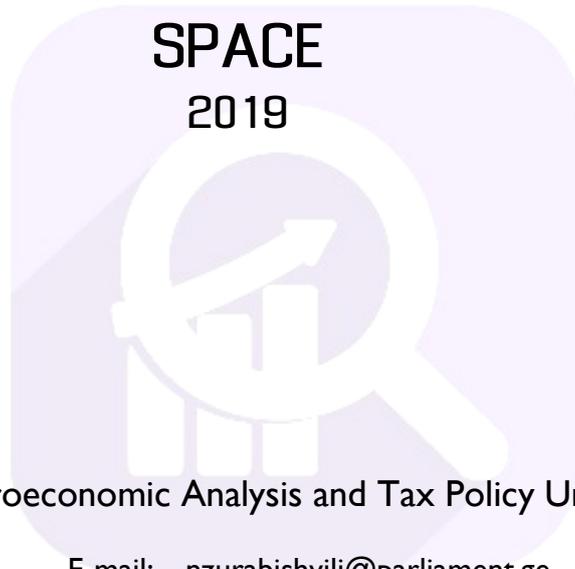




# FISCAL POLICY IN GEORGIA: DIRECTION, CYCLICALITY, MANEUVERING SPACE 2019



Macroeconomic Analysis and Tax Policy Unit

E-mail: [nzurabishvili@parliament.ge](mailto:nzurabishvili@parliament.ge)

**Note:** According to the PBO mandate, material in the research publication series cannot be interpreted as any type of recommendation with respect to the corresponding issue. The series aims to present international experience/independent research results on a selected issue solely in order to ensure informed decision-making by interested parties.

# SUMMARY

---

Figures And Tables .....	3
Executive Summary .....	4
1. Introduction.....	7
2. Potential Gdp And The Gdp Gap.....	8
3. Fiscal Stance, Impulse And Space .....	13
3.1 Fiscal Stance And Impulse .....	13
3.1.1. Analysis Based On The Overall Balance .....	13
3.1.2. Analysis Based On The Fiscal Balance .....	21
3.1.3. Conclusion .....	24
3.2 Fiscal Space .....	25
4. Long Run Relationship Between Revenues And Expenditures .....	27
Bibliography.....	30

# FIGURES AND TABLES

---

Figure 1: Actual and Potential Growth Rates of GDP (Univariate Estimates).....	9
Figure 2: GDP Gap (Univariate Estimates).....	9
Figure 3: Actual and Potential Growth Rates of GDP (Kalman Filter).....	11
Figure 4: The GDP Gap (Kalman Filter).....	11
Figure 5: Actual and Potential Growth Rates of GDP (Kalman Filter, Smoothed) .	12
Figure 6: The GDP Gap (Kalman Filter, Smoothed).....	12
Figure 7: Budget Balance and the GDP Gap. .	14
Figure 8: Primary Balance and Cyclically Adjusted Primary Balance .....	17
Figure 9: Fiscal Stance and the GDP Gap.....	18
Figure 10: Fiscal Impulse and Change in the GDP Gap. ....	20
Figure 11: Fiscal Balance and the GDP Gap. ....	21
Figure 12: Primary Balance and the Cyclically Adjusted Primary Balance. .	21
Figure 13: Fiscal Stance and the GDP Gap.....	22
Figure 14: Fiscal Impulse and Change in the GDP Gap. ....	24
Figure 15: Fiscal Space During Boom. ....	25
Figure 16: Cointegration Between Revenues and Expenditures. ....	28
Figure 17: Revenue and Expenditure Impulse Response Functions. .	29
Table 1: Fiscal Indicators.....	13
Table 2: Revenue Elasticities. ....	16
Table 3: Expenditure Elasticities.....	16

# EXECUTIVE SUMMARY

---

**The first issue while analyzing the fiscal environment** concerns assessing the fiscal policy direction – expansionary or contractionary. Expansionary fiscal policy entails expanding the budget deficit by cutting taxes or increasing expenditures, with a goal of stimulating the economy during slowdown. Contractionary fiscal policy works the opposite way.

**The second issue regarding fiscal policy evaluation is its link with the economic cycle.** Short run stability requires that, notwithstanding exceptional cases, fiscal policy should help smooth economic cycles, i.e. consolidate during a boom and expand during a recession. Analyzing fiscal policy cyclicity also allows for gauging the country's capability to pursue countercyclical fiscal policy without endangering long run fiscal sustainability.

**The goal of this research publication is to provide, based on internationally utilized indicators, a short and long run analysis of discretionary fiscal policy in Georgia, estimating the policy direction, cyclicity, maneuvering space and equilibrium conditions.**

Fiscal policy comprises two components: **automatic stabilizers and the discretionary part.** Automatic stabilizers act naturally in parallel with output fluctuations and help dampen the effect of economic cycles. For example, during a recession, revenues shrink by themselves, while social expenditures increase, resulting in a higher budget deficit (or a lower surplus). On the other hand, discretionary fiscal policy can be defined as actions undertaken by the government under its own discretion for particular purposes. In order to assess the latter, it is necessary to remove cyclical components from fiscal indicators, for which:

1. Firstly, we estimate **potential GDP and the GDP gap.** Potential GDP can be defined as the level of output that corresponds with utilizing resources with a normal intensity and, subsequently, stable inflation. The GDP gap shows the level by which actual GDP deviates from potential GDP, providing information about inflationary or deflationary pressures. At any moment in time actual GDP might be different from the potential one, as a result of economic cycles. According to our results, GDP was higher than its potential level in 2003-2008; also, slightly in 2011-2012. The gap has been negative since 2013, meaning that GDP remains lower than its potential level.
2. Afterwards, based on the GDP gap estimates, we determine the cyclically adjusted budget balances, which are required to evaluate discretionary fiscal policy. For this purpose, we use two indicators: **a. the overall balance**, which is calculated according to the IMF Government Finance Statistics Manual (GFSM 2011), and **b. the overall fiscal balance**, which is calculated as per the 1986 manual of the same system (GFSM 1986). After removing non-discretionary interest expenditures and filtering out the effect of economic cycles from overall balance and overall fiscal balance, we calculate the cyclically adjusted primary balances. As per our results, budget revenue elasticity with respect to the GDP gap is 1.1-1.2, meaning that a rise in the gap results in a higher than proportional rise in revenues. As for expenditures, the elasticity with respect to the output gap is statistically non-significantly different from 0, meaning that expenditure policy is discretionary.

In order to analyze the fiscal policy direction and cyclicity, we use the following indicators:

- Let's define **fiscal stance** as the cyclically adjusted primary balances with a negative sign. A positive fiscal stance means that the government pours more resources into the economy than it removes (fiscal expansion), while a negative fiscal stance means that the government removes more resources from the economy than it returns (fiscal consolidation).
- Let's define **fiscal impulse** as a change in the fiscal stance. If the output gap falls, countercyclical fiscal policy requires either smaller consolidation (in case of positive gap) or larger expansion (in case of negative gap), which means that the fiscal impulse ought to be positive. If the output gap rises, countercyclical fiscal policy requires either larger consolidation (in case of positive gap) or smaller expansion (in case of negative gap), which means that the fiscal impulse ought to be negative.

In order to comprehensively evaluate discretionary fiscal policy, it is necessary to combine the analysis of the fiscal stance and impulse according to these two criteria:

1. Fiscal policy is countercyclical if the fiscal stance is positive during recession (expansion) and negative during boom (consolidation);
2. Fiscal policy is countercyclical if the fiscal impulse is positive when the output gap falls (larger expansion or smaller consolidation) and negative when the gap rises (smaller expansion or larger consolidation).

**Analyzing the indicators based on the primary budget balance, we determine:**

- Evaluation of the fiscal stance that corresponds to the primary balance reveals that, in the reporting period, the fiscal stance was more contractionary than expansionary. Moreover, the fiscal stance can be deemed weakly countercyclical. Namely, the coefficient corresponding to the impact of the GDP gap on the fiscal stance falls between -0.3 and -0.5 (with different significance levels).
- The fiscal impulse corresponding to the primary balance was largely neutral in the reporting period – the number of years of consolidation and expansion were almost equal. Moreover, the fiscal impulse can be deemed weakly countercyclical. Namely, the coefficient corresponding to the impact of change in the GDP gap on the fiscal impulse falls between -0.3 and -0.5 (with different significance levels).

**According to the abovementioned strict criteria, discretionary fiscal policy, as per the cyclically adjusted primary balance, can be deemed weakly countercyclical.**

**On the other hand, analyzing the indicators based on the primary fiscal balance, we determine:**

- Evaluation of the fiscal stance that corresponds to the primary fiscal balance reveals that the fiscal stance was largely expansionary in the reporting period. Moreover, the fiscal stance can be deemed weakly procyclical or acyclical. Namely, the coefficient corresponding to the impact of the GDP gap on the fiscal stance falls between 0.1 and 0.3 (with different significance levels).
- The fiscal impulse corresponding to the primary fiscal balance was largely neutral in the reporting period – the number of years of consolidation and expansion were almost equal. Moreover, the fiscal impulse can be deemed acyclical (or very weakly procyclical). Namely, the coefficient corresponding to the impact of change in GDP gap on the fiscal impulse falls between 0.1 and 0.2 (statistically insignificant).

**According to the strict criteria as given above, discretionary fiscal policy, as per the cyclically adjusted primary fiscal balance, can be deemed acyclical or very weakly procyclical.**

**In total, analysis based on the overall balance points to weak countercyclicality, while analysis based on the overall fiscal balance points to acyclicity. Accordingly, if we take into account the privatization proceeds and financial asset operations, the weak policy countercyclicality disappears. We can conclude that, in the reporting period, discretionary fiscal policy was not particularly aimed towards smoothing the economic cycles.**

On the next step we estimate the **fiscal space**, which we define as the country's capability to conduct countercyclical fiscal policy without endangering long run fiscal sustainability. Our results show that, **during the 2003-2007 economic boom, fiscal space slightly increased, as a consequence of a smaller rise in procyclical expenditures compared to procyclical revenues. This, possibly, facilitated fiscal expansion during the recession in the following years, which was followed by a quick closure of the GDP gap.**

Finally, an important issue for fiscal policy **concerns the relationship between budget revenues and expenditures.** According to our results, an unexpected rise in revenues is followed by a higher than proportional rise in expenditures. Moreover, in the long run, change in revenues results in change in expenditures, but no causality is observed the other way round (the coefficient is statistically non-significantly different from 0), which is a noteworthy issue with respect to fiscal discipline and sustainability. It should also be noted that an expenditure shock has only a short run impact on revenues, while the impact of a revenue shock on expenditures is permanent. The permanent effect of a revenue shock on expenditures arises from the fact that it is expenditures that adjust to maintain the long run equilibrium. As for the independence of revenues from the expenditure shocks, this might be a result of the long run independence between public expenditures and output, which is an issue for separate research.

# 1. INTRODUCTION

---

Fiscal policy, as a macroeconomic stabilizer and public policy instrument, plays a major role in our everyday life. The goals and mechanisms of fiscal policy differ across time. The situation is made more difficult by the fact that short and long run goals often come into conflict with each other.

**In the short run**, change in fiscal policy affects output through the aggregate demand channel – fiscal expansion increases aggregate demand and creates additional incentives for economic agents to increase economic activity, while fiscal consolidation, on the contrary, decreases aggregate demand and pushes economic agents towards less activity. Short run stability requires that fiscal policy facilitates smoothing of economic cycles, undertaking consolidation while in boom and expansion whilst in recession. Utilizing the positive effect of the boom in this way allows for creating resources to soften or eliminate the recession. Countercyclical fiscal policy, on the one hand, makes it possible to shield the economy from overheating that might be followed by a sudden drop, and, on the other hand, provides a stimulus for the economy when private agents refrain from significant activity. Procyclical fiscal policy is largely characteristic for developing countries, while developed countries are associated with countercyclical fiscal policy (Szarowska, 2013)<sup>1</sup>.

**In the medium and long run**, goals of fiscal policy include ensuring public debt sustainability, stimulating private and public saving norms, increasing productivity, etc., which result in an increase of the long run level of output. It is clear that correct management of fiscal policy is necessary to minimize trade-offs between short and long run goals. For example, neglecting public debt sustainability might result in a requirement for fiscal consolidation in the midst of a recession, which further worsens the economic cycle and is generally very painful<sup>2</sup>, as seen in various countries during the last few years. The latest good example of possible conflict among goals is the Eurozone, where, according to the European Central Bank analysis, considering the existing macroeconomic environment, the stabilization goal requires an expansive fiscal stance, but this entails a deviation from the sustainability goal (Bańkowski & Ferdinandusse, 2017).

Fiscal policy comprises two components: **automatic stabilizers and the discretionary part**. Automatic stabilizers act naturally in parallel with output fluctuations and help dampen the effect of economic cycles. For example, during a recession revenues shrink by themselves, while social expenditures increase, resulting in a higher budget deficit (or a lower surplus). Removing this cyclical component from fiscal policy allows for evaluating discretionary fiscal policy, which can be defined as actions undertaken by the government under its own discretion for particular purposes<sup>3</sup>.

Analyzing discretionary policy has become of broad interest during the past few years in developed European countries (Polito & Wickens, 2006), as a result of the European fiscal framework commitments. For example, Ireland's independent fiscal council is obliged by law to evaluate the country's fiscal policy position, including with respect to the EU Stability & Growth Pact (Irish Fiscal Advisory Council, 2015). The goal of this research publication is a short and long run analysis of discretionary fiscal policy, estimating the policy direction, cyclicity, maneuvering space and equilibrium conditions. The following chapters review potential GDP, the GDP gap, fiscal stance, impulse and space, and long run relationship between the budget revenues and expenditures.

---

<sup>1</sup> Despite being correct on a theoretical level, it should be taken into account that there is no universal recipe to choose one correct direction of fiscal policy. Since every economy has individual characteristics, it is necessary to undertake analysis that fits each specific country.

<sup>2</sup> It should be noted that fiscal consolidation might not necessarily result in a fall in output, since reducing the country risk premium might compensate the effect of removing stimulus from the economy. This issue concerns debates about the Keynesian view.

<sup>3</sup> For detailed information about fiscal policy theoretical aspects see the PBO research publication "Main Aspects of Fiscal Policy Impact".

## 2. POTENTIAL GDP AND THE GDP GAP

---

The publication is based on the Parliamentary Budget Office macroeconomic model data, covering the time period 1996Q1-2017Q4. The data is collected from the databases of respective institutions<sup>4</sup>.

**Firstly, it is necessary to determine the level of potential GDP. Potential GDP can be defined as the level of output that corresponds with utilizing resources with a normal intensity, and, subsequently, stable inflation. The GDP gap shows the level by which actual GDP deviates from potential GDP, providing information about inflationary or deflationary pressures. At any moment in time actual GDP might be different from the potential one, which is caused by economic cycles.**

**Potential GDP and, consequently, the GDP gap are unobserved variables, so we need to estimate them. A high degree of accuracy in estimating potential GDP is crucial since the research results are highly sensitive towards the cyclical structure of the economy. Below four different methods of estimation are presented: the linear trend, the Hodrick-Prescott (HP) filter, the Band-Pass (BP) filter, and the Kalman filter.**

The simplest way to estimate potential GDP is by using the linear trend, which implies that the growth rate of potential GDP within the given time frame is permanent. Subsequently, such an estimation is based on the assumption that potential GDP is growing with a permanently larger number in absolute terms<sup>5</sup>. In 2000-2017<sup>6</sup>, the annual growth rate of potential GDP in Georgia was 5.65%.

It is clear that the assumption that potential GDP growth is permanent is unrealistic and not suitable for comprehensive analysis, so we have to take account the growth rate variability for more precise estimates. This is made possible by the HP filter, which decomposes GDP into trend and cyclical components. We can thus treat the GDP trend as potential GDP and the cyclical component as the GDP gap. The growth rate of potential GDP estimated by the HP filter fluctuated within 3.9-8.4% in the reporting period (5.5% on average).

Along with advantages, the HP filter has its disadvantages as well. For example, the filter mechanism is designed to suit the USA economic cycles, which differ across countries; moreover, for countries like Georgia, the data usually contains one or more structural breaks, which the HP filter treats as a permanent shock, etc. The BP filter directly estimates the cyclical component, fixing its duration, and provides a relatively smooth estimate. Despite the fact that the average growth rate of potential GDP estimated by the BP filter was also 5.6% on average during 2000-2017, its variability was much larger (Figure 1).

It is clear from Figure 1 that the analyzing period is too long for the assumption about permanent potential GDP growth rate to be correct. The potential growth rates estimated both by the HP and BP filters<sup>7</sup> were higher than that estimated by the linear method in 2002-2008, which corresponds to the probable economic boom. It should be noted that, in parallel with higher activity in 2017, actual

---

<sup>4</sup> For detailed information see the PBO macroeconomic forecasts publication.

<sup>5</sup> It should be noted that, for estimating potential GDP with a linear trend, we use seasonally adjusted quarterly real GDP data in log form. This ensures that the estimated potential growth rate of GDP is permanent. In case of using absolute values, there would be permanent absolute growth, instead of the growth rate.

<sup>6</sup> Considering, on the one hand, structural breaks in the data and, on the other hand, advantages of a longer analyzing period, we settled on the 2000-2017 time frame.

<sup>7</sup> We use seasonally adjusted quarterly real GDP data in log form for the HP filter ( $\lambda=1,600$ ). The BP filter is also based on the same data (Christiano-Fitzgerald method).

GDP growth exceeded the potential growth rates estimated by the HP and BP filters and was slightly lower than the linear growth rate.

After estimating potential GDP, we can calculate the GDP gap (Figure 2). It is interesting to note that both the recession and boom estimated by the linear method are stronger and longer. The gap estimated by the linear method is positive from the end of 2004 till the beginning of 2009, while the HP and BP filters show that the boom took place between mid-2005 and mid-2008. Moreover, the linear trend method fails to account for the 2008-2009 recession, and its corresponding gap has a downward trend since 2014. Contrary to this, according to the HP filter, real GDP growth has been close to its potential level during the last few years (average gap is almost 0 in 2014-2017), while the BP filter shows that, in line with post-2015 recovery, GDP is higher than potential. As mentioned above, the BP filter gap is relatively smooth and has a lower variance.

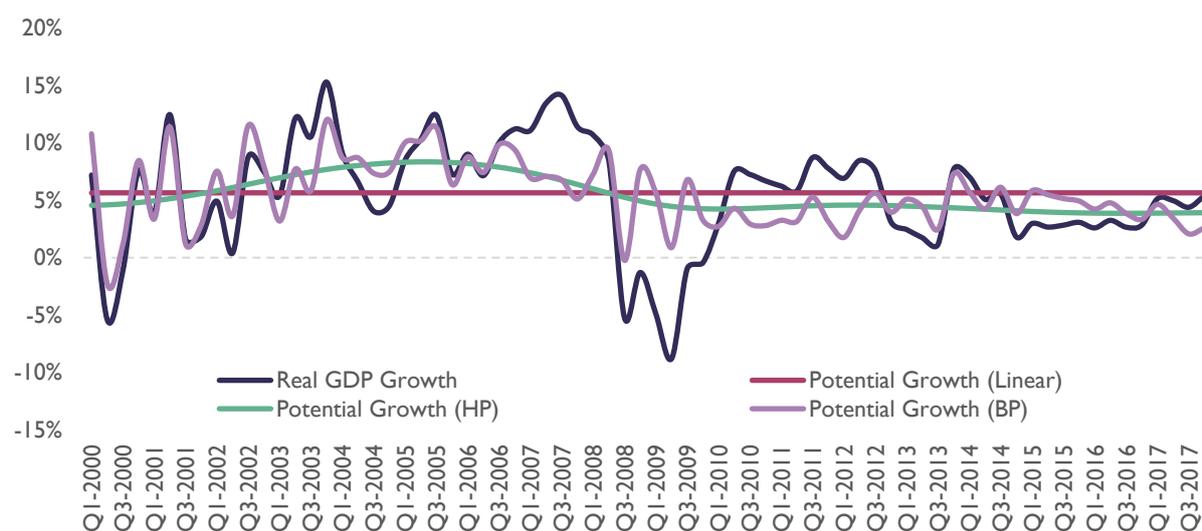


Figure 1: Actual and Potential Growth Rates of GDP (Univariate Estimates). Source: PBO Calculations.

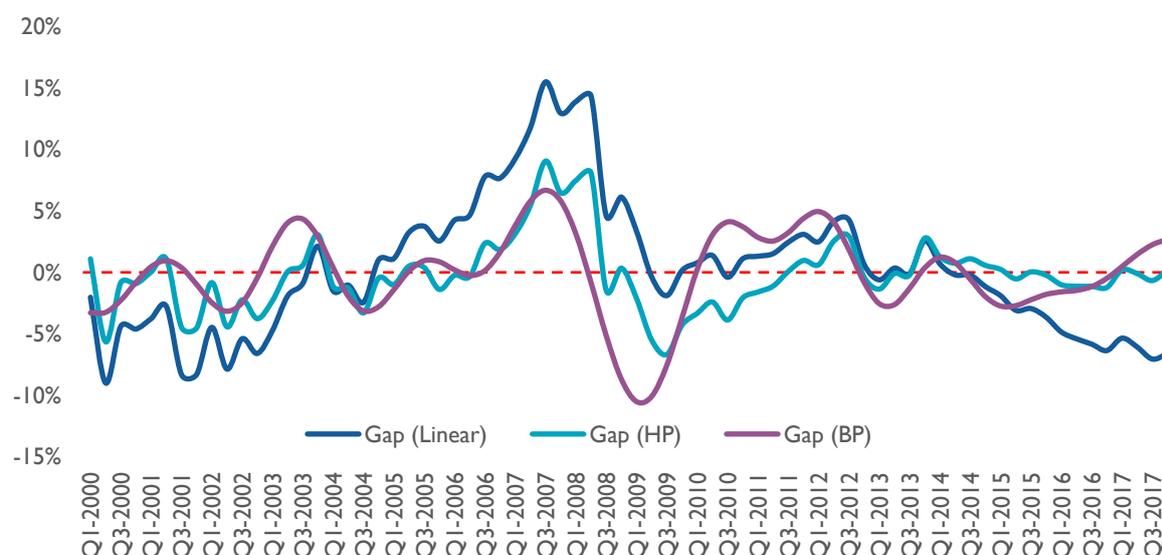


Figure 2: GDP Gap (Univariate Estimates). Source: PBO Calculations.

Even though the HP and BP filters provide more accurate estimates compared to the linear method, they are not free from caveats either. The most important thing is that univariate filters are not backed up by economic theory: they are only statistical methods designed to single out a cyclical component

from a time series. Economic relationships among variables can be taken into consideration by using multivariate filters, e.g. the Kalman filter, which maximizes the likelihood function while estimating unobserved variables.

In this publication we use a two variable specification, which links output and the Phillips curve:

$$y_t = y_t^n + y_t^c \quad (1),$$

$$\pi_t = \delta\pi_t^e + \beta y_t^c + \varepsilon_t^\pi \quad (2),$$

$$y_t^c = \gamma y_{t-1}^c + \varepsilon_t^c \quad (3),$$

$$y_t^n = \alpha + y_{t-1}^n + \varepsilon_t^n \quad (4),$$

Where:

- Equation (1) breaks output down into its trend (potential GDP) and cyclical (GDP gap) components;
- Equation (2) characterizes inflation as a function of expected inflation and the GDP gap (Phillips curve);
- Equation (3) presents the cyclical component of GDP as an autoregressive process of order one (AR(1));
- Equation (4) depicts the trend component of GDP as a random walk with drift.

If we assume that expected inflation is equal to last year's inflation (backwards looking Phillips curve), equation (2) can be rewritten in the following way:

$$\pi_t^e = \pi_{t-1} \quad (5),$$

$$\Delta\pi_t = \beta y_t^c + \varepsilon_t^\pi \quad (6),$$

Which implies the assumption that change in expected inflation has a one-for-one effect on actual inflation ( $\delta = 1$ ).

Potential output and gap are estimated according to three different specifications:

1. The coefficient initial values are chosen as per individual regressions and the model is given freedom to choose final values corresponding to convergence;
2. The model is calibrated according to individual regressions and expert judgement, which means that coefficients are determined in advance and do not change;
3. We use equation (2) instead of equation (6), which means that change in inflation expectations results in change in actual inflation with a proportion of smaller than one ( $\delta < 1$ ).

Figure 3 shows growth rates of potential GDP estimated according to these three specifications.

**As evident from Figure 3, potential GDP growth rates estimated by the Kalman filter are closer to the actual real GDP growth rate. The potential GDP growth rates corresponding to the 1<sup>st</sup> and 2<sup>nd</sup> specifications were 5.5% on average in the analyzing period, while the average potential growth rate reached 5.7% for the 3<sup>rd</sup> one. Despite minor differences, estimates corresponding to the three specifications do not show large divergence. The same can be said about the GDP gap (Figure 4). Namely, Figure 4 shows that the GDP gap corresponding to the modified assumption about the Phillips curve slightly, but always exceeds those corresponding to the other two specifications, which are very close to each other. For our research purposes, we will use the potential GDP**

and the GDP gap corresponding to the 1<sup>st</sup> specification and estimated by the model-chosen coefficients. According to our selected estimate, GDP was higher than its potential level in 2003-2008; also, slightly in 2011-2012. The gap has been negative since 2013, meaning that GDP remains lower than its potential level.

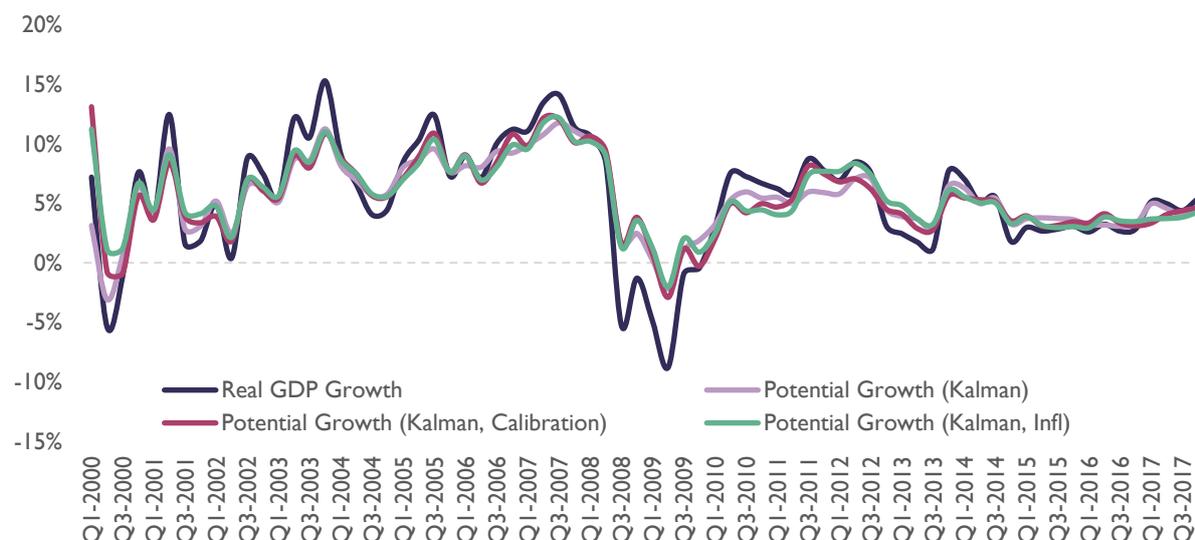


Figure 3: Actual and Potential Growth Rates of GDP (Kalman Filter). Source: PBO Calculations.

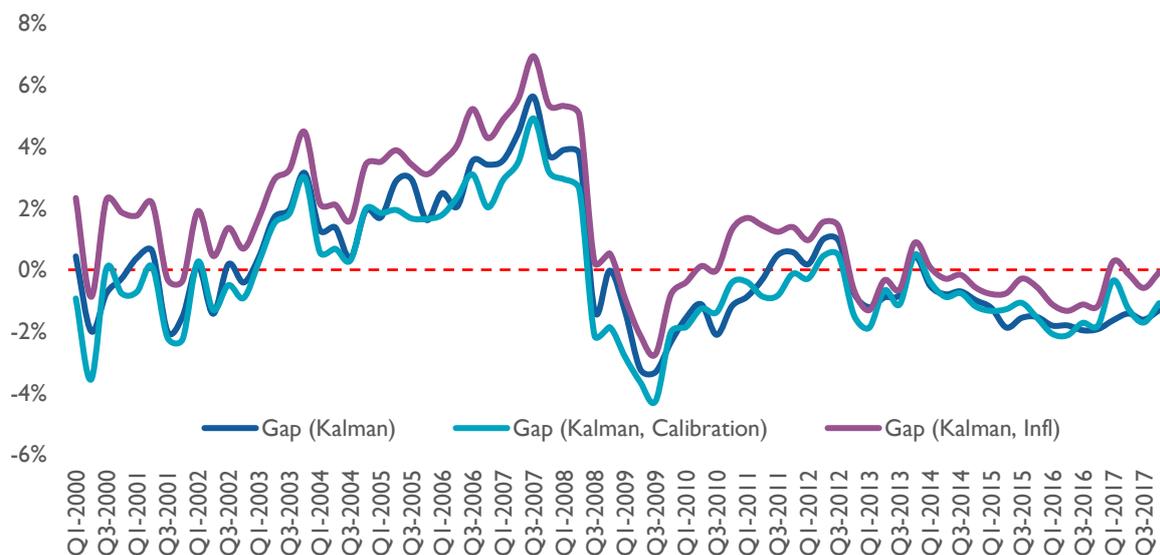


Figure 4: The GDP Gap (Kalman Filter). Source: PBO Calculations.

Before moving on to the next stage, it should be noted that it is possible to smooth the Kalman filter estimates. The smoothed growth rate of potential GDP is relatively less elastic and looks similar to the growth rate provided by the HP filter (Figure 5). As for the GDP gap, it is also close to the HP filter estimate (Figure 6). The gap corresponding to the modified assumption about the Phillips curve remains permanently higher, while the difference between the estimates corresponding to the other two specifications is small. It's interesting to note that, according to smoothed estimates, the 1<sup>st</sup> boom begins from 2005 instead of 2003, while the 2<sup>nd</sup> boom, on the contrary, goes on for longer: including 2014, instead of 2012. Apart from this, the smoothed gap is relatively lower in the beginning of the reporting period, and relatively higher in the second part.

It is clear that, when concerned with unobserved variables, it is impossible to speak about one correct specification, so statistical estimates must always be accompanied with judgement. The selected estimate of potential GDP and the GDP gap corresponds with the Georgian (and global) economy's expected trends, and combines both initial assumptions (initial coefficients) and statistical properties of data (final coefficients).

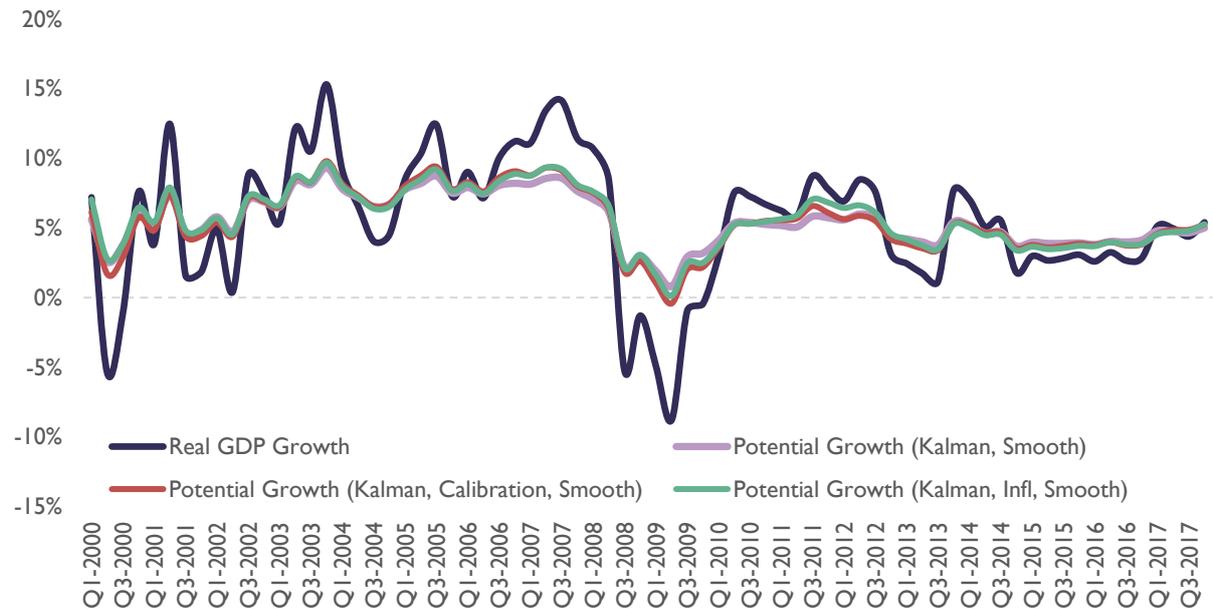


Figure 5: Actual and Potential Growth Rates of GDP (Kalman Filter, Smoothed). Source: PBO Calculations.

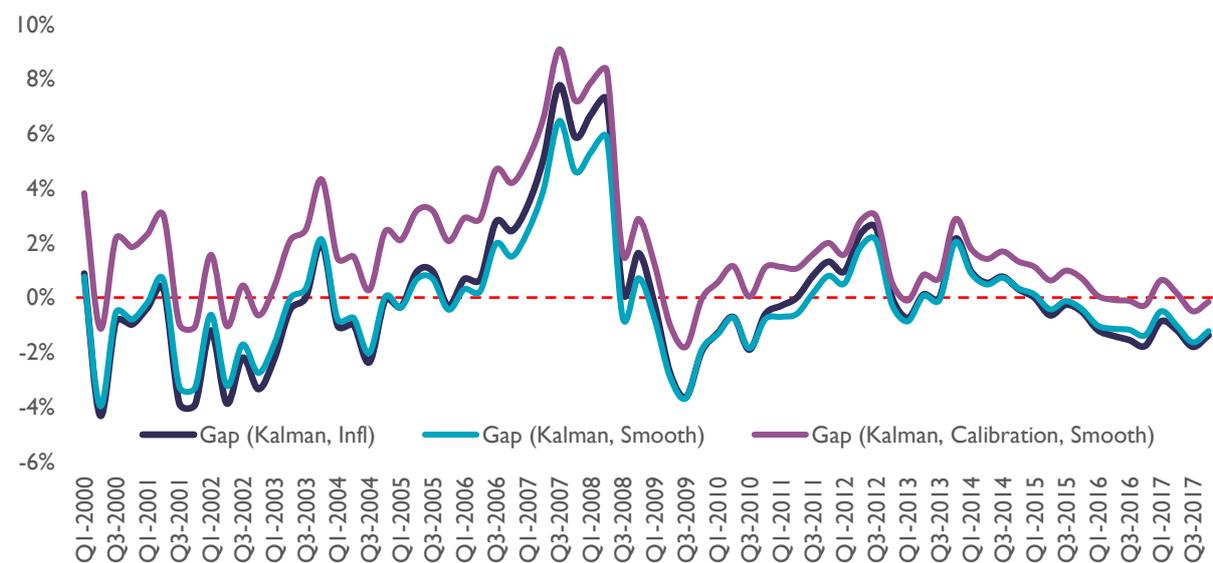


Figure 6: The GDP Gap (Kalman Filter, Smoothed). Source: PBO Calculations.

## 3. FISCAL STANCE, IMPULSE AND SPACE

### 3.1 FISCAL STANCE AND IMPULSE

After estimating potential GDP and the GDP gap, we can calculate the cyclically adjusted primary balance, which is the main point of analysis of this publication. It should be noted that different types of indicators are used for different analytical purposes, and comparing them is crucial to get a coherent picture.

The overall balance is calculated according to the IMF Government Finance Statistics Manual (GFSM 2011). Moreover, overall fiscal balance is also utilized, calculated as per the 1986 manual of the same system (GFSM 1986). The definition of fiscal indicators used in this publication is given in Table 1<sup>8</sup>.

INDICATORS	DEFINITION
OPERATING BALANCE	REVENUES – EXPENDITURES
OVERALL BALANCE	OPERATING BALANCE – NET ACQUISITION OF NON-FINANCIAL ASSETS
PRIMARY BALANCE	OVERALL BALANCE – INTEREST EXPENSES
CYCLICALLY ADJUSTED PRIMARY BALANCE	PRIMARY BALANCE, ADJUSTED FOR THE IMPACT OF ECONOMIC CYCLES
OVERALL FISCAL BALANCE	OVERALL BALANCE, ADJUSTED BY REARRANGEMENT OF OPERATIONS: PRIVATIZATION PROCEEDS ARE MOVED TO REVENUES AND NET LENDING SUBSIDIES ARE MOVED TO EXPENDITURES
PRIMARY FISCAL BALANCE	OVERALL FISCAL BALANCE – INTEREST EXPENSES
CYCLICALLY ADJUSTED PRIMARY FISCAL BALANCE	PRIMARY FISCAL BALANCE, ADJUSTED FOR THE IMPACT OF ECONOMIC CYCLES

Table 1: Fiscal Indicators. Source: IMF.

#### 3.1.1. ANALYSIS BASED ON THE OVERALL BALANCE

In 2000-2017 the budget deficit (negative overall balance) made up 0.8% of GDP on average. The highest deficit was in 2009 (-6.7%), and the biggest surplus in 2004 (3.7%).

As for the primary balance, in the reporting period it was positive on average and equaled 0.4% of GDP. The highest surplus (5.1%) was 1.4 percentage point higher than that of the overall balance, while the largest deficit (-5.8%) was 1 percentage point lower. It is primary balance that is relevant to evaluate fiscal policy, since interest expenses constitute a non-discretionary part of fiscal policy and largely represent past debt trends.

<sup>8</sup> For detailed information see the PBO methodological note about calculating the budget deficit.

Initial analysis of fiscal indicators shows that in 2000-2007 fiscal policy was contractionary, as evident from the positive primary balance (Figure 7). It should be noted that in 2000-2003, as a result of large interest expenses, the overall balance was negative, which gives an incorrect indication of the fiscal policy direction. In 2008-2010, in parallel with the global economic crisis and the August 2008 war, fiscal policy was expansionary, followed by consolidation in 2011-2012. In 2013-2016 the primary balance was again negative, while in 2017, for the first time since 2012, it turned positive. As in 2000-2003, the overall balance remained negative in 2011, 2012 and 2017, despite the primary balance being positive.

As evident from Figure 7, in the beginning of the reporting period, in 2000-2002, the GDP gap was negative, meaning that GDP was lower than potential. It follows that countercyclical policy throughout period would have been fiscal expansion, i.e. a negative primary balance. However, the balance remained positive during all three years.

GDP was higher than its potential level during 2003-2008, so the primary balance should have been positive (fiscal consolidation) for countercyclicity. During 2003-2007 the balance was indeed positive, but in 2008, in parallel with worsening economic conditions, consolidation was replaced with expansion.

Expansion was maintained in 2009-2010, when the gap was negative, conforming to the countercyclicity criterion, as well as the 2011-2012 consolidation during the positive gap. In 2013-2017 GDP again fell below potential, which was accompanied with the negative primary balance necessary for countercyclicity, except 2017, when the balance turned slightly positive.

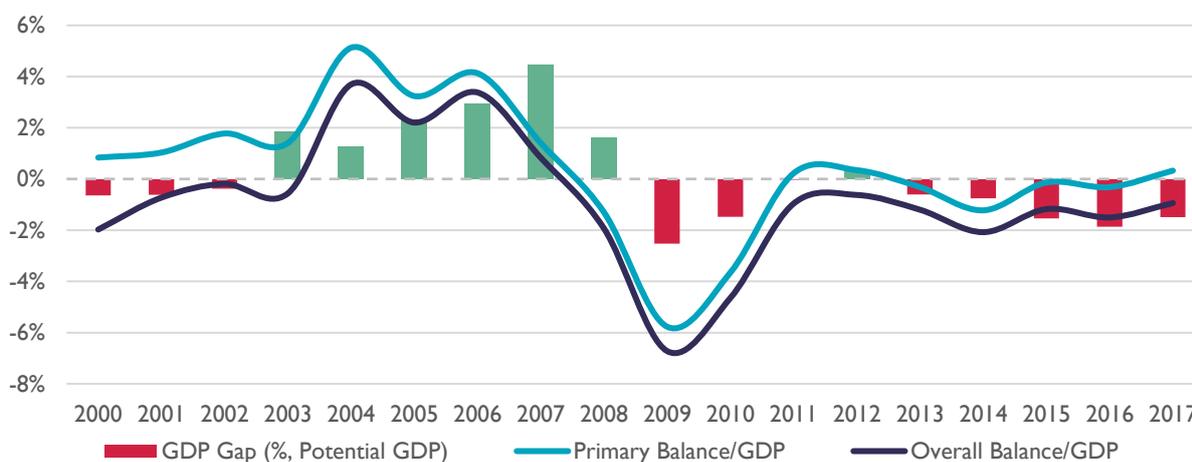


Figure 7: Budget Balance and the GDP Gap. Source: PBO Calculations.

Removing interest expenses from the overall balance and analyzing the primary balance is a necessary condition to evaluate fiscal policy, but it is not sufficient. As per economic cycles, automatic stabilizers ensure that the budget balance is too high during booms and too low when in recessions. **Therefore, a more comprehensive analysis of fiscal policy requires removing the impact of economic cycles from the balance as well.**

The cyclically adjusted balance equals (IMF, Fiscal Affairs Department, 2009):

$$CAB = R^{CA} - G^{CA} \quad (7),$$

Where  $R^{CA}$  stands for cyclically adjusted revenues,  $G^{CA}$  stands for cyclically adjusted expenditures, and they are calculated in the following way:

$$R^{CA} = R \left( \frac{Y^*}{Y} \right)^{\varepsilon_{R,Y}} \quad (8),$$

$$G^{CA} = G \left( \frac{Y^*}{Y} \right)^{\varepsilon_{G,Y}} \quad (9).$$

R and G, respectively, stand for actual revenues and expenditures,  $Y^*$  for potential output, Y for actual output, and  $\varepsilon$  for elasticity.

If the revenues elasticity is positive, this means that revenues are procyclical. Hence, when potential GDP is higher (lower) than the actual one, actual revenues are lower (higher) than cyclically adjusted revenues. In practice it is often assumed that revenue elasticity equals one ( $\varepsilon_{R,Y} = 1$ ), which means that a change in the output gap has a one-for-one impact on revenues.

If the expenditure elasticity is negative, this means that expenditures are countercyclical. Hence, when potential GDP is higher (lower) than the actual one, actual expenditures are higher (lower) than cyclically adjusted expenditures. In practice it is often assumed that expenditure elasticity equals 0 ( $\varepsilon_{G,Y} = 0$ ), which means that the expenditure policy is completely discretionary ( $G^{CA} = G$ ).

$\varepsilon_{R,Y} = 1$  and  $\varepsilon_{G,Y} = 0$  assumptions about aggregate revenues and expenditures are representative for developing countries. However, since every economy has individual characteristics, it is appropriate to estimate the elasticity coefficients as part of our research.

If we take into account that Georgia is a developing market economy and the 2003-2008 boom coincided with fundamental structural reforms and economic acceleration, we can expect revenue elasticity to be higher than 1. As for expenditures, in the reporting period large financial resources became much more readily available to the country, which might indicate a positive elasticity. On the other hand, both the positive balance during boom and the negative balance during recession were mainly driven by changes in expenditures, which might suggest that the elasticity is negative. Furthermore, expenditures attached to economic cycles, e.g. unemployment benefits, remain negligible to this day. Therefore, we can expect the expenditure elasticity to be statistically non-significantly different from 0.

The following simple linear regressions resulting from log transformation of equations (8) and (9) are often used to estimate elasticities:

$$\ln(R) = \alpha + \varepsilon_{R,Y} * \ln\left(\frac{Y^*}{Y}\right) + U_R \quad (10),$$

$$\ln(G) = \alpha + \varepsilon_{G,Y} * \ln\left(\frac{Y^*}{Y}\right) + U_G \quad (11).$$

However, this method is prone to spurious regression problems, since budget revenues and expenditures are I(1) processes, i.e. non-stationary, while the GDP gap (and the inverse of the gap) are I(0), i.e. stationary, which means there can be no direct linear relationship between these variables. Indeed, according to economic intuition, a rise in the output gap results in not simply a rise in revenues, which by itself is characterized with a time trend, but a rise of revenues beyond the margin which corresponds with a zero gap, i.e. an acceleration of the revenue growth rate.

Thus, it is necessary to transform the data both in order to ensure statistically sound results and to follow economic intuition. We use the following normalized specification to estimate the elasticity coefficients:

$$\ln\left(\frac{R}{Y^*}\right) = \alpha + \varepsilon_{R,Y} * \ln\left(\frac{Y}{Y^*}\right) + U_R \quad (12),$$

$$\ln\left(\frac{G}{Y^*}\right) = \alpha + \varepsilon_{G,Y} * \ln\left(\frac{Y}{Y^*}\right) + U_G \quad (13).$$

Consequently, the elasticity coefficients reflect by what percentage the revenue and expenditure shares in potential GDP change as a result of a change in the output gap. We use both annual and quarterly data in order to estimate the coefficients, so as to prevent potential statistical problems caused by the short annual sample (only 18 observations).

Aside from few observations, as mentioned above, the data contains several structural breaks, which fundamentally changes the relationship between the variables. In order to prevent inaccurate results as a result of not taking these structural breaks into account, we use the breakpoint least squares (BLS) method, which accounts for potential breaks. It should be noted that, as per our specification, these breaks are reflected in the regression constant, which ensures that, on the one hand, the changing mean is accounted for and, on the other hand, there is minimal interference in the statistical properties of data. In parallel, we estimate the model using ordinary least squares (OLS) and use dummy variables to take structural breaks into consideration.

The revenue elasticities are displayed in Table 2. Both the annual and quarterly models point to structural breaks in 2004 and 2006 (Q1 2004 and Q4 2006). This is linked with jumps in the revenues to potential GDP ratio, which by itself is caused by high growth rates of revenues. The elasticity coefficients, as expected, are slightly larger than 1 and fluctuate between 1.1-1.2.

	Annual		Quarterly	
	BLS	OLS	BLS	OLS
$\varepsilon_{R,Y}$	1.2**	1.1*	1.2**	1.1***

Table 2: Revenue Elasticities. \*, \*\* and \*\*\* represent significance levels at 10%, 5% and 1%, respectively. Source: PBO Calculations.

The expenditure elasticities are displayed in Table 3. The annual model points to structural breaks in 2005 and 2007, while the quarterly model selects Q3 2005, Q1 2008 and Q3 2010 as break dates. As in case of revenues, this is linked with jumps in expenditures to potential GDP ratio, which by itself is caused by high growth rates of expenditures. It should be noted that elasticities estimated by the BLS method are positive, while the OLS method provides negative coefficients. All 4 coefficients are small and statistically insignificantly different from 0, which also conforms to expectations and means that expenditure policy is completely discretionary.

	Annual		Quarterly	
	BLS	OLS	BLS	OLS
$\varepsilon_{G,Y}$	0.03	-0.23	0.5	-0.3

Table 3: Expenditure Elasticities. \*, \*\* and \*\*\* represent significance levels at 10%, 5% and 1%, respectively. Source: PBO Calculations.

After estimating the elasticities, we can use equations (8) and (9) to calculate cyclically adjusted revenues and expenditures ( $\varepsilon_{R,Y} = 1.2, \varepsilon_{G,Y} = 0$ ), and then use equation (7) to compute the cyclically adjusted primary balance.

Figure 8 displays the primary balance (% of GDP) and the cyclically adjusted primary balance (% of potential GDP) in the analyzing period. The cyclically adjusted primary balance is higher than the primary balance in 2000-2002, which points to a negative GDP gap in this period. During 2003-2008

and in 2012, in parallel with the positive gap, the primary balance exceeded the cyclically adjusted primary balance, was almost equal to it in 2011, and was lower in the remaining years, as a result of the negative gap.

**Interestingly, the cyclical adjustment of the primary balance reveals new characteristics. Namely, the balance turns negative a year earlier, in 2007, when the GDP gap was highest. The marginally positive balance in 2012 became even smaller after cyclical adjustment, but not enough to turn negative. However, the cyclically adjusted balance turned slightly positive in 2015-2016, when GDP was lower than its potential level.**

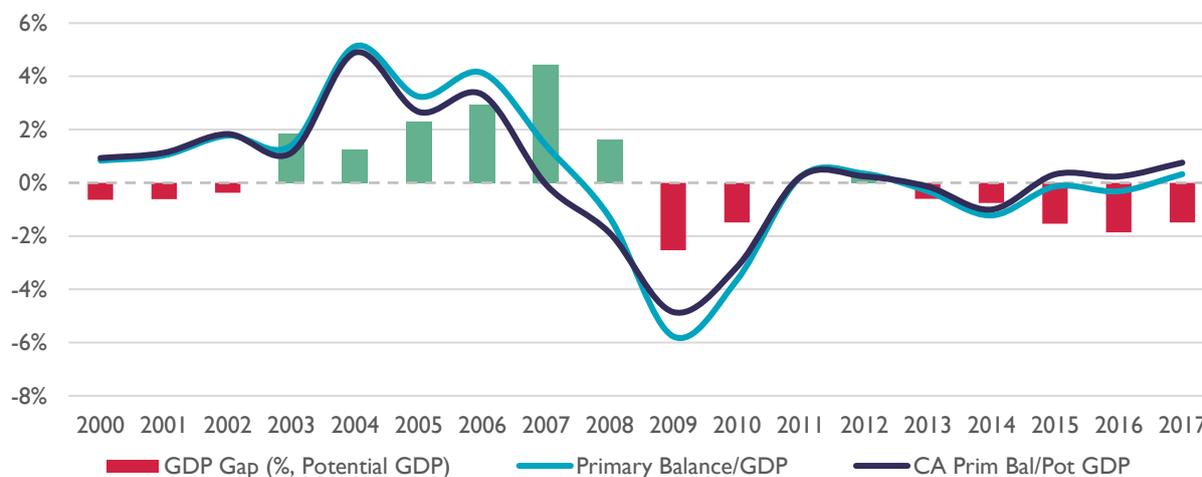


Figure 8: Primary Balance and Cyclically Adjusted Primary Balance. Source: PBO Calculations.

## FISCAL POSITION

Let's define fiscal stance as the cyclically adjusted primary balance with a negative sign:

$$FS = - CAB \quad (14).$$

A positive fiscal stance means that the government provides more stimulus to the economy than it removes (fiscal expansion), while a negative fiscal stance means that the government withdraws more resources from the economy than it returns (fiscal consolidation). Hence, countercyclicality requires that the fiscal stance and the output gap move in opposite directions: expansion ( $FS > 0$ ) during recession ( $Y < Y^*$ ) and consolidation ( $FS < 0$ ) during boom ( $Y > Y^*$ ).

As evident from Figure 9, the fiscal stance was more contractionary than expansionary, despite the fact that in the beginning and end of the reporting period there was a clear need for an expansion. The relationship between the fiscal stance and the output gap was volatile. The fiscal stance was distinctly countercyclical during 2003-2006 (consolidation during boom) and 2009-2010 (expansion during recession). However, the fiscal stance was procyclical in the beginning of the period (consolidation during 2000-2002 recession) and 2007-2008 (expansion during boom). The fiscal stance was again countercyclical during 2011-2014 and procyclical during 2015-2017.

**Thus, out of the 18 years of the reporting period, the fiscal stance was countercyclical during 10 years and procyclical during eight. Econometric analysis of the fiscal stance and the output gap reveals that discretionary fiscal policy, as expressed by the cyclically adjusted primary balance, can be deemed weakly countercyclical. Namely, the coefficient**

corresponding to the impact of the GDP gap on the fiscal stance falls between -0.3 and -0.5 (with different significance levels).

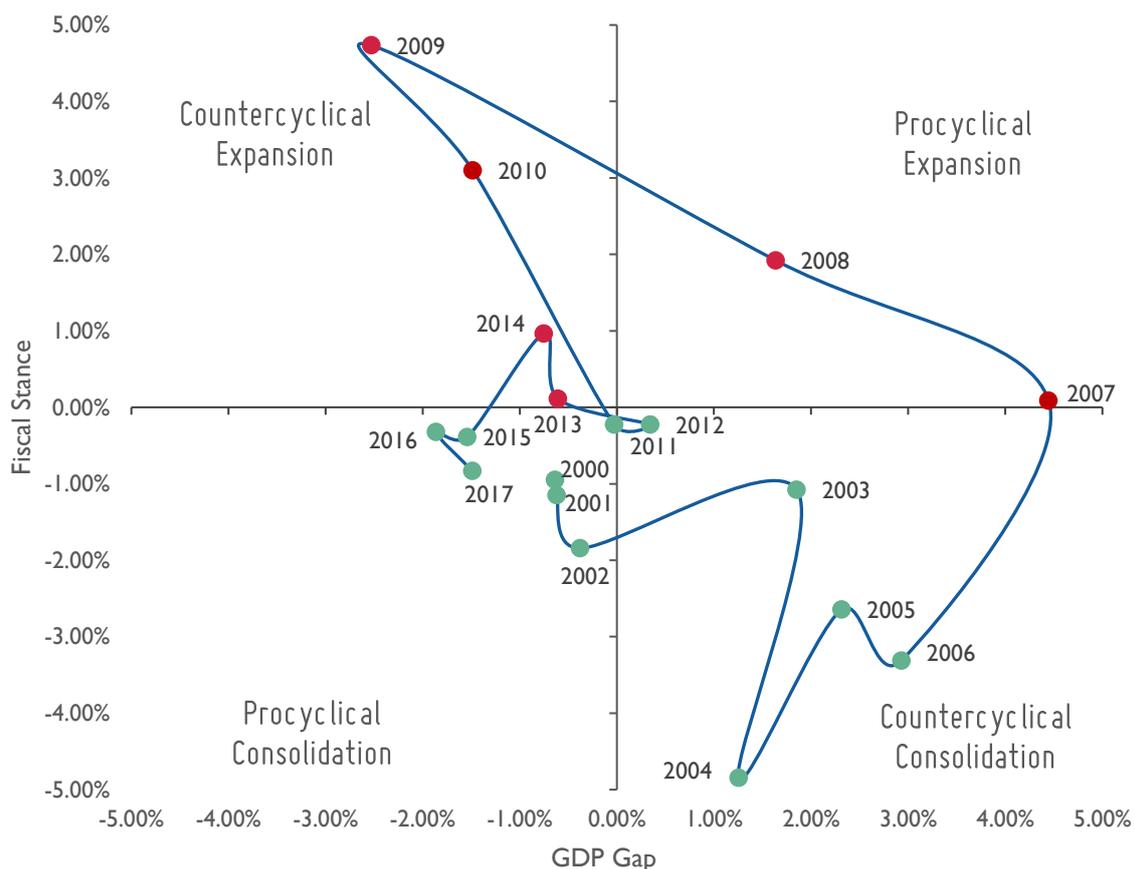


Figure 9: Fiscal Stance and the GDP Gap. Source: PBO Calculations.

## FISCAL IMPULSE

Countercyclical fiscal policy requires that the fiscal stance is positive when the output gap is negative and, on the contrary, that the fiscal stance is negative during periods when the gap is positive. But is solely the sign of the gap sufficient to comprehensively assess fiscal policy cyclicality?

Figure 9 shows that in 2004 the GDP gap was positive and the fiscal stance was negative. Therefore, fiscal policy was countercyclical. However, in 2004 the positive GDP gap shrank; the fiscal stance also shrank (the negative fiscal stance increased). Thus, economic deceleration was accompanied by fiscal consolidation, which points not towards countercyclicality, but procyclicality. This means that an additional criterion is necessary to assess fiscal policy cyclicality. Namely, in 2004 countercyclical fiscal policy required that the fiscal stance was a) still negative, and b) higher compared to 2003 (decreasing the negative fiscal stance).

Let's define fiscal impulse as the change in fiscal stance:

$$FI = FS_t - FS_{t-1} = \Delta FS \quad (15).$$

If the output gap falls, countercyclical fiscal policy requires either smaller consolidation (in case of positive gap) or larger expansion (in case of negative gap), which means that

**the fiscal impulse ought to be positive. If the output gap rises, countercyclical fiscal policy requires either larger consolidation (in case of positive gap) or smaller expansion (in case of negative gap), which means that the fiscal impulse ought to be negative. Therefore, a more comprehensive analysis of fiscal policy requires to study the relationship between the change in output gap and the change in fiscal stance, i.e. the fiscal impulse. Fiscal policy is countercyclical if there is a negative relationship between the fiscal impulse and the output gap.**

Analysis of the fiscal impulse (Figure 10) shows that during 2000-2006 the fiscal policy was largely contractionary, except 2003 and 2005, when the positive balance declined. It should be noted that, even though the budget balance was positive in 2003 and 2005, increase in the fiscal impulse suggests that there was a fiscal expansion during these years.

As a result of the 2007-2009 major expansion, the balance turned negative (fall of eight percentage points). This was followed by a large fiscal consolidation in 2010-2011 and a return to surplus (rise of six percentage points), negligible activity in 2012 and another expansion in 2013-2014. In 2015, after further consolidation, the fiscal stance turned negative, followed by a small expansion in 2016 and consolidation in 2017. There was no particular trend in fiscal policy by the end of the reporting period.

As evident from Figure 10, the fiscal impulse was negative during 2000-2002, while the GDP gap was growing, which points towards countercyclicity at first glance. However, caution is necessary during analysis. It should be taken into account that during this period GDP was lower than its potential level (the gap was negative), which was accompanied by a growing positive balance (subsequently, a negative impulse), a sign of procyclicality. For countercyclicity, the fiscal stance during 2000-2002 should firstly have been positive (expansion during recession) and only then should have decreased (smaller expansion in parallel with closing the gap). Thus, the fiscal impulse is countercyclical, but the fiscal stance is procyclical, which means that only one out of these two indicators is insufficient to analyze fiscal policy cyclicity, and both should be considered. It should be noted that, despite fiscal consolidation, the gap gradually closed.

During the 2003-2008 boom fiscal policy was countercyclical in only 2006 and 2008: in 2006, the rising gap was accompanied by a negative impulse, while in 2008 the falling gap was followed by a positive impulse. The events in 2008 are especially noteworthy: even though the fiscal impulse was moving in the direction required by countercyclicity, it was too large and resulted in a deficit while the gap still remained positive, which already points towards fiscal stance procyclicality. However, it should also be noted that, despite the gap being positive overall, it turned negative from Q3 2008, as a result of the global recession and the 2008 August war (Figure 4).

It's also interesting that in 2003, 2005 and 2007 fiscal expansion was accompanied by a rise in the output gap, and the 2004 consolidation with a gap reduction, which conforms to expected trends. However, the gap also increased in 2006, despite consolidation, which means that the boom would probably have been even higher in case of expansion. A similar picture was observed in 2008, but in an opposite direction, when the gap fell despite major expansion. It's probable that, without this expansion, the gap would have been negative in 2008.

As for the time period beyond 2008, the fiscal impulse and the GDP gap moved in opposite directions throughout the whole remaining period, except 2012 and 2015. Hence, by analyzing solely the fiscal impulse, discretionary fiscal policy was countercyclical during 12 years, and procyclical during six. **Econometric analysis of the fiscal impulse and change in the output gap reveals that discretionary fiscal policy, as expressed by the cyclically adjusted primary balance, can be**

deemed weakly countercyclical. Namely, the coefficient corresponding to the impact of the GDP gap on the fiscal impulse falls between -0.3 and -0.5 (with different significance levels).

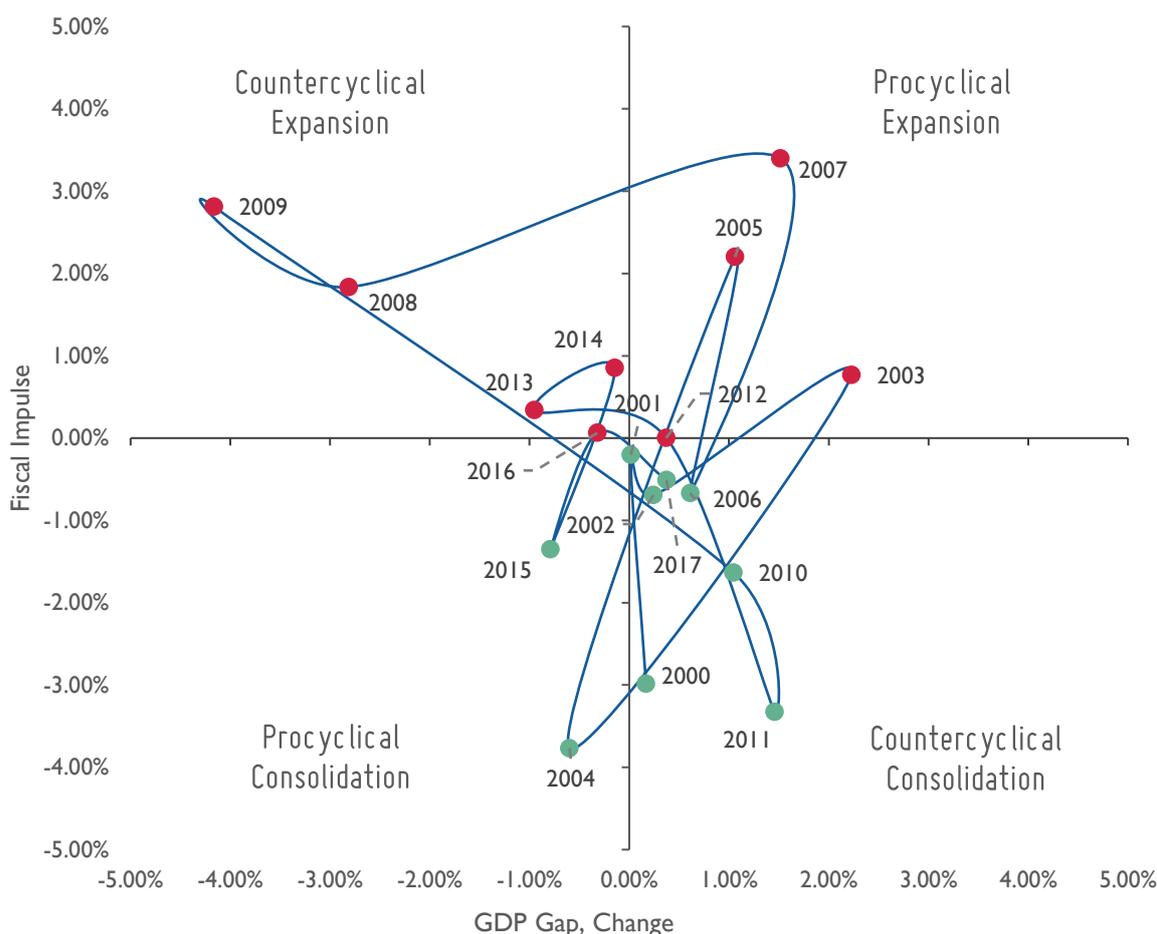


Figure 10: Fiscal Impulse and Change in the GDP Gap. Source: PBO Calculations.

## FISCAL STANCE AND IMPULSE

Analysis of the fiscal stance and impulse reveals that neither comparing the deficit/surplus to economic cycles nor comparing the change in balance to change in cycles are sufficient for evaluating fiscal policy. It is necessary to combine these two criteria:

1. Fiscal policy is countercyclical if the fiscal stance is positive during recession (expansion) and negative during boom (consolidation);
2. Fiscal policy is countercyclical if the fiscal impulse is positive when the output gap falls (larger expansion or smaller consolidation) and negative when the output gap rises (smaller expansion or larger consolidation).

According to these strict criteria, fiscal policy, as per the cyclically adjusted primary balance, was countercyclical during six years out of the 18 of the reporting period: in 2006, 2009, 2010, 2011, 2013 and 2014, and was procyclical during two: 2007 and 2015. During the remaining 10 years fiscal policy was countercyclical according to one criterion and procyclical according to the other. Therefore, in the analyzing period, fiscal policy as

expressed by the cyclically adjusted primary balance can be deemed weakly countercyclical.

### 3.1.2. ANALYSIS BASED ON THE FISCAL BALANCE

Apart from the primary balance, there is one more crucial fiscal indicator in Table 1: fiscal balance, which is calculated by rearrangement of operations and aims to showcase the discretionary fiscal policy direction.

The overall and primary fiscal balances are displayed on Figure 11. The overall fiscal balance was permanently negative in the reporting period, while the primary fiscal balance had a surplus in the beginning, during 2000-2004. Between 2004 and 2009 the fiscal balance deficit was permanently growing, in 2013 improved almost to the 2005 level and then worsened again.

Removing the impact of economic cycles from the primary fiscal balance shows that, as evident from Figure 12, improving the deficit began a year earlier, in 2009, after which, towards the end of the reporting period, it stabilized and fluctuated between -2%-2.1%.

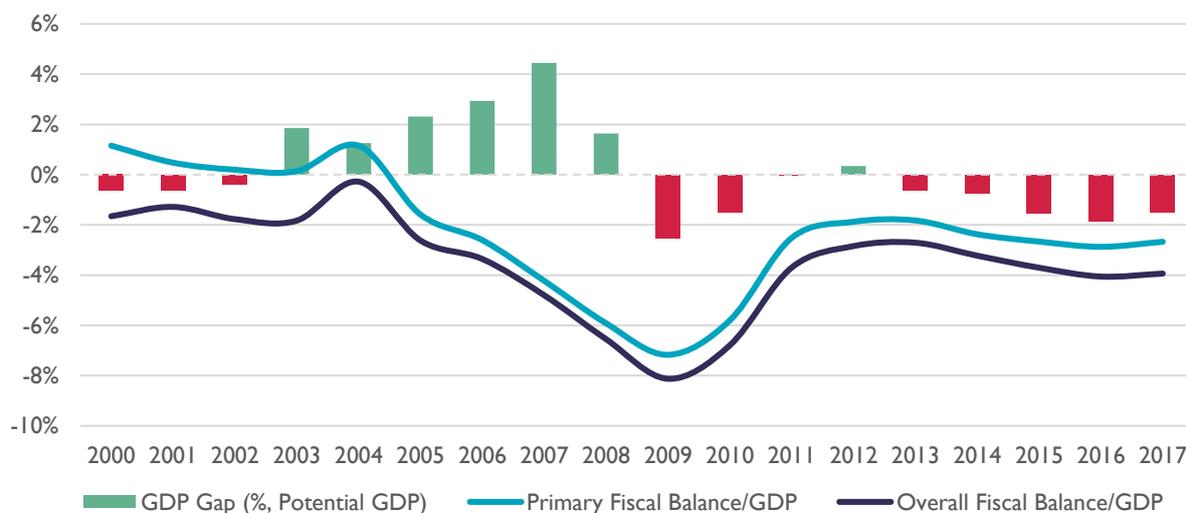


Figure 11: Fiscal Balance and the GDP Gap. Source: PBO Calculations.

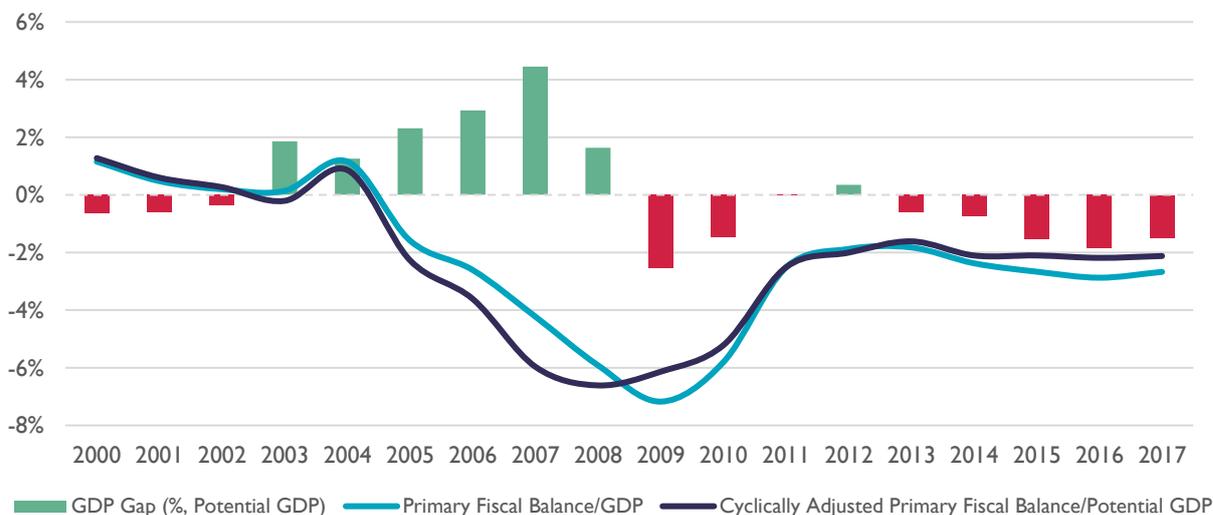


Figure 12: Primary Balance and the Cyclically Adjusted Primary Balance. Source: PBO Calculations.

## FISCAL STANCE

It is clear from Figure 13 that the fiscal stance corresponding to the primary fiscal balance differs from that corresponding to the primary balance.

During 2000-2002, despite the negative gap, the fiscal stance was contractionary, turning positive in 2003 in parallel with the positive gap, and returning to negative in 2004. This was the first year when the fiscal stance was countercyclical – consolidation during a positive gap. **Starting from 2005 all the way till the end of the analyzing period the fiscal stance was permanently positive, which, according to this criterion, means that discretionary fiscal policy was expansionary during the last 13 years. Therefore, it can be deemed countercyclical in the years when the gap was negative (expansion during recession) – during 2009-2010 and 2013-2017, although the permanent expansion signals that the policy did not truly depend on the cyclical structure of the economy.**

It is interesting to note the 2004-2007 dynamics, when the fiscal stance was distinctively procyclical, growing together with the GDP gap. The fiscal stance reached its maximum in 2008, which was followed by a large, but smaller expansion in 2009-2010. Since 2011 the fiscal stance has stabilized and, by the end of the analyzing period, has been fluctuating around 2%.

Thus, out of the 18 years of the reporting period, the fiscal stance was countercyclical during eight years, and procyclical during 10. **Econometric analysis of the fiscal stance and the output gap reveals that discretionary fiscal policy, as expressed by the cyclically adjusted primary fiscal balance, can be deemed weakly procyclical or acyclical. Namely, the coefficient corresponding to the impact of the GDP gap on the fiscal stance falls between 0.1 and 0.3 (with different significance levels).**

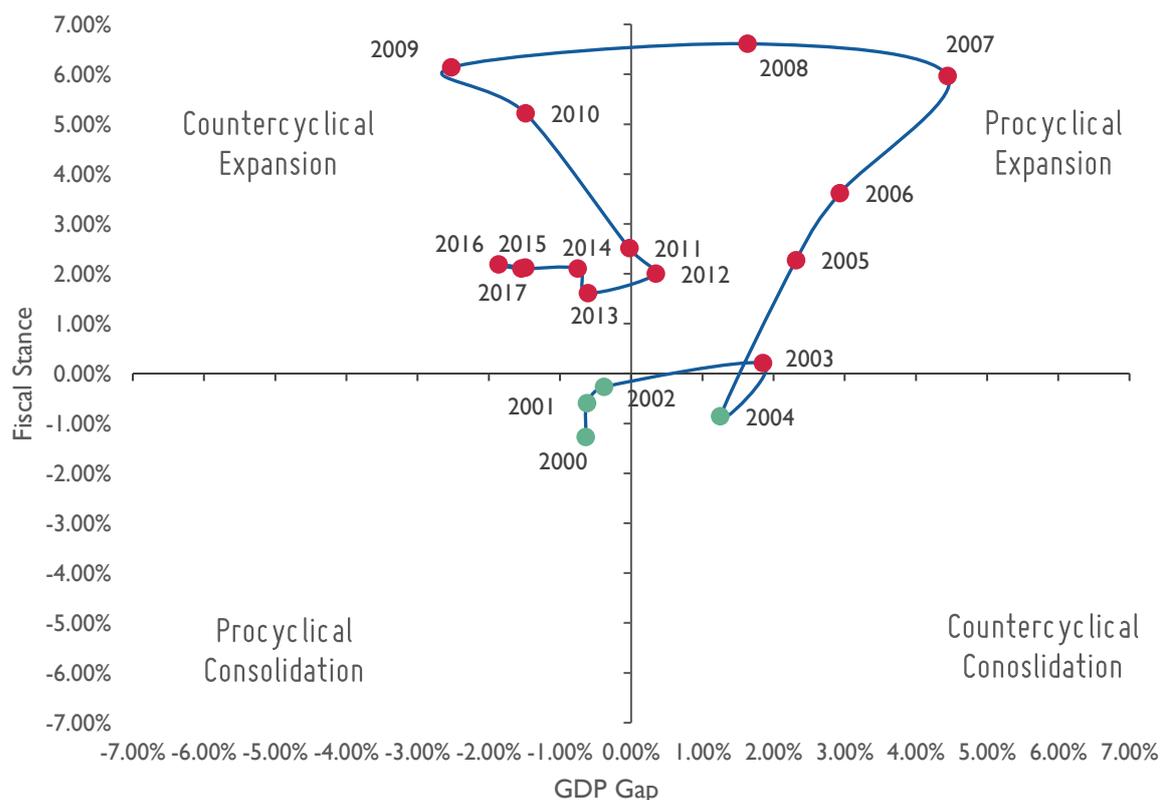


Figure 13: Fiscal Stance and the GDP Gap. Source: PBO Calculations.

## *FISCAL IMPULSE*

As for the fiscal impulse (Figure 14), analysis reveals that in the first half of the reporting period the impulse was largely positive (expansion), while in the second half it was negative (consolidation).

During 2000-2008 the fiscal impulse, except 2000 and 2004, was positive, which reflects a growing fiscal stance. On the contrary, during 2009-2014 the impulse remained negative except 2014, while during 2015-2017, as a result of the fiscal stance stabilization, it was neutral.

It should be noted that, following the 2005-2008 major expansion, the fiscal impulse was negative in 2009-2010, when output fell below potential. Thus, even though the fiscal balance was negative in 2009, analyzing the fiscal impulse reveals that there was a fiscal consolidation during recession. **As mentioned above, this reaffirms that analyzing the fiscal stance or the fiscal impulse separately is insufficient for evaluating fiscal policy cyclicity.** On the other hand, in 2010 the negative output gap fell, which was accompanied by a decreasing negative balance (smaller expansion), pointing towards countercyclicity. Following the 2004-2008 expansion, the fiscal stance increased by 7.5 percentage points, but fell by 5 percentage points by 2013 as a result of consolidation.

As evident from Figure 14, the fiscal impulse was positive in 2001-2002, while the output gap was growing, which points towards procyclicality at first glance. However, similar to what was said above, caution is necessary when interpreting the data. During this period GDP was lower than its potential level (the gap was negative), which was accompanied by a decreasing positive balance (therefore, positive impulse), a sign of countercyclicity. Thus, the picture of procyclicality is created by the fiscal stance which was contractionary during the negative gap, instead of the necessary expansionary stance for countercyclicity.

During the 2003-2008 boom, fiscal policy was countercyclical only in 2008, when a fall in the gap was accompanied by a positive impulse. It's interesting that from 2004 till 2008 the impulse was positive despite the rising positive gap, which is why in 2008, when the gap fell, the fiscal position was already significantly high and the fiscal impulse was, thus, relatively small. The impulse was procyclical again in 2009, when a major fall in the gap turned it negative, but the impulse was also negative (consolidation during recession). The impulse remained negative during 2010-2011, in parallel with the improving gap, which points towards countercyclicity (smaller expansion accompanying the closing gap). It should be noted that in 2008 the impulse was already so high that the fall during the 2009 recession might not reflect an accurate picture about procyclicality.

It's also interesting that throughout this period fiscal expansion was always accompanied by a rising gap, except 2008, when the gap fell despite major expansion. It's probable that, without this expansion, the gap would have been negative in 2008.

As for the post-2008 period, the fiscal impulse and the GDP gap moved in different directions during the whole period except 2009, 2013 and 2015. Hence, by analyzing solely the fiscal impulse, discretionary fiscal policy was countercyclical during eight years, and procyclical during 10. **Econometric analysis of the fiscal impulse and change in the output gap reveals that discretionary fiscal policy, as expressed by the cyclically adjusted primary fiscal balance, can be deemed acyclical (or very weakly procyclical). Namely, the coefficient corresponding to the impact of the GDP gap on the fiscal impulse falls between 0.1 and 0.2 (statistically insignificantly different from 0).**

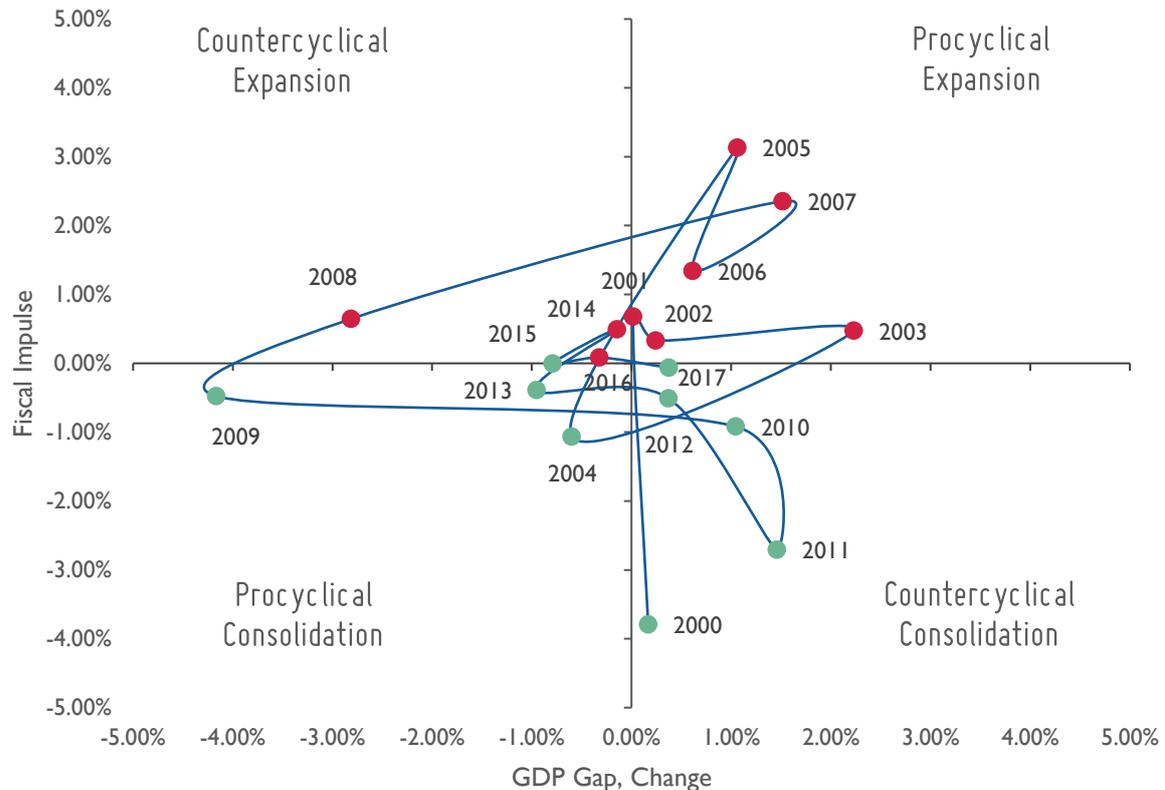


Figure 14: Fiscal Impulse and Change in the GDP Gap. Source: PBO Calculations.

### FISCAL STANCE AND IMPULSE

As mentioned above, comprehensive analysis of fiscal policy requires to combine the following two criteria:

1. Fiscal policy is countercyclical if the fiscal stance is positive during recession (expansion) and negative during boom (consolidation);
2. Fiscal policy is countercyclical if the fiscal impulse is positive when the output gap falls (larger expansion or smaller consolidation) and negative when the output gap rises (smaller expansion or larger consolidation).

According to these strict criteria, fiscal policy, as per the cyclically adjusted primary fiscal balance, was countercyclical during four years out of the 18 of the reporting period: in 2010, 2014, 2016 and 2017, and was procyclical during six: 2001, 2002, 2003, 2005, 2006 and 2007. During the remaining eight years fiscal policy was countercyclical according to one criterion and procyclical according to the other. Therefore, in the analyzing period, fiscal policy as expressed by the cyclically adjusted primary fiscal balance can be deemed very weakly procyclical or acyclical.

### 3.1.3. CONCLUSION

Thus, analysis based on the overall balance points to weak countercyclicity, while analysis based on the overall fiscal balance points to acyclicity. Accordingly, if we take into account the privatization proceeds and financial asset operations, the weak policy countercyclicity disappears. We can conclude that, in the reporting period,

discretionary fiscal policy was not particularly aimed for smoothening the economic cycles.

## 3.2 FISCAL SPACE

Let's define fiscal space as the country's capability to conduct countercyclical fiscal policy without threatening long run fiscal sustainability (Rahman, 2010). Following the global financial crisis, the financial markets have become increasingly concerned with the countries' fiscal maneuvering space, which is linked with the intertemporal government budget constraint (Ostry, Ghosh, Kim, & Qureshi, 2010). It should be noted that while there is little disagreement about the need to create fiscal space, determining the optimal time period to utilize this space is very difficult and depends on various factors (IMF, 2016).

Creating fiscal space requires countercyclical fiscal policy during boom, which is reflected in an improvement of the cyclically adjusted balance and/or fall in the public debt. Fiscal consolidation during boom not only helps smooth short run fluctuations, but also creates fiscal space in the medium run as a result of high revenues and/or smaller expenditures, which is necessary for providing fiscal stimulus during recession. Moreover, utilizing higher resources that follow the boom to reduce public debt facilitates access to financing in difficult periods, as a result of a fall in the risk associated with debt sustainability and the interest expenses required for debt servicing.

In order to estimate fiscal space, we calculate the difference between the actual growth rates of revenues and expenditures, and the growth rates that are explained by the output gap trends<sup>9</sup>. If the actual growth rates of revenues and expenditures exceed those explained by the output gap, revenues and expenditures are procyclical (Rahman, 2010).

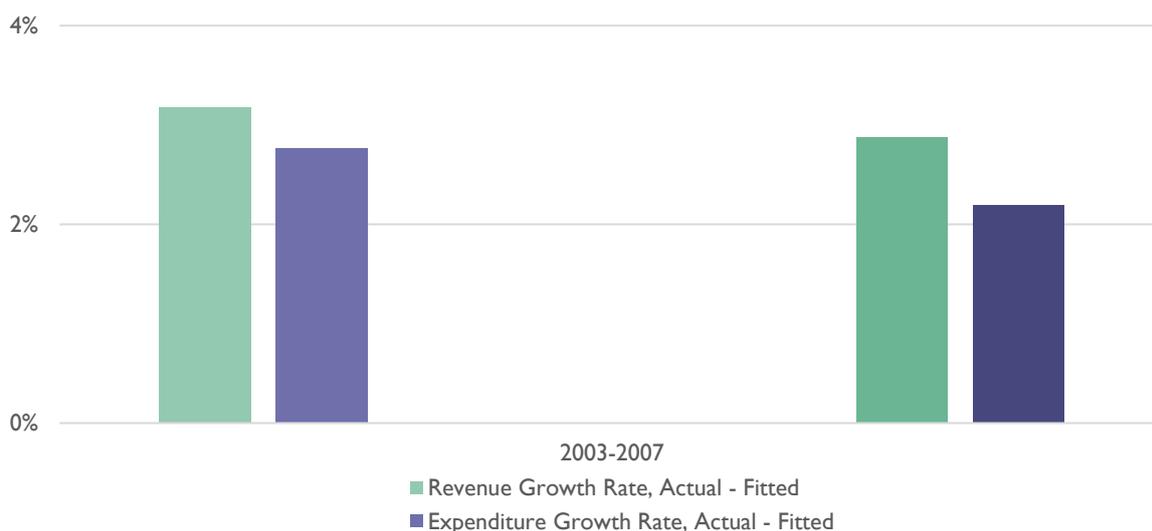


Figure 15: Fiscal Space During Boom. Source: PBO Calculations.

<sup>9</sup> The latter corresponds to coefficients from the following regressions:  $d(\log(\text{real\_rev})) = c + \alpha \cdot \log(\text{gap}) + u$ , and  $d(\log(\text{real\_exp})) = c + \beta \cdot \log(\text{gap}) + u$ . In order to remove serial correlation, several specifications include the dependent variable lags. Revenues and expenditures are deflated by the consumer price index. Moreover, expenditures don't include nondiscretionary interest expenses. The regression fitted values correspond to revenue and expenditure growth rates that are explained by changes in the output gap. Quarterly series are seasonally adjusted and annual growth rate is selected as the dependent variable.

The left side of Figure 15 corresponds to regression results using annual data, while the right side displays the results using quarterly data. 2003-2007 is selected as the boom period. Even though the overall gap was positive in 2008 as well, the gap was already negative in the second half of the year and there was a subsequent significant fiscal expansion. Thus, 2008 cannot be deemed an optimal time period to create fiscal space.

During 2003-2007 revenues were procyclical: average actual growth rate exceeded the growth rate explained by the output gap. This was caused by a jump in revenues in 2004, as was noted above when analyzing the fiscal stance and fiscal impulse. During the boom expenditures were also procyclical, as evident from the positive values displayed on Figure 15. It should be noted that the highest growth of expenditures during the boom was also in 2004, albeit significantly lower compared to that of revenues.

**According to this criterion, during the 2003-2007 economic boom, fiscal space slightly increased, which was caused by a smaller rise in procyclical expenditures compared to procyclical revenues. By the end of the boom, in 2007, the cyclically adjusted primary balance was neutral, while the cyclically adjusted primary fiscal balance was negative. Despite this, the increased fiscal space played its role in the major fiscal expansion of 2008-2010, which was successful – in 2011-2012 the gap closed and even turned slightly positive. In this respect, the 2008 expansion of the cyclically adjusted primary fiscal balance is especially noteworthy, since, following the high 2007 deficit and a fall in the output gap, it might not have been possible without enough fiscal space.**

## 4. LONG RUN RELATIONSHIP BETWEEN REVENUES AND EXPENDITURES

---

There might be four types of relationships between budget revenues and expenditures:

- Rise in revenues are automatically followed by rise in expenditures (Chicago School view);
- Rise in expenditures cause rise in revenues as a result of increasing economic activity (according to the Wagner law);
- Revenues and expenditures co-move, which implies an assumption about bidirectional causality (as per the Ricardian equivalence);
- Revenues and expenditures are independent (fiscal neutrality).

Empirical results with respect to this topic are heterogeneous and research exists to support all four types of relationships (Nyamongo, Sichei, & Schoeman, 2007).

For Georgia, we will study the relationship between revenues and expenditures using the Vector Autoregressive (VAR) model<sup>10</sup>, which implies an assumption that both revenues and expenditures are endogenous and co-determine each other.

In the beginning, we choose two lags (past observations) for the model as per the selection criteria (lags of higher order are statistically insignificantly different from 0). In order to account for the effects of structural breaks and outliers, we use dummy variables.

The estimated model passes diagnostic tests, with the residual free from autocorrelation, but one of the eigenvalues is larger than one (in modulus), which means that the stability condition is not satisfied – the effect of shocks do not die out. This is expected: revenues and expenditures are integrated of order one ( $I(1)$ ), i.e. non-stationary<sup>11</sup>, so we need to further transform the model.

If there exists a long run relationship between revenues and expenditures, we need to utilize the Vector Error Correction Model (VECM), which takes this relationship into account. If there is only a short run relationship between revenues and expenditures, they should be transformed into stationary variables ( $I(0)$ ), which, in this case, means analyzing growth rates instead of absolute values, and should be analyzed using the standard VAR model.

In order to test for the long run relationship between the variables, we use the notion of **cointegration**. If there exists any linear combination of  $I(1)$  variables (or higher order of integration) that is integrated of order zero ( $I(0)$ ), these variables are cointegrated. Cointegration is a statistical notion and not economic, but we can interpret it as a long run economic relationship, which allows for estimating long run relationships between non-stationary variables in initial form.

We use two methods to test the cointegration hypothesis between revenues and expenditures: the Engle-Granger and Johansen methods. Both methods point out that the variables are cointegrated<sup>12</sup>. The cointegration graph is given on Figure 16.

---

<sup>10</sup> We use seasonally adjusted real quarterly variables in log form for analysis. To ensure straightforward interpretation of causality, the model only includes the variables of interest. However, it should be noted that including output as a control variable did not change the results.

<sup>11</sup> Checked as per relevant unit root tests.

<sup>12</sup> Engle-Granger: at 5% significance level (z-statistics) and 10% significance level (tau-statistics). Johansen: at 5% significance level as per the maximum eigenvalue test, while the p-value corresponding to the trace test is very marginally larger than 5%.

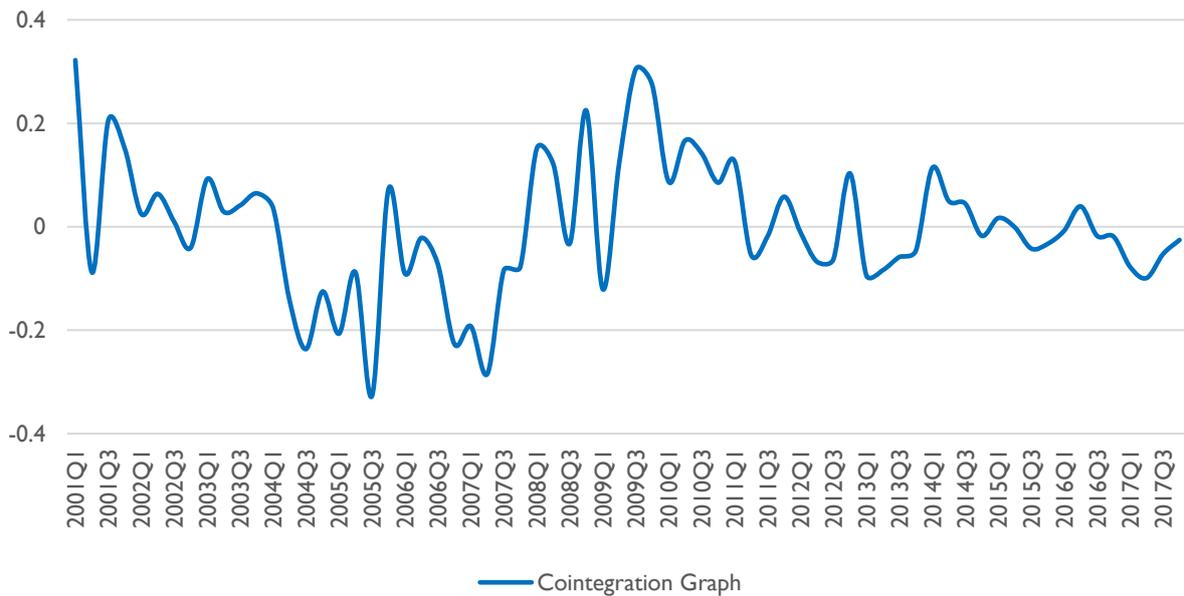


Figure 16: Cointegration Between Revenues and Expenditures. Source: PBO Calculations.

Following the results of the cointegration tests, we estimate the VECM with one lag, taking the cointegrating relationship into account, after which we verify that the model passes all diagnostic tests.

According to the model, there is a following long run relationship between expenditures and revenues:

$$\ln(exp) = -0.96 + 1.13 * \ln(rev) \quad (16),$$

$$\ln(rev) = 0.85 + 0.88 * \ln(exp) \quad (17),$$

Which means that a 1% rise in revenues causes a 1.13% rise in expenditures in the long run, while a 1% rise in expenditures results in a 0.88% rise in revenues. **Thus, an unexpected rise in revenues is followed by a higher than proportional rise in expenditures, which is a noteworthy result for fiscal policy.**

The error correction terms are negative in both equations, which confirms that the long run relationship is stable, non-explosive and, following the shock in the explanatory variable, the dependent variable ensures the long run equilibrium is restored.

The coefficient is statistically significant in the expenditures equation and equals -0.39, which means that expenditures' deviation from the long run equilibrium is corrected by 39% within a quarter. Hence, equilibrium will be restored in 2.5 quarters. As for the revenues equation, the coefficient is -0.01, but statistically insignificantly different from zero, which means that the cointegrating relationship does not enter the equation for revenues.

The revenue and expenditure cointegration confirms that there exists a causal relationship between the variables at least in one direction. **In order to find out which direction this causality runs, we use the Granger method.**

The short-run Granger causality test is based on estimating the significance of lags of the explanatory variable. For example, revenues Granger cause expenditures in the short run if the revenue lags are statistically significant in the equation with expenditures as the dependent variable and vice versa.

The long run Granger causality test, on the other hand, is based on estimating the significance of error correction terms, i.e. determining whether the cointegrating relationship is statistically significant or not in the given equation. For example, if the error correction term is statistically significant in the equation with expenditures as the dependent variable, revenues have a long run impact on expenditures.

**The Granger causality test<sup>13</sup> reveals that in the short run revenues and expenditures are independent, which is logical, since a quarter is too short a time period to coordinate revenues and expenditures. As for the long run, the error correction term is statistically significant in the equation for expenditures, but statistically insignificant in the equation for revenues, which means that in the long run changes in revenues cause changes in expenditures, but there is no causality in the other direction.**

**If we estimate the impact of changes in revenues and expenditures by using the Structural Vector Autoregressive (SVAR) model and use the Cholesky recursive decomposition as per the results obtained above (change in revenues affect expenditures, but not vice versa), the impulse response functions indicate that an expenditure shock has only a short run impact on revenues, while the impact of a revenue shock on expenditures is permanent (Figure 17). The permanent effect of a revenue shock on expenditures arises from the fact that it is expenditures that adjust to maintain the long run equilibrium. As for the independence of revenues from expenditures, this might be a result of the long run independence between public expenditures and output (on the one hand, fiscal neutrality and, on the other hand, violation of the Wagner law), which is an issue for separate research.**

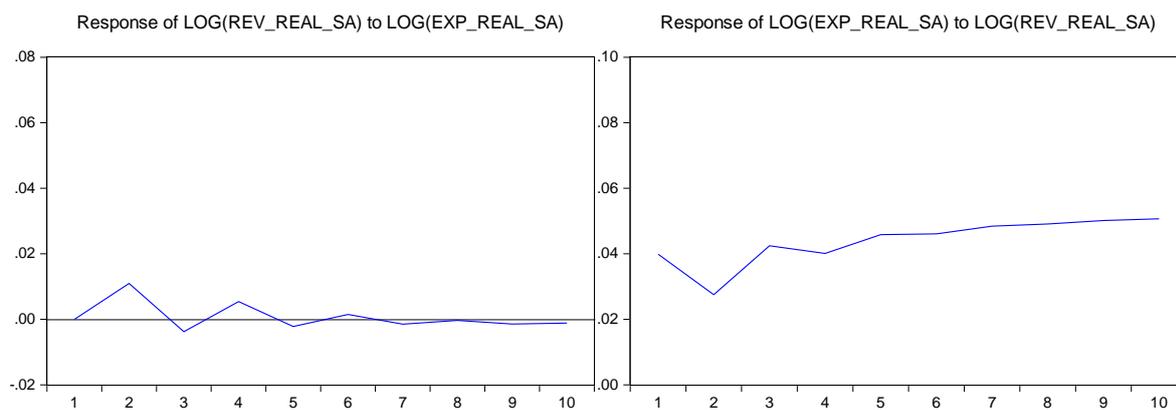


Figure 17: Revenue and Expenditure Impulse Response Functions. Source: PBO Calculations.

<sup>13</sup> It should be noted that the Granger causality test estimates the significance of the explanatory variable lags and does not take the contemporary period impact into account, which might provide a different picture.

# BIBLIOGRAPHY

Bańkowski, K., & Ferdinandusse, M. (2017). *Euro area fiscal stance*.

IMF. (2016). *Assessing Fiscal Space: An Initial Consistent Set Of Considerations*.

IMF, Fiscal Affairs Department. (2009). *Computing Cyclically Adjusted Balances and Automatic Stabilizers* .

Irish Fiscal Advisory Council. (2015). *Fiscal Assessment Report*.

Nyamongo, M. E., Sichei, M. M., & Schoeman, N. J. (2007). *Government revenue and expenditure nexus in South Africa*.

Orseau, E., & Salto, M. (2016). *Measuring and assessing the fiscal stance in the euro area: Methodological issues*.

Ostry, J. D., Ghosh, A. R., Kim, J. I., & Qureshi, M. S. (2010). *Fiscal Space*.

Polito, V., & Wickens, M. (2006). *Measuring the Fiscal Stance*.

Rahman, J. (2010). *IMF. Absorption Boom and Fiscal Stance: What Lies Ahead in Eastern Europe?*

Szarowska, I. (2013). *Relationship between government expenditure and output in the problematic regions in the European Union*.