnitude.

More recently, developments in the debate on the efficacy of fiscal policy have led to a modern synthesis view (1970s and 1980s) which states that fiscal policy, while effective in influencing aggregate demand, should be employed with caution since there are negative effects such as crowding out and lags associated with its execution. Such shortcomings render it a less effective tool for macroeconomic stabilization. Proponents of the synthesis view argue that discretionary fiscal policy should only be employed during difficult economic times.

Another more recent view is the new economic consensus (1990s to present), which includes opinion shapers such as Bernanke, Reinhart, Krugman and Sack. Krugman (2005) suggested that fiscal policy was useful when short term interest rates approach zero and rendered monetary policy ineffective. Proponents of the new economic consensus argue that fiscal policy should be used for short term economic objectives but only during difficult and deep recessions. Co-ordination of monetary and fiscal policy was also emphasized as being essential for macroeconomic stabilization.

Empirical findings show that most countries have actively employed fiscal policy as one of their stabilization tools. In particular, Alesina and Tabellini (2008) found that in most OECD countries fiscal policy is countercyclical, while approximately half of non-OECD countries follow pro-cyclical fiscal policies. Arestis (2011), in his review of the role of fiscal policy, concluded that fiscal policy is a key component of the

² For more details on the Keynesian and Classical views see: Van Aarle et al. (2003).

³ For more details on the Modern Synthesis and the New Economic Consensus see: Arestis et al. (2011).

macroeconomic framework along with monetary policy. He further emphasized the importance of coordination of fiscal and monetary policies in achieving macroeconomic stability.

2.3 Fiscal impulse indicators

Traditionally, fiscal analysis utilized the overall fiscal balance⁴ (also referred to as the fiscal stance) to assess the impact of fiscal policy on domestic demand and financial resources. This balance can either be a surplus or deficit, where the former would suggest a contractionary fiscal policy that decreases the level of aggregate demand and a deficit would suggest an expansionary fiscal policy that increases the level of aggregate demand. The change in the overall fiscal balance between two fiscal years is the simplest measures of whether fiscal policy is adding to or subtracting from aggregate demand pressures in the economy, i.e. the fiscal impulse.

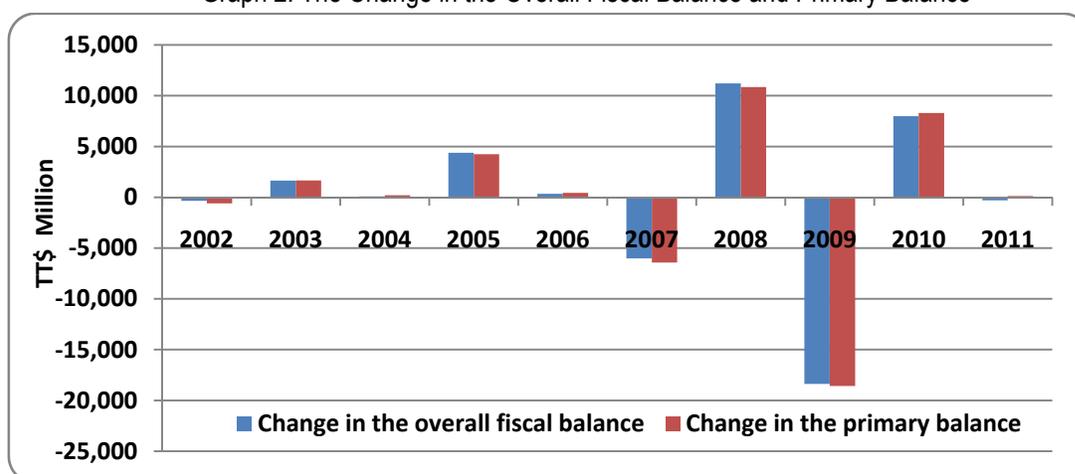
While this indicator is frequently used, it can be misleading, since it does not take into account the effect of changes in the business cycle on the fiscal balance. As a result, the changes in the fiscal balance cannot always be attributed to a change in the discretionary policy⁵ of the government. Furthermore, fluctuations in the rates of inflation, unemployment and growth can impact tax revenues and expenditure and have important effects on the observed changes in the fiscal deficit in any given year.

The primary fiscal balance has also been used as an indicator of the discretionary change in fiscal policy. The primary fiscal balance excludes interest payments and as such only captures the effects of contemporaneous fiscal policy actions; it excludes the actions of past governments from the estimate. However, like the overall balance it does not take into account the effects of changes in the business cycle and commodity prices on the balance. The following graph compares the change in the overall balance and primary balance during the period 2002 to 2011 (See Graph 2).

⁴ The overall fiscal balance measures the difference between revenue and expenditures and net lending.

⁵ Discretionary policy involves changes in the tax rates, coverage, exemptions or deductions which can add to or subtract from aggregate demand pressures in a given year.

Graph 2: The Change in the Overall Fiscal Balance and Primary Balance



Source: Central Bank of Trinidad and Tobago.

The evolution of the change in the overall fiscal balance and primary fiscal balance in the graph above would suggest that fiscal policy was mixed during 2002 to 2011. The large positive values during 2002 to 2008 suggest that fiscal policy was mostly contractionary, while it appears largely expansionary over the period 2009-2011. The combination of seemingly contractionary fiscal policy with high growth rates during 2002 to 2008 and expansionary fiscal policy during times of economic decline (2009-2011) may suggest a predominantly countercyclical fiscal policy response to the economic cycle. However, this type of assessment of the fiscal stance may be misleading because it does not take into account the specific nature of resource revenues. Additionally, the analysis does not control for the influence of the non-resource economic cycle on non-resource government revenues.

In order to produce a more accurate picture of the underlying trends in the economy the cyclically adjusted and structural fiscal balance indicators were estimated. These indicators correct conventional fiscal stance measures for the effects of cyclical and other factors and yield an estimate of the changes in the discretionary component of fiscal policy in each year; that is, the changes in the deficit that can be attributed to changes in tax rates, brackets, coverage, exemptions and deductions in a given year. These indicators provide a more accurate signal of the impact of changes in fiscal policy on aggregate demand pressures in an economy. In this instance the “fiscal impulse” can be calculated as the change in the cyclical fiscal balance from one year to another.

The fiscal impulse however, should not be confused with the fiscal policy multiplier, which attempts to measure the effect of changes in fiscal policy on economic activity and variables. The calculation of the fiscal impulse is primarily intended as a first step in the analysis of fiscal policy. It is not an indicator of the full

impact of fiscal policy in the short or medium term, nor does it measure the contribution of the government sector to the growth in GDP. At best it provides a measure of the magnitude of the initial stimulus to aggregate demand arising from the net effects of fiscal policy in a given period.

The cyclical fiscal balance, structural fiscal balance and fiscal impulse are useful components of the fiscal analysis toolkit and can enhance the interpretations of changes in fiscal policy. Schinasi (1991) proposed that a properly constructed fiscal impulse measure can be useful for two purposes: (i) it measures the effect of government's fiscal policies on budget outcomes and; (ii) it is useful for international comparisons of whether fiscal policy has changed over time. According to Chand (1993), these measures aim at providing a more accurate indication of budget impact than can be gained by simply observing movements in the actual budget balance. This is particularly applicable for commodity exporting countries which are susceptible to price shocks that can cause sudden deterioration in the budget balance. The calculation of these indicators allows for better formulation of medium-term fiscal frameworks to mitigate the impact of shocks and effectively manage public debt. Therefore, these indicators form the best criteria to assess the impact of the underlying discretionary fiscal policies on the economy and are important for guiding the medium-term fiscal framework towards a neutral or counter-cyclical path.

3. Methodology

The two most frequently used methods of calculating the cyclical fiscal balance, structural fiscal balance and fiscal impulse were elaborated by the Organization for Economic Co-operation and Development (OECD)⁶ and International Monetary Fund (IMF)⁷.

The IMF attempts to calculate the "initial impulse" to aggregate demand during a given period. To achieve this objective, the IMF defines a "cyclically adjusted balance" (CAB), which is as an estimate of the cyclical component of the budget. The methodology outlines two main approaches to calculating the CAB, these are the aggregated approach and the disaggregated approach (also known as the OECD approach). The aggregate approach is computationally simpler as elasticities of revenue and expenditure are assumed to be 1 and 0 respectively. They can also be sourced from existing studies or via regression analysis on aggregate levels of revenue and expenditure. While the aggregated approach does not distinguish between different components of revenue and expenditure, Girouard (2005) found that the weighted average of individual components' elasticities lends support to the 1-0 elasticity assumption. The cyclical adjustment for the

⁶ See Schinasi et al. (1991).

⁷ See Bornhorst et al. (2011).

aggregates approach involves decomposing the overall balance into a cyclical and cyclically adjusted component.

The OECD employs a structural approach in that it attempts to calculate, at each point in time, what the budget balance would be along some smoothly and appropriately defined path. The OECD methodology was elaborated in Schinasi (1986) where it was noted that the OECD's approach is to remove built-in stabilizer effects from the actual budget balance. To achieve this objective, the OECD assumes the actual budget balance is composed of two major components: (i) a policy-induced or discretionary component; and (ii) an income-induced component. The adjusted balance measures that part of the budget balance which is policy related or what has been called the "structural deficit". It includes the income-induced component which would exist were the economy expanding along a trend growth path.

Schinasi (1986) noted that the IMF and OECD measures of the fiscal impulse differ in at least four fundamental ways: (1) the OECD includes fiscal drag under the presumption that it is part of the "structure" of fiscal policy, while the IMF excludes it from its adjustment measure of the budget balance; (2) the OECD and the IMF both adjust for cyclical factors but they do so differently; (3) the OECD estimates its marginal tax and expenditure rates from structural models whereas the IMF assumes unit income-elasticity of its parameters and uses historical average tax and spending rates; and (4) each agency uses different estimates of potential output. Both approaches are expression notationally below:

The purpose of the cyclical adjustment is to decompose the overall balance into a cyclical and cyclically adjusted component.

$$OB = CB + CAB$$

(Eq.1)

This cyclical adjustment removes the impact of the business cycle effects from the fiscal balance and provides an estimate of the fiscal position net of cyclical effects. The CAB is computed as cyclically adjusted overall revenue (R^{CA}) minus cyclically adjusted expenditure (G^{CA}).

$$CAB = R^{CA} - G^{CA}$$

(Eq.2)

The equation can be further disaggregated to yield estimates of R^{CA} and G^{CA} .

$$R^{CA} = R \left(\frac{Y^*}{Y} \right)^{\varepsilon_{r,y}}$$

(Eq.3)

Where:

R^{CA} is the cyclically adjusted overall revenue which can be obtained by adjusting the actual revenues for the effects of the deviation of potential output from actual output.

$\varepsilon_{r,y}$ is the revenue elasticity which defines the strength of the cyclical effect.

$$G^{CA} = G \left(\frac{Y^*}{Y} \right)^{\varepsilon_{g,y}}$$

(Eq.4)

Where:

G^{CA} is the cyclically adjusted expenditure, however this is equal to actual expenditure, under the assumption of zero expenditure elasticity.

$\varepsilon_{g,y}$ is the elasticity of expenditure, which the IMF assumes to be zero since all expenditure is viewed as discretionary and hence independent of the business cycle.⁸

To ensure robustness of estimates the disaggregated approach, also called the OECD approach, can be used. In this approach cyclical adjustments are made to individual components of revenue and expenditure and then summed using a weighted average method.

$$CAB = [(\sum_{i=1}^N R_i^{CA}) - G_{cur}^{CA} + R^{NCA} + G^{NCA}]$$

(Eq.5)

Where:

R_i^{CA} represents the cyclically adjusted components of the i^{th} revenue category

G_{cur}^{CA} represents the cyclically adjusted current primary expenditures, capital expenditure is not cyclically adjusted.

R^{NCA} and G^{NCA} represent all categories of revenue and expenditure which do not need cyclical adjustment, such as non-tax revenue and interest expenses

⁸ The exception here is unemployment benefits which can exhibit countercyclical patterns.

$$\varepsilon_{R_i,Y} = \varepsilon_{R_i,B_i} \cdot \varepsilon_{B_i,Y}$$

(Eq.6)

On the revenue side, the elasticity of each revenue category can be decomposed into two factors. The output elasticity of tax revenue ($\varepsilon_{R_i,Y}$) is the product of the elasticity of tax revenues (R_i) with respect to the relevant tax base (B_i), ε_{R_i,B_i} and the elasticity of the tax base relative to the output gap $\varepsilon_{B_i,Y}$.

Applying this decomposition to the computation of the cyclically adjusted revenue yields R_i^{CA} as follows:

$$R_i^{CA} = R_i \left[\left(\frac{Y^*}{Y} \right)^{\varepsilon_{B_i,Y}} \right]^{\varepsilon_{R_i,B_i}}$$

(Eq.7)

Where $\varepsilon_{B_i,Y}$ and ε_{R_i,B_i} are the elasticity of the tax revenue with respect to the tax base (B_i) and the elasticity of the tax base relative to output, respectively. The output elasticity of tax revenue is the product of these two elasticities.

Similarly G_{cur}^{CA} can be defined as follows:

$$G_{cur}^{CA} = G_{cur} \left[\left(\frac{Y^*}{Y} \right)^{\varepsilon_{U,Y}} \right]^{\varepsilon_{G_{cur},U}}$$

(Eq.8)

Where $\varepsilon_{U,Y}$ and $\varepsilon_{G_{cur},U}$ are the elasticity of the current expenditure with respect to its base and the elasticity of the base with respect to the output gap. The output elasticity of expenditure is the product of these two elasticities.

While these two methods are computationally different, the IMF suggests that they will arrive at similar cyclically adjusted balances once two main conditions are met: (1) the composition of revenue and expenditure remain broadly constant and (2) elasticities for major component of revenue and expenditure remain fairly constant. The fiscal impulse is calculated as the change in the cyclically adjusted balance between two consecutive years.

As noted above, the standard cyclical adjustment alone may not detect the impact of a commodity price boom on higher revenue earnings. Instead, cyclically adjusted balances would signal an improvement and

convey the misleading impression that the fiscal “effort” behind this improvement is significant (while in reality there was none) and that the improvement is permanent (while it may last only as long as the price boom). Therefore, in resource based economies like Trinidad and Tobago the cyclical adjustment can be supplemented with a structural adjustment for movements in commodity prices and/or one-off or temporary revenue and expenditure which do not affect the underlying fiscal position.

The structural fiscal balance⁹ (SFB) goes beyond the CAB as it eliminates the direct effect of natural resource related revenue. The SFB also makes consideration for the indirect effects of commodity price changes. That is, commodity price changes may also affect the profitability of companies and their corporation tax payments that need to be taken into account by the adjustment methodology. These adjustments however, require more judgment and should be properly documented and have an appropriate justification. The SFB like other non-resource fiscal indicators (e.g. the non-oil deficit¹⁰) can provide greater clarity to the underlying fiscal position and strengthen fiscal analysis in Trinidad and Tobago.

The structurally adjusted revenue is expressed notationally below:

$$R^{CA,C} = R \left[\frac{Y^* \varepsilon_{R,Y}}{Y} \right] \left[\frac{C^*}{C} \right]^{\varepsilon_{R,C}}$$

(Eq.9)

Where :

$R^{CA,C}$ stands for revenues adjusted for the output and commodity price gaps.

Y^* is the potential output

$\left[\frac{C^*}{C} \right]^{\varepsilon_{R,C}}$ adjusts revenue for the deviation of commodity prices from the average commodity price index

$\varepsilon_{R,C}$ is the commodity price elasticity, once this is greater than 0, deviations of commodity prices from the average price will affect the structural balance.

This paper utilized the IMF methodology (aggregated approach) in estimating the cyclical and structural fiscal balances¹¹. This methodology draws on simple arithmetic formulas to assess the budgets impact on

⁹ Adjustments beyond the business cycle are warranted when changes in commodity prices, asset prices or the terms of trade are significant.

¹⁰ For further details on the non-oil deficit See: The Central Bank of Trinidad and Tobago, Annual Economic Survey 2006, Box 7, page 46.

¹¹ See Bornhorst et al., (2011).

aggregate demand and involves three conceptual issues: (i) the choice of a base year; (ii) deriving the cyclical balance; and (iii) deriving the structural balance.

The base year was chosen using the Hodrick-Prescott filter (HP filter), which is a mathematical tool used in macroeconomics to separate the cyclical component of a time series from raw data. Using the HP filter, the base year is selected in the period when the economy is assessed to be at its potential level of activity, that is, when actual and potential GDP are approximately equal (zero output gap). For the purposes of this analysis the base year chosen was the calendar year 2003. When GDP differs from potential GDP an output gap emerges. A negative output gap signals that the economy is operating below its potential and is referred to as a recessionary gap, while, a positive output gap points towards possible overheating characterized by a general upward pressure on prices in the economy. Constant price GDP subdivided into energy and non-energy was used in the calculation of the output gap during the review period.

Deriving the cyclical balance involved five steps; data gathering, identifying relevant one-off factors, removing one-off factors from data, adjust for cyclical factors and add back one-off factors. Central government revenue and expenditure data was compiled for the period 2001 to 2011. The revenue data was subdivided into energy and non-energy, while the expenditure data was adjusted for the components that would not impact domestic aggregate demand including: interest payments abroad, transfers abroad, CARICOM Petroleum Fund and transfers to the Heritage and Stabilization Fund. The second and third steps were to identify relevant one-off factors affecting revenue and expenditure and exclude them from the series. The one-off factors can be described as large non-recurrent operations that distort the fiscal analysis of the underlying fiscal operations. The following revenue factors were identified as one-off during the review period: the tax amnesty 2009 (\$553 million), the tax amnesty 2011 (\$1.2 billion) and payments of outstanding arrears in 2012 (\$1 billion). The one-off expenditure items were: CLICO and HCU interest payments in 2011 (\$748.2 million) and payments for the TrinGeneration Unlimited Power plant of \$500 million and \$300 million in 2010 and 2011 respectively.

The fourth step involved the adjustment for cyclical factors. The revenue¹² and expenditure elasticities for the cyclical calculations were assumed to be 1 and 0 respectively. The cyclical adjusted revenue was obtained by adjusting actual revenues for the effect of the deviation from actual output with the revenue elasticity defining the strength of the cyclical effect. The assumption of zero expenditure elasticity implies that expenditure is discretionary and as such independent of the business cycle.

¹² Tax Elasticity and Buoyancy coefficients for Trinidad and Tobago were estimated in an earlier Central Bank paper. See Cotton (2012).

A similar methodology was used to derive the SFB except that it excluded commodity related revenue and expenditure and considers the permanent component of natural resource related revenue¹³ (See Eq.9). Additionally, the structural balance includes an adjustment for changes in asset prices over the review period. The asset/commodity price adjustments includes a separate term that adjusts for the deviation of the prices from their benchmark levels, denoted as the asset/commodity price gaps. The paper considers only the commodity price gap since changes in taxation receipts from asset prices were negligible. The commodity price gap was estimated as the difference between the Energy Commodity Price Index (ECPI) and a three year moving average of the ECPI. Finch and Cox (2010) indicate that the ECPI is a summary measure of the price movements of Trinidad and Tobago's top ten energy-based commodity exports. In broad terms, the ECPI is an average of international commodity prices of key energy exports of Trinidad and Tobago weighted by each commodity's relative share of the value of energy exports. Movements in the index can provide an overall indication of how changes in the relevant international commodity prices could affect Trinidad and Tobago's export earnings and government revenue. The HP filter was then used to generate a quarterly trend series for the ECPI. The average of the quarterly ECPI data was then used to arrive at an annual average ECPI (this gives us a sense of the "normal" commodity prices).

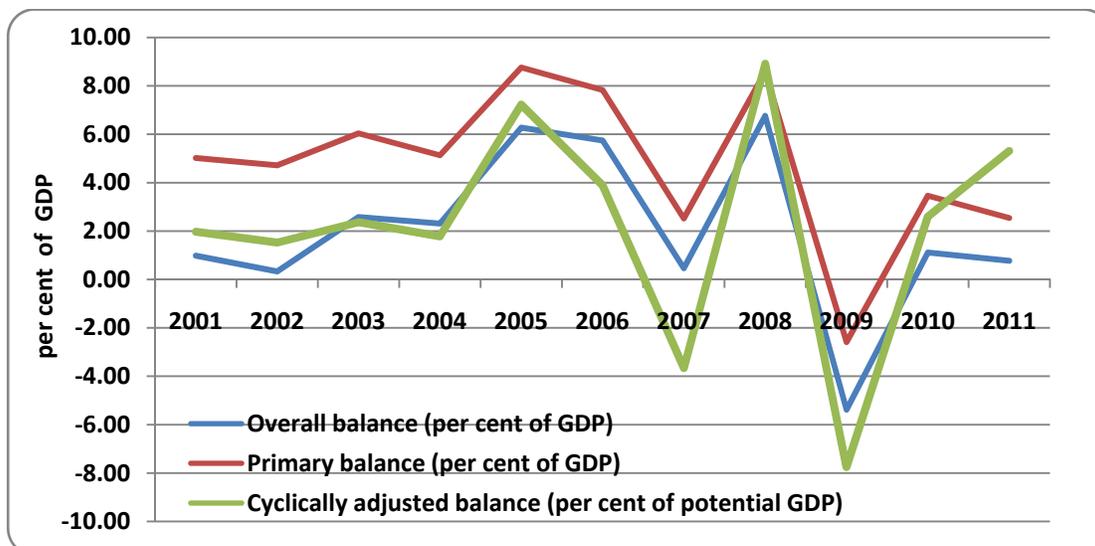
The cyclical and structural fiscal balances like other economic indicators have their limitations for assessing fiscal impact. Firstly, errors in the estimation of the output gap and elasticity estimates make the estimated cyclical and structural fiscal balances less reliable. The HP filter is one of the more frequently used methods of estimating the output gap in the literature; however it has its drawbacks. Nelson and Plosser (1982) noted that the HP filter may yield a cycle containing contributions from noncyclical frequencies. Secondly, the commonly assumed revenue and expenditure elasticities of 1 and 0 were used in this study. This implies that expenditure is discretionary in its entirety and is independent from the business cycle. While this is a reasonable assumption, in some cases some components of expenditure can exhibit a cyclical pattern. Thirdly, there is some level of subjectivity in selecting one-off revenue and expenditure factors. These one-off factors may vary between studies and as such can lead to variations in the results and interpretations. Finally, the ECPI was only available from the year 2004 and as such the "normal" asset or commodity prices and three year moving average of the ECPI were not available for the years 2001 to 2003 and were the same in the years 2004 and 2005. Notwithstanding this, the fiscal impulse is a useful fiscal indicator to inform policy decisions provided that its shortcomings are noted.

¹³ In resource based economies the rents are frequently utilized to invest in plant and equipment in related industries which are expected to generate a stable stream of income over the medium to long-term. In addition, some of the energy receipts are also saved and can be utilized for stabilization and for achieving long term development objectives.

4. Results

The results of the arithmetic calculations are displayed in the appendix tables¹⁴ and graphs below and provide some insight into the effectiveness of fiscal indicators in assessing government policy and how fiscal policy impacted aggregate demand during the period 2001 to 2011. The following graph (Graph 3) displays the overall fiscal balance, primary fiscal balance and cyclically adjusted balance.

Graph 3: Comparison of the Overall Fiscal Balance, Primary Balance and Cyclically Adjusted Balance

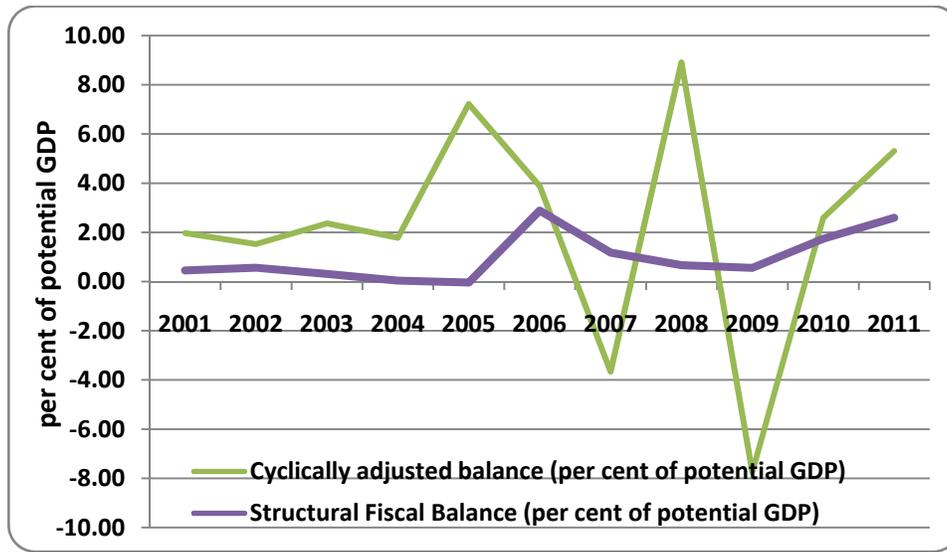


Source: Central Bank of Trinidad and Tobago.

It reveals that the cyclically adjusted balance generally displayed a similar trend to the overall fiscal balance and primary balance during the review period. Notwithstanding, the pre-crisis boom (mid 2004 to 2008) and the corresponding uptick of inflation from 8.3 per cent in 2006 to 12.0 per cent in 2008 and economic growth averaging 6.8 per cent (during the years 2004 to 2008). This suggests the effect of the business cycle on revenue and expenditure did not appear to significantly distort the fiscal analysis during the review period. However, in resource-dependent countries it may be preferable to estimate the SFB to get a clearer understanding of the non-natural resource part of the budget and the underlying fiscal position. The CAB and SFB were compared in graph 4 below.

¹⁴ See Appendix tables 2-4 for the fiscal data used in this study and the estimates of the cyclical and structural fiscal balance.

Graph 4: Comparison of the Cyclically Adjusted Balance and Structural Fiscal Balance

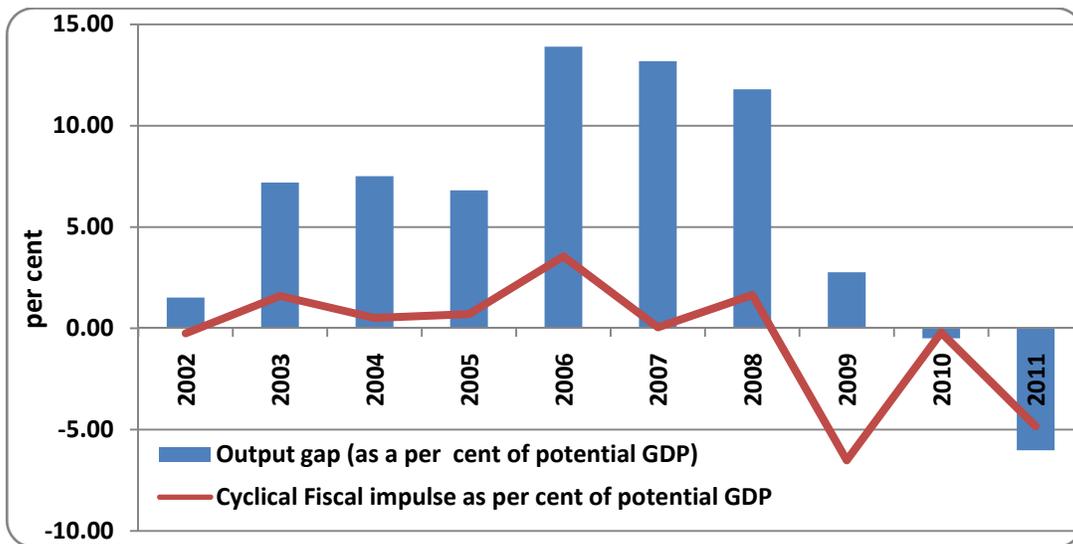


Source: Central Bank of Trinidad and Tobago.

The graph (graph 4) shows that the CAB displayed more volatility during the review period than the SFB. The SFB is an important indicator of the fiscal sustainability of economies dependent on petroleum revenues since it gauges whether the permanent component of revenue can support government expenditure in the event of shocks to the external sector. Sudden shocks to revenues can have especially deleterious effects in growing economies since these can derail development efforts of the government.

With respect to the impact of fiscal policy on aggregate demand, the results (graph 5) show that the cyclical fiscal impulse was much stronger in the pre crisis (2003-2008) period than the post-crisis period (2009-2011). The fiscal impulse was positive during 2003 to 2008, averaging 1.34 per cent of potential GDP. It peaked at 3.55 per cent of potential GDP in 2006. However, the cyclical fiscal impulse became negative during the years 2009 to 2011. The relatively weak fiscal impulse in the post crisis period may be able to explain the sluggish nature of growth since 2009.

Graph 5: Cyclical Fiscal Impulse



Source: Central Bank of Trinidad and Tobago.

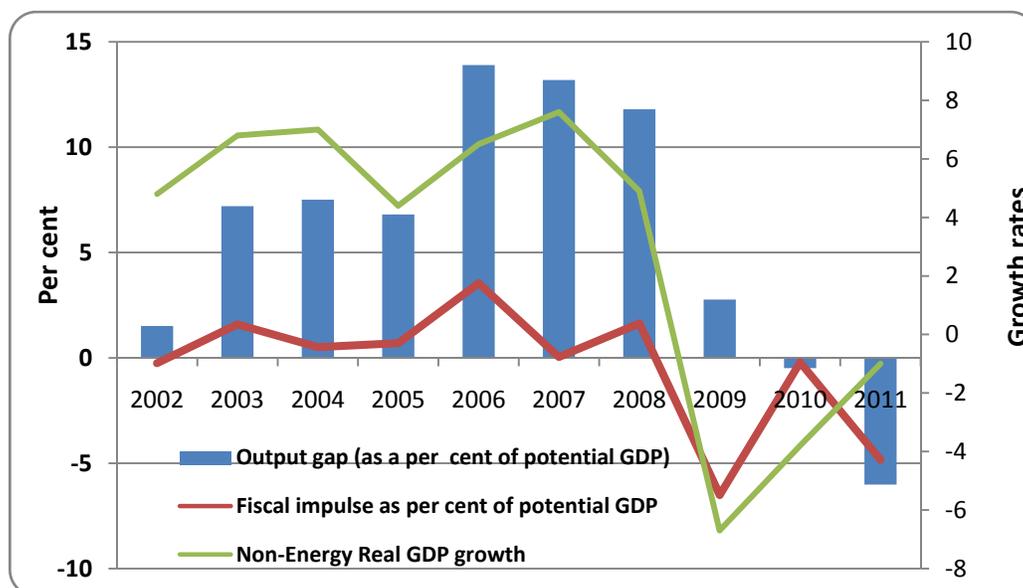
The combination of a positive output gap and positive fiscal impulse (and a negative output gap and negative fiscal impulse) implies that fiscal policy in Trinidad and Tobago was largely pro-cyclical (graph 5). That is, fiscal policy added to aggregate demand during upturns and withdrew from aggregate demand during downturns. Villafuerte et al. (2010) noted that fiscal policy in the LAC region was predominantly pro-cyclical during 2003 to 2008 and the degree of pro-cyclicality was substantial in Ecuador and Trinidad and Tobago. The average degree of pro-cyclicality in the LAC region was 0.5 in LAC.

Amongst other factors the prevalence of pro-cyclical fiscal policy can be explained by institutional factors such as: the structure of local government, quality of institutions and concentration of power. In general, a more decentralized local government, weaker institutions and more concentrated political power leads to pro-cyclical fiscal policy.

Additionally, graph 6 shows that changes in the non-energy sector almost mirror movements in the government's fiscal impulse. Therefore, as the economy attempts to return to a path of sustainable economic growth, particularly in the non-energy sector, governments' active participation will be critical. The State is the largest purchaser of goods and services in the economy and plays a crucial part in engendering private sector confidence through its own spending programme. Based on the analysis, the recovery of the non-energy sector in the short to medium term can be jeopardized without the necessary fiscal support. However, in adopting an appropriate fiscal stimulus, the government has to strike a delicate balance between fostering economic growth and containing potential inflationary pressures, while ensuring that the fiscal outturn is

sustainable. The latter is very important, as persistent fiscal deficits can translate into higher debt levels and debt servicing costs.

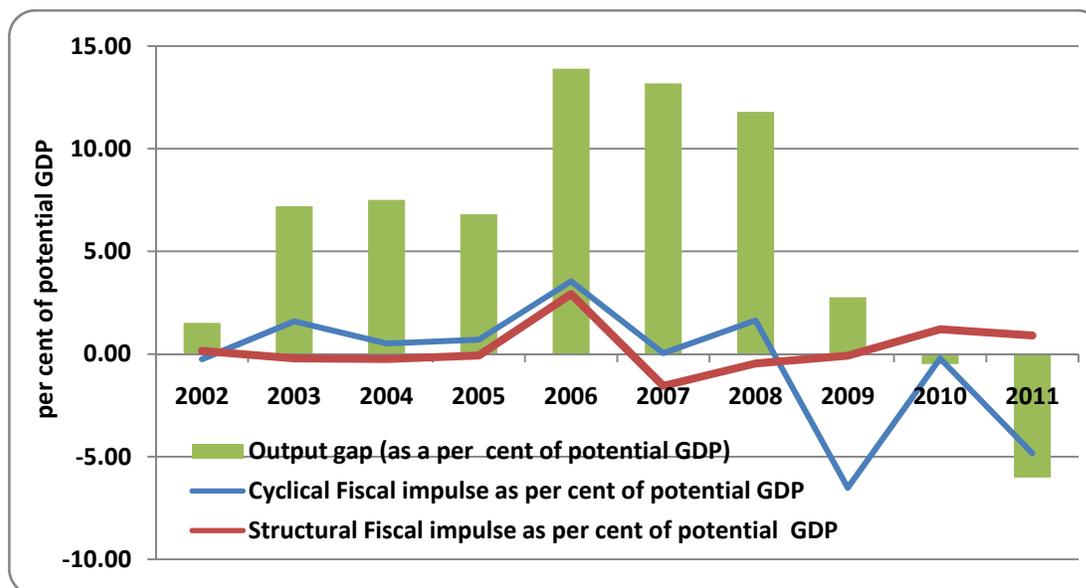
Graph 6: Cyclical Fiscal Impulse and Non-Energy GDP growth



Source: Central Bank of Trinidad and Tobago.

The final part of the analysis estimated the structural fiscal impulse (Graph 7). This indicator supplements the standard cyclical analysis for movements in commodity prices and provides a sense of how the energy sector contributed to changes in aggregate demand. The results showed that during the pre-crisis years (2003-2008) the energy sector provided most of the impetus for changes in aggregate demand. However, there have also been signs of an improved fiscal impulse from the non-energy sector since 2009. This may be related to the heightened efforts of the government to strengthen this sector including: ongoing efforts to improve tax policy administration and enforcement of the personal and corporate income tax, value added tax and excise duties; infrastructure development programmes funded both by the Public Sector Investment Programme and through Public Private Partnerships; expanding of the use of Information and Communication Technology and renewed focus on entrepreneurship and small business development.

Graph 7: Cyclical and Structural Fiscal Impulse



Source: Central Bank of Trinidad and Tobago.

5. Conclusions

This paper attempted to investigate the appropriateness of various fiscal indicators to measure the impact of fiscal policy on aggregate demand. The results showed that cyclical factors did not significantly distort the interpretation of fiscal indicators during the period 2001-2011. However, in resource dependent economies like Trinidad and Tobago it may be useful to estimate the SFB to get a clearer picture of the underlying fiscal position. This paper suggests that the SFB be estimated routinely since this can provide greater clarity on the non-resource budget outturn and help strengthen fiscal analysis in Trinidad and Tobago.

Secondly, the paper argues that fiscal policy in Trinidad and Tobago is predominantly pro-cyclical, that is fiscal policy contributed to AD during upturns and withdrew from AD during downturns. This can potentially magnify the effect of business cycle trends causing sharper increases during upswings and more prolonged recessions during downturns.

Thirdly, the fiscal impulse was much stronger in the pre-crisis period (2003-2008) than in the post-crisis period (2009-2011) which explains the sluggish nature of growth since 2009. The energy sector provided most of the impetus for changes in aggregate demand. However, there have also signs of an improved fiscal impulse from the non-energy sector since the year 2009 which may be related to the heightened efforts of the government to strengthen this sector.

References

Arestis, Philip. "Fiscal Policy is Still an Effective Instrument of Macroeconomic Policy." Cambridge Centre for Economic and Public Policy, University of Cambridge, UK University of the Basque Country, Spain. *Panaeconomicus*, 2011, vol. 58, issue 2, pages 143-156.

Alesina, Alberto, Filipe Campante and Guido Tabellini. "Why is Fiscal Policy Often Pro-cyclical?" *Journal of the European Economic Association*, September 2008.

<http://www.economics.harvard.edu/faculty/alesina/files/Why%20is%20Fiscal%20Policy%20Often%20Procyclical.pdf>

Baldini, Alfredo. "Fiscal Policy and Business Cycles in an Oil-Producing Economy: The Case of Venezuela", *International Monetary Fund, Working Paper 05/237, 2005*.

Baxter, Marianne, and Robert King. "Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series", *The Review of Economics and Statistics*, Vol. 81 November, pp.575-93, 1999.

Blanchard, Olivier. "Suggestions for a New Set of Fiscal Indicators." *OECD Economics Statistics Department Working Papers, No.79, April 1992*.

Blejer, M. and Cheasty, A. "How to Measure the Fiscal Deficit: Analytical and Methodological Issues", Washington D.C., *International Monetary Fund, 1993*.

Bornhorst, Fabian, Gabriela Dobrescu, Annalisa Fedelino, Jan Gottschalk and Taisuke Nakata. "When and How to Adjust Beyond the Business Cycle? A Guide to Structural Balances, *International Monetary Fund, Technical Notes and Manuals, Number 02, 2011*.

Chalk, N., "Structural balances and all that: What indicators to use in assessing fiscal policy." *International Monetary Fund Working Paper WP/02/101, 2002*.

Chand, K., "Fiscal Impulse measures and their fiscal impact" in How to Measure the Fiscal Deficit: Analytical and Methodological Issues, Eds M.I. Blejer and A. Cheasty, *International Monetary Fund, Washington, 1993*, pp.85-99.

Cotton, Joseph. "The Buoyancy and Elasticity of Non-Oil Tax Revenue in Trinidad and Tobago (1990-2009)". *Central Bank of Trinidad and Tobago, Working Papers, No. 6, April 2012.*
<http://www.central-bank.org.tt/sites/default/files/WP%20Buoyancy%20and%20Elasticity%20of%20Non-Oil%20Tax%20Revenues%20in%20Trinidad%20and%20Tobago.pdf>

Corbae, Dean, Sam Ouliaris, and Peter Phillips "Band Spectral Regression with Trending Data". *Econometrica, Vol.70, , 2002, pp. 1067-109.*

Finch, Kevin and Delvin, Cox. "The Energy Commodity Price Index". *Central Bank of Trinidad and Tobago, Economic Bulletin, Volume XII No.2, July 2010.*
<http://www.central-bank.org.tt/sites/default/files/Economic%20Bulletin%20July%202010%20Article%20Ib.pdf>

Girouard, Nathalie and Christophe Andre. "Measuring Cyclically Adjusted Budget Balances for OECD Countries." *OECD Economics Department, WP No. 434, 2005.*

International Monetary Fund "Regional Economic Outlook". *Western Hemisphere, Washington D.C., May 2009.*

Fedelino A., Ivanova A., and Horton M., "Computing Cyclically Adjusted Balances and Automatic Stabilizers." *International Monetary Fund, Fiscal Affairs Department, Technical Notes and Manuals, 2009.*

Hemming, R. Kell, M and Mahfouz, S., "The Effectiveness of Fiscal Policy in Stimulating Economic Activity: A Review of the Literature." *International Monetary Fund, Working Paper 02/208, 2000.*

Girouard N. and André C., "Measuring Cyclically adjusted Budget Balances for OECD Countries." *OECD Economics Department, Working Papers No. 434, 2005.*

International Monetary Fund. "Guyana: Selected Issues" *International Monetary Fund Country Report No. 10/293, September 2010, pages 19-29.*
<http://www.imf.org/external/pubs/ft/scr/2010/cr10293.pdf>

International Monetary Fund. "Uruguay: Selected Issues." *International Monetary Fund Country Report No. 11/63, 2011.*

Krugman, Paul. "Fiscal Policy Poised for a Comeback?". *Oxford Review of Economic Policy*, 21(4), (2005): 515-523.

Kumah, Francis and John Matovu. "Commodity Price Shocks and the Odds on Fiscal Performance: A Structural VAR Approach." *International Monetary Fund, Working Paper 05/17*, 2005.

Schinasi, G., and Lutz, M., "Fiscal Impulse." *International Monetary Fund Working Paper, WP91/91, September 1991*.

Nelson, Charles R., and Charles, I. Plosser. "Trends and Random Walks in Macroeconomic Time Series." *Journal of Monetary Economics, Elsevier, Vol. 10, pp.139-62, 1982*.

Perotti, R., and Alesina, A., "Fiscal Adjustment in OECD Countries: Composition and Macroeconomic Effects." *National Bureau of Economic Research, Working Paper Number 5730, August 1996*.

Philip, R., and Janssen, J., "Indicators of Fiscal Impulse for New Zealand." *New Zealand Treasury, Working Paper 02/30, December 2002*.

<http://www.treasury.govt.nz/publications/research-policy/wp/2002/02-30/twp02-30.pdf>

Robinson, D., Gold, J., Liu, P., Monroe, H., and Wu, Y., "The Caribbean Experience with the Global Crisis." Paper presented at the 42nd Annual Monetary Studies Conference Financial Stability, Crisis Preparedness and Risk Management in the Caribbean, November 2010.

http://ccmfuwi.org/files/publications/conference/2010/2_1-Gold_Liu_Monroe_Wu-p.pdf

Schinasi, G., "International Comparisons of Fiscal Policy: the OECD and the IMF Measures of Fiscal Impulse." *International Finance Division, Federal Reserve Board, Discussion Papers Number 274, February 1986*.

<http://www.federalreserve.gov/pubs/ifdp/1986/274/ifdp274.pdf>

Van Aarle, Bas and Harry Garretsen. "Keynesian, Non- Keynesian or No Effects of Fiscal Policy Changes? The EMU Case." *Journal of Macroeconomics*, 25(2) (2003):213-240.

Villafuerte Mauricio and Lopez- Murphy Pablo. "Fiscal Policy in Oil Producing Countries During the Recent Oil Price Cycle." *International Monetary Fund, Working Paper 10/28, 2010*.

Appendix

Appendix Table 1: Constant Price GDP, 2000-2011

Year	TT\$ Millions			
	GDP	GDP Trend/ Potential	GDP Cycle	Output Gap as % Potential GDP
2000	51,370.7	52,128.1	-757.4	-1.45
2001	53,512.1	56,897.1	-3,385.0	-5.95
2002	57,759.2	61,658.6	-3,899.4	-6.32
2003	66,095.9	66,371.1	-275.2	-0.41
2004	71,355.2	70,954.1	401.1	0.57
2005	75,785.6	75,324.6	461.0	0.61
2006	85,795.4	79,403.3	6,392.1	8.05
2007	89,874.3	83,115.7	6,758.6	8.13
2008	92,922.6	86,451.3	6,471.3	7.49
2009	88,841.7	89,466.8	-625.1	-0.70
2010	89,029.2	92,284.1	-3,254.9	-3.53
2011	86,731.3	95,018.4	-8,287.1	-8.72

Source: Ministry of Finance and Central Bank of Trinidad and Tobago.

Appendix Table 2: Fiscal data 2001-2011

Scale	Indicator name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	REVENUE											
millions	Central Government Revenue	13,993.8	14,555.9	17,858.4	22,026.2	31,917.7	38,558.2	40,696.6	57,821.4	38,598.0	45,063.9	49,556.3
millions	Central Government Oil Revenue	3,693.5	3,931.0	6,904.7	8,143.9	15,851.8	21,111.5	19,365.4	31,100.5	14,825.5	19,216.4	23,292.8
millions	Refining, Gas processing & Petrochemicals	1,742.3	1,418.3	2,179.8	2,476.4	3,166.2	3,965.7	4,489.7	7,652.5	5,173.3	6,611.9	8,998.9
millions	- Energy	675.2	364.5	720.8	1,086.8	1,831.2	2,368.1	2,168.2	2,196.1	2,761.8	4,222.4	6,374.8
millions	- Non-Energy	558.9	687.1	1,006.8	952.2	1,013.6	944.1	1,149.0	2,278.6	2,178.4	2,240.6	2,511.4
millions	Central Government Non-Oil Revenue	9,686.4	10,575.6	10,947.9	13,876.3	16,058.6	17,442.0	21,300.8	26,684.0	23,718.0	25,619.0	25,946.8
millions	Central Government capital revenue	35.6	38.7	5.8	6.1	7.2	4.7	30.4	36.9	54.5	1.5	316.7
	EXPENDITURE	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
millions	Central Government Expenditure (excl. HSF)	13,456.1	14,369.1	16,023.4	20,093.5	25,601.9	31,900.3	40,063.8	45,974.8	45,127.8	43,606.5	48,403.1
millions	Central Government Interest Payments	2,222.2	2,469.0	2,459.3	2,357.8	2,501.9	2,412.0	2,815.8	3,183.2	3,389.9	3,085.3	2,661.8
millions	Central Government Interest Payments (domestic)	1,453.9	1,644.5	1,732.3	1,711.6	1,819.0	1,884.7	2,132.4	2,546.6	2,792.5	2,789.4	2,200.0
millions	Central Government Interest Payments (abroad)	768.3	824.5	726.9	646.2	682.9	527.2	683.4	636.6	597.4	295.9	461.8
millions	Central Government transfers abroad	74.5	66.0	88.4	134.2	154.7	441.7	83.8	592.2	244.0	230.6	143.1
millions	Central Government other transfers abroad	8.1	5.1	6.4	7.3	7.2	6.8	10.9	8.6	9.7	14.8	9.3
millions	CARICOM Petroleum Fund	0.0	0.0	0.0	0.0	0.0	0.0	421.5	424.0	0.0	100.0	100.0
millions	Petroleum Subsidy	164.0	133.6	222.4	566.4	1,055.8	1,322.2	1,100.0	2,162.1	1,049.5	905.0	1,178.0
millions	Heritage and Stabilization Fund	4,690.9	5,142.7	5,235.8	5,423.5	6,221.4	6,594.6	7,247.7	9,553.3	8,083.0	7,421.0	6,754.0
millions	ONE-OFF REVENUE	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
millions	Tax amnesty 2008/2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	553.0	0.0	0.0
millions	Tax amnesty 2010/2011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,200.0
millions	Payment of outstanding arrears	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,000.0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
millions	ONE-OFF EXPENDITURE											
millions	CLICO & HCU interest payments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	748.2
millions	Tringeneration unlimited	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	500.0	300.0

Appendix Table 3: Estimates of the Cyclically Adjusted Balance and Cyclical Balance

TT\$ Millions	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Revenue (excl. one-off)	13,993.8	14,555.9	17,858.4	22,026.2	31,917.7	38,558.2	40,696.6	57,821.4	38,045.0	45,063.9	47,356.3
Expenditure (excl. one-off)	12,605.2	13,473.5	15,201.7	19,305.8	24,757.2	30,924.6	38,864.3	44,313.4	44,276.7	42,465.3	46,640.7
Overall balance (OB)	1,388.6	1,082.4	2,656.8	2,720.4	7,160.5	7,633.6	1,832.3	13,508.0	(6,231.8)	2,598.7	715.5
Cyclically adj. Revenue	13,631.9	14,338.6	16,659.5	20,487.7	29,882.9	33,852.4	35,955.2	51,719.1	37,021.3	45,285.4	50,388.2
Cyclically adj. Expenditure	12,605.2	13,473.5	15,201.7	19,305.8	24,757.2	30,924.6	38,864.3	44,313.4	44,276.7	42,465.3	46,640.7
Cyclically adjusted balance (CAB)	1,026.6	865.2	1,457.8	1,181.9	5,125.7	2,927.8	(2,909.2)	7,405.7	(7,255.4)	2,820.2	3,747.4
Cyclically adjusted balance (add one-offs)	1,026.6	865.2	1,457.8	1,181.9	5,125.7	2,927.8	(2,909.2)	7,405.7	(6,702.4)	2,320.2	4,899.2
Cyclical balance = OB - CAB	361.9	217.3	1,198.9	1,538.5	2,034.8	4,705.8	4,741.4	6,102.4	470.4	278.5	-4,183.7
Fiscal impulse = CAB_t - CAB_{t-1}		-144.68	981.66	339.61	496.29	2,670.98	35.65	1,360.91	-5,631.69	-192.17	-4,462.17
Cyclical balance as per cent of potential GDP	0.69	0.38	1.94	2.32	2.87	6.25	5.97	7.34	0.54	0.31	-4.53
Fiscal impulse as per cent of potential GDP		-0.25	1.59	0.51	0.70	3.55	0.04	1.64	-6.51	-0.21	-4.84
Memo items:											
Nominal GDP –Constant prices (TT\$ Millions)	53,512.1	57,759.2	66,095.9	71,355.2	75,785.6	85,795.4	89,874.3	92,922.6	88,841.7	89,029.2	86,731.1
Potential GDP (TT\$ Millions)	52,128.1	56,897.1	61,658.6	66,371.1	70,954.1	75,324.6	79,403.3	83,115.7	86,451.3	89,466.8	92,284.1
Output gap	1,384.0	862.1	(4,437.3)	4,984.1	4,831.5	10,470.8	10,471.0	9,806.9	2,390.4	(437.6)	(5,552.8)

Source: Ministry of Finance and Central Bank of Trinidad and Tobago.

Notes:

1. The elasticity of revenue was assumed to be 1 and the elasticity of expenditure was assumed to be 0.

Appendix Table 4: Estimates of the Structural Adjusted Balance and Structural Balance

TT\$ Millions	2003	2004	2005	2006	2007	2008	2009	2010	2011
Revenue (excl. one-offs)	17,858.4	22,026.2	31,917.7	38,558.2	40,696.6	57,821.4	38,045.0	45,063.9	47,356.3
Energy	9,084.5	10,620.3	19,018.0	25,077.2	23,855.1	38,753.0	19,998.9	25,828.3	32,291.7
Non-Energy	8,774.0	11,406.0	12,899.6	13,481.0	16,841.5	19,068.4	18,046.1	19,235.6	15,064.6
Expenditure (excl. one-offs)	14,979.3	18,739.4	23,701.4	29,602.4	37,764.3	42,151.3	43,227.2	41,560.3	45,462.7
Overall balance (OB) = Rev. – Exp.	2,879.2	3,286.8	8,216.3	8,955.8	2,932.3	15,670.1	(5,182.3)	3,503.7	1,893.5
Structurally Adjusted Revenue	17,666.9	21,998.6	31,942.8	36,384.0	39,757.3	57,267.5	37,563.2	43,505.6	44,960.9
Energy	9,084.5	10,620.3	19,015.4	22,622.0	21,918.9	36,424.6	19,330.2	25,047.0	30,916.2
Non-Energy	8,582.5	11,378.3	12,927.3	13,762.0	17,838.4	20,842.8	18,233.0	18,458.6	14,044.7
Structurally Adjusted Expenditure	14,979.3	18,739.4	23,701.4	29,602.4	37,764.3	42,151.3	43,227.2	41,560.3	45,462.7
Structurally Adjusted Balance(SAB) = Structural Rev. – Structural Exp.	2,687.7	3,259.2	8,241.4	6,781.6	1,993.0	15,116.2	(5,664.1)	1,945.3	(501.8)
Structural Balance = OB - SAB	191.51	27.66	(25.09)	2,174.16	939.32	553.95	481.81	1,558.37	2,395.38
Fiscal impulse	-131.40	-163.85	-52.75	2,199.25	-1,234.84	-385.36	-72.14	1,076.56	837.01
Fiscal impulse (per cent of potential GDP)	0.21	-0.25	0.07	2.92	-1.56	-0.46	-0.08	1.20	0.91
Memo items:									
Non-oil GDP (Constant price) TT\$m	40,830.9	43,698.8	45,900.0	48,692.8	52,389.2	55,820.4	53,068.6	51,708.0	51,469.9
Non-oil Potential GDP (Constant price) TT\$m	41,742.0	43,805.0	45,801.7	47,698.2	49,461.4	51,068.2	52,524.7	53,884.8	55,207.4
Output gap	(911.1)	(106.2)	98.3	994.6	2,927.8	4,752.3	543.9	(2,176.7)	(3,737.5)
Commodity price gap	0.0	0.0	0.0	10.9	8.8	6.4	3.5	3.1	4.4
Commodity prices index		85.4	95.4	105.9	114.6	121.2	124.2	128.5	135.0
Commodity price index (3-year moving average)		85.4	95.4	95.6	105.3	113.9	120.0	124.6	129.2

Source: Ministry of Finance and Central Bank of Trinidad and Tobago.