

# FISCAL FORECASTS OF THE AUSTRIAN FISCAL ADVISORY COUNCIL: FORECASTING PRINCIPLES AND METHODS<sup>1</sup>

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## 1 PRINCIPLES, FORECAST PERIOD AND UNDERLYING DATA

In preparing its **fiscal forecasts**, the Fiscal Advisory Council relies on international best practices requiring forecasters to exercise **prudence**, to adopt **transparent** and **realistic assumptions**, and to use **recognized forecasting methods** (see e.g. European Commission, 2013, or ECB, 2007). Given its mandate to support the Austrian government by monitoring fiscal policies and by giving policy recommendations, the Fiscal Advisory Council must maintain a high degree of transparency and accountability. Hence its work is guided by the following principles:

### Independence

The fiscal forecasts are the result of **independent analyses conducted by the Fiscal Advisory Council**. Existing forecasts by national or international research institutes or results targeted by the federal government or regional governments serve as sources of information but do not preempt the outcome.

### Prudence

In the absence of **known public commitments to policy changes**, the fiscal forecasts are based on a **“no policy change” assumption**. **Discretionary measures** are taken into account only in such instances where **the details of implementation (range and timing of measures as well as their fiscal impact)** are known and where **implementation is highly likely**. In the absence of discretionary adjustments, the budget will be forecast on the basis of current revenue and expenditure flows, using different forecasting methods as appropriate (see section 2).

### Transparency

Forecasting guidelines, methods and results are disclosed to the public. The Fiscal Advisory Council’s fiscal forecasts are meant to serve as an objective benchmark and to contribute to an informed, objective debate.

### Forecast Period and Timeline

The Fiscal Advisory Council releases its fiscal forecasts twice a year, in the spring and in the fall, with its first forecast dating from fall 2014. The **forecast period** covers the current year and the year ahead (t and t+1). The forecasts cover the **general government** (federal government, regional governments, local governments and social security authorities), based on the European System of Accounts (ESA) 2010, which has been applied since September 2014 and has replaced ESA 95.

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<sup>1</sup> Bericht zur Einschätzung der Budgetentwicklung 2014 – 2015. Austrian Fiscal Advisory Council. Vienna 2014.

## Underlying Data

The **fiscal forecasts** draw on **data compiled in line with the conceptual framework** of the European System of Accounts **2010**. This framework differs substantially from the conceptual framework underlying the **administrative budgets**, which **rules out direct comparisons** between the two sets of data.

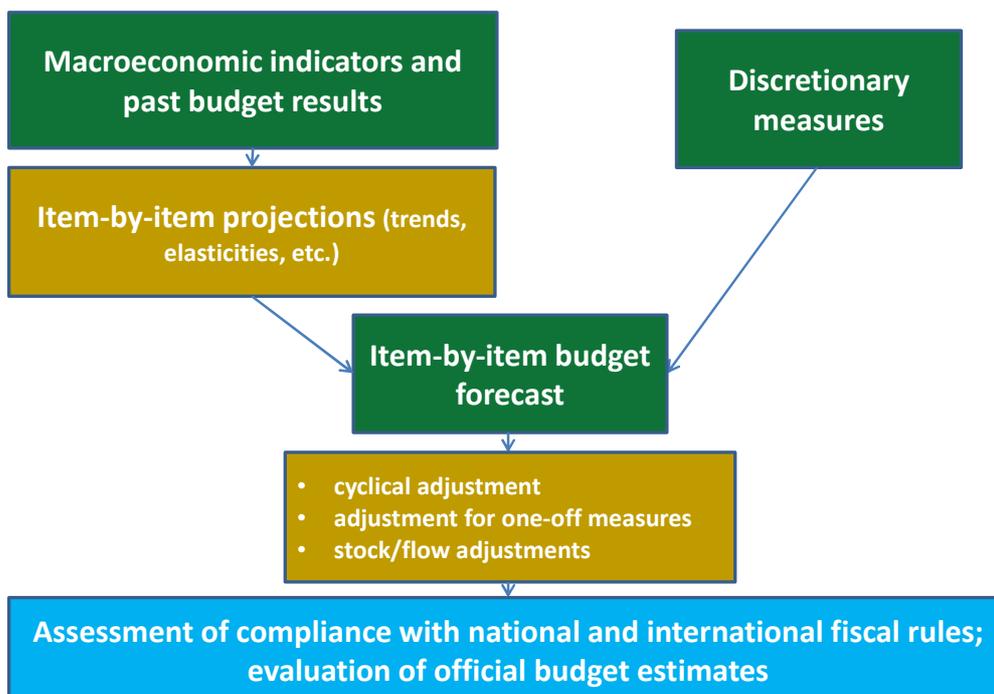
Like the Federal Ministry of Finance, the Fiscal Advisory Council bases its assumptions about **macroeconomic developments** on the **current economic outlook** of an **independent research institute** (WIFO, the Austrian Institute of Economic Research). This helps prevent differences between the two sets of fiscal forecasts that would arise from divergent underlying macroeconomic assumptions. The fiscal measures forecast by the Fiscal Advisory Council do not, as a rule, feed back into the macroeconomic measures obtained from WIFO. The Fiscal Advisory Council may, however, opt to adjust the underlying macroeconomic measures if its forecast were to deviate substantially from that of WIFO.

In addition, the Fiscal Advisory Council's fiscal forecasts reflect **numerous other sources of information** which are relevant for individual revenue and expenditure categories, such as data published by the Austrian Association of Social Insurance Providers, administrative tax statistics compiled by Statistics Austria, forecasts of the EU budget, expert opinions of the Austrian Pension Sustainability Committee, the federal government's stability programs, federal financial legislation, etc.

## 2 FORECASTING MODEL AND METHODS

### Forecasting Model Framework

**Chart 1: Building Blocks of the Fiscal Forecasts of the Fiscal Advisory Council**



The forecasts of the Fiscal Advisory Council are based on a **disaggregated approach**, i.e. on item-by-item forecasts of general government **revenue and expenditure** (e.g. ESA tax categories), which mirrors the approach of the Eurosystem staff fiscal projections (Prammer and Reiss, 2014). In a next step, the item-by-item forecasts are aggregated into **revenue and expenditure divisions** (one-digit ESA codes) and used to derive the three headline measures of public finance: **the (nominal) general government fiscal balance, the structural fiscal balance and government debt**. Chart 1 illustrates the building blocks of the Fiscal Advisory Council’s fiscal forecasts.

To calculate the structural fiscal balance, the fiscal balance must be adjusted for cyclical developments on the basis of potential output estimates. To **estimate the potential output**, the Fiscal Advisory Council applies the European Commission’s methods and definitions using the latest macroeconomic forecasts from WIFO.

## Forecasting Methods

The forecasts are based on a bottom-up approach: Government revenue and expenditure flows are gathered and broken down and projected item by item. For instance, withholding taxes on wages and pensions are broken down into employee income tax and pension income tax based on wage tax statistics. This breakdown is relevant for the quality of the forecasts, as the growth rates of wage income and pension income may differ. On the expenditure side, cash social benefits are broken down into major transfer items (pensions, long-term care benefits, unemployment benefits, family transfers and other transfers) to be able to adjust the respective forecasts for different factors (such as labor market data, population growth, range of recipients or adjustments for inflation). For an overview of the methods used to forecast individual budget categories, see tables 1 and 2 below.

The forecasting methods were chosen on the basis of pragmatic considerations, i.e. depending on what was assessed to be **the most adequate method** for the individual budget categories. The most adequate methods were established in line with three criteria: unbiasedness, precision and simplicity. **Unbiasedness** means that, in the past, the forecasting error should have hovered around zero on average. In other words, the forecasts have tended to be neither too optimistic nor too pessimistic because underestimated and overestimated results have offset each other on average. **Precision** is given when the mean squared errors have been small. This means that the development of flows has been captured well over time. The criterion of **simplicity**, finally, implies that in case of doubt the simpler of two methods should be the method of choice.

### Overview of Methods

As a rule, all forecasting methods are based on the assumption that all revenue and expenditure categories  $X_t$  evolve over time according to the following equation:

$$X_t = (1 + g_t^X)X_{t-1} + Disk_t, \tag{1}$$

with  $Disk_t$  indicating discretionary measures taken into account in year  $t$  and  $g_t^X$  representing the rate at which the flows captured in category  $X$  are projected (“cast forward”) to grow from  $t - 1$  to  $t$ . All forecasting methods described below are special cases of equation (1). In other words, all budget categories can be adjusted for discretionary measures, if applicable. Moreover, the forecasts may also be based on a mix of the forecasting methods outlined below.

### Method 1: Adjusted Trend Projections

The **first forecasting method** is the method of projecting **the trend as adjusted for discretionary measures**. The way to do this is to calculate the adjusted growth rate for the years preceding the forecast period  $s < t$  by using the following equation:

$$g_s^X = \frac{X_s - Disk_s}{X_{s-1}} - 1. \quad (2)$$

Note that the results are influenced above all by two assumptions: First, the functional relationship defined in the equation comes with the assumption that the discretionary part will continue to grow at the adjusted growth rate. Second, the adjustment is by definition based on an estimate of the actual budgetary impact of the discretionary measure, which is typically difficult to establish as the counterfactual outcome (i.e. what would  $X_t$  have been in the absence of the discretionary measures) is unobservable.

A geometric mean of the growth factors adjusted for the discretionary measures ( $1 + g_t^X$ ) of the previous years yields the growth factor underlying the adjusted trend projections (see e.g. Pflaumer et al., 1998). The choice of the period for calculating the adjusted trend is dependent on structural breaks in the respective revenue and expenditure categories.

### Method 2: Elasticity-Based Projections

The **second forecasting method** consists in using **elasticities** to project the changes in revenue and expenditure categories that are due to changes in underlying macroeconomic, fiscal, structural and socio-demographic measures. The projection rate for the revenue or expenditure category  $X$  ( $g_t^X$ ) is calculated as the growth rate of the underlying variable  $Y$  against the previous year ( $g_t^Y$ ) and the elasticity of  $X$  with regard to  $Y$  ( $\varepsilon^{X,Y}$ ):

$$g_t^X = g_t^Y \cdot \varepsilon^{X,Y}. \quad (3)$$

The choice of the underlying variables is a qualitative decision based on the confluence of economic factors; ideally, these variables will be highly correlated with the budget category at hand. As an added constraint, the choice of underlying variables is limited to variables for which forecasts exist or may be derived through forecasting methods. Hence this approach may require combining different methods. Revenue forecasts are only based on macroeconomic variables, whereas expenditure forecasts are also derived from other variables, above all socio-economic variables.

**An elasticity** is a measure of the responsiveness of the budget variable  $X$  to changes in the underlying variable  $Y$ . An elasticity of 1, which is chosen in most cases, implies that a 1% increase in the underlying variable results in a 1% increase in the dependent variable. Taxes with a **progressive (regressive) schedule** will yield disproportionately high (low) revenues compared with the tax base. In those instances, the elasticity will be higher (lower) than 1. The outcome is similar for taxes which are based on linear schedule but are subject to a tax allowance or an earnings cap. Elasticities other than 1 may also reflect sustained **structural changes** in the aggregated underlying variable. For instance, an ongoing shift in the consumption of goods and services taxed at the standard VAT rate to goods and services which are subject to a reduced VAT rate would imply an elasticity of VAT revenues from consumption of below 1. In its forecasts, the Fiscal Advisory Council uses elasticities other than 1 only when they are backed up by economic rationale and imply a robust improvement of the results in terms of unbiasedness and precision.

The estimates of **tax revenue elasticities for macroeconomic factors** follow recommendations made in the literature. Specifically, the estimates must take into account two characteristics that are typical of

the data used: (a) Nonstationarity and (b) cointegration between the fiscal variables and their underlying macroeconomic variables. A standard reference for methodological procedures is Bouthevillain et al. (2001), which is also used by the European Commission to calculate the cyclical component of structural fiscal balances (see Mourre et al., 2013). Similar estimates have been made by Leibrecht (2004) as well as Grossmann and Prammer (2005) for Austria, and by Koester and Priesmeier (2012) for Germany. Given the range of determinants, different expenditure categories are projected on the basis of the combined impact of a number of underlying variables and the elasticities of several underlying variables.

### Method 3: Carry-Forward Projections

The **third forecasting method** consists in carrying forward the previous year's figures, based on a symmetric **random walk** assumption, i.e. based on the assumption that the best guess estimate of future fiscal flows of a given category is the past year's level. This approach is used above all for smaller, erratic budget categories for which the sign of the previous trend is not robust for the choice of the forecast period. In such instances, the projection equation (1) reads  $g_t^X = 0$ .

### Method 4: Ad Hoc Projections Reflecting Expert Judgment

The **fourth forecasting method** is to choose an **ad hoc** measure for  $X_t$  based on research and expert judgment. This method is used for income and expenditure categories which are not directly linked to macroeconomic developments and do not follow a stable trend. Cases in point include government spending on bank support packages and corresponding revenues, income distributed by public entities, revenues raised through the recently introduced tax on bank liabilities and spending on infrastructure projects. As these examples show, this approach is used above all for income or expenditure categories dominated by discretionary measures. In the projection equation (1) the previous year's level does not matter; in other words, the forecasting measure  $X_t$  is explained by the discretionary measure alone.

## Plausibility Checks for Current-Year Forecasts

The four forecasting methods are used to produce forecasts for the current year  $t$  as well as for the year  $t+1$ . The **fall forecasts** are fine-tuned with an additional forecasting step. The availability of **interim administrative data** for the current year makes it possible to cross-check the forecasting results for selected categories and to adjust them as appropriate. This is particularly relevant for large tax categories, but also for some expenditure categories (e.g. unemployment benefits and pension benefits). For this purpose, the administrative data must, however, first be adjusted in line with ESA definitions, as the administrative data are cash data.

## Method Used to Adjust Fiscal Balances for Cyclical Effects

**Potential output** is the maximum level of goods and services an economy can produce **on a sustained basis with existing resources without generating inflation pressures**. The output gap, i.e. the percentage of potential output by which actual output deviates from potential output, is used to filter out the cyclical component of the fiscal balance, together with the budget sensitivity (see Mourre et al., 2013)<sup>2</sup>, which measures the impact of cyclical fluctuations on the budget. Adjusting the budget for its cyclical component as well as for one-off effects yields the structural fiscal balance.

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2 The semi-elasticity published in Mourre et al. (2013), which the European Commission uses to adjust the fiscal balance based on the output gap, was updated in 2014.

The European Commission uses a production function approach to estimate potential output, with the contributions to potential output stemming from the input factors labor and capital and total factor productivity (see D'Auria et al., 2010). To align the potential output estimates of the European Commission with the data underlying the fiscal forecasts of the Fiscal Advisory Council, above all with the GDP and labor market measures of the WIFO forecast, the **Fiscal Advisory Council estimates the potential output by applying the methods and concepts of the European Commission to the WIFO data**. Where the WIFO data correspond to the definitions of the European Commission, which is the case e.g. for the unemployment rate, the Fiscal Advisory Council uses the data as published by WIFO; otherwise the data are adjusted accordingly, cases in point being the data on wages and salaries, employment and hours worked per employee. In addition, the capacity utilization indicator used in the forecasting model is updated in line with European Commission procedures.

**Table 1: Overview of the Methods Used to Project Government Revenue**

ESA 2010	Budget category	Forecasting method	Underlying macroeconomic variables	Elasticity
<b>P.1</b>	<b>OUTPUT</b>	Trend	-	-
<b>D.2</b>	<b>TAXES ON PRODUCTION AND IMPORTS</b>			
D.211+12	Value added taxes and import taxes	Elasticity	Nominal private consumption	1
D.214Ax	Petroleum tax	Elasticity	Real GDP	1
D.214Ax	Motor vehicle registration tax	Elasticity	Nominal private consumption	1
D.214A (n.e.c.)	Excise taxes (n.e.c.)	Elasticity	Real private consumption	1
D.214Ax	Property purchase tax and insurance tax	Trend	-	-
D.214 (part)	Taxes on products (n.e.c.)	Elasticity	Nominal private consumption	1
D.29Cx (part)	Municipal payroll tax, public sector	Elasticity	Compensation of employees, public sector	1
D.29Cx (part)	Municipal payroll tax, private sector	Elasticity	Compensation of employees, private sector	1
D.29H	Tax on bank liabilities	Ad hoc	-	-
D.29 (n.e.c.)	Other taxes on products (n.e.c.)	Trend	-	-
<b>D.4</b>	<b>PROPERTY INCOME</b>			
D.41 (part)	Interest: Bank support package	Ad hoc	-	-
D.41 (n.e.c.)	Interest (n.e.c.)	Trend	-	-
D.42 (part)	Dividends: OeNB, bank support package, ÖIAG (= state holding company), Verbund (= electricity utility), ASFINAG (= highway authority)	Ad hoc	-	-
D.42 (n.e.c.)	Dividends and other income (n.e.c.)	Trend	-	-
<b>D.5</b>	<b>CURRENT TAXES ON INCOME, WEALTH, ETC.</b>			
D.51Ax (part)	Assessed income tax	Elasticity	Nominal GDP (t-1)	1
D.51Ax+Ex (part)	Chamber of Labour membership dues and contribution to housing subsidies	Elasticity	Compensation of employees	1
D.51Ax+Bx (part)	Withholding tax on investment income	Elasticity	Net operating surplus**	2.25
D.51Ax+Bx (part)	Withholding tax on interest income	Carried forward	-	-
D.51Ax (part)	Withholding tax on wages	Elasticity	(1): Paid employment (2): Average compensation of employees	1* 1.88
D.51Ax (part)	Withholding tax on pensions	Elasticity	(1): Pensioners (2): Average pension	1* 1.88
D.51Bx (part)	Business chamber membership dues	Elasticity	Nominal GDP	1
D.51Bx (part)	Corporate income tax	Elasticity	Net operating surplus (t-1)	1
D.5 (n.e.c.)	Current taxes on income, wealth, etc. (n.e.c.)	Trend	-	-
<b>D.6</b>	<b>SOCIAL CONTRIBUTIONS</b>			
D.611+12+13CE (part)	Actual and imputed social contributions, public sector	Elasticity	Compensation of employees, public sector	1
D.611+13CE (part)	Actual social contributions, private sector	Elasticity	Compensation of employees, private sector	1
D.613CS	Actual social contributions, self-employed	Elasticity	Gross operating surplus	1
D.613CN	Actual social contributions, inactive labor force	Elasticity	Spending on pensions	1
D.613V	Voluntary social contributions, households	Trend	-	-
<b>D.7</b>	<b>OTHER CURRENT TRANSFERS</b>	Trend	-	-
<b>D.9</b>	<b>CAPITAL TRANSFERS</b>			
D.91A+B	Withholding tax on capital income	Ad hoc	-	-
D.9 (n.e.c.)	Capital transfers (n.e.c.)	Trend	-	-

\* Restricted to 1 in the estimate.

\*\* The net operating surplus is defined as the gross operating surplus minus economy-wide capital consumption.

Source: Fiscal Advisory Council.

**Table 2: Overview of the Methods Used to Project Government Expenditure**

ESA 2010	Budget category	Forecasting method	Main indicators
<b>P.2</b>	<b>INTERMEDIATE CONSUMPTION</b>	xt-1/trend/elasticity	Budget subcategories, health sector reform
<b>D.1</b>	<b>COMPENSATION OF EMPLOYEES</b>		
D.11	Wages and salaries	Trend/elasticity	Negotiated wages or CPI, employment growth, structural or socio-demographic changes of employment (wage drift), Federal Finance Act
D.121	Employers' social contributions	Elasticity	Growth of wages and salaries
D.122	Employers' imputed social contributions	Trend	
<b>D.2</b>	<b>TAXES ON PRODUCTION AND IMPORTS</b>	Elasticity	Growth of wages and salaries
<b>D.3</b>	<b>SUBSIDIES</b>	xt-1/trend	
<b>D.4</b>	<b>PROPERTY INCOME</b>	Elasticity	Level of market interest rates, debt maturity profile, growth of government debt
<b>D.5</b>	<b>CURRENT TAXES ON INCOME, WEALTH, ETC.</b>	xt-1	Budget subcategories
<b>D.62</b>	<b>SOCIAL BENEFITS OTHER THAN SOCIAL TRANSFERS IN KIND</b>		
	Pensions	Trend/elasticity	Official growth pension payments, structural and socio-demographic changes and number of pensioners
	Unemployment benefits	Elasticity	Number of unemployed
	Long-term care benefits	Trend	Recipients of long-term care benefits (by levels of care)
	Family benefits	Trend/elasticity	Budget subcategory, demographic changes
	N.e.c.	xt-1	
<b>D.631</b>	<b>SOCIAL TRANSFERS IN-KIND</b>	Trend/elasticity	Budget subcategory, CPI, number of recipients of long-term care benefits, pupils, old-age or invalidity
<b>D.7</b>	<b>OTHER CURRENT TRANSFERS</b>		
	to households	Trend	Budget subcategory
	to the EU	Ad hoc	EU budget
	N.e.c.	Trend	Budget subcategory
<b>D.9</b>	<b>CAPITAL TRANSFERS</b>		
	Bank support package	Ad hoc	Level of market interest rates, annual reports, budget plan
	N.e.c.	xt-1/trend	
<b>P.5</b>	<b>GROSS CAPITAL FORMATION</b>		
	Other general services	Trend	Budget subcategory
	Health	Ad hoc	Health care reform
	Research and development	Trend	Budget subcategory
	Rail transport	Ad hoc	Public works plan
	Road transport	Trend	Budget subcategory
	Military defense	xt-1	
	N.e.c.	Trend	Budget subcategory
<b>K.2</b>	<b>ECONOMIC DISAPPEARANCE OF NON-PRODUCED ASSETS</b>	Ad hoc	Federal Finance Act, stability program

Source: Fiscal Advisory Council.

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