

Structural budget balance and fiscal policy stance in Tunisia

Wissem KHANFIR

University of Sfax, Tunisia
khanfirwissemfseg@yahoo.fr

Abstract. *In this paper, we employed the methodology used by the international organizations (Organization for Economic Co-operation and Development – OECD, International Monetary Fund – IMF and the European Commission). It is a two-step approach that enables to estimate the structural budget balance in Tunisia for the 1972-2014 period, as an indicator of discretionary fiscal policy. The importance of this indicator is derived from the fact that it helps evaluate the fiscal policy stance. The empirical results showed that the deterioration of the budget balance is due to the economic fluctuations. In Tunisia, it can be confirmed that fiscal policy is largely counter-cyclical.*

Keywords: Fiscal policy, Output gap, Structural budget balance, Tunisia.

JEL Classification: E62, C32.

1. Introduction

Since the early 1980s, the international organizations used the discretionary changes in the government budget as a measure of fiscal policy impulse for most advanced economies (Chouraqui et al. (1990) and Hagemann (1999)). These changes are measured by the structural budget balance usually called the cyclically adjusted budget balance.

Blanchard (1990) was the first who introduced the cyclically adjusted budget balance. He indicated that it is necessary to distinguish in terms of evolution of public finances between the deliberate actions of the public authorities and the automatic stabilization of the economic activity. To isolate the contribution of the automatic stabilizers to the changes in the budget balance, international organizations calculated a cyclically adjusted budget indicator which showed the causes of fiscal positions, when the cyclical or automatic movements are eliminated. On the other hand, Chouraqui et al. (1990) added that the purpose of the estimation of the cyclically adjusted budget balance is to distinguish between the changes in the budget balance due to the fiscal policy actions and the changes that induced by the fluctuations of the economic activity.

According to Blanchard (1990) and Chouraqui et al. (1990), the structural budget balance is used for many purposes: it is used as an index of discretionary changes in fiscal policy, an index of sustainability of fiscal policy and an indicator of the effect of fiscal policy on the economic activity.

Several definitions have been attributed to the concept of structural budget balance. Muller and Price (1984) considered the cyclically adjusted budget balance as an indicator of the deliberate action of the public authorities, because they considered the variations of the budget deficit as a cause of fluctuations in the economic activity. Following Giorno et al. (1995), this indicator provided information about what the revenues and the expenditures would be if the production is at its potential level, i.e. excluding the evolution of the economic activity. Hagemann (1999) defined this indicator as «the residual balance after purging the actual balance of the estimated budgetary consequences of the business cycle». He specified that it reflects the discretionary fiscal policies rather than the non-discretionary ones.

Bouthevillain and Garcia (2000) and Audenis and Prost (2003) used the structural budget balance as defined by the international organizations. It is the budget balance obtained if the real GDP were equal to the potential output. The evolution of this indicator has been adopted to eliminate the influence of the economic situation on the budget balance. Therefore, this indicator ensures the regularity of the economic situation. The cyclical budget balance is still defined, by the international organizations, as the impact of fluctuations of the economic activity on the budget balance. Boije (2004) added that the structural budget balance indicates what the financial position of general government would be if the utilization of the production factors were at a normal level.

Among the different methodologies proposed to estimate the structural budget balance, we can mention the approach used by the IMF and another adopted by the OECD. In fact, this estimation has been the subject of several empirical studies mainly for the developed countries, more particularly the countries of the European Union (Altar et al. (2010), Mencinger and Aristovnik (2013), Mourre et al. (2014), Camelia (2014), Ana-Maria and Alexandru (2015)...), whereas a minority of studies dealt with the developing countries, such as the case of Morocco (Tlidi, 2013)⁽¹⁾.

To our knowledge, Khanfir's study (2017) is the only one that estimated the structural budget balance for the Tunisian context. She used the structural VAR model and showed that the orientation of the fiscal policy in Tunisia does not respect the fiscal rules, but it evolves with the economic activity.

The objective of this paper is to estimate the structural budget balance in Tunisia over the 1972-2014 period using the two-step approach. In the first step, we estimated the output gap and in the second, we removed the influence of the economic cycle from the changes of the observed budget balance.

2. Structural budget balance: data and methodology

2.1. Data

We used annual data for Tunisia over the 1972-2014 period. The economic variables studied are:

- current GDP,
- net government expenditure (G),
- personal income tax (PIT),
- corporate income tax (CIT),
- indirect taxes (IT) and
- social security contributions (SSC)⁽²⁾.

All these variables are transformed into logarithms. The results of the ADF⁽³⁾ test showed that all the variables are stationary in first difference.

2.2. The two-step approach

We employed a methodology similar to that of Bouthevillain and Garcia (2000). This method of cyclical adjustments, which is common to all the international organizations, is based on a two-step approach. It consists of an assessment of the cyclical component based on the position of the economy in the cycle, and a structural component by difference.

The first step consists in evaluating the potential GDP using a Hodrick-Prescott (HP) filter⁽⁴⁾, whereas the second to remove the influence of the economic cycle in the changes in the observed budget balance, using the estimation of the fiscal elasticities with respect to GDP.

2.2.1. Evaluation of the output gap

The potential output is the maximum level of sustainable production, without tension in the economy, and more precisely without an acceleration of inflation (Le Bihan et al., 1997). The output gap, which is defined as a deviation of the current GDP (Y_t) from its potential level (Y_t^*), in percentage of the former, is obtained according to the following expression:

$$OG = \frac{(Y_t - Y_t^*)}{Y_t} \quad (1)$$

Where:

Y_t : the current GDP

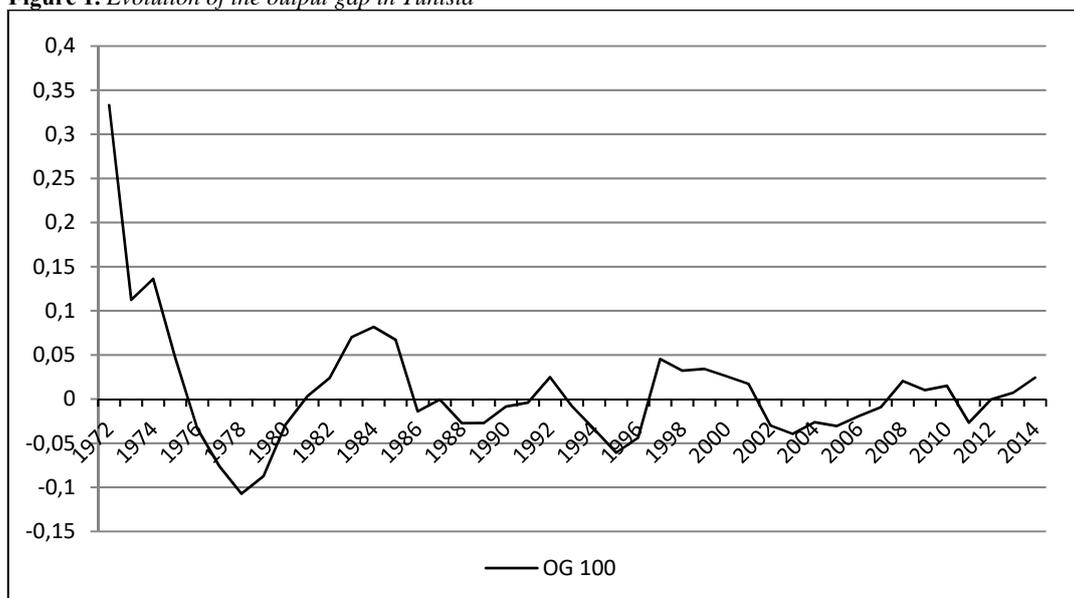
Y_t^* : the potential GDP

The sign and the magnitude of the output gap identify the phases of the business cycle. According to Baccouche et al. (1997), a positive output gap implies a sign of tension on the productive apparatus, while a negative output gap indicates an under-utilization of production capacity.

In fact, there are two main types of methods for the estimation of the potential output or the output gap: the first is based on the technique of smoothing or filtering, and the second is elaborated from a production function⁽⁵⁾.

In this paper, we used the technique of filtering based on the Hodrick-Prescott (HP) filter, to evaluate the trend of the GDP and the output gap, with the value of the smoothing parameter equal to $\lambda = 100$ ⁽⁶⁾ (Figure 1).

Figure 1. Evolution of the output gap in Tunisia



Source: Author's compilation.

2.2.2. Evaluation of the fiscal elasticities

To estimate the fiscal elasticities, we regressed each category of revenue and expenditure with respect to GDP⁽⁷⁾. We obtained an aggregate fiscal elasticity of both the revenue and expenditure.

The aggregate revenue elasticity is obtained by calculating the apparent fiscal elasticity of each category of tax sensitive to the business cycle, such as:

- the personal income tax (PIT),
- the corporate income tax (CIT),
- the indirect taxes (II) and
- the social security contributions (SSC).

Like Bouthevillain and Garcia (2000), we estimated the fiscal elasticity of each category of tax (ε_i) using the following regression:

$$\text{Log (tax)} = \varepsilon_i \text{Log(GDP)} + c \quad (2)$$

Given that the different categories of tax and the GDP are stationary, equation (2) describes the co-integration relationship between each of these two variables. ε_i represents an apparent elasticity of tax with respect to GDP.

Therefore, the aggregate revenue elasticity is defined by the following equation:

$$E_R = \frac{\sum \text{Personal income tax}}{\sum \text{TR}} \varepsilon_1 + \frac{\sum \text{Corporate income tax}}{\sum \text{TR}} \varepsilon_2 + \frac{\sum \text{Indirect taxes}}{\sum \text{TR}} \varepsilon_3 + \frac{\sum \text{Social Security Contributions}}{\sum \text{TR}} \varepsilon_4 \quad (3)$$

E_R and ε_i ($i = 1,2,3,4$) respectively denote the aggregate revenue elasticity and the apparent elasticity of each type of tax sensitive to the economic cycle with respect to GDP. TR is the total revenues.

On the expenditures side, the cyclical component of expenditure is obtained by calculating the apparent fiscal elasticity for the category of expenditure sensitive to the business cycle. This apparent elasticity is obtained by regressing the expenditure to GDP. Due to the absence of unemployment expenditures in Tunisia, all categories of expenditures are considered to be sensitive to the business cycle. Consequently, the expenditure elasticity is defined by the following regression:

$$\text{Log (expenditure)} = \delta \text{Log(GDP)} + c \quad (4)$$

Given that the expenditure and the GDP are stationary, equation (4) describes the relationship between these two variables. δ denotes the elasticity of expenditure with respect to GDP. All these fiscal elasticities calculated for the case of Tunisia are summarized in the Table 1.

Table 1. Fiscal elasticities

	E_{PIT}	E_{CIT}	E_{II}	E_{SSC}	E_R	E_E
1972-2014	1,77	0,50	0,7	1,66	1,04	0,66

To estimate the structural budget balance in Tunisia, we used the output gap obtained from an HP filter with a value of $\lambda = 100$ as well as the set of revenue and expenditure elasticities described in table 1.

Consequently, and according to Bouthevillain and Garcia (2000), the structural budget balance, which equals the difference between the cyclically adjusted revenues and the cyclically adjusted expenditures, is defined by the following equation (5):

$$SBB = \left(\frac{R}{Y}\right)_t E_R GAP_t - \left(\frac{D}{Y}\right)_t E_D GAP_t \quad (5)$$

Where:

SBB: the structural budget balance

$\left(\frac{D}{Y}\right)_t$: the average share of the expenditure on the current GDP

$\left(\frac{R}{Y}\right)_t$: the average share of the revenue on the current GDP

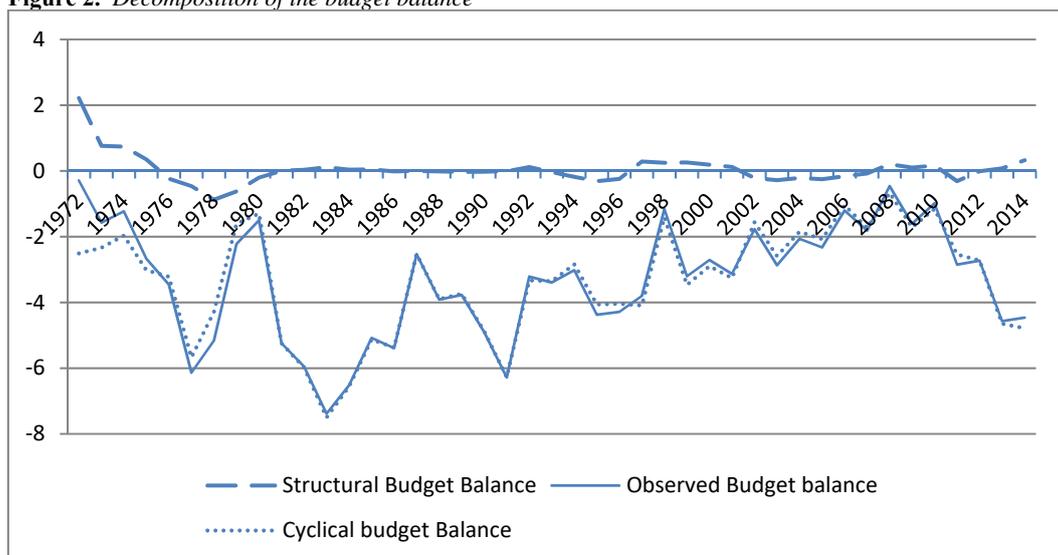
E_R : the aggregate revenue elasticity

E_D : the aggregate expenditure elasticity

$GAP_t = \frac{Y_t - Y_t^*}{Y_t}$ is the output gap.

2.3. Evolution of the structural budget balance

Figure 2 depicts the dynamics of the structural, the observed and the cyclical budget balance for the 1972-2014 period.

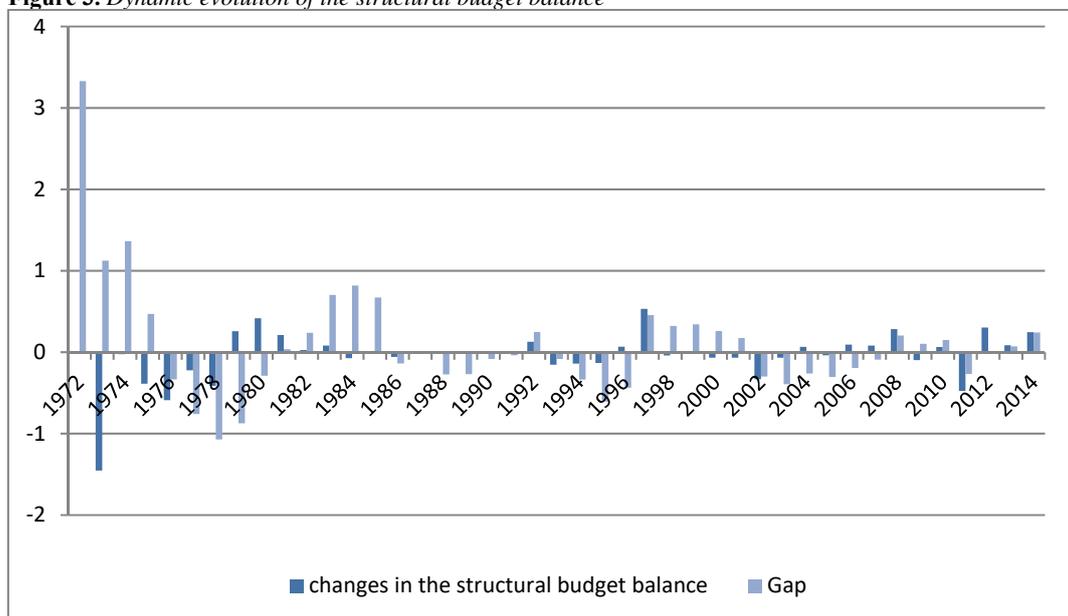
Figure 2. Decomposition of the budget balance

Source: Author's compilation.

According to the two-step approach, the deterioration in the budget balance is partially due to the discretionary measures of fiscal policy in Tunisia during the studied period. The structural component of the budget deficit is almost stable. Whereas, the contribution of the cyclical component is the most important. Consequently, this deterioration is mainly due to the fluctuations of the economic activity.

To evaluate the pro-cyclical or counter-cyclical fiscal policy stance in Tunisia, we compared the dynamic evolution of the structural budget balance and the output gap. The negative change in the structural budget balance indicates an expansive fiscal policy. On the other hand, fiscal policy is restrictive when the change of the structural balance is positive. Fiscal policy is said to be pro-cyclical (counter-cyclical) if the correlation between the structural budget balance and the output gap is negative (positive) (Mencinger and Aristovnik, 2013). In other words, a fiscal policy is pro-cyclical if it is expansive in the situation of a positive output gap and restrictive in the situation of a negative output gap. Therefore, pro-cyclical fiscal policy is a policy that amplifies the economic fluctuations. However, a fiscal policy is considered as counter-cyclical if it is restrictive in the situation of a positive output gap and expansive in a situation of a negative output gap. Consequently, a counter-cyclical fiscal policy is a policy that goes against the economic cycle and enables to stabilize the economy. For this reason, these phenomena are called automatic stabilizers.

Figure 3. *Dynamic evolution of the structural budget balance*



Source: Author's compilation.

The examination of figure 3 shows that the studied period is characterized by 21 restrictive impulses⁽⁸⁾, leading to the improvement of the structural budget balance, and 21 expansive impulses, leading to the deterioration of the structural budget balance.

Furthermore, it shows that fiscal policy in Tunisia is largely counter-cyclical, suggesting that the government has adopted an expansionary fiscal policy in recession periods⁽⁹⁾, and a contractionary fiscal policy in periods of booms⁽¹⁰⁾: there are 24 counter-cyclical impulses against 18 pro-cyclical impulses.

3. Conclusion

The evolution of public deficit reflects both fiscal policy decisions and the impact of fluctuations of the economic activity. In this regard, it is necessary to distinguish between the structural (or discretionary) and cyclical component of the budget balance. The first component is equal to the change of the structural budget balance. The second component includes the impact of the economic fluctuations of the budget balance. Consequently, to evaluate the fiscal policy stance, it is necessary to correct the impact of economic cycle on the budget balance.

In this paper, we estimated the structural budget balance for the Tunisian economy over the 1972-2014 period. This estimation requires the evaluation of the output gap and the fiscal elasticities. On the other hand, the output gap is a key element in the estimation of the structural budget balance, but it is unobservable and sensible to the method of estimation. It is estimated either through a production function, or the Hodrick-Prescott (HP) filter.

During the 1972-2014 period, the results of the empirical analysis confirm that the contribution of the cyclical component is more important than that of the structural one. Therefore, the deterioration of the budget balance is mainly due to the fluctuations of the economic activity. Moreover, by comparing the changes of the structural budget balance and the output gap, we found that the fiscal policy is largely counter-cyclical over the studied period.

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Notes

⁽¹⁾ Like Bouthevillain and Garcia (2000), Tlidi (2013) applied the two-step approach to estimate the structural budget balance in Morocco.

- (2) We use data from World Development Indicators, Government Finance Statistics Yearbook, National Institute of Statistics of Tunisia, Central Bank of Tunisia, Tunisian Institute of Competitiveness and Quantitative Studies and Ministry of Finance of Tunisia.
- (3) Augmented *Dickey–Fuller test*
- (4) Following Ongena and Roger (1997), the Hodrick-Prescott filter consists in assimilating the “normal” economic environment to a tendency evolution of the main macroeconomic variables.
- (5) According to Le Bihan et al. (1997), Ongena and Roger (1997), De Masi (1997) and Giorno and Suyker (1997), the OECD and the IMF used the production function, while the European Commission opted for the Hodrick-Prescott (HP) filter to estimate the potential production.
- (6) In our case, the GDP data are annual.
- (7) Current GDP.
- (8) The fiscal impulse measures the changes that occur in the structural budget balance.
- (9) Recession periods are characterized by a negative output gap.
- (10) Periods of booms are defined by a positive output gap.

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