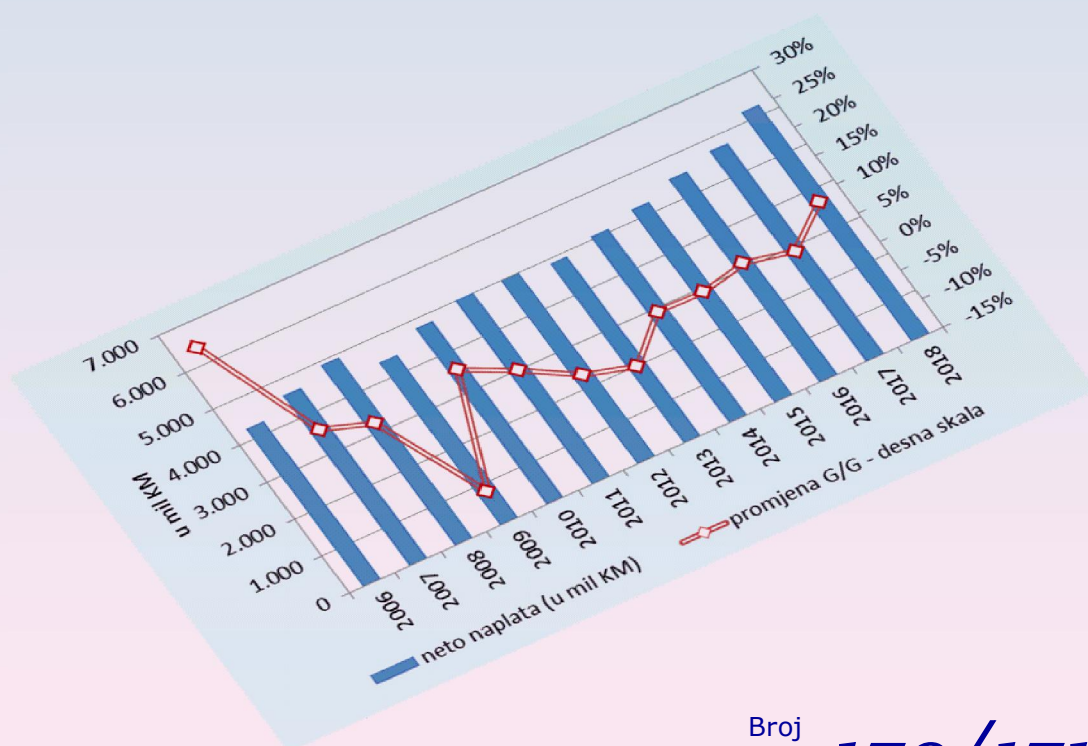




Macroeconomic Unit of the Governing Board of the Indirect Taxation Authority

# ОМА Билтен



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## With this issue

According to the cash flow report on the ITA SA 700,5 million BAM of gross indirect tax revenues was collected in August, which is 1,8% more than in the same month of 2018. At the same time, refund payments were reduced by 23,8 million BAM. The growth in gross collection and reduction in refunds had cumulatively a positive effect on net collection in August, which was higher by 6,5% or by 35,4 million BAM in comparison with August 2018 (Chart 1). The main factor affecting the growth of revenues in August was a large decrease in VAT refunds (Chart 2), whose contribution to the net revenue surplus in August amounted even 74%. On the other hand, the strong increase in revenues from excises on oil derivatives was largely neutralized by the fall in collection of excises on tobacco and other products, while the stabilization in domestic VAT collection could not offset decline in the collection of VAT on imports.

Chart 1

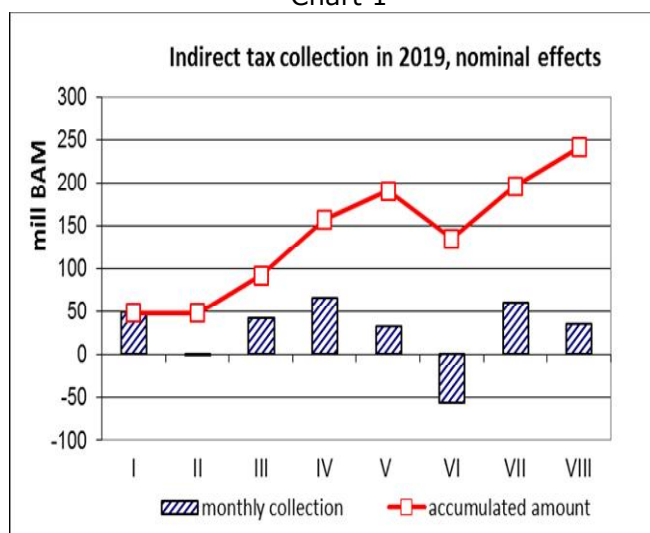
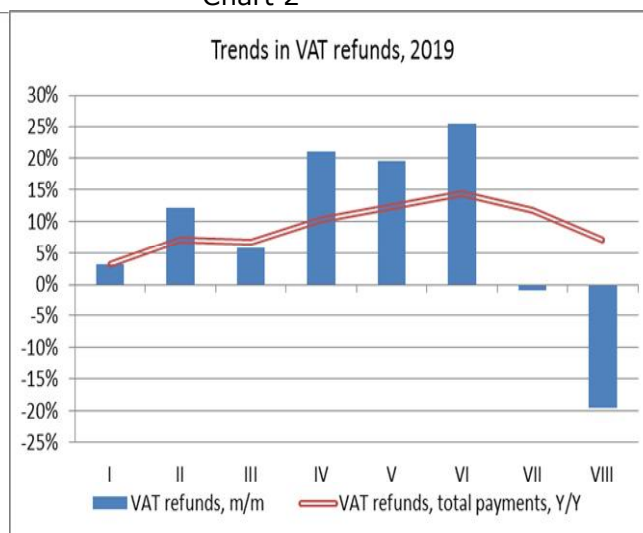


Chart 2



The rise in the collection of indirect tax revenue in August increased the accumulated surplus of revenue so far. The net collection of indirect taxes in the period January - August 2019 increased by 240,7 million BAM or by 6% (Chart 1). Chart 2 indicates a positive trend in VAT refund payments over the last two months. The rate of VAT refund growth is halved in comparison with the semi-annual trends. A fall in the payment of refunds can be linked to a fall in exports and a slowdown in imports and investments. Considering that the increase in revenues includes the impacts of changes in the Law on Excise Duties (in effect as of 1<sup>st</sup> February 2018), it is necessary to exclude the impact of changes related to the increase in rate of earmarked road tax, whose effects were manifested in January 2019. This effect amounted 0,5 percentage points, and after its exclusion, the growth rate of indirect tax collection in the period January - August 2019 amounted 5,5%.

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## Quality of forecasts of tax revenues

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### Introduction

Each forecast is associated with a high level of uncertainty of realization. Preparing forecasts of tax revenues is not only an activity with uncertain result, but also a complex job for several reasons. Tax systems and tax structures are extremely complex, accompanied by complex tax legislation (the so called "tax jungle") and frequent changes carried out by governments, even during the fiscal year. Macroeconomic forecasts, historical and current trends in tax collection must be taken into account when preparing the forecasts of tax revenues. The uncertainty increases due to the direct impact of behaviour of taxpayers, who are obliged by law to pay taxes, and the final consumers, who *de facto* bear the tax burden on the collection of tax revenues. Tax discipline and tax psychology, especially at the moment of changes in the tax regulations, have a big influence on the collection of tax revenues. The ability to anticipate company and consumer responses to certain measures are of major importance for tax revenue forecasts, especially in the case of monopoly market, when tax collection depends on the business strategies of the monopolist. In this regard, the elasticity of consumption has to be taken into account in relation to price changes caused by changes in tax rates.

Preparing tax forecasts is a sensitive issue because they have a great significance - for governments, because of budget financing, and for taxpayers, because of the expectations about the tax burden on the economic capacity of individuals (i.e. income, property and consumption) or legal entities (profit). Furthermore, tax revenue forecasts are also important for monetary authorities, international financial institutions, credit rating agencies, large companies and financial markets, not only in terms of assessing the future financial position of the government in light of the ability to execute the undertaken or future commitments, but also because of the analysis of attractiveness of investing in economy and other forms of investment.

The above reasons lead to the conclusion that the forecast of tax revenue must be approached with caution. Standard practice requires revenue forecasts to be revised during the fiscal year, and after the fiscal year has ended, it is necessary to analyze deviations of forecasts relative to actual revenue collection. It is customary that quality of revenue forecasts is measured only quantitatively - by comparing deviations of the outturn relative to its forecasts, often referred to as "forecasts errors" in literature and practice. In order to make a judgment on the quality of the forecasts of tax revenue, it is not enough just to determine the forecast error, but to detect the causes of the deviations and publish them in the light of the application of the pillars of transparency of public finances.

### Dimensions of the revenue forecasts quality evaluation

Quality of revenue forecasts is usually measured by the results - actual revenue collection. The accuracy of forecasts, according to the European Central Bank (ECB), has two aspects (Leal et al., 2007). It is common to test the accuracy of the forecast in a quantitative sense, as a deviation of outturn relative to its forecasts. However, there is also a qualitative approach, which refers to the capacity of the forecaster to predict the direction of the collection movement in the final outturn. The key elements for understanding the efficiency or rationality of forecasts is the availability of information at the time of preparing of forecasts, in terms of data, government measures and policies, as well as using of such information, in terms of access, methods and procedures. In this respect, the assessment of the quality of forecasts should also include the analysis of the features of forecasts, principles, methodology, inputs and assumptions on which the forecasts were based. The quality of revenue forecasts is also influenced by the horizon of planning, in terms of

decreasing accuracy and increasing the uncertainty of realization of the assumptions on which forecasts were based over time, as well as by the presentation format of forecasts, in terms of wealth of information and content. It should be borne in mind that the assessment of the effects of future tax measures is subject to a high degree of risk, as they are being prepared in advance, *ex ante*. On the other hand, the *ex post* evaluation of the effects of tax measures is complex because it is very difficult to distinguish the impact of tax measures on the collection of taxes from the effects of other factors, such as widening of the base, moving within the base, efficiency of revenue collection, unexpected macroeconomic trends, etc.

### *Characteristics of the forecasts*

The ECB defines three qualitative features of fiscal forecasts - unbiasedness, efficiency and accuracy (Leal et al., 2007). The unbiasedness of the forecasts is observed from the aspect of costs of forecast errors. They are not symmetrical, since, from the aspect of costs, it is not the same if outturn fails regarding its forecasts and if the outturn exceeds its forecasts for the same amount of revenue. Golosov and King (2002) argue that the fiscal deficit that arose from the overestimated revenue forecasts is more costly for the government than the fiscal surplus in the same amount as a result of underestimated forecasts. Asymmetry of government costs in these two situations to some extent justifies the wilfully set lower revenue forecasts. The research on tax revenue forecasts errors conducted by Chatagny and Soguel (2012) on the revenue forecasts in Swiss cantons in the time range from 1980 to 2002 showed that conservative forecasts of tax revenues reduce the deficit as they lead to a reduction in public expenditures, while the overoptimistic revenue forecasts increase fiscal deficits. The ECB concludes that governments have an interest in presenting pessimistic forecasts in order to build in a safety margin that would allow them to meet budgetary targets, also in case of revenue slippages (Leal et al., 2007).

### *Methodology of preparing a forecast*

The ECB analysis (Leal et al., 2007) has shown that national fiscal policy agencies implement revenue forecasting procedures that include different methodologies such as judgments, simple regression equations, time series methods, structural macroeconomic models, or combinations of different models. The analysis showed the polarization of methodologies in terms of combining judgment and simple methods against more complicated or automated techniques.

According to the ECB (Leal et al., 2007) research, the practice of preparing revenue forecasts in institutions of developed countries differs from the practice in international institutions. Selection of a forecasting method depends essentially on the goals of an agency that prepares forecasts. The detailed fiscal forecasting model is the most common method of forecasting in developed countries (UK, USA, Australia, Germany, EU, OECD). It is also common to use the judgments and macro models, as well as *bottom-up* approach from micro data to macro level.

A combination of multiple approaches is necessary for several reasons. Macroeconomic models are not sufficiently detailed to take into account all revenue analytics, fiscal developments and policies. ECB (Leal et al., 2007) emphasizes that exclusively reliance on macroeconomic models can weaken the importance of preparing budget forecasts, as fiscal forecasters try to produce detailed revenue forecasts. Macroeconomic models are mainly based on quarterly national accounts statistics, while the budgeting is based on annual data. Using quarterly macro statistics for fiscal purposes can be complex and challenging, especially in terms of time needed for preparing, given the "crowded" budget calendar. On the other hand, monthly and quarterly fiscal developments are heavily burdened by the impact of special factors, which makes difficult to project revenue on a yearly basis. Also, it is very complicated to include detailed tax information, tax parameters and tax policies into macro models.

Judgments are of great importance for fiscal forecasts and together with fiscal model represent another segment of forecasts. They can be the product of estimates of the experts from different institutions regarding the effects of the functioning of the institutions, the effects of tax policy measures or temporary or specific government measures.

Researching the practice of preparing revenue forecasts in the 12 most developed members of the OECD, Buettner and Kauder (2009) have noted that some countries use a micro simulation method in cases of focusing on certain taxpayers (households or corporations) for which the calculation of tax revenues is made individually and then aggregated. This approach is usually used in forecasting the profit tax of corporations.

### *Revenue forecasting pillars*

The basic pillar in revenue forecasting requires caution and a realistic approach. In order for annual or medium-term revenue forecasts to be based on realistic assumptions, it is necessary to take publicly available information on policy changes already adopted by the parliament as well as on the measures of governments for which it is certain to pass the parliamentary procedure.

### *Inputs for forecasts*

ECB (Leal et al., 2007) defines main inputs - sources of assumptions for fiscal forecasts:

- Budget Law and Guidelines
- Updated stability and convergence programmes
- Current revenue developments
- Supplementary budget to correct budget plans within the current year
- Implemented tax reforms or fully defined tax reforms for the coming years.

Persons involved in making revenue forecasts must also take into account temporary government measures in the sphere of taxes that *de facto* have the character of one-off measures. Temporary measures that may influence the collection of revenues do not have to be associated with the formal regulation or government act, but can represent a change in the tax administration's procedures in relation to the previous fiscal years. One-off effects can result from a change in taxpayers' behavior regarding compliance with tax regulations. In addition, a one-off effect on tax revenue growth may also result from the collection of old tax debts accumulated from previous tax periods. The effects of one-off measures have a different impact on forecasts. In the year of their appearance they directly influence the collection of taxes. In the coming years it is necessary to exclude their effect in order to avoid distorting the trend.

### *Planning horizon*

Planning horizon is crucial for the quality of forecast, since longer horizon implies lower accuracy of the forecasts. Regarding the length of the planning horizon, short-term, mid-term and long-term forecasts of tax revenues are being prepared.

*Short-term* forecasts are prepared for budget purposes and cover a period of up to one year. Forecasts are prepared by government agencies based on monthly and quarterly revenue collection data. Short-term forecasts are significant in the process of revising annual revenue forecasts, and since they rely on current collection trends, they represent an "early alert signal" in the event of serious distortions and deviations of trend from the annual forecasts, especially when the year approaches its end.

*Medium term* forecasts cover a period of 2 to 5 years. They are being prepared for finance ministries for the purpose of planning economic and fiscal policies. Medium term forecasts are being prepared for the needs of stability and convergence programmes in the EU. Medium term forecasts used for national fiscal planning are detailed in terms of revenue categories, while those for EU supervisory purposes only include forecasts of the main types of revenues for the general government level. Medium term revenue forecasts are also being developed by the European Commission, ECB, IMF, OECD, central banks and research institutes for the purpose of estimating the effects of fiscal policy on the economy, and for identifying possible risks for the achievement of goals set by the government. The medium term forecasts of these organizations enable interested entities to have access in the implementation of fiscal policy and to actively participate in discussions at the national and international level. Macroeconomic forecasts are of great importance for the quality of medium term forecasts. Transparency of macroeconomic assumptions which are the base for fiscal forecasts is important for a proper assessment of fiscal policy, as well as for comparison with forecasts made by other institutions. There is a risk of political influence when drafting medium term forecasts. ECB (Leal et al., 2007) advocates a good practice of distinguishing medium term fiscal goals from the forecast. Fiscal goals basically assume that there will be implemented fiscal measures to achieve them. On the other hand, fiscal forecasts should contribute to emphasizing the fiscal adjustments, needed to achieve the government goals. Fiscal forecasts should be conceptualized based on the principle of caution, taking into account only credible policies which are announced and well-defined.

*Long-term* revenue forecasts cover a period over five years, and even several decades. They are mainly made for the estimation of revenues from social contributions, regarding the impact of population ageing on the financing of social and pension funds. The goal of long-term forecasts is to estimate the fiscal sustainability of the funds, and to point out the need for structural reforms which would assist demographic recovery. Long-term forecasts are also needed for the purpose of simulating macroeconomic models. At the beginning, the long-term forecasts were being prepared only by international economic organizations. However, the awareness of the budgetary impacts of population ageing has led to the regular preparing and revision of long-term forecasts by ministries of finance, central banks and national research institutes.

#### *Time of preparing forecasts*

Good practice and international standards of fiscal transparency require preparing tax revenue forecasts twice a year, in the spring for the purpose of medium term fiscal planning, and in the fall for the purpose of budgeting for the next fiscal year. The forecast quality depends on the time interval between the time of the preparing forecasts and the beginning of the budget year they relate to. The forecast errors are lower in shorter time intervals between the time of preparing forecasts and the beginning of the budget year. Researching the practice of preparing revenue forecasts in the 12 most developed members of the OECD, Buettner and Kauder (2009) found that time interval varies greatly, from one to 9,5 months.

#### *Tax structure*

The quality of revenue forecasts also depends on the tax structure. In this regard, the number of types of taxes in the structure is not a crucial factor for the assessment of forecast quality, but their significance. Buettner and Kauder (2009) point out that it is easier to produce revenue forecasts including a large number of small taxes with a share in the structure, than when several large taxes dominate in the tax structure (e.g. VAT and / or income tax)<sup>1</sup>. The level of breakdown

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<sup>1</sup> Buettner and Kauder (2009) have noticed that level of breakdown of taxes for the purpose of preparing forecasts varies significantly and is not related to factors such as country size. The smallest number of taxes is projected in Ireland and New Zealand (23) and US (26), and most in France (106). Breakdown of forecasts does not also depend on the fiscal  
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is also significant for the quality of the forecast. Whether a particular type of revenue will be projected depends on its share in the tax structure. Persons preparing the forecasts should determine the minimum share in total revenue. After determining the minimum significance of the type of revenue (tax), those categories with a share less than the minimum would be projected all together as "other revenues". Apart from the factor of the minimum significance, Buettner and Kauder (2009) have found that taxes are often grouped under the criterion of collecting on the same base or from the same taxpayer. An important factor for forecasting revenues by categories is the availability of data. If data (time series and current trends) are not available in whole then it is necessary to introduce certain assumptions about the future trends or to include taxes into "other income" category, specifying in the note the structure of that category. The important issue of screening level of forecast is also the purpose of forecast. The ministries of finance, central banks and international institutions prefer a bottom-up and then add a tax group (e.g. income and capital taxes, taxes on goods and services ...). The purpose of forecasts is also important for the level of forecasts breakdown. Ministries of finance, central banks and international institutions prefer tax decomposition ("*bottom-up*") followed by tax grouping (e.g. income and capital taxes, taxes on goods and services ...).

Presentation of forecasts depends on the institution that prepares them. Ministry of finance is interested in an analytical approach, in order to establish the basis for monitoring revenue collection and adopting new policies and tax measures. Likewise, a more detailed breakdown allows the control of harmonization of tax forecasts with macroeconomic trends, as well as monitoring the effects of changes in taxation policy and the impact of certain risks. External institutions (central banks, institutes) use rough classification into direct and indirect taxes and social contributions, with the split in direct taxation on those paid by individuals and those paid by companies, and in social contributions on those paid by employees and those at the expense of employers. In the structure of indirect taxes only VAT is shown, and since the revenues from customs duties are of less importance due to the global trade liberalization trend, the rest of revenues from indirect taxes *de facto* relates to excises, which is not necessary to note. In centralized fiscal systems, the level of breakdown is lower than in fiscally complex countries. The forecasts of general government revenue broken down into basic tax groups would be insufficient to present forecasts of tax revenues that fall under the responsibility of lower government levels and are thus influenced by government policies at those levels. However, a balanced approach is needed that will respect the purpose of forecasts as well as fiscal structure and competencies.

Taking all these factors into account, as well as short deadlines for making forecasts in budget calendars, it is necessary to make a decision on the level of disaggregation which will not burden the resources of the agency preparing the forecasts, in terms of data collection and processing, the number of staff and time needed to prepare the forecasts.

### **Causes of deviations from the forecasts**

It is not enough just to compare revenue collection with its forecasts, but it is necessary to understand the reasons for the deviations.

Auerbach (1995) distinguishes three types of errors:

- policy errors,
- economic errors,
- technical errors.

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structure (unitary or complex country). Some fiscally complex states, such as the United States, Canada (37) and Germany (40), project a smaller number of taxes, while complex Belgium, which is a small territory, projects 58 taxes, and Austria as much as 70.

Policy errors arise due to errors in fiscal policy. These are new fiscal measures, which were not announced until the time of preparing the forecasts. It may be a situation when, after the deadline for forecasts is expired, a parliament or a government adopts a tax measure that differs significantly from the draft known to forecasters at the time of preparing the forecasts. Or it is possible that the government has given up on the announced tax measures. The study conducted by Afonso and Carvalho (2014) about the factors of errors in tax revenue forecasts in the EU-15 in the period from 1999 to 2012, showed a correlation between tax policy changes and forecasts errors, where changes in income tax rates increases errors in forecasts, while increase in profit tax rates reduces forecast errors.

Economic errors can be explained by errors in the forecasts of macroeconomic indicators. This is also the main factor that may affect changes in the collection of tax revenues. The process of preparing tax revenue forecasts takes place in two phases. In the first phase, macroeconomic aggregates are projected while in the second - the other tax revenues. Furthermore, most often the production of fiscal and macroeconomic forecasts is performed in two agencies. Obviously, tax revenue forecasts are largely conditioned by macroeconomic forecasts. Given the unknown reliability of macroeconomic forecasts, a simpler way of *ex post* analysis of tax revenue forecasts, suggested by Golosov and King (2002), is the use of indicators measured by the share of tax in GDP. After that, the forecast evaluation is based on the difference between actual and projected tax revenues in relation to GDP.

Study conducted by Alfonso and Carvalho (2014) has shown a correlation between errors in GDP forecasts and errors in revenue forecasts, in the sense that increasing errors in GDP forecasts reduces errors in revenue forecasts, while growth in error in inflation forecasts increases errors in revenue forecasts.

Technical errors are also referred to as behavioral errors, which may arise from the unpredictable behavior of taxpayers, but may also be the consequence of errors in the models.

ECB (Morris et al., 2009) makes the difference between "unexpected" and "unexplainable" errors in forecasts. The unexpected errors result from the errors in macroeconomic indicators and the application of discretionary tax measures by governments that were not known to forecasters ("economic errors" and "policy errors"). For the purpose of investigating the unexplained errors in forecasts, the ECB has analyzed forecasts in the "big five" euro area member countries (Germany, Spain, France, Italy and the Netherlands), as well as in Ireland, Latvia and Portugal. The research has shown that unexplainable revenue growth (windfall) and fall (shortfall) are caused by changes in the profit tax base and to a lesser extent in the VAT base. In addition, structural factors such as drop in consumption of derivatives and cigarettes have been recorded, affecting the collection of excises and VAT. The research has shown that the error in revenue forecast resulting from the unexpected revenue growth in the mentioned countries during the economic growth period amounted to as much as 1% of GDP. The error in revenue forecast incurred as a consequence of the unexpected fall in revenue during the fall of the economy is of the similar size.

The ECB also mentions other causes of forecast errors, such as the *ex ante* impact of a certain tax policy on revenue collection. For example, increase of the excise on oil derivatives and cigarettes or the increase in the VAT rate, imposition of customs, etc., affects increase in the consumption or stockpiling before the entry into force of the new tax measures, leading to unexpected revenue growth that does not match the usual pattern of collection. On the other hand, introduction of releases, rights to a tax refunds, lower rates, etc. leads to a delay in consumption, and thus less revenue collection than usual. If the changes in regulations take place during the fiscal year, the *ex ante* effect of a certain measure would be "settled" ultimately with the *ex post* effects. However, if a new tax measure is introduced at the beginning of a fiscal year, the *ex-ante* impact



of the tax measure leads to revenue shift between fiscal years. Reversal of revenue shift occurs in the case of tax increases (i.e. the collection is realized in fiscal year "t" instead of "t + 1") while revenue shift forward occurs in a case of tax reduction (i.e. the collection is realized in fiscal year "t + 1", instead of "t").

### **Analysis of tax forecast errors in Ireland**

Hannon et al. (2015) analyzed the forecast errors of tax revenues in Ireland. Significant factors of errors are the attempts by the governments to achieve certain fiscal goals within fiscal consolidation, which create a stimulus for *ex-ante* preparing of either optimistic forecasts of tax revenues or intentionally cautious forecasts, depending on whether they want to achieve or exceed the goals. Investigating errors in tax revenue forecasts, the analysts have watched separately the errors in forecasts of VAT, income tax, excise and withholding tax on income (PAYE - *pay as you earn*). They noted three typical errors. The first error is related to the base, i.e. the collection of revenue in the current year. This is in line with the conclusions of Golosov and King (2002), who, in the analysis the occurrence of bias in forecasts, underlined that errors in the forecasts are expected, since the forecasts for the next fiscal year are being produced during the current fiscal year. Regardless of whether the forecasts are intentionally set higher or lower, the revenue collection for the current year (which is the baseline for comparisons) is not known, nor is it known the level of error in the forecasts for the current year. The second group of errors that they perceived is related to errors in macroeconomic forecasts, on which the forecasts of tax revenues are based. The third set of errors refers to incorrect estimates of other forecast components, such as one-off effects in current and future years, wrong static estimates of the effects of changes in tax policies in the coming years, and errors in judgments and estimates of tax elasticities.

Auerbach (1999) warns that budget forecasters are prone to pessimistic forecasts for the purpose of budgeting, given that the budget process ignores the uncertainty of forecasts. Not only is it in conflict with the demand for revenue forecasts to be effective, but it is often the reason for major forecast errors. Afonso and Carvalho (2014) believe that optimistic revenue forecasts are associated with errors in GDP forecasts, changes in profit taxation, and political factors such as the existence of a minority government or developing of forecasts in the election year. On the other hand, they believe that prudent forecasts of tax revenues are the result of errors in inflation forecasts and changes in the VAT rate.

### **Political impact on revenue forecasts**

Public finances in all its segments (revenues, expenditures, borrowing, budget) may, to a greater or lesser extent, be subject to political influence. Bearing in mind that budget reflects government policy, it is normal to expect reflections on forecasts of tax revenues, since taxes are the main source for the financing of government expenditures, programs and projects.

In its researches, the ECB investigated the influence of political factors on forecast errors (Leal et al., 2007). A research on the EU member state practice in the area of revenue forecasts has shown that the public has monitored the government revenue outturn. Governments have been criticized for the forecasts systemically biased, unrealistically set and motivated by political goals.

In their research on the relationship between policy and forecasts of tax revenues in the 18 OECD member states in the period 1996-2012, Jochimsen and Lehmann (2015) found a strong correlation, recognizing the polarization with regard to profile of government. The left-wing governments were more optimistic in the forecasts, i.e. in the time of the economy's growth their

tax revenue forecasts were more optimistic and in times of crisis less pessimistic than those of the right-wing governments. In the study it was also analyzed the quality of tax revenue forecasts regarding the structure of government and parliament. The analysis showed less optimism, i.e. a tendency to make less optimistic or more pessimistic forecasts, in countries with a dominance of one party and in countries with more fragmented governments and parliaments in the sense that it is composed of the several parties. Goeminne et al. (2008) explain the influence of fragmentation on the quality of forecasts by the fact that no party is dominant and the expectations that some of the smaller parties from which the coalition is formed will become a part of government after the elections. This all reinforces the responsibility of government and staff for the quality of revenue forecasts. Likewise, Jochimsen et al. (2015) have confirmed the link between the role of the finance minister and revenue forecasts in fragmented governments. The position of the finance minister in the government is stronger where the coalition is more complex, which ultimately has a positive impact on the quality of the forecasts, as there are no incentives to underestimate or overestimate tax revenues. Based on a set of Swiss cantons data for the time range 1980-2007, Chatagny (2013) found a positive correlation between the finance minister's ideological affiliation and errors in tax revenue forecasts, in the sense that left-wing finance ministers have tendencies for conservative forecasts in order to justify their competences to voters. The analysis has shown that the influence of ideology on the quality of revenue forecasts can be reduced by introducing fiscal and debt rules.

Given that there is no symmetry of the effects of underestimating and overestimating the tax revenue forecasts, Frankel (2011) has investigated whether governments are generally more inclined to make overoptimistic forecasts of tax revenues, because in that case there is no need to cut costs, increase taxes and other painful fiscal measures which would hit the citizens. In his research of forecast errors in the US and EU in the period before the recent global economic crisis, Frankel found that US tax revenue forecasts were optimistic since 2001 up to the crisis, and concluded that this was probably the main reason why the US has missed the opportunity to save in the time of expansion before the crisis. The reason for the optimism in the forecasts referred to the expectation that tax cuts will stimulate economic growth to the extent that even lower rates will lead to higher tax revenues.

In order to reduce the political bias and the tendency to use the so-called "private information" for preparing the forecasts, Merola and Pérez (2013) advocate for greater transparency of fiscal reporting and the responsibility of the government for forecasts which may even include sanctions. The ECB proposes that revenue forecasts are being prepared by independent government agencies (Leal et al., 2007), while Jochimsen and Lehmann (2015) go even further, requiring both institutional and personal independence.

The IMF analysis (Mühleisen et al., 2005), which focuses on the most developed countries in the world, has shown a great deal of government closure when preparing tax forecasts. Forecasts are being prepared by governments in Australia, Canada, UK, Switzerland and Sweden, while independent public agencies are preparing forecasts in Netherlands. The practice of Germany is specific, as forecasts emerge as a consensus of a coalition composed of experts and representatives of the non-governmental sector. On the other hand, Canada has shown a great openness in macroeconomic forecasts, which are being drafted by a large number of experts outside the government sector<sup>2</sup>.

Regarding the dilemma whether to rely solely on the tax revenue forecasts from the government institutions or the forecasts of international organizations should be taken into account, Merola and Pérez (2013) advocate the preparation of tax revenues forecasts by national institutions. In

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<sup>2</sup> The base for preparing government macroeconomic forecasts is the average of forecasts of macroeconomic aggregates produced by 20 external economists

the analysis of government and external forecasts of the EU Member States in the period from 1999 to 2007, they concluded that the forecasts of international organizations (EC and OECD) were not better than the government forecasts. The first reason is the asymmetry of information. The government has access to more information than the external forecasters, not only in terms of data scope, but also in the current trends in tax collection, effects of planned tax measures or tax administration activities. External forecasters can rely only on data and reports released by the government, which are usually only available in short format and with time lag compared to the period they relate to. Revenue forecasts by governments and international organizations also differ in the level of breakdown. Government forecasts are more detailed in comparison with the external forecasts, precisely because the government has a greater coverage of information that allows such an approach. Merola and Pérez (2013) have noticed that the small number of staff in international organizations compared to a large number of countries for which revenue forecasts are being prepared is the reason why international organizations need to rely on information provided by the countries, which reverses the quality and independence of their forecasts.

The analysis of significance of the government forecasts of revenues in comparison with the external forecasts indicates a certain paradox (Leal et al., 2007). A large number of analysts believe that, regardless of access restrictions, the external forecasts of independent agencies tend to be less accurate than the forecasts prepared by the staff of the agencies responsible for forecasts. However, on the other hand, they believe in necessity of parallel existence of forecasts of independent national and international institution. External forecasts have a positive feedback effect on the quality of government forecasts since the competition with independent agencies tends to increase the accuracy of government forecasts.

## Conclusion

Analysts agree that fiscal forecasts are more than science. They are more skills that should be of benefit to fiscal authorities when discussing fiscal policy and decision-making, rather than an exercise that can be assessed only on the basis of a set of forecast performance indicators (Leal et al., 2007). Logic would indicate that forecasts are "good" when they are more accurate, or closer to real outturn. Fiscal forecasting officials are faced with great dilemmas, as there is no best practice. They have to decide which procedures to use, how to make consistent macroeconomic and fiscal forecasts, and whether the forecasts will be more based on judgments and expertise, and less on econometrics and modeling techniques. The existence of international standards, principles and guidelines of the IMF, OECD and EU in terms of forecast planning horizons and level of breakdown facilitates the process of preparing the forecasts. Researches have shown the need to strengthen the transparency of the entire process, including *post festum* decomposition of forecast errors. This is necessary to do so, in order to distinguish the impact of tax policy measures on macroeconomic trends, the impact of administrative, technical, statistical or accounting factors. The ECB emphasizes that, despite the importance of quantitative forecasts, good fiscal forecasts are not necessarily the best in statistical sense, but they must allow for understanding trends and as a sound basis for fiscal policy making.

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## Some of the conclusions of the analysis „Revenue Forecast Errors in the EU“ (Afonso, Antonio and Carvalho, Rui, 2013) and comparison with the errors in projections of indirect taxes of the Unit

(Author: Aleksandra Regoje, Macroeconomist in the Unit)

### I Analysis of errors in the projections of general government revenues in the EU-15

Afonso, A. and Carvalho, R. presented in 2013 an analysis of general government revenue projections in the EU-15 (hereafter Study)<sup>3</sup>. The Study states that making precise projections is not an easy job. There is a need to consider a broad set of variables, from the basic macroeconomic variables, to fiscal policies, tax revenue structures, and those which are most difficult to predict - concerning patterns of behavior towards uncertainty. There have been used data from the biannual reports of the European Commission from 2000 spring up to 2013 spring, for the EU-15 countries: Austria (AT), Belgium (BE), Germany (DE), Denmark (DK), Spain (ES), Finland (FI), France (FR), Greece (GR), Ireland (IE), Italy (IT), Luxembourg (LU), Netherlands (NL), Portugal (PT), Sweden (SW) and United Kingdom (UK).

A forecast error ( $e_{i;t}$ ) is calculated as the difference between the outturn of a certain variable ( $outturn_{i;t}$ ) and its forecast ( $forecast_{i;t}$ ) where  $i$  stands for the country and  $t$  for the period. Positive values of  $e_{i;t}$  indicate that the projections were pessimistic, while negative values point to optimistic projections. Data from the first available estimates published by the European Commission in the period  $t + 1$  (spring forecast) were used for the outturn variable.

$$\text{Equation (1)} \quad e_{i;t} = outturn_{i;t} - forecast_{i;t}$$

The data were collected for the years  $t$ ,  $t+1$  i  $t+2$  for the following indicators: GDP, private consumption price deflator, and government revenue as percentage of GDP. Based on the methodology explained in Equation (1), the corresponding variables were calculated: GDP errors, inflation errors and revenue as a percentage of GDP errors. Data for government consolidated gross debt (DEBT), general government balance (BAL), and the gap between actual and potential GDP (GAP) were taken from the Annual Macroeconomic database of the European Commission (AMECO). A set of *dummy* variables was used to exclude political influences, based on database information made by Armingeon et al. (2012), as well as the information gathered by the authors themselves. The Fiscal Rules Index (FRI) variable was used to check whether these rules have any impact on revenue estimates. Finally, in order to capture the uncertainty resulting from the changes in the tax rates, a series of dummy variables were used. They assume a value of 1 in case of a change in the tax rate relative to previous year, and the value 0 in the opposite case. Data on changes in the rate of VAT, income tax, corporate tax and social security tax (Table 1) have been collected. It was also taken into consideration whether the tax rate have been increased or decreased. These variables were extracted from the OECD Database, except for the VAT (European Commission). The total general government revenues in the study follow the ESA 95 nomenclature, i.e. represent the sum of taxes on production and imports (D.2), other subsidies on production (D.39), property income (D.4), current taxes on income and wealth (D.5), social contributions (D.61), other current transfers (D.7) and capital transfers (D.9).

<sup>3</sup> Afonso, Antonio and Carvalho, Rui, Revenue Forecast Errors in the European Union (2013). Department of Economics, ISEG-UL, WP 02/2014/DE/UECE.

Table1 - Dummy variables by tax type, country and direction of change

	Corporate tax *)			VAT **)			Income tax **)			Soc. secur. tax **)		
	Δ	↑	↓	Δ	↑	↓	Δ	↑	↓	Δ	↑	↓
AT	1	0	1	0	0	0	5	3	2	1	0	1
BE	1	0	1	1	1	0	1	0	1	0	0	0
DK	3	0	3	0	0	0	10	3	7	2	1	1
FI	2	0	2	3	3	0	12	2	10	11	7	4
FR	5	0	5	2	1	1	7	3	4	9	5	4
DE	4	1	3	1	1	0	7	1	6	14	4	10
GR	7	0	7	3	3	0	8	2	6	4	4	0
IE	3	0	3	11	8	3	3	0	3	7	3	4
IT	4	0	4	1	1	0	6	3	3	1	1	0
LU	3	1	2	0	0	0	5	2	3	8	4	4
NL	5	0	5	2	2	0	14	7	7	6	4	2
PT	2	0	2	5	4	1	6	4	2	0	0	0
ES	2	0	2	2	2	0	5	2	3	1	0	1
SW	1	0	1	0	0	0	3	1	2	1	1	0
UK	3	0	3	3	2	1	4	2	2	5	3	2
	46	2	44	34	28	6	96	35	61	70	37	33

Source: Afonso, Antonio and Carvalho, Rui (2013), calculations of authors of the Study and OECD Tax database

\*) period from 2000 to 2012

\*\*) period from 1999 to 2012

Table 2 - Descriptive statistics for general government revenue errors in % of GDP

Period	t			t+1			t+2		
	mean	std.de v.	obs.	mean	std.de v.	obs.	mean	std.de v.	obs.
AT	0,22	0,69	28	0,65	1,32	26	0,58	1,72	12
BE	0,42	0,73	28	0,81	1,00	26	0,93	1,10	12
DE	0,19	0,59	28	0,38	1,10	26	0,29	1,29	12
DK	0,92	1,05	28	1,41	1,38	26	1,83	1,38	12
ES	-0,25	1,04	28	-0,67	1,68	26	-0,90	1,84	12
FI	0,39	0,89	28	1,22	1,14	26	1,67	1,36	12
FR	0,05	0,67	28	0,23	1,14	26	0,34	1,49	12
GR	-0,40	2,47	28	-0,15	3,23	26	-0,53	2,55	12
IE	0,44	1,73	28	0,63	2,22	26	0,53	1,85	12
IT	0,03	0,66	28	0,40	0,88	26	0,55	0,84	12
LU	-0,05	1,77	28	-0,03	3,01	26	-0,13	3,22	12
NL	0,07	0,76	28	0,14	1,03	26	0,03	1,21	12
PT	-0,13	1,60	28	-0,46	1,68	26	-0,68	1,56	12
SE	0,23	1,20	28	0,25	1,44	26	0,10	1,65	12
UK	0,19	0,81	28	0,15	1,23	26	-0,19	0,96	12
EU-15	0,15	1,25	420	0,33	1,77	390	0,29	1,80	180

Source: Afonso, Antonio and Carvalho, Rui (2013)

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Table no. 2 shows the descriptive statistics for revenue error variables in % of GDP for EU-15 countries. By observing the mean value of these variables for the EU-15, it is concluded in the Study that the realized revenues in the analyzed period have been, on average, higher than projected, indicating that planning was, on average, cautious. The revenue outturn was, on average, 0,15 percentage points higher than projected for the year t; 0,33 p.p. higher for year t+1; and 0,29 p.p. higher for year t+2.

It can be seen from Table 2 that among the countries with the most accurate projections are: United Kingdom, Luxembourg and the Netherlands. On the opposite side, Denmark, Finland and Belgium are among the countries with the biggest average errors.

Greece, Portugal, Spain and Luxembourg had negative mean revenue forecast errors, which means that their projections were, on average, optimistic. All other EU-15 member states had positive mean revenue forecast errors.

## II Projections of indirect taxes in B&H and their realization

This Appendix compares the projections of indirect tax revenues of the Macroeconomic Analysis Unit of the Governing Board of the ITA (hereinafter: the Unit) produced in the time range from 2010 to 2018 for the years t, t+1 and t+2 with the outturn of indirect taxes in the respective years. Both indicators are expressed in % of realized GDP.<sup>4</sup> For the purpose of comparison, the effects of the changes in the Law on Excises were excluded for the year 2018 in all cases where they were not incorporated in projections (April and October 2016 for the year t+2; April and October 2017 for the year t+1). There were not taken into account the effects of the change in excise tax policy carried out in 2014<sup>5</sup> which has brought a growth in the fiscal burden of the cut tobacco. Since the DEP's projections were revised for the purposes of preparing the Economic and Fiscal Program in November of 2011 and 2013 in comparison with their September projections, the MAU then also adjusted its October projections in accordance with DEP's changes, and so these November projections were taken into account in this analysis instead of October. The results calculated based on the methodology explained in Equation (1) are shown in Table 3.

Table 3 - Differences between realized and projected indirect taxes in % of GDP for the projections produced in the time range 2010-2018

Period	t			t+1			t+2		
	mean	std.dev	obs.	mean	std.dev	obs.	mean	std.dev	obs.
B&H	0,10	0,27	19	-0,06	0,65	17	-0,35	1,25	15

Source: Author's calculations based on indirect tax projections (MAU) and outturn data (ITA), and GDP data (BHAS)

We see that in this period the projections were, **on average**, pessimistic by only 0,10% of GDP for the year t (outturn was, on average, higher than projections) and optimistic by only -0,06% of GDP for the year t+1 and by -0,35% of GDP for the year t+2.

<sup>4</sup> The projection was used only in the case of 2018 (DEP, September 2018) due to the lack of data.

<sup>5</sup> Official Gazette of B&H No. 49/14

Given the mean values of errors are shown, the results vary with the change in the observation period. Since the projections produced in 2010 proved to be quite optimistic for the year 2012 (year t+2), as well as those from 2011 for years 2012 and 2013 (years t+1 and t+2)<sup>6</sup>, in the case of their exclusion from the observation we get a different picture of the direction of mean error for years t+1 and t+2. The descriptive statistics for the projection errors produced in the time range 2012-2018 are shown in Table 4.

Table 4 - Differences between realized and projected indirect taxes in % of GDP for the projections produced in the time range 2012-2018

Period	t			t+1			t+2		
	mean	std.dev	obs.	mean	std.dev	obs.	mean	std.dev	obs.
B&H	0,09	0,25	15	0,11	0,53	13	0,25	0,74	11

Source: Author's calculations based on indirect tax projections (MAU) and outturn data (ITA), and GDP data (BHAS)

Table 4 is interpreted in the same way as Table 3. If we observe period 2012-2018 of producing projections, the projections for years t, t+1 and t+2 were, on average, "exceeded" by 0,09%, 0,11% and 0,25% of GDP, respectively .

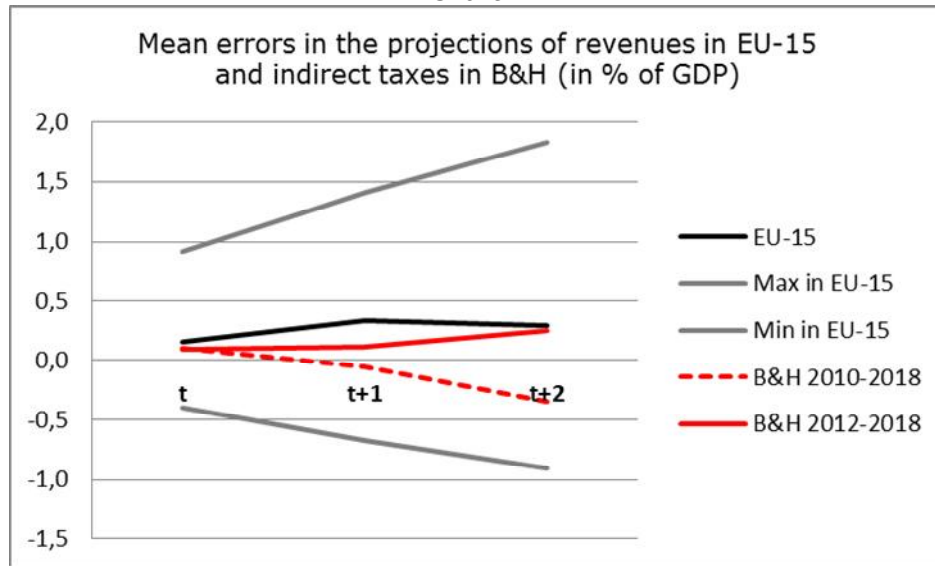
### III Comparison of the Projections of general government revenues in the EU-15 with the Projections of indirect taxes in B&H

In the Study conducted by Afonso, A. and Carvalho, R. for the EU-15 Member States on the basis of the European Commission (EC) reports from 1999 spring up to 2013 spring, it can be seen that the mean of the differences between the outturns of total revenues of the general government and their projections for these countries for years t, t+1 and t+2 amounted to +0,15% of GDP, + 0,33% of GDP and + 0,29% of GDP respectively. If we consider the Projections of indirect taxes of the Unit prepared in the period from 2010 to 2018 and the actual outturns we see that the mean errors for the respective periods amounted + 0,10% of GDP, -0,06% of GDP and -0,35% of GDP. After excluding projections prepared in 2010 and 2011, we calculated that mean errors for the respective periods amounted + 0,09% of GDP, + 0,11% of GDP and + 0,25% of GDP. The comparison with the EU member states should be taken with a grain of salt, given the different revenue coverage (total revenues vs. indirect taxes), and the specificity of the methodology for calculating the errors. It should also be taken into account that the Study for the EU also covers the period of the past economic crisis.

<sup>6</sup> Projections prepared in 2010 and 2011 for the indicated periods were optimistic mainly because of the optimistic projections of the DEP from that period, on which they were based. For example, the DEP's projections for the growth in consumption from this period (March 2010, September 2010, March 2011, September 2011, November 2011) for 2012 were gradually revised from 6,5% (March 2010) to 4,8% (November 2011), while, according to data from the Agency for Statistics of B&H, it has been later showed that the growth rate of total consumption for 2012 reached only 1,81%. Similar happened with the projections of consumption for 2013. DEP gradually revised them in the mentioned documents from 6,4% to 5%, while according to the Agency for Statistics data, it has been later showed that the growth rate of consumption in 2013 amounted 0,62%.



Chart 1



Source: Afonso, A. and Carvalho, R.(2013) for the EU-15 indicators; The author's calculation (based on the data of Unit, ITA, BHAS and DEP) for the indicators for B&H

*It can be seen from Chart 1 that the mean errors of the Unit's projections from both observed periods (2010-2018 and 2012-2018) were within the range of mean errors of the EU-15 total general government revenues, and their absolute values were even below the mean errors in the EU-15, with the exception of the case of the projection analysis from 2010 to 2018 for the year t+2, where the absolute value of mean error in B&H was higher by only 0,06 p.p. than the EU-15 mean value.*

The standard deviation in both observed cases (2010-2018 and 2012-2018) for all three observed periods (t, t+1 and t+2) was considerably smaller for the Unit's projection errors than the same indicator for the EU-15, and given that the average values were compared, it also tells about the degree of projection's precision.

**PEFA - International analytical tool for the quality assessment of revenue forecasts**

(Author: Dinka Antić, PhD)

PEFA<sup>7</sup> is an international project that deals with the assessment of public finance management. Assessing of financial management is done on the basis of 31 indicators covering seven key pillars of performance (PEFA, 2016).

The Pillar IV "Policy-based fiscal strategy and budgeting" is directly relevant for revenue forecasts or the indicator related to Macroeconomic and fiscal forecasting (PI-14).

The abovementioned indicator includes three indicators:

- i. macroeconomic forecasts,
- ii. fiscal forecasts and
- iii. macro-fiscal sensitivity analysis.

The PEFA Standards require that the preparation of economic forecasts and estimates of future revenue flows should be a transparent and formalized process and that the underlying assumptions for macroeconomic and fiscal forecasts should be clearly explained and allow the *ex post* verification. The quality assessment is measured by a decreasing scale from A to D.

**Box 1: PEFA, assessment of fiscal forecasts**

A = The government prepares revenue forecasts by type for the budget year and the next two years. The forecasts are included in the budget documentation submitted to the Parliament, together with an explanation of the assumptions and the main differences compared to the forecasts from the previous budget year.

B = The government prepares revenue forecasts by type for budget year and two following years. The forecasts are included in the budget documentation submitted to the Parliament, together with an explanation of the assumptions.

C = Government prepares revenue forecasts by type for the budget year and the two following years.

D = Performance is smaller than required for a C score.

Source: PEFA (2016a).

The analysis of fiscal forecasts (Box 1) is based on a medium term fiscal forecasts analysis, which includes assessing the underlying assumptions and the basis for calculating the fiscal forecasts. The evaluation process also includes the evidence that information on fiscal forecasts is an integral part of the budget documentation submitted to the Parliament. The budget documentation, Ministry of Finance documentation and materials in the Parliament are analyzed for this purpose. It is assessed in the analysis of fiscal management whether the government has prepared fiscal forecasts for the budget year and two following years based on the updated macroeconomic forecasts. Revenue forecasts should be presented analytically so that a plan can be perceived by type of revenue. In addition, it is necessary to clearly identify the assumptions on which the forecasts are based.

It is assessed in the macro-fiscal sensitivity analysis whether the alternative fiscal scenarios have been produced in the same format as medium term fiscal forecasts (Box 2).

<sup>7</sup> The PEFA project (Public Expenditure and Financial Accountability), which was established in 2001, is supported by the European Commission, the IMF, the World Bank and the governments of France, Norway, Switzerland and the United Kingdom.

**Box 2: PEFA, assessment of macro-fiscal sensitivity**

A = The government prepares several scenarios of fiscal forecasts based on alternative macroeconomic assumptions, and these scenarios are published together with the main forecast.

B = The government prepares for internal use several scenarios of fiscal forecasts based on alternative macroeconomic assumptions. The budget documents include a discussion of forecast sensitivities.

C = The macro-fiscal forecasts prepared by the government include a qualitative assessment of the impact of alternative macroeconomic assumptions.

D = Performance is smaller than required for a C score.

Source: PEFA (2016a).

Revenue forecasts are indirectly linked to other pillars of the assessment of fiscal management (PEFA 2016a). There is a significant indicator within the Pillar I - "Budget reliability" measuring revenue outturn in relation to the originally approved budget. The indicator contains two dimensions. One refers to total revenue collection, and the other to the composition of revenue collection.

For the credibility of the budget, it is necessary to have as accurate revenue forecasts as possible during its preparation. Overly optimistic revenue forecasts can lead to unjustified increases in budget expenditures that may have a detrimental effect if the forecasts fail during the year. In such circumstances, it is necessary to rebalance and reduce expenditures in real revenue streams or implement an unplanned increase in borrowing to finance expenditures that are not covered by revenues. On the other hand, pessimistic prognoses can result in excess revenues that will be spent on expenditures that have not been taken into account in the budgeting process, public hearings, and parliamentary discussions, which can be a channel for non-transparent spending of public money. However, due to the severity of consequences on the budget, greater attention is given to optimistic approach to forecasts. This approach also reflected on the indicators of quality of the revenue forecast, which allow for greater over-realization, rather than under-realization (Box 3).

**Box 3: PEFA, assessment of revenue forecast quality**

A = actual revenue collection ranged between 97% and 106% of the forecasted amount in at least two of the last three years

B = actual revenue collection ranged between 94% and 112% of the forecasted amount in at least two of the last three years

C = actual revenue collection ranged between 92% and 116% of the forecasted amount in at least two of the last three years

D = Performance is smaller than required for a C score.

Source: PEFA (2016a).

Revenue collection can deviate from the approved budget for reasons unrelated to the accuracy of forecasts, such as macroeconomic shocks. For this reason, the PEFA project, when assessing the quality of forecasts, allows for the exception of the year in which shocks occurred (PEFA, 2016a). PEFA standards also serve to measure deviations in the structure of revenue in comparison with the forecasted amounts (Box 4). The standard should serve to evaluate the accuracy of the

forecasted revenue structure and the ability of the government to collect revenue amounts in the each of the revenue categories as forecasted.

**Box 4: PEFA, quality assessment of the tax structure**

The assessment is measured by decreasing scale from A to D  
A = dispersion of tax structure was less than 5% in at least two of the last three years  
B = dispersion of tax structure was less than 10% in at least two of the last three years  
C = dispersion of tax structure was less than 15% in at least two of the last three years  
D = Performance is smaller than required for a C score.

Source: PEFA (2016a).

Revenue forecasts can be revised once or more times over a budget period. The main inputs for the preparation of forecasts are macroeconomic forecasts. According to the PEFA, the forecasting process has two phases: (i) the macroeconomic forecasts phase and (ii) the forecast of main public revenues. For this reason, forecasts of tax revenues are largely dependent on macroeconomic forecasts. The assessment of fiscal management referring to forecasts includes information on an institutional arrangement of revenue planning and information on specific factors that may affect revenue forecasts and their outturn, such as dependencies on natural resources, macroeconomic instabilities, significant tax policy changes and tax administering, additional revenues (e.g. from privatization).

#### LITERATURE

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