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Calculation of Cyclically Adjusted Budget Balance and Assessment of Fiscal Policy Stance

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Abstract

What is the real character of fiscal policy? Is it expansionary or restrictive? Is it pro-cyclical or does it have stabilization effects? Policymakers and economic analysts need to be able to ascertain fiscal policy effort. As the actual budget balances are affected both by cyclical factors and structural measures, they may not, in general, be very useful when seeking to assess the stance of the fiscal policy. To understand the true nature of fiscal policy, it is therefore fundamental to remove cyclical effects of general government budget balances. The cyclically-adjusted budget balance (CAB) indicator plays this role in the fiscal surveillance framework as a means of analyzing the fiscal situation and changes in policy that result from the intentional actions of the government. This paper, for the first time, provides detailed calculations of the cyclically-adjusted budget balances in BiH, following a commonly agreed method by the European Commission and assesses the character of the fiscal policy in BiH from 2008 to 2019. The analysis showed that in earlier years BiH had led stabilizing expansionary fiscal policy, while in more recent years the fiscal policy was mostly restrictive and procyclical.

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Calculation of Cyclically Adjusted Budget Balance and Assessment of Fiscal Policy Stance

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1. Introduction

Budgetary position, that is, the budget deficit/surplus in a particular year depends on many factors, such as discretionary measures, certain expenditures with predefined pace (such as pensions), and cyclical movements of the economy. In periods of economic expansion, the cyclically sensitive revenues tend to rise, while expenditures tend to decrease, which would, all other things being equal, result in an improvement of the fiscal balance. The opposite situation would be true during an economic downturn. As the cyclical developments of the economy cancel each other out through time, for an assessment of the 'actual' fiscal position, it is useful to exclude the influence of the economic cycle on public finances. For this reason, the cyclically adjusted budgetary balance is often calculated—a budget balance that excludes cyclical developments. Applying an appropriate method for calculation is important for the suitable formulation of fiscal policy.

The *cyclically adjusted balance* (CAB) is defined as the fiscal balance that would prevail if the economy was at the potential level of aggregate production. The assessment of the CAB can be performed in several ways. The basic difference between the methods is the degree of disaggregation of the fiscal data used, the selection of relevant macroeconomic bases for the calculation of elasticities, and the cyclical component of revenues/expenditures. The CAB net of certain temporary and one-off measures is also called the *structural budget balance* and is one of the key fiscal indicators in the European Union (EU).

This paper addresses an identified gap in research regarding calculations of the CAB in BiH. In addition, it also contributes to country's obligation to report this indicator to the EU as part of the Economic Reform Program (ERP) following the commonly agreed method of cyclical adjustment. Applying this methodology, the paper also contributes to policy decisions in the country.

The paper is structured as follows: after the introduction, chapter 2 defines and presents different methodologies for calculating the cyclically adjusted budget balance. Chapter 3 provides detailed calculations of the cyclically adjusted budget and structural balance for BiH. The same chapter also assesses the historical fiscal policy stance and estimates the fiscal stance in the coming years, by applying the official projections, and compares the BiH fiscal developments with those in European countries. At the end, a conclusion is provided.

2. Fiscal coordination in BiH and Approaches to Calculate Cyclically Adjusted Budgetary Balance

2.1. Fiscal coordination in BiH

In BiH, fiscal coordination is tasked to the Fiscal Council of BiH which is composed of State and Entity Prime Ministers and Finance Ministers. The responsibilities of the Council are to: (1) coordinate fiscal policy in BiH; (2) adopt the proposed Global Framework of Fiscal Balance and Policy in BiH for the next three years (the basis for drafting the Medium Term Fiscal Framework of lower levels of government); (3) adopt short-term and long-term macroeconomic projections; (4) monitor realization of budgetary targets and take any necessary corrective measures; (5) coordinate activities to comply with the calendars for preparing, adopting, executing, and auditing the budgets of the institutions of BiH, Federation of BiH (FBiH), Republika Srpska (RS), and Brcko District (BD); and (6) propose priorities for improving BiH public finances.

However, actual fiscal coordination is minimal. The responsibilities the law assigns to the Fiscal Council are quite vague and prone to interpretations. In terms of the most important role— preparation of the Global Frameworks of the Fiscal Balance and Policy—in practice the Fiscal Council decides only on revenues from indirect taxation, prepared by the Macroeconomic Analysis Unit of Indirect Taxation Authority (ITA) and the State budget. Entity revenues and expenditures are prepared separately by their Finance Ministries. Nor is there any official harmonized methodology for fiscal reporting, which is a significant barrier to planning, coordinating, and monitoring fiscal policy.

Given the fiscal framework and institutional structure, calculating and analyzing CAB is a challenge for the country. This paper takes into consideration complex organizational structure of the country and addresses a gap in calculating CAB given countries obligation to report this indicator to EU. In the remaining of this section we present CAB definition, available methodology and then apply the appropriate method to calculate the BiH CAB.

In the literature the CAB is defined as the fiscal balance that would be realized if the economy was on its potential or trend level. By calculating the CAB, one can indirectly assess to what extent have both discretionary fiscal policy and cyclical developments contributed to the current fiscal position. In addition, the CAB allows assessing the character of fiscal policy, that is, an answer to the question of whether fiscal policy in a specific period was expansive or restrictive. Finally, the CAB is used to assess the sustainability of public finances. In this sense, it can assist the authorities in avoiding excessive increases of expenditures in the phase of expansion, as well as in evaluating the space available for stimulating the economy in the times of recession.

The usefulness of that indicator is recognized by many international institutions, such as the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD), and the European Central Bank (ECB), which regularly publish it in their publications. The European Commission (EC) has gone even further, and it defines the medium-term budgetary target for each EU member country in terms of the CAB (or, more precisely, the structural balance) to ensure compliance in the context of the Stability and Growth Pact.

International financial institutions are using various methods to assess the cyclically adjusted budget balance. Common to all the methods is that the CAB is calculated in two steps: calculation

of the potential GDP and then determine how different components of the budget respond to fluctuations in economic activity.

2.2. IMF's Aggregate Approach

The aggregate approach of the IMF (Fedelino, Horton, and Ivanova 2009) for calculation of the CAB is based on the assessment of elasticity of total revenues and expenditures on the aggregate production gap. By multiplying the elasticity with total revenues/expenditures and the aggregate production gap, the cyclical component of the budget is acquired. By subtracting it from the realized revenues/expenditures the cyclically adjusted component is attained. The same result can be obtained in a single step if the aggregate production gap is defined as the ratio of potential and actual production, as presented below.

Cyclically adjusted revenues and expenditures are derived as:

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

(1)

$$E^{CA} = E\left(\frac{Y^*}{Y}\right)^{e_E},$$

(2)

where R is total revenues, R^{CA} is cyclically adjusted revenues, E is total expenditures, E^{CA} is cyclically adjusted expenditures, Y^* is potential (trend) level of aggregate production, Y is actual level of aggregate production, and ε_R and. ε_E are elasticity of revenues and expenditures, respectively, on the gap of aggregate production.

The cyclically adjusted budgetary balance is derived by subtracting the cyclically adjusted expenditures from the cyclically adjusted revenues:

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

(3)

The described method is one of the simpler methods for calculating the CAB.

2.3. Semi-aggregated Approach of the EC

The EC (Larch and Turrini 2009) uses the so-called semi-aggregated method. They calculate the total elasticity of revenues/expenditures as a weighted sum of elasticities of individual categories of revenues/expenditures that are sensitive to developments in the business cycle, wherein the weights of individual categories are their shares in the total revenues/expenditures. On the revenue side, as the cyclically sensitive components, it is standard to select revenues from indirect taxes, revenues from income tax[1], revenues from profit tax, and revenues from social contributions, while on the expenditure side only the expenditures for benefits for unemployed persons are considered to be cyclically sensitive.

The difference compared to the IMF's aggregate method results from the selection of the base for the calculation of elasticity. In the aggregate method, the elasticity of total revenues and

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[1] Income tax refers t personal income tax (PIT) and profit tax refrs to corporte income tax (CIT)

expenditures is calculated directly on the gap of aggregate production, while the EC's method first calculates the elasticity of individual components of revenues/expenditures considering their relevant macroeconomic base, followed by the elasticity of the macroeconomic base on the gap of aggregate production. The product of those two elasticities results in the elasticity of the individual component of revenues/expenditures on the gap of aggregate production.

This can be written in the form of an equation:

$$CAB = B - R\varepsilon_{R,gapY}\, gapY + E^U \varepsilon_{E^U,gapY}\, gapY \quad , \tag{4}$$

$$\varepsilon_{R,gapY} = \sum_i \frac{R_i}{R}\varepsilon_{R^i,V^i}\varepsilon_{V^i,gapY} \quad , \tag{5}$$

$$\varepsilon_{E^U,gapY} = \varepsilon_{E^U,U}\varepsilon_{U,gapY} \quad , \tag{6}$$

where B is the total fiscal balance, $\varepsilon_{R,gapY}$ is the total elasticity of revenues on the gap of aggregate production, $\varepsilon_{E^U,gapY}$ is the elasticity of benefits for the unemployed (E^U) on the gap of aggregate production, ε_{R^i,V^i} is the elasticity of the selected revenue component (i) on its relevant macroeconomic base (V), $\varepsilon_{V^i,gapY}$ is the elasticity of the selected macroeconomic base considering the gap of aggregate production, $\varepsilon_{E^U,U}$ is the elasticity of benefits for the unemployed considering the number of the unemployed (U), and $\varepsilon_{U,gapY}$ is the elasticity of the number of unemployed persons considering the output gap.

2.4. Disaggregated Approach of the ECB

The ECB emphasizes (Bouthevillain et al. 2001) that the relevant macroeconomic bases can be found in the phases of the business cycle that differ from the phase of the cycle in which aggregate production is found.[2] To calculate a more precise assessment of the total cyclical component of the budget, for each relevant macroeconomic base the ECB calculates the discrepancy from its trend, that is, it calculates the gap of each of the bases. After that, elasticities are assessed for individual cyclically sensitive revenue/expenditure items compared to their relevant macroeconomic bases. At the end, the cyclical component of the fiscal balance equals the sum of products of the individual category of revenues/expenditures,[3] elasticities of revenues/expenditures compared to their macroeconomic bases, and the gap of relevant macroeconomic bases, or, in summary:

$$CB = \sum_i X^i \varepsilon_{x^i V^i}\, gapV^i \quad , \tag{7}$$

where X^i is the individual revenue/expenditure category, $\varepsilon_{x^i V^i}$ signifies the elasticity of individual budget item with regard to its relevant base, and $gapV^i$ is the gap of each individual basis, which is calculated as:

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[2] IMF, EC, and OECD determine the phase of the business cycle with the gap of aggregate production.
[3] Expenditures are entered into the calculation with the negative sign.

$$gapV^i = \frac{V^i - V^{i*}}{V^{i*}},$$

(8)

where V^i is the relevant macroeconomic basis and V^{i*} is the trend of its level.

In the third step, the last step, the cyclically adjusted budgetary balance is calculated as:

$$CAB = B - \sum_i X^i \varepsilon_{x^i V^i} gapV^i$$

(9)

2.5. Structural Balance

International institutions have recognized that the adjustments of budget items for cyclical developments in the economy are insufficient to acquire an impression of the 'actual' fiscal position of the country, and they emphasize that additional corrections are necessary for the cyclically adjusted budget balance. The fiscal indicators acquired in that manner are referred to as structural balance in the literature or, as in the case of the CAB, there is no single definition of this category. The IMF, therefore, uses the term structural balance to refer to the CAB from which the effects of significant changes to the prices of assets and raw materials, changes in the structure of GDP, and one-off measures are excluded (IMF 2011).

The EC excludes from the CAB only the one-off and temporary measures in calculating the structural balance. Therein it defines the one-off measures as those that have a transitional effect and that do not lead to any lasting changes in the budget position (Larch and Turrini 2009). The temporary character of those measures and the lack of a long-term effect on public finances, along with simultaneous introduction of the noise in the 'actual' current condition, represent the main argument for their exclusion from the cyclically adjusted budget balance.

The EC places large emphasis on the calculation of the structural budgetary balance, and therefore, both the medium-term budget targets of the member states of the EU and the required annual adjustment within the framework of the Stability and Growth Pact are expressed in terms of the structural budgetary balance. There is no single methodology that would define which are those temporary and one-off measures, but the EC suggest these are usually the sale of nonfinancial assets (real estate, concession, and so on), temporary changes in the tax system with a positive effect on the budget balance, a reduction in the tax debt in exchange for a lump sum payment, expenditures related to natural disasters, and so on. Temporary or one-off measures that are, at the end, excluded must exceed 0.1 percent of GDP, affect the fiscal balance in one year only or in a very limited number of years, and must not repeat.

3. Assessment of Cyclically Adjusted Budgetary and Structural Balance for BiH

3.1 Potential GDP

There is no practice in evaluating the potential GDP in BiH. The potential GDP represents the maximum sustainable level of output that the economy can produce, without inflationary pressures. However, the calculation of potential GDP is not straightforward and this represents a challenge in both economic analysis and in the implementation of economic policy. The main issue is the inability to directly measure (observe) the actual value of the potential GDP because of which the calculation of the surplus (deficit) of aggregate demand, that is, the *output gap*, is rendered challenging.

In the last couple of decades, a whole set of different methods were established to assess the potential GDP. Selecting an appropriate method for calculating the potential GDP in general is challenging — for BiH in particular, due to lack of data and structural breaks in time series is no exception. The more recent approaches to the calculation of the potential output are based on the statistical methods of filtration, i.e. the use of specific methods of analysis of time series, wherein an assessed time series of data is acquired that represents the trend. That time series is, however, interpreted as the representation of the balanced values of the original time series.

In its simplest form, the filtration can be applied only to a single time series (the univariant filter), wherein for the calculation of the trend lines only the information contained in the analyzed series is used. One of the most frequently used univariant filters is the Hodrick-Prescott (HP) filter. The HP technique of filtration is the method of decomposition of the series into trend and cyclical component. This is the method used in this paper, too.

When applying the HP filter, it is assumed that the actual value of output equals:

$$Y_t = Y_t^* + Y_t^c ,$$

(10)

where $Y*$ is the trend component and Y^C is the cyclical component.

Hodrick and Prescott proposed the following calculation of the trend $Y*$:

$$\min \sum_{t=1}^{T} \left[(Y_t - Y_t^*)^2 + \lambda (\Delta Y_{t+1}^* - \Delta Y_t^*)^2 \right]$$

(11)

The trend is calculated from the original series as a sum of minimized discrepancies of the GDP from its trend $[(Y_t - Yt^*)^2]$ and the variability of the actual trend $[\lambda(\Delta Y_{t+1}^* - \Delta Y_t^*)^2]$. The trend represents two sides' moving averages, in the calculation of which, in each of the periods, both the past and the future data are taken into account. The trend value is calculated for each year as the weighted average of all the elements of the original series (the weights depend on the length of the period and the λ parameter). The weights are allocated symmetrically (that is, equal impact of observations, before and after, on the trend) only in the middle of the period. At the beginning and the end of the period, the distribution of the weights becomes more and more sloping, that is, the actual values in those years start having deciding impact on the trend.

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The selection of the λ parameter is of exceptional significance as the assessment of discrepancy from the trend largely depends on it. The larger the preference toward the smoothening of the trend, the larger the smoothing parameter should be. If λ trends toward infinity, the trend will be a linear trend, and if λ equals 0, the trend will be equal to the original series. There is no agreement in the literature regarding the correct use of the value of the smoothening parameter. There are, however, some recommendations of individual authors on the value of λ when using annual and quarterly data. For example, Hodrick and Prescott suggest the value of 1,600 for quarterly data and 100 for annual data, while other authors suggest lower values. For the most part, the recommendations boil down to selecting a relatively low value of the parameter, which implies that shorter cycles may, to a large extent, be left in the trend component and that a relatively large compression effect can be tolerated (when too many cyclical developments are included in the trend). Furthermore, it is deemed that the appropriate value of λ depends on the objectives of the analysis, which also determine the critical length of the cycle and the acceptable 'trade-off' between the costs of compression and the leak. Neither the criteria proposed in statistical literature nor empirical practice provides any recommendations as to how to determine the trends of macroeconomic variables for the requirements of cyclical adjustment of budget balances.

One of the possible criteria is to use such λ that the effect of the compression does not exceed 10 percent of the amplitude of the cycle for eight years. According to Ravn and Uhlig (2002), the adjusted HP filter resolves the problem of bias in the sample, and they suggest for annual data a value for λ that is much lower than the usual HP filter.

Overall for calculating the potential GDP of BiH, annual data from 2008 to 2019 was used. For comparison purposes, along with the original HP filter, the adjusted HP filter. In the calculation, two values of λ were applied, one at 100 and another smoothening coefficient of 6.25. The latter helps resolve the potential bias in the sample.

Figure 1: Comparative review of the calculation of potential GDP in BiH
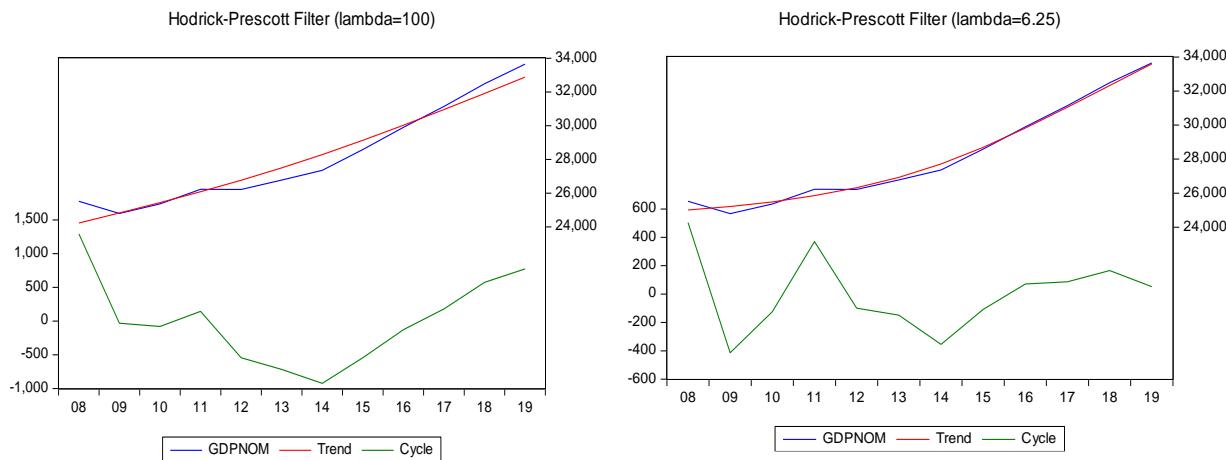
Source: BiH Agency for Statistics, World Bank, author's calculation.

Figure 1 shows the outcomes in estimating potential GDP in BiH applying the two different methods. "Ordinary" HP filter suggests upward straight line and, by and large, drifting upwards, while the adjusted HP filter suggests that BiH economy was below its potential most of the time and with less drift.

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Such dynamics do not surprise considering that BiH recent history and existence of its obsolete capital. The BiH went through large structural transformations in last two and a half decades (from socialist country through war-peace period and to transition economy and still undergoing reforms[4]) affecting the allocation and use of factors of production. Hence, applying either the adjusted or unadjusted filter, it is still difficult to assess BiH growth potential. This paper recognizes that it may be useful for future research to invest further efforts in assessing alternative methods to calculating BiH potential GDP.

3.2. Cyclical Sensitivity of the Budget

To understand to the impact of cyclical developments on the fiscal position in BiH, cyclically-sensitive categories of data on both the revenue and expenditure side were identified. Indirect taxes, income tax, profit tax, and social contributions we used for the revenue side. On the expenditures side, only benefits for the unemployed were used. As for the relevant macroeconomic base the following was selected: for indirect taxes, total consumption was selected;[5] for income tax and social contributions, the gross wages were selected; for the profit tax, the gross operating surplus was selected; while for benefits for the unemployed, the number of unemployed persons was selected. All the fiscal data relate to consolidated BiH data based on the Government Financial Statistics (GFS) methodology and consolidated by the Central Bank of BiH for 2008–2016. For projections of 2017–2019, global fiscal framework data were used.

Elasticities of cyclically sensitive components of revenues and expenditures are assessed in two ways: econometrically and non-econometrically.

Elasticities of revenues, expenditures, and macroeconomic bases on cyclical developments in the economy were assessed by using the econometric error correction mechanism (ECM). Box 1 provides a brief description of the ECM method. The applied approach followed the described ECM method. Still, it is necessary to emphasize that the accessibility of data through time series is limited at the BiH level. In principle, only 72 observations were available. As this represents a short time series, the validity of obtained results therefore needs to be interpreted carefully. Whenever the time series are relatively short, as is the case in BiH, and when, in addition to that, changes in the tax system are proportionally frequent, it is justified, and even more reliable, to assess the elasticity in the non-econometric manner. Namely, econometric analysis in such conditions says more about the 'reactivity' of the tax models to changes in the tax system than about the actual elasticity, and, in addition, the values of coefficients of elasticity are not robust and are extremely sensitive to the actual specification of the model that is being assessed. In such situations, the so-called calibration of elasticity coefficients is frequently applied, that is, the use of elasticity coefficients that are not the result of regression analysis but are instead derived from values that have economic meaning.

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[4] Reform Agenda (2015-2018): https://europa.ba/wp-content/uploads/2015/09/Reform-Agenda-BiH.pdf
[5] This includes imports, consumption of households, and expenditures for final consumption.

Box 1: Assessment of elasticity of cyclically sensitive components of the budget

The assessment of elasticity of revenues from value added tax (VAT), excises, income tax, and social contributions in relation to their macroeconomic bases was implemented with an econometric approach in three steps. Before checking the co-integration of revenues and their macroeconomic bases, unit root tests were implemented to determine the order of integration of the variables. The unit root tests were implemented by the augmented Dickey-Fuller (ADF) test. All the variables are non-stationary in levels, but stationary in the first differentials, which meets the necessary condition of first order co-integration between the variables.

In the second step, the co-integration of relevant variables, that is, of individual types of revenues and their macroeconomic bases, was tested. The results of the analysis show the existence of one co-integration vector between the revenues and the corresponding macroeconomic bases.

In view of the presence of a long-term relation, the elasticities were calculated with an ECM, which has the following form:

$$\Delta \ln X_t^i = \alpha + \beta(\ln X_{t-1}^i - \gamma \ln V_{t-1}^i + \phi + \delta t) + \delta_1 \Delta \ln V_t^i + \delta_2 \Delta \ln V_{t-1}^i + \varepsilon \qquad (12)$$

where X_i is the budgetary category expressed in constant prices, V_i is the corresponding macroeconomic base in constant prices, α is a constant, γ is the long-term elasticity of individual category of revenues, β is the parameter that signifies the speed of adjustment to the balanced state, parameters δ_1 and δ_2 are short-term elasticities of revenue in the current and preceding period, and ε is the error in the relation.

Table 1 provides a review of the level of integration of vectors used in the ECM method. The ADF and Phillips-Peron (PP) tests are applied to test the co-integrated relationship and both suggest that all the vectors are integrated I(1) in levels and stationary in first differentials. This is a sufficient condition to proceed with the method but still caution is needed in interpreting the results of the model, as the sample is small. The unit root tests suggest that the vectors are stationary in the first differentials, therefore they follow the I(1) process, and that the residuals follow the I(0) process, which means that they have the average value of 0 when they are selected at random. The critical values and the probability, however, must be taken as potentially incorrect for such a small sample. In any case, considering that the sample is small, the precondition on the basis of both tests is, however, met for the estimation of the co-integration and regression with ECM, whose results are present in Table 2.

Table 1: Level of integration indicated through ADF and PP tests

Vectors (level)	ADF	PP	Vectors (level)	ADF	PP
Revenue from income tax	I(0)	I(0)	Revenue from income tax	I(1)**	I(1)*
Revenue from profit tax	I(0)	I(0)	Revenue from profit tax	I(1)**	I(1)**
Indirect taxes	I(0)	I(0)	Indirect taxes	I(1)**	I(1)**
Social contributions	I(0)	I(0)	Social contributions	I(1)**	I(1)*
Other revenues	I(0)	I(0)	Other revenues	I(1)**	I(1)**

Note: In each of the tests, Ho: series is characterized by unit root. Significant result suggests the rejection of Ho.
** significant at the 1 percent level or better.
* significant at the 5 percent level or better.

The econometric results from the co-integration and regression with ECM suggest that all the assessed results, both statistically and economically, are significant in those regressions. In BiH, both the cyclically sensitive variables on the expenditure and revenue side are shown to affect revenues between 2 and 4 percent. The coefficients of social security contributions are the largest, suggesting that the effect of this variable is 33 percent. It should be emphasized that the sample is

very small, which casts doubts over the entire result. However, to be sure about the findings, additional diagnostic tests were undertaken and it was found that there are no major discrepancies from usual practice (Figure 2).

Table 2: Econometric model

| Econometric method						
Revenues (dependent variable)						
Cointegrated regression				Error correction method (ECM)		
Variables	(static OLS)			Vektori:	(dynamic OLS)	
Revenue form income tax	0.04***		(13.06)	Revenue form income tax	0.04***	(14.41)
Revenue form profit tax	0.02***		(10.8)	Revenu from profit tax	0.03***	(10.53)
Indirect taxes	0.3***		(81.26)	Indirect taxes	0.31***	(43.32)
Socia contributions	0.33***		(40.67)	Social contributions	0.34***	(22.67)
Other revenues	0.3***		(99.20)	Other revenues	0.3***	(124.05)
Constant	1.27***		(47.98)	Constant	-0.00	(0.56)
				ECM(-1)	-1.62**	(-2.61)
Diagnostic tests for cointegrated regression				*Diagnostic tests for the ECM*		
R-sqr	0.999			R-sqr	0.999	
Adjusted R-sqr	0.999			Adjusted R-sqr	0.999	
S.E	0.000			S.E	0.000	
F statistic	69819.52			F statistic	9125.258	
Probability (F-statistics)	0.000			Probability (F-statistics)	0.000	
DW	2.252			DW	2.21	
ADF test for residual		Probability				
test statistics:	-3.49 (0)**	0.033				
test of critical values						
	1%	-4.20				
	5%	-3.17				
	10%	-2.72				

Note: ** and *** point to rejection of the null hypothesis at 5% and 1% critical values, respectively.

OLS is Ordinary Least Squares method, and DW stands for Durbin-Watson test statistics

The lagged ECM that measures the speed of adjustment of revenues was estimated to be −1.62.

The coefficient itself has the expected sign; however, the fact that the coefficient is above 1 suggests potential instability of the model and excessively fast adjustment from short-term to long-term equilibrium, even more than 100 percent per year.

Considering that BiH is going through structural changes, such a high speed of adjustment could be interpreted in accordance with ongoing reform processes. As an alternative, however, a CUSUM test was performed, which, if within the limit of 5 percent, is an indicator of structural stability of the model. Figure 2, therefore, still confirms that the model, set in this manner, is stable. Because of the small number of observations, it is necessary to work on building the time series in BiH to be able to test the stability of the model and confirm the estimated result.

Figure 2: Stability test of the CUSUM model
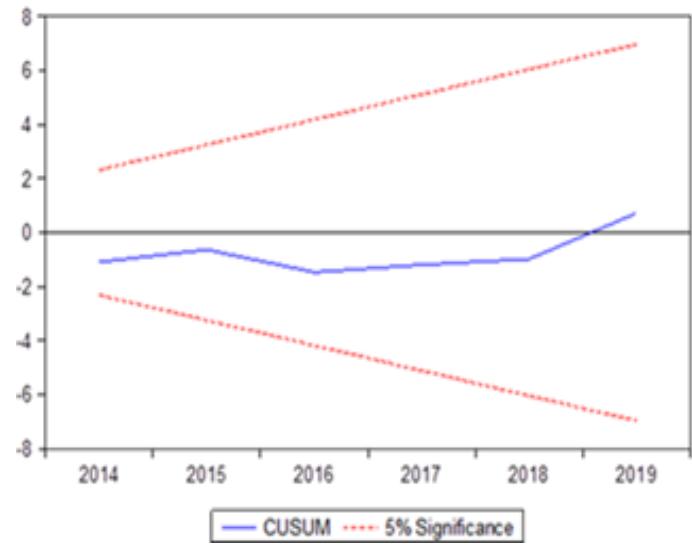
Source: Author's calculations. CUSUM test is based on the cumulative sum of the recursive residuals. The test finds parameter instability if the cumulative sum goes outside the area between the two critical lines.

Table 3 provides the review of elasticity of revenues and expenditures according to the semi-aggregated methodology of the EC. The method used by the EC t is used in assessing compliance with the rules of the Compact for Stability and Growth. As the EC places a lot of emphasis on the calculation of the CAB and in view of the requirements of the EC from BiH under the process of the ERP, BiH is under the obligation to report its compliance with the set standards of the EC.

Table 3: Elasticities of budgetary revenues and expenditures

	Average share in total revenues/expenditures	Elasticity of the component of the budget in relation to the base	Elasticity of the base compared to the gap of aggregate production	Total elasticity
Semi-aggregate method of the EC				
Total revenues		-	-	0.61
Revenue from income tax	0.04	1.46	0.73	1.06
Revenue form profit tax	0.03	1.57	1.00	1.57
Indirect tax	0.30	0.97	1.00	0.97
Social contributions	0.33	0.97	0.73	0.70
Other revenues	0.30	0.00	0.00	0.00
Total expenditures	1	-	-	-0.09
Unemployment benefits	0.01	1.00	-6.91	-6.91
Other expenditures	0.99	1.00	0.00	0.00

Source: Author's calculations.

From Table 3, the elasticity of total revenues used in the semi-aggregate method of the EC equals 0.61. The assessed elasticity of total revenues was acquired by weighting the elasticities of selected fiscal variables on their macroeconomic bases and of macroeconomic bases on the gap of aggregate production. Regarding the total expenditures, it was assumed that the expenditures did not react to cyclical developments in the economy, excluding unemployment benefits, and therefore the elasticity is, as expected, close to 0, as their share in total expenditures is very small.

The total cyclical sensitivity was calculated by weighting the total elasticity of revenues and expenditures with their shares in the GDP. In the period under review, the total cyclical sensitivity of the budget, that is, automatic fiscal activity, amounted to 0.32. In other words, if the aggregate production grew by 1 percent, the share of the budget balance in the GDP may be expected to increase by (average) 0.32 percentage points. By multiplying the gap of aggregate production and the total cyclical sensitivity, the cyclical component of the budget is acquired. Table 4 shows the comparative review of BiH and countries of the EU, in addition to the detailed calculation of the total cyclical sensitivity for each of the countries. The total assessed cyclical sensitivity of the fiscal balance of BiH does not diverge from the results in the EU countries, which is certainly in compliance with expectations, and suggests that the econometric model is well set.

Table 4: Comparative review and decomposition of the total cyclical sensitivity

	Elasticity of:				Weights (% of GDP) of:		Semi-elasticity for:		
	Revenue level	Expenditure level	Revenue to GDP ratio	Expenditure to GDP ratio	Total revenue	Total expenditure	Revenue	Expenditure	Budget balance
	(a)	(b)	c = a-1	d = b-1	(e)	(f)	g = c*e	h = d*f	i = g-h
BE	1.03	-0.17	0.03	-1.17	49.05	50.70	0.02	-0.59	0.61
BG	0.78	-0.03	-0.22	-1.03	37.75	38.10	-0.08	-0.39	0.31
CZ	0.97	-0.02	-0.03	-1.02	39.91	43.77	-0.01	-0.45	0.43
DK	1.00	-0.14	0.00	-1.14	55.75	54.34	0.00	-0.62	0.62
DE	0.98	-0.21	-0.02	-1.21	44.00	46.45	-0.01	-0.56	0.55
EE	1.10	-0.10	0.10	-1.10	37.63	36.99	0.04	-0.41	0.44
IE	1.05	-0.24	0.05	-1.24	35.20	41.14	0.02	-0.51	0.53
EL	0.94	-0.05	-0.06	-1.05	39.93	48.06	-0.02	-0.51	0.48
ES	1.03	-0.28	0.03	-1.28	38.14	41.13	0.01	-0.53	0.54
FR	1.00	-0.11	0.00	-1.11	49.90	54.11	0.00	-0.60	0.60
HR	0.97	-0.02	-0.03	-1.02	40.48	46.96	-0.01	-0.48	0.47
IT	1.08	-0.03	0.08	-1.03	45.14	48.77	0.04	-0.50	0.54
CY	1.18	-0.04	0.18	-1.04	40.27	43.47	0.07	-0.45	0.52
LV	0.92	-0.07	-0.08	-1.07	35.08	38.26	-0.03	-0.41	0.38
LT	1.07	-0.08	0.07	-1.08	32.92	36.13	0.02	-0.39	0.41
LU	1.01	-0.08	0.01	-1.08	41.87	41.09	0.00	-0.44	0.45
HU	0.96	-0.01	-0.04	-1.01	44.97	50.33	-0.02	-0.51	0.49
MT	1.02	-0.03	0.02	-1.03	39.48	43.74	0.01	-0.45	0.46
NL	1.15	-0.22	0.15	-1.22	45.25	47.37	0.07	-0.58	0.65
AT	1.02	-0.12	0.02	-1.12	48.49	50.77	0.01	-0.57	0.58
PL	1.07	-0.13	0.07	-1.13	38.78	43.79	0.03	-0.49	0.52
PT	0.95	-0.13	-0.05	-1.13	41.08	46.42	-0.02	-0.53	0.51
RO	0.86	-0.04	-0.14	-1.04	32.97	36.78	-0.05	-0.38	0.34
SI	0.99	-0.04	-0.01	-1.04	43.46	46.49	-0.01	-0.48	0.48
SK	0.99	-0.03	-0.01	-1.03	34.23	38.62	-0.01	-0.40	0.39
FI	0.94	-0.18	-0.06	-1.18	53.13	51.08	-0.03	-0.60	0.57
SE	0.96	-0.15	-0.04	-1.15	53.99	53.13	-0.02	-0.61	0.59
UK	1.30	-0.03	0.30	-1.03	40.36	45.60	0.12	-0.47	0.59
BiH	0.61	-0.09	-0.39	-1.09	42.94	44.74	-0.17	-0.49	0.32

Source: EC, author's calculations.

To further test the validity of the results, the calculation of total cyclical sensitivity was also performed non-econometrically (Table 5). During 2008–2016, the average elasticity of budgetary

revenues was between 0.64 and 0.75. The average elasticity of expenditures, caused by the small share of unemployment benefits in total budget expenditures, is close to 0. The total cyclical sensitivity, calculated as the sum of the cyclical sensitivity of budgetary revenues and expenditures, weighted by the share of budgetary revenues and expenditures in the GDP for the period under review, amounts to between 0.29 and 0.32. In other words, if the gap of aggregate production grew by 1 percent, the share of budget balance in the GDP can be expected to increase by (in average) 0.30 percentage points.

Table 5: Total cyclical sensitivity of the budget

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Average cyclical sensitivity of revenues	0.75	0.64	0.68	0.73	0.69	0.70	0.70	0.67	0.69
Average cyclical sensitivity of expenditures	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Share of revenues in the GDP	0.43	0.42	0.43	0.43	0.44	0.43	0.44	0.43	0.43
Share of expenditures in the GDP	0.00	0.46	0.45	0.45	0.46	0.45	0.46	0.43	0.43
Total cyclical sensitivity	**0.32**	**0.26**	**0.29**	**0.31**	**0.30**	**0.29**	**0.30**	**0.29**	**0.29**

Source: Author's calculations.[6]

By comparing the econometric and non-econometric method, a very similar result is found, this suggests that the total cyclical sensitivity of the fiscal balance amounts to between 0.30 and 0.32. Therefore, both the econometric and non-econometric method arrive at an almost identical result. In view of the adequate results of econometric diagnostic, the coefficient of 0.32 is applied in calculations going forward.

3.3. Cyclically Adjusted and Structural Budgetary Balance
To calculate the CAB in BiH, it is necessary to assess the cyclical component, defined as the automatic increase or reduction in revenues and expenditures, depending on the phase of the economic cycle. Therefore, by calculating the cyclical sensitivity with the gap of aggregate production, the cyclical component of the fiscal balance is obtained. When the cyclical component of the budget was subtracted from the actual fiscal balance, the cyclically adjusted fiscal balance—the CAB—was obtained. While calculating the structural fiscal balance, the effect of one-off and discretionary measures of fiscal policy should be excluded from the CAB (Appendix 1).

The structural balance facilitates the assessment of the character of fiscal policy, that is, an answer to the question of whether the fiscal policy was stabilizing or procyclical. The cyclical nature of fiscal policy is determined by comparing the annual change in the cyclically adjusted primary balance and a certain indicator of the condition of the economic cycle.[7] As the cyclical indicator of the condition of the cycle, the level of the output gap is assessed. For example, an increase in deficit, that is, reduction of the surplus, during the period when the output gap is positive, suggests a procyclical fiscal policy.

Before analyzing the cyclical nature of fiscal policy in BiH, it is important to emphasize that, on the basis of changes in the primary structural budgetary balance, a conclusion on the character of

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[6] Working document in Excel is available upon request.

[7] As expenditures for interest in the current year are, for the most part, not under control of the fiscal policy setters, in assessments of fiscal effects of discretionary measures one often uses the cyclically adjusted primary budgetary balance, that is, the balance reduced by expenditures for interest.

fiscal policy can be made in a particular year. For example, it is possible to answer the question of whether, during a particular year, the fiscal policy was expansionary or restrictive. The annual increase (reduction) of the structural deficit (surplus) or, in other words, an increase (reduction) in economic resources in the country, points to expansionary (restrictive) character of the fiscal policy.

Figure 3: Character of fiscal policy in BiH
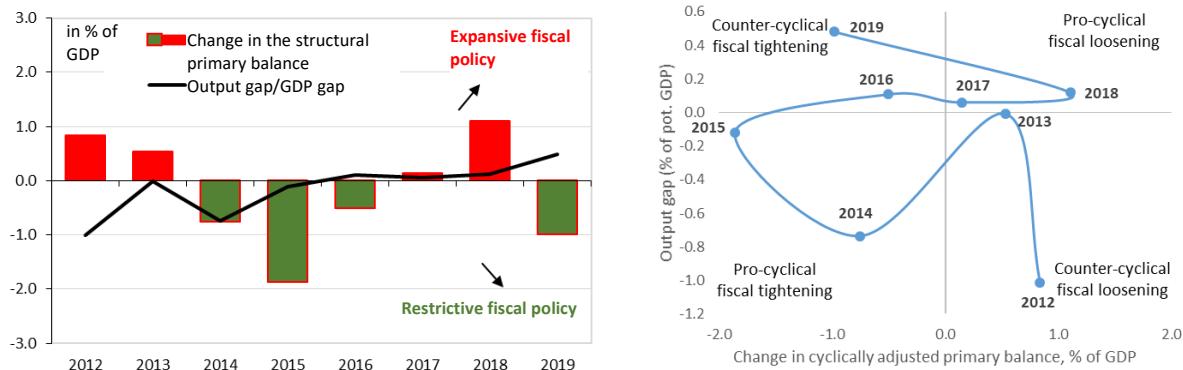
Source: Ministries of Finance, Central Bank, BiH Agency for Statistics, author's calculations.

For the period for which data were available, the calculations of BiH fiscal policy stance showed interesting results. It is evident from Figure 3 that in 2012 and 2013 stabilization geared expansionary fiscal policy, while in 2014 and 2015, fiscal policy in BiH was restrictive and of procyclical character. That result is especially interesting as BiH had been affected by floods in 2014 and seemed without significant support from the fiscal policy. That may be a result of the fact that the rehabilitation of flooded areas had not affected the BiH budget, but instead, for the most part general reduction in economic activities affected the budget. The expected effect of support from fiscal policy is not visible in 2015, either, as fiscal policy was even more restrictive compared to 2014. The last year for which executions are available is 2016, and in that year the consolidated data for BiH suggest that the authorities are continuing to lead a restrictive fiscal policy. In view of the position of the BiH economy in relation to the economic cycle, however, a policy of stabilization character was led. According to the most recent global fiscal balance and policies framework in BiH (2018–2020), the data suggest a U-turn in the fiscal policy in the direction of leading a procyclical expansionary policy. Such a turn would be driven by planned significant investments in capital projects.

To acquire an impression on whether BiH is an outlier in international terms in the period under review, compared to member states of the EU, the change in the CAB and its developments in BiH are compared. Table 6 shows the change of the cyclically adjusted budget balance of BiH and member states of the EU in from 2012 to 2019, wherein the calculations for the member states of the EU were taken from the EC.

From 2012 to 2014, the data suggest that BiH implemented a fiscal policy that differs from the average direction of developments of fiscal policy within the EU. In 2015, BiH belonged to the group of countries that had led the most restrictive fiscal policies. While in 2016 BiH did not differ from the EU average, in 2017 BiH attempted to implement one of the most expansive fiscal

policies in Europe. According to available projections, in 2018–2019, BiH plans to start the process of fiscal consolidation, somewhat more strongly than the majority of EU member countries.

Implementation of adequate fiscal policy is therefore crucial for maintaining the stability of public finances. Consequently, in good years, BiH authorities should make an effort to save, so that savings can be used in the years of slow growth or weather-related shocks. In the earlier years, when growth was low, consolidated data suggests that BiH had led stabilization-geared expansionary fiscal policy, while in later years the fiscal policy in the country was restrictive and procyclical. According to the most recent global fiscal balance and policies framework the fiscal policy goes in a direction of procyclical expansionary policy, somewhat more strongly than is the case with the majority of countries of the EU (table 6). Without sufficient inflows of FDI's currently at only 2.8 percent of GDP, decrease in unemployment (currently 20.5 percent) and moderate debt levels (around 40 percent of GDP), this may not be sustainable. It is of a crucial importance for the BiH policy makers to make sure to coordinate fiscal policy that is implemented at the entity levels. Prudent, efficient, and effective fiscal policy that addresses persistent unemployment and safeguards the financial sector needs remains central in BiH. Given the currency board arrangement, fiscal policy remains the only macroeconomic lever to respond to economic shocks, so it is of utmost importance to use it well.

Table 6: Cyclical nature of fiscal policy in the countries of the EU and BiH

	2012	2013	2014	2015	2016	2017	2018	2019
EU	-0.8	-1.2	0.1	-0.1	-0.4	-0.1	0.1	0.0
BE	-0.4	-1.4	0.2	-0.4	0.0	-0.8	0.1	0.2
BG	-1.9	-0.1	4.8	-3.7	-1.3	0.1	0.2	-0.1
CZ	0.6	-3.3	1.0	-0.3	-1.4	0.1	0.4	0.2
DK	1.1	-2.2	-1.9	3.0	-1.0	0.7	0.2	0.0
DE	-1.1	-0.4	-0.2	-0.3	-0.2	0.0	0.0	-0.1
EE	2.5	-0.2	-0.6	0.2	0.2	0.5	0.4	0.0
IE	-5.4	-2.3	-0.1	-1.2	-1.2	-0.4	-0.8	-0.8
EL	-3.4	4.1	-8.4	2.8	-5.6	2.8	-0.8	1.3
ES	-0.4	-4.0	-0.3	0.9	0.5	-0.3	0.1	-0.2
FR	-0.8	-0.9	-0.2	-0.3	-0.1	-0.3	0.4	0.2
HR	-3.3	-0.3	-0.4	-1.1	-1.6	0.9	0.7	0.1
IT	-1.7	-0.7	0.2	0.2	0.5	0.3	0.2	0.4
CY	-1.6	-2.6	4.1	-5.9	-0.3	0.6	0.4	0.1
LV	-1.7	0.4	0.5	0.3	-1.1	1.3	0.0	-0.2
LT	-4.8	0.1	-1.4	-0.4	-0.3	0.7	0.0	-0.1
LU	-1.1	-0.2	0.8	0.1	-0.1	1.4	0.3	0.0
HU	-3.9	0.7	1.1	-0.2	-0.1	0.7	0.8	-0.1
MT	0.9	-0.7	0.8	-0.4	-2.7	0.3	0.2	-0.2
NL	-1.4	-1.9	0.3	0.4	-2.0	0.5	0.7	0.0
AT	-0.5	-0.7	0.7	-1.6	0.5	-0.2	0.1	-0.1
PL	-2.1	-0.4	-0.4	-0.6	-0.2	-0.2	0.2	0.2
PT	-3.1	-0.9	2.9	-2.0	-2.0	0.1	0.3	-0.1
RO	-2.1	-1.0	-0.5	-0.3	2.5	0.7	1.0	0.3
SI	-3.9	10.1	-8.4	-1.8	-0.1	0.2	0.0	-0.2
SK	-0.3	-1.9	0.2	0.4	-0.3	-0.4	-0.4	-0.7
FI	0.3	0.0	0.2	-0.7	-0.4	0.7	0.4	-0.1
SE	-0.3	0.1	0.4	-0.6	-0.7	0.3	0.1	0.0
UK	1.0	-2.2	1.0	-0.7	-1.1	-0.8	-0.3	-0.6
BiH	0.3	0.5	-0.4	-2.5	-0.5	2.7	-1.3	-1.0

Note: The intensity of the color reflects a country's fiscal position. Colors range from green, meaning a budget surplus, to yellow (relative balanced budget) and red (deficit).
Source: EC and author's calculations.

4. Conclusion

Being a transition economy with clear aspirations of becoming an EU candidate country, which is evident from a submitted detailed Questionnaire to the European Commission, the importance of correct assessment and analysis of the potential GDP and the cyclical sensitivity of fiscal policy, as well as the impact of the initiated reform processes on the developments of the potential GDP, the output gap, and the character of the fiscal policy is of great importance. In addition to BiH's obligation to report the CAB indicator to EC through the its regular ERP process, analyzing the fiscal position for carrying evidence-based fiscal policy is of utmost importance to respond to economic developments and shocks.

This paper assesses the cyclical nature of fiscal policy in BiH from 2008 to 2019. For that purpose, the cyclically adjusted fiscal balance was calculated for the first time for BiH and the character of the BiH fiscal policy was analyzed by performing a dynamic comparison of the primary structural balance and the size of the output gap, as an indicator of the condition of the cycle in the economy. The quality of data, adequate calculation, and comprehensive analysis and interpretation are of great significance for understanding of directions of the fiscal policy. Two methods—econometric and non-econometric method -- were applied in this work. The results showed consistency of both methods, considering that in this paper only data for the consolidated level of BiH were used. The non-econometric method, however, was also tested on consolidated entity-level data to confirm the consistency of the results.

The global financial crisis and the public debt crisis in individual member states of the EU and in the Western Balkans have confirmed that the implementation of adequate fiscal policy is a necessary condition for maintaining the stability of public finances. Countries that had, in times of strong growth, realized a high cyclically adjusted deficit, such as Greece, Portugal, and Hungary, faced, with the onset of the crisis, lack of confidence among investors in the sustainability of their public finances. The analysis shows that BiH had, in 2012 and 2013, led stabilization-geared expansionary fiscal policy, while in 2014 and 2015 the fiscal policy in BiH was restrictive and procyclical. These results are especially interesting because BiH had been affected by floods in 2014 and seemed to be left without significant fiscal policy response to this economic shock. Furthermore, in 2015, BiH belonged to the group of countries that had led one of the most restrictive fiscal policies. In 2016, the data suggest that fiscal policy continued to be a restrictive, however, in interpretation of the cycle, that policy had a stabilizing character. According to the most recent global fiscal balance and policies framework in BiH (2018–2020), the data suggest a U-turn in the direction of fiscal policy toward a procyclical expansionary policy, somewhat more strongly than was the case with the majority of countries of the EU.

In future research, it would be desirable to pay more attention to other methods, such as the method of the ECB, to calculate the cyclical sensitivity of the fiscal balance. In addition, a possible direction of research could improve the calculations of potential GDP by using the production function and applying multivariant filter, conditional on the long enough length of the time series to facilitate such a type of analysis. Drawing conclusions on the stability of the acquired series of potential GDP by using various methods would also add value to the fiscal policy assessment.

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Appendix: Detailed Excel-based Calculations

	A	C	D	E	F	G	H	I	J	K
1		BDPnom_hp (u BAM)	3DPreal (u BAM)	Preal_hp (u BAM)		Real GDP	Potential GDP	Output gap / GDP gap	0.32	Cyclical component
5	T	25,212.1	25,146.7	25,414.4	-2.8	-3.0	-0.3	=+D5/E5*100-10		=+I5*J1
6	T + 1	25,489.1	25,365.0	25,396.4	2.3	0.9	-0.1	-0.12		-0.04
7	T + 2	25,861.1	25,607.4	25,470.5	3.4	1.0	0.3	0.54		0.17
8	T + 3	26,322.7	25,396.3	25,656.2	0.0	-0.8	0.7	-1.01		-0.33
9	T + 4	26,927.5	25,993.4	25,995.2	2.1	2.4	1.3	-0.01		0.00
10	T + 5	27,713.5	26,292.2	26,487.4	2.2	1.1	1.9	-0.74		-0.24
11	T + 6	28,694.4	27,100.4	27,132.3	4.5	3.1	2.4	-0.12		-0.04
12	T + 7	29,827.7	27,928.6	27,898.4	4.6	3.1	2.8	0.11		0.03
13	T + 8	31,052.9	28,766.5	28,749.1	4.1	3.0	3.0	0.06		0.02
14	T + 9	32,321.5	29,687.0	29,652.3	4.3	3.2	3.1	0.12		0.04
15	T + 10	33,598.5	30,726.1	30,579.0	3.6	3.5	3.1	0.48		0.16

		K	L	M	N	O	P	Q	R	S
1		Cyclical component	Actual balance (Fiscal data)	Actual balance (in % of GDP)	Actual primary balance (Fiscal data)	Actual primary balance (in % of GDP)	Cyclically adjusted balance	One-off measures (in % of GDP)	Structural primary balance	Change in the structural primary balance
5	T	-0.34	-1070.02	-4.31	-946.10	-3.82	=+M5+-K5	-0.6	-2.86	
6	T + 1	-0.04	-611.87	-2.41	-489.17	-1.93	-2.37	-2.2	0.32	=-(R6-R5)
7	T + 2	0.17	-322.72	-1.23	-161.31	-0.61	-1.40	-1.1	0.28	0.04
8	T + 3	-0.33	-526.90	-2.01	-326.31	-1.24	-1.68	-0.4	-0.56	0.84
9	T + 4	0.00	-579.16	-2.16	-378.11	-1.41	-2.16	-0.3	-1.09	0.53
10	T + 5	-0.24	-555.30	-2.03	-316.36	-1.16	-1.79	-0.6	-0.33	-0.75
11	T + 6	-0.04	187.34	0.66	451.67	1.58	0.69	0.1	1.53	-1.86
12	T + 7	0.03	370.47	1.24	622.48	2.08	1.20	0.0	2.04	-0.50
13	T + 8	0.02	-461.80	-1.48	570.47	1.83	-1.50	-0.1	1.89	0.14
14	T + 9	0.04	-67.70	-0.21	251.72	0.77	-0.25	0.0	0.78	1.11
15	T + 10	0.16	317.80	0.94	619.73	1.84	0.79	-0.1	1.77	-0.98