THE CALCULATION OF CYCLICALLY ADJUSTED BALANCES AT BANCO DE PORTUGAL: AN UPDATE*

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1. INTRODUCTION[1]

In recent years, the cyclically adjusted budget balance has gained relevance as one of the indicators used in the assessment of the underlying position of public finances in the European Union Member-states. Indeed, the reform of the Stability and Growth Pact increased the role of the balance adjusted for cyclical effects and temporary measures, when defining, at the "preventive arm" level, the medium-term fiscal objective based on this variable, as well as the annual minimum convergence required for the Member-states that have not yet reached it. As regards the "corrective arm", the fiscal adjustment imposed to Member-states incurring in excessive deficit situations in the recent period has also been measured in terms of the change in the balance adjusted for cyclical effects and temporary measures.

The difficulties in explaining this indicator to the general public, the diversity of available methodologies, as well as the ex-post revision of cyclically adjusted balances, even if only as a result of the update of the future macroeconomic outlook, are among the factors that have hampered its widespread use. Nonetheless, although estimates used in the European Union framework are those of the European Commission, other international institutions, such as the OECD and the IMF, have been regularly publishing values for cyclically adjusted budget balances. As far as the European System of Central Banks (ESCB) is concerned, a cyclical adjustment methodology was adopted in 2001, which has since then been followed by Banco de Portugal. The values obtained are regularly made public in the Banco de Portugal publications, namely in the *Annual Report* and in the *Economic Bulletin*.

The purpose of this article is to update parameters and to improve some assumptions made by Banco de Portugal in the initial implementation of the ESCB cyclical adjustment methodology. Moreover, it applies the results to the analysis of public finances based on the disaggregated framework developed within the scope of a project involving some central banks, including Banco de Portugal. The text is structured as follows. Section 2 presents an introductory short description of the main features of the ESCB methodology and its application to the Portuguese case. Section 3 includes the updates and improvements of such methodology, as regards both the re-estimation of some elasticities of the fiscal variables with respect to their macroeconomic bases and the adoption of new macroeconomic bases. As a result of these changes, Section 4 shows their impact on the estimation of the cyclically adjusted balances *vis-à-vis* the latest values made public by Banco de Portugal. Section 5 adapts the analysis of public finances based on the disaggregated framework to the new procedures and includes the new results obtained. Finally, Section 6 draws the conclusions.

(1) The general government accounts for the 1999-2005 period underlying the preparation of this article were compiled by the National Statistical Institute (INE), on a 2000 National Account basis, within the scope of the September 2006 excessive deficit procedure notification. Data from 1995 to 1998 are Banco de Portugal estimates. In terms of the macroeconomic scenario, the complete set of National Accounts according to the new basis only covers the years from 1999 to 2002, wherefore the data for the years from 1995 to 1998 and from 2003 to 2005 are also Banco de Portugal estimates.

2. THE METHODOLOGY OF THE EUROPEAN SYSTEM OF CENTRAL BANKS

Currently, Banco de Portugal calculation of the cyclically adjusted general government balance, regularly made public in the *Economic Bulletin* and in the *Annual Report*, is based on the methodology agreed in the ESCB in 2001 (see Bouthevillain *et al.* (2001) and Neves and Sarmento (2001)).

This methodology assumes that the fiscal variables influenced by the economic cycle have other-than GDP macroeconomic bases that better explain their development. However, in order to determine the semi-elasticity of the budget balance with respect to GDP, these macroeconomic bases must be National Accounts aggregates. It is worth highlighting three aspects related to the selection of the fiscal variables and the respective macroeconomic bases. Firstly, it is assumed that non-tax revenue and the different expenditure components, other than unemployment benefits, are not affected by economic activity. This characteristic is common to the cyclical adjustment methodologies implemented by important international institutions, such as the European Commission, the OECD and the IMF, and results from the difficulty in measuring, in a standardised manner in the different countries and even in one country in different years, the impact of the economic cycle on most public expenditure items and non-tax revenue. Indeed, the institutional structure relevant for budgetary decisions, the type of government, the starting point of the fiscal position, inter alia, are factors determining the response of public expenditure to the macroeconomic context. Secondly, the macroeconomic bases are defined in real terms, which means that the effect of actual inflation on public accounts is not taken into consideration. The main difficulties in the quantification of the impact of the price changes on the budget balance emerge on the expenditure side, given that it highly depends on the behaviour of budgetary authorities in response to inflation deviations from initial forecasts. Therefore, although in terms of tax and social contributions revenue it would be more appropriate to consider nominal macroeconomic bases in the cyclical adjustment, this does not happen in the methodologies currently implemented. However, the disaggregated framework mentioned in Section 5 considers this issue to some extent, when assuming that the structural change in each of the items of tax revenue evolves in line with the respective trend macroeconomic base defined in nominal terms. Finally, some items are excluded from the fiscal variables so that the treatment of revenue and expenditure in terms of the cyclical adjustment is consistent. At present, in the Portuguese case, the revenue of the personal income tax (Portuguese acronym: IRS) deriving from final withholding schemes, which stems essentially from interest on financial instruments, and from public sector labour income is excluded from the receipts of taxes on household income. The same occurs with actual contributions to the civil servants pension system and imputed contributions, which are deducted to the total amount of social contributions. Table 1 presents the fiscal variables with a cyclical impact, as well as the respective macroeconomic bases.

Taking into account these considerations, the cyclical component of each of the fiscal variables is calculated according to the following formula:

$$R_i^c = \eta_{R_i, X_i} * \left(\frac{X_i - X_i^t}{X_i^t} \right) * R_i$$

(1)

where:

R_i – fiscal variable *i*;

R_i^c – cyclical component of fiscal variable *i*;

X_i – macroeconomic base for fiscal variable *i*;

X_i^t – trend value of the macroeconomic base for fiscal variable *i*;

η_{R_i, X_i} – elasticity of fiscal variable *i* relative to its macroeconomic base.

The trend values of the macroeconomic bases are obtained by applying the Hodrick-Prescott filter to series extended with forecasts elaborated by each national central bank, so as to avoid a bias at the end of the sample, in which the value for the filter smoothing parameter (λ) is 30. The estimation of the elasticities in the Portuguese case was chiefly based on the tax codes and is described in detail in Neves and Sarmento (2001)

One of the main advantages of the disaggregated approach suggested by the ESCB *vis-à-vis* the other methodologies for the calculation of cyclically adjusted balances consists in the possibility of taking into account the effects of different compositions of economic growth on public accounts. However, in view of the traditional approach in which the cyclical component depends only on the output gap, it has the disadvantage of not allowing the straightforward calculation of the semi-elasticity of the fiscal balance as a percentage of GDP with respect to real GDP, defined as:

$$\varepsilon_{FB\%GDP,GDP_r} = \frac{\Delta FB\%GDP}{\dfrac{\Delta GDP_r}{GDP_r}}$$

(2)

Nonetheless, in the methodology adopted by the ESCB, this semi-elasticity can be obtained indirectly from the following formula:

$$\varepsilon_{FB\%GDP,GDP_r} = \sum_i \frac{R_i}{GDP} * \eta_{R_i, X_i} * \eta_{X_i, GDP_r}$$

(3)

The elasticities of the macroeconomic bases with respect to real GDP $\left(\eta_{X_i, GDP_r} \right)$ were calculated on the basis of a specific shock scenario, described in detail in Bouthevillain *et al*. (2001). This one is based on National Accounts identities and takes into account six main assumptions: (i) the contribution of net exports to the change in real GDP is nil; (ii) public consumption (including public wages and employment), public investment and subsidies do not react under the shock scenario; (iii) the contribution of consumption of fixed capital to the change in real GDP is negligible; (iv) the gross operating surplus and the private sector wage bill grow at the same rate; (v) private investment evolves similarly to private consumption; (vi) the elasticity of the labour force with respect to real GDP is almost nil. As can be observed in Table 2, based on the results then assumed for the Portuguese case (columns 1 and 2),

Table 1

BUDGET VARIABLES AND RESPECTIVE MACROECONOMIC BASES IN ESCB METHODOLOGY

Taxes on household income (excluding the IRS revenue from final withholding schemes and public sector labour income)	$\Longrightarrow$	Private sector wage bill
Taxes on corporate income	$\Longrightarrow$	Gross operating surplus
Taxes on production and imports (including European Union own receipts)	$\Longrightarrow$	Private consumption
Social contributions (excluding actual contributions of the civil servants pension system and imputed contributions)	$\Longrightarrow$	Private sector wage bill
Unemployment benefits	$\Longrightarrow$	Number of unemployed

Table 2

THE SEMI-ELASTICITY OF THE FISCAL BALANCE WITH RESPECT TO GDP IN THE ESCB METHODOLOGY					
	Elasticity of the fiscal variable with respect to the macroeconomic base[a]	Elasticity of the macroeconomic base with respect to GDP[a]	Elasticity of the fiscal variable with respect to GDP	Weight of the fiscal variable on GDP[b]	Contribution to the semi-elasticity of the budget balance with respect to GDP
	(1)	(2)	(3)=(1)*(2)	(4)	(5)=(3)*(4)
Taxes on household income			1.37	0.03	0.05
Macroeconomic base: private sector wages	1.69	0.43			
Macroeconomic base: private employment	1.00	0.64			
Taxes on corporate income	1.00	1.07	1.07	0.03	0.04
Taxes on production and imports	1.10	1.31	1.44	0.14	0.20
Social contributions			1.07	0.07	0.08
Macroeconomic base: private sector wages	1.00	0.43			
Macroeconomic base: private employment	1.00	0.64			
Unemployment benefits	1.00	-10.23	-10.23	0.01	-0.07
				Total:	**0.43**

Notes: **(a)** According to Neves and Sarmento (2001) and to the section about Portugal in Bouthevillain *et al*. (2001). **(b)** The ratios of the fiscal variables to GDP are based on National Accounts and correspond to averages for the 1995-2000 period. In order to obtain ratios that are more consistent with the methodology to calculate cyclically adjusted balances adopted by the ESCB, IRS revenue from final withholding schemes and public sector labour income was excluded in the case of taxes on household income, actual contributions to the civil servants pension system and imputed contributions were deducted from total social contributions, while the European Union own receipts were added to taxes on production and imports.

but with the currently available general government accounts (column 4), the value obtained for the semi-elasticity of the balance with respect to GDP is 0.43.

3. UPDATES AND IMPROVEMENTS WITHIN THE SCOPE OF THE ESCB METHODOLOGY

This Section analyses the relationship between the different fiscal variables assumed to be influenced by the economic cycle and the respective macroeconomic bases in the 1995-2005 period. In some cases, it is suggested to change and update the procedures adopted by Neves and Sarmento (2001). Concerning the estimation of elasticities, three key points are worthy of note. Firstly, the period considered in the analysis covers chiefly one economic cycle and is therefore short in terms of the actual number of observations. However, the possibility of starting the analysis in some earlier year is hindered by the fact that the introduction of the main taxes in the current Portuguese tax system occurred chiefly until the late 1980s/early 1990s, as well as by the absence of a retropolation of National Accounts on a 2000 basis for the period prior to 1995. Secondly, since the objective is to determine the cyclical elasticities of the fiscal variables, regressions are based on series of different taxes and social contributions adjusted for the effects of permanent or temporary discretionary measures. Nonetheless, it is not possible to disregard the effects of possible structural changes that may have occurred, but, in view of the short period of the analysis, they are not expected to be significant. Lastly, it is worth stressing that the specification of the regressions is deemed appropriate for the purpose of the elasticity estimation to be used in the cyclical adjustment of the budget balance within the scope of the ESCB methodology and, as such, is not necessarily based on the explanatory variables which would allow the best possible fit to data observed.

3.1. Taxes on household income

The estimation of the elasticity of taxes on household income with respect to the private sector wage bill is described in detail in Neves and Sarmento (2001) and was based on data made available by the tax administration relative to a sample of taxpayers in 1998. The values obtained (1.69 for private sector wages and 1.0 for private employment) will not be updated in this article. However, in spite of the discretionary measures taken in recent years, which had an impact on the structure and progressivity of the tax, the estimated elasticity is a reasonably good proxy for the behaviour of this tax revenue in the 1995-2005 period, particularly in the most recent years.

Chart 1 presents the growth rates of revenue from taxes on household income, resulting chiefly from the IRS, excluding the revenue from final withholding schemes and from public sector labour income. This series was adjusted taking into account the estimated impact on IRS of the main temporary or permanent discretionary measures implemented from 2000 to 2004.[2] Worthy of note among these are: the effect of the tax rate cuts and the introduction of a new bracket in 2001, as a result of the income tax reform in 2000; the above-inflation update of the tax withholding tables in 2002, with an opposite impact on tax revenue in 2002 and 2003; the reduction in the tax rates included in the 2005 Budget, only partly reflected in the update of the tax withholding tables in that year; the extraordinary settlement of tax arrears in late 2002 and early 2003; the securitisation of tax credits in 2003. Chart 1 also includes a series constructed from the estimated elasticity and the development of the respective macroeconomic base, according to the following formula:

$$\hat{R}^e_{Taxes\ hous.\ inc.} = 1.69 * \left(\hat{W}_{priv} - \hat{U}_{IRS} - \hat{E}_{priv} \right) + \hat{U}_{IRS} + \hat{E}_{priv}$$

(4)

where:

$\hat{R}^e_{Taxes\ hous.\ inc.}$ – Estimated growth rate of taxes on household income (excluding the IRS derived from final withholding schemes and public sector labour income);

$\hat{W}_{priv}$ – Growth rate of the private sector wage bill, net of social contributions;

$\hat{U}_{IRS}$ – Annual update of the IRS brackets and other parameters that usually coincide with the update of the tax withholding tables;

$\hat{E}_{priv}$ – Growth rate of private employment.

Equation (4) indicates that the effect of progressivity, via the IRS structure, will only be reflected in the collection of these taxes when the development of wages differs from the update of the IRS brackets and other parameters. In effect, this should account for a significant part of the very marked difference between the two series presented in Chart 1 in 1997 and 1998, when the IRS brackets and other parameters were updated in line with expected inflation but private sector wages grew significantly above such values. In 1996, the opposite effect may be explained by the settlement of debt arrears within the scope of the Mateus plan. Finally, the divergence of the two series in 2005, with a more favourable behaviour of revenue from taxes on household income than estimated taking into account the elasticity, may partly illustrate the impact increased effectiveness of tax administration in the collection of these taxes.

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(2) IRS changes introduced from 1995 to 1999 were not explicitly considered in this analysis due to difficulties in the quantification of their effects.

Chart 1

GROWTH RATES OF TAXES ON HOUSEHOLD
INCOME
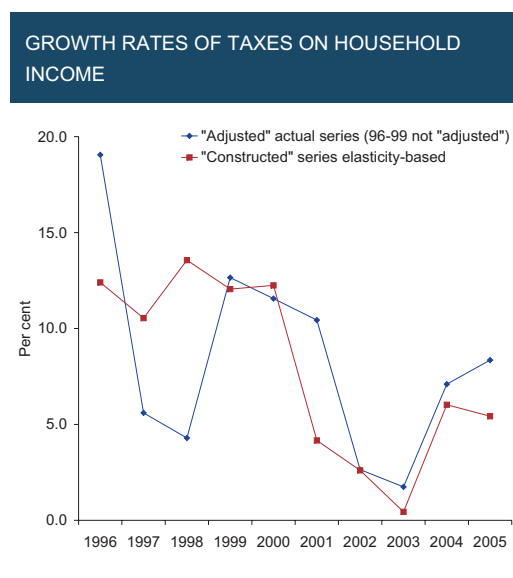
3.2. Taxes on corporate income

Taxes on corporate income, mainly composed by the Corporate Income Tax (Portuguese acronym: IRC) show a very volatile behaviour over time, which makes extremely difficult to select an appropriate macroeconomic base to model its development. Indeed, in Portugal, IRC revenue is highly dependent on the development of profits in some large corporations that are naturally the main contributors to this tax collection. In addition, the fact that the variable profit is not one of the aggregates compiled in the elaboration of the National Accounts and the method itself for the calculation of this tax receipts, in particular the possibility of deducting losses from previous years, make it even more difficult to establish a relationship with the macroeconomic scenario. Neves and Sarmento (2001) used gross operating surplus as a proxy to corporate profits and, given the proportionality of the tax, assumed an elasticity of revenue with respect to its macroeconomic base equal to one.

Chart 2 shows the growth rates of revenue from taxes on corporate income in the 1996-2005 period, adjusted for the effects of the main temporary and permanent tax policy measures. It could be referred, as examples, the IRC rate cuts from 36 to 34 per cent (1997), from 34 to 32 per cent (2000), from 32 to 30 (2002) and from 30 to 25 per cent (2004), the change in the percentage used to calculate pre-payments (2000) and a number of other changes related to special pre-payments. In the years when gross operating surplus growth rates are available, the resulting developments seem to suggest that private GDP is a more suitable variable to capture the dynamics of revenue from taxes on corporate income. After the choice of the new macroeconomic base, defined in real terms, the revenue elasticity was obtained from the estimation of equation (5) by ordinary least squares, using data from 1995 to 2005, and its value corresponded to $\beta_{Taxes\ corp.\ inc.} = 3.14$.

$$\Delta \ln\left(R^{cor}_{Taxes\ corp.\ inc.} \right)_t - \Delta \ln\left(GDP^{deflator}_{priv.} \right)_t = \beta_{Taxes\ corp.\ inc.} \Delta \ln\left(GDP^{real}_{priv.} \right)_t + \varepsilon_t \tag{5}$$
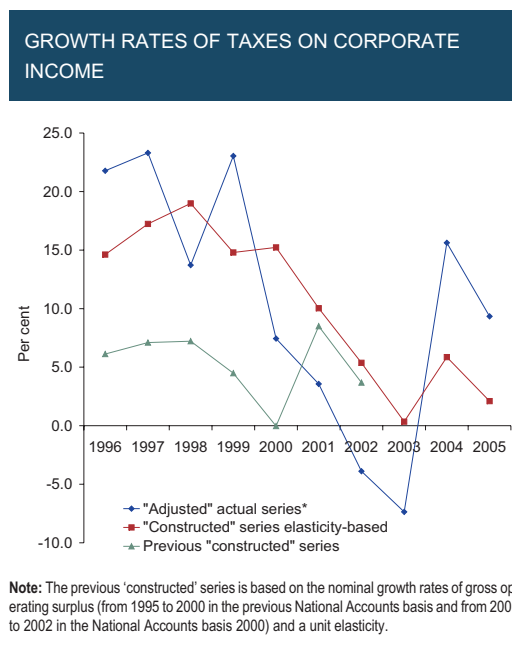
where:

$R^{cor}_{Taxes\ corp.\ inc.}$ – Revenue from taxes on corporate income adjusted for the effects of tax policy measures;

$GDP^{deflator}_{priv.}$ – Private GDP deflator;

$GDP_{priv.}^{real}$ – Real private GDP.

Three aspects should be highlighted in this estimation. Firstly, the specification of equation (5) assumes a unit elasticity with respect to the private GDP deflator, which captures the fact that revenue from these taxes actually depends on a nominal base. Secondly, the period used in the analysis includes the year 2005, although this one was much affected by effectiveness gains in tax collection of a non-cyclical nature and difficult to quantify. However, the inclusion of this observation does not change significantly the value obtained for the elasticity. Finally, a result for the elasticity higher than one does not reflect any progressivity in this tax, but only the use of a macroeconomic variable to capture the cyclical effect with an average growth clearly below the one of tax receipts. It should also be noted that the series of taxes on corporate income receipts based on the estimated elasticity presents less volatility than the actual series, as can be confirmed in Chart 2.

Chart 2

GROWTH RATES OF TAXES ON CORPORATE INCOME

Note: The previous 'constructed' series is based on the nominal growth rates of gross operating surplus (from 1995 to 2000 in the previous National Accounts basis and from 2001 to 2002 in the National Accounts basis 2000) and a unit elasticity.

3.3. Taxes on production and imports

Neves and Sarmento (2001) adopted a procedure based on the data from the Survey of Household Budgets for 25 categories of consumer goods and the respective tax rates, which allowed the estimation of a value of 1.1 for the elasticity of taxes on production and imports, as a whole, with respect to private consumption. This article estimates individual elasticities for the main taxes on production and imports, i.e., the Value Added Tax (VAT), the Tax on Oil Products and the Car Tax, while other taxes are considered together.

As regards VAT, the estimation of the elasticity with respect to real private consumption was based on equation (6), using the data for the revenue of this tax from 1995 to 2005, adjusted for the impact of the main discretionary changes implemented in this period. Among these, it should be highlighted the introduction of an intermediate rate of 12 per cent in 1996 and the rise in the standard rate from 17 to 19 per cent in 2002 and to 21 per cent in 2005. The growth rates adjusted for these effects are presented in Chart 3. Given that the VAT is a tax on the sales of goods and services, it depends not only on the quantity of goods and services traded, but also on their price. Therefore, equation (6) assumes that a 1

per cent increase in the private consumption deflator is proportionally reflected in VAT revenue. The value obtained for the elasticity, β_{VAT} =1.69, points to a more-than-proportional effect on revenue. This may imply that in periods of economic expansion (recession) the households tend to change their consumption pattern towards more (less) goods taxed at the standard rate and less (more) subject to the reduced rate. Moreover, in the period under review, other structural factors have occurred, such as the modernisation of the distribution circuits, whose positive effect cannot be quantified, and, as such, may lead to some overestimation of the elasticity with respect to the economic cycle. Nevertheless, actual and elasticity-based growth rates are relatively close, even in most recent years, as can be seen in Chart 3.

$$\Delta \ln\left(R_{VAT}^{cor} \right)_t - \Delta \ln\left(C^{deflator} \right)_t = \beta_{VAT} \, \Delta \ln\left(C^{real} \right)_t + \varepsilon_t \tag{6}$$

where:

R_{VAT}^{cor} – VAT revenue, including European Union own receipts, adjusted for the effects of tax policy measures;

$C^{deflator}$ – Private consumption deflator;

C^{real} – Real consumption deflator.

As regards the Tax on Oil Products, changes in tax rates were frequent between 1995 and 2005. However, taking into account the quantities of fuel consumed, the elimination of its effects on the series used in the estimation of the elasticity is quite straightforward (Chart 4). However, two aspects should be highlighted. On the one hand, private consumption of services and non-durable goods measured in real terms is deemed to be an appropriate, but not perfect, macroeconomic base for the quantities of fuel consumed. On the other hand, tax revenue does not depend on actual prices, since is defined in monetary units per litre of fuel consumed. The elasticity of revenue from the Tax on Oil Products with respect to real private consumption of services and non-durable goods $\left(\beta_{TOP}\right)$ estimated for the 1995-2005 period is 1.07. In most recent years, in particular from 2003 to 2005, the series constructed on the basis of the estimated elasticity seems to overestimate the tax revenue actual growth. This result should be mainly explained by the fact that the volume of private consumption of services and non-durable goods does not accurately reflect the quantities of fuel sold. To a lesser extent, it may also
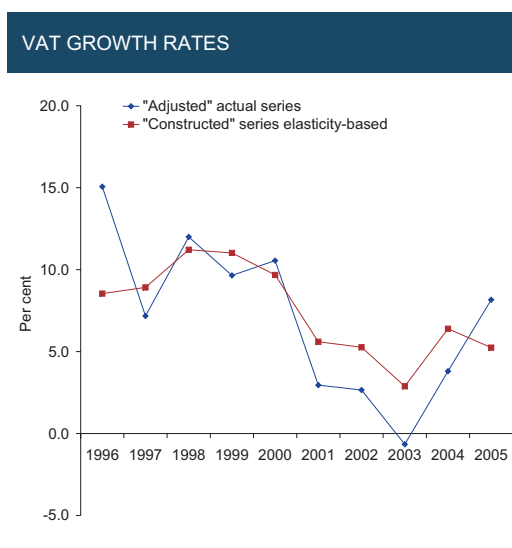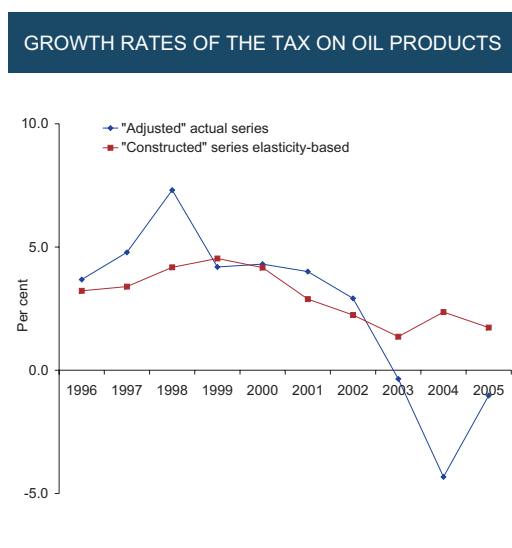
Chart 3

Chart 4

VAT GROWTH RATES

GROWTH RATES OF THE TAX ON OIL PRODUCTS

be influenced by changes in the composition of vehicles in circulation, with a growing share of diesel vehicles, as this fuel is taxed at lower rates.

$$\Delta \ln\left(R_{TOP}^{cor} \right)_t = \beta_{TOP} \Delta \ln\left(C_{non-durables}^{real} \right)_t + \varepsilon_t \tag{7}$$

where:

R_{TOP}^{cor} – Revenue from the Tax on Oil Products adjusted for the effects of tax policy measures;

$C_{non-durables}^{real}$ – Private consumption of services and non-durable goods measured in real terms.

The Car Tax, on its turn, depends on certain characteristics of the vehicles, such as the cylinder capacity in cubic centimetres. It is established in tables that are updated every year in the State Budget Law, usually in line with expected inflation. Therefore, revenue from this tax derives chiefly from the number of vehicles sold and their quality, measured by the private consumption of durable goods in real terms for the purpose of calculating the elasticity, and from expected inflation considered in the different State Budgets, which justifies the specification of equation (8). In addition, changes in the tax structure, similarly to changes introduced in other taxes, may justify the correction of the observed series via the impact of such measures. However, in the period analysed, these were not significant, and the most relevant occurred in 2001 with an increase in the taxation on off-road vehicles. From the estimation of equation (8) for the 1995-2005 period, based on ordinary least squares, resulted an elasticity of β_{CT} =1.33, which brings the growth of the estimated series based on the elasticity reasonably closer to the one of actual revenue, as can be observed in Chart 5.

$$\Delta \ln\left(R_{CT} \right) - \Delta \ln\left(Inf^{budg.} \right) = \beta_{CT} \Delta \ln\left(C_{durables}^{real} \right)_t + \varepsilon_t \tag{8}$$

where:

R_{CT} – Actual revenue from the Car Tax;

$Inf^{budg.}$ – Price index constructed on the basis of the expected inflation included in the State Budget;

$C_{durables}^{real}$ – Private consumption of durable goods measured in real terms.

Finally, as regards other taxes on production and imports, a unit elasticity was assumed with respect to real private consumption. In effect, this aggregate includes a number of taxes, much different in their incidence and calculation. Stress should be laid, for their relevance, on the Tax on Tobacco, the Stamp Tax, the Municipal Tax on Real Estate and the Municipal Tax on Real Estate Transactions.[3] In addition, in the period under analysis, the structure and rates of these taxes were subject to some changes, whose individual effects are difficult to estimate. As a result, in parallel with the impact of the price level on the revenue of these taxes, the growth of this aggregate usually exceeds the one estimated on the basis of a unit elasticity, as illustrated in Chart 6. In most recent years, the difference between both series is partly explained by the increase in the Tax on Tobacco included in the different State Budgets, as well as by the reform of taxation on real estate. The latter, on account of the updates of the values of the properties to be used for tax purposes, has been behind the strong rise in revenue from the Municipal Tax on Real Estate.

Table 3 summarises the values estimated and assumed for the elasticities of the different taxes on production and imports with respect to their bases and real private consumption, as well as the calculation

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(3) The Stamp Tax receipt related with banking operations is reclassified as tax on income and property in National Accounts. It should also be highlighted that revenue from taxes on property is recorded as tax on production and imports in National Accounts, but it is classified under direct taxes in Public Accounts.
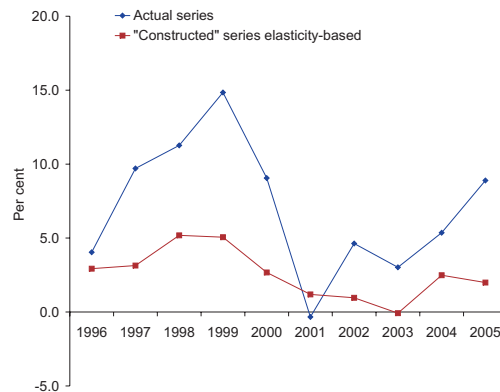
Chart 5

GROWTH RATES OF THE CAR TAX
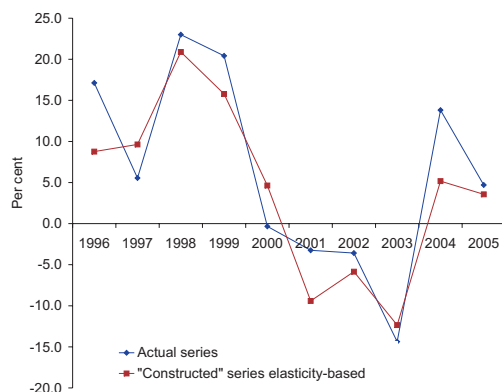
Chart 6

GROWTH RATES OF OTHER TAXES ON
PRODUCTION AND IMPORTS

Table 3

| THE ELASTICITY OF TAXES ON PRODUCTION AND IMPORTS				
Taxes on production and imports	Elasticity with respect to the base	Elasticity with respect to private consumption[a]	Average weight on total taxes on production and imports[a]	Total elasticity of taxes on production and imports with respect to private consumption
VAT	1.69	1.69	0.55	
Tax on oil products	1.07	0.83	0.16	
Car tax	1.33	0.17	0.06	**1.30**
Other	1.00	1.00	0.23	

Note: (a) Based on average weights from 1995 to 2005.

of an aggregate elasticity for these taxes as a whole. This aggregate elasticity stands at 1.3, above the 1.1 value considered in Neves and Sarmento (2001).

3.4. Social contributions

As presented in Section 2, when applying the ESCB cyclical adjustment methodology, only social contributions of the private sector system are deemed to be affected by economic activity, so that the treatment of public revenue is consistent with that of expenditure. As far as the elasticity is concerned, given the existence of single rates for the share of employers (23.75 per cent) and of employees (11 per cent), Neves and Sarmento (2001) assumed that the behaviour of revenue from these contributions with respect to the private sector real wage bill was proportional. As illustrated in Chart 7, this assumption seems to replicate rather closely the actual growth in private sector social contributions in the period analysed and, as such, it will be maintained. With regard to tax policy measures or other factors which may distort the relationship with the macroeconomic base, the series in the chart was only adjusted for the extraordinary effect of a State's payment to Social Security in 2004, regarding social contributions the State committed to pay on behalf of small farmers between 2001 and 2003.

Chart 7

GROWTH RATES OF SOCIAL CONTRIBUTIONS OF
THE PRIVATE SECTOR SYSTEM
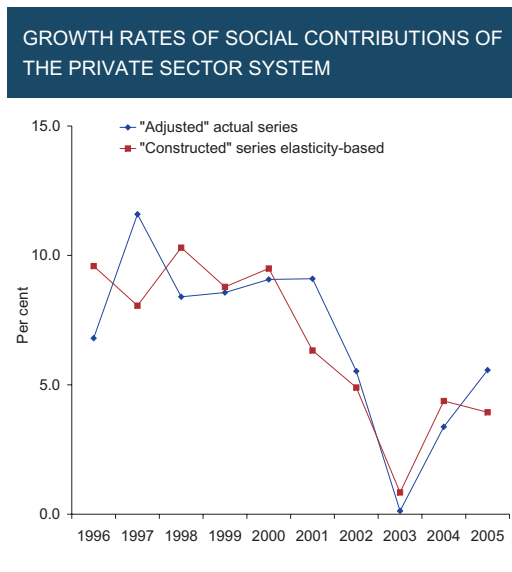
3.5. Unemployment benefits

In most EU Member States the cyclical component of unemployment, within the framework of the ESCB methodology, is obtained with the Hodrick-Prescott filter. However, in the Portuguese case, the unemployment gap was estimated on the basis of the difference between actual unemployment and natural unemployment, since conclusions from a number of empirical studies for Portugal point to reasonably stable values for the natural rate of unemployment since the beginning of the 1980s (see equation (9)). In this context, Neves and Sarmento (2001) assumed a natural rate of unemployment of 5.0 per cent, as well as the proportionality between expenditure on unemployment benefits and the number of unemployed.

$$Unemployed\ gap = \frac{no.unemployed - natural\ rate\ of\ unemployment * labour\ force}{natural\ rate\ of\ unemployment * labour\ force} \qquad (9)$$
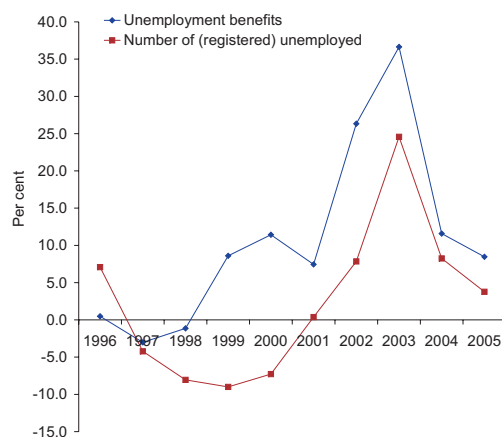
In Portugal, data on the number of unemployed registered in the Employment and Professional Training Institute (Portuguese acronym: IEFP) are available on a regular basis. This series, which in the past showed a rather volatile difference *vis-à-vis* the number of unemployed in the economy obtained on the basis of the Labour Force Survey, is currently more accurate to explain the developments in expenditure on unemployment benefits. In fact, in recent years, changes in the rules for granting these benefits and in the monitoring by employment offices of job seeking efforts by the unemployed rendered this variable a good indicator for developments in expenditure on unemployment benefits.

Chart 8 shows that in most years under analysis, as anticipated, rates of change in unemployment benefits stand above those in the number of registered unemployed, which illustrates a positive growth in the average unemployment benefit, in line with wage developments. Nevertheless, in addition to the effect of the change in the structure of unemployment throughout the period and in the related benefits, the difference between the two series is also affected by changes introduced in the meantime in the rules for granting unemployment benefits.

The use of the number of registered unemployed requires changes in the trend number of unemployed taken into account in the cyclical adjustment. In fact, as illustrated in Chart 9, the ratio of the number of registered unemployed (calculated on the basis of IEFP data) to the labour force is clearly higher than
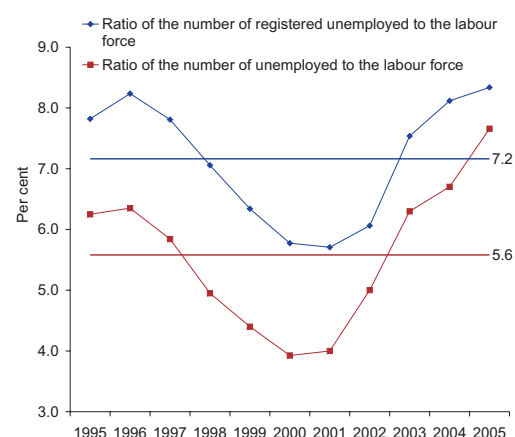
Chart 8

Chart 9

| GROWTH RATES OF UNEMPLOYMENT BENEFITS AND THE NUMBER OF UNEMPLOYED | RATIOS OF THE NUMBER OF UNEMPLOYED TO THE LABOUR FORCE |

the one based on the number of unemployed in the economy (calculated according to the Labour Force Survey results), and points to an average value of 7.2 per cent between 1995 and 2005, compared with 5.6 per cent in the case of unemployed in the economy. This latter value is higher than that considered by Neves and Sarmento (2001) for the natural unemployment rate, although it is quite in line with the reassessment made by Dias *et al*. (2004). These authors, by using quarterly data from 1983 to 2003 and alternative approaches, obtained average estimates for the NAIRU[4] at around 5.5 per cent. Hence, in the practical implementation of the cyclically adjusted balances' methodology, the gap in the number of unemployed will be calculated on the basis of the difference between the number of registered unemployed and the average number of unemployed equal to 7.2. per cent of the labour force.

3.6. Semi-elasticity of the budget balance

The change in some elasticities of fiscal variables *vis-à-vis* their macroeconomic bases, elaborated throughout this Section, allows the update of the budget balance's semi-elasticity with respect to GDP. In this context, it is also convenient to revise the elasticities of macroeconomic bases with respect to GDP, based on the currently available National Accounts data and drawing on the shock scenario specified by Bouthevillain *et al*. (2001). As mentioned in Section 2, this exercise is based on the relationship among the different macroeconomic bases via National Accounts' identities and, as such, its calculation does not require a simulation using a macroeconomic model. Table 4 shows the results obtained and points to a semi-elasticity of 0.50. This increase from the previous estimate (0.43) reflects the increase in the elasticities of budget variables *vis-à-vis* the respective macroeconomic bases, since the updating of the sensitivities of the different macroeconomic bases with respect to GDP would by itself lead to a decline in the semi-elasticity. In addition, it should be noted that the current estimate for the semi-elasticity is very close to the values currently used by the European Commission (0.45) and the OECD (0.46).

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(4) Non-accelerating inflation rate of unemployment, i.e. an unemployment rate that is compatible with a constant inflation rate.

Table 4

THE UPDATED SEMI-ELASTICITY OF THE BUDGET BALANCE WITH RESPECT TO GDP IN THE ESCB METHODOLOGY					
	Elasticity of the fiscal variable with respect to the macroeconomic base	Elasticity of the macroeconomic base with respect to GDP	Elasticity of the fiscal variable with respect to GDP	Weight of the fiscal variable on GDP[a]	Contribution to the semi-elasticity of the budget balance with respect to GDP
	(1)	(2)	(3)=(1)*(2)	(4)	(5)=(3)*(4)
Taxes on household income			1.33	0.04	0.05
Macroeconomic base: private sector wages	1.69	0.49			
Macroeconomic base: private employment	1.00	0.51			
Taxes on corporate income	3.14	1.15	3.61	0.03	0.12
Taxes on production and imports	1.30	1.15	1.49	0.14	0.21
Social contributions			0.99	0.07	0.07
Macroeconomic base: private sector wages	1.00	0.49			
Macroeconomic base: private employment	1.00	0.51			
Unemployment benefits	1.00	-5.79	-5.79	0.01	-0.05
				Total:	**0.50**

Note: (a) The ratios of the fiscal variables to GDP are based on National Accounts and correspond to averages for the 1995-2005 period. In order to obtain ratios that are more consistent with the methodology to calculate cyclically adjusted balances adopted by the ESCB, IRS revenue from final withholding schemes and public sector labour income was excluded in the case of taxes on household income, actual contributions to the civil servants pension system and imputed contributions were deducted from total social contributions, while the European Union own receipts were added to taxes on production and imports.

4. CYCLICALLY ADJUSTED BALANCES

On the basis of the methodology implemented by Neves and Sarmento (2001), Banco de Portugal had already changed the macroeconomic bases of corporate income taxes and unemployment benefits to, respectively, private GDP and the number of registered unemployed. *Vis-à-vis* the figures now presented, the elasticity of corporate income taxes was higher and the average share of registered unemployed with respect to the labour force was lower. Therefore, the differences between the latest version of cyclically adjusted balances made public by Banco de Portugal (in the Autumn 2006 issue of the *Economic Bulletin*) and that which would result from the update of parameters carried out in this article are not very si as can be seen in Table 5. The revision of the total balance adjusted for cyclical effects and temporary measures reaches at the most an absolute value of 0.3 percentage points of GDP in 2005, standing below that figure in all other years considered in this analysis. The differences regarding the change in the primary balance adjusted for cyclical effects and temporary measures, an indicator that is commonly used to assess the fiscal policy stance, are negligible. Overall, changes introduced in this article mainly entail a reduction of the cyclical component, which is less positive (negative) during strong (weak) economic growth periods (Chart 10). This results from the lower elasticity of taxes on corporate income, which more than offsets the higher elasticity of taxes on production and imports as whole with regard to private consumption and the increase in the average share of registered unemployed with respect to the labour force (Chart 11).

Chart 12 illustrates the effect of the composition of economic growth on the cyclical component of the budget balance, defined as the difference between the cyclical component calculated using the ESCB methodology, in line with the update described previously, and that obtained through the application of the 0.5 semi-elasticity of the budget balance with respect to GDP to the output gap. It should be noted that a positive value for this effect means that the behaviour of the different macroeconomic bases as a whole, given their fiscal elasticities, was more favourable to the balance than the one which would re-

Table 5

| CYCLICALLY ADJUSTED BALANCES: COMPARISON WITH THE LATEST FIGURES MADE PUBLIC | | | | | | | | | | | |
| As a percentage of GDP | | | | | | | | | | | |
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Cyclically adjusted total balance, excluding temporary measures											
Previous	-3.8	-3.3	-2.9	-2.9	-3.5	-4.7	-5.5	-4.9	-4.8	-4.7	-5.2
Revised	-4.0	-3.4	-2.9	-3.0	-3.6	-4.7	-5.4	-4.8	-4.9	-4.9	-5.5
Difference: revised-previous	*-0.2*	*-0.1*	*-0.1*	*0.0*	*-0.1*	*0.0*	*0.1*	*0.0*	*-0.1*	*-0.2*	*-0.3*
Change in the cyclically adjusted primary balance, excluding temporary measures											
Previous		-0.3	-0.6	-0.8	-0.8	-1.2	-0.8	0.5	0.0	0.0	-0.4
Revised		-0.2	-0.6	-0.7	-0.9	-1.1	-0.7	0.4	-0.1	-0.1	-0.5
Difference: revised-previous		*0.0*	*0.1*	*0.0*	*-0.1*	*0.1*	*0.1*	*-0.1*	*-0.1*	*-0.1*	*-0.1*

Chart 10

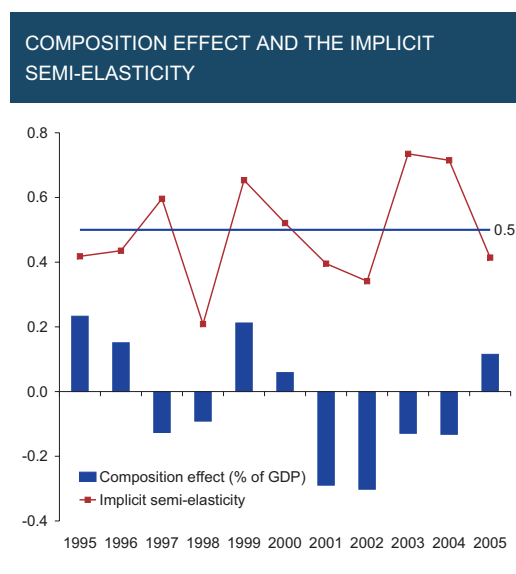| OUTPUT GAP AND THE REVISION OF THE CYCLICAL COMPONENT OF THE BUDGET BALANCE |
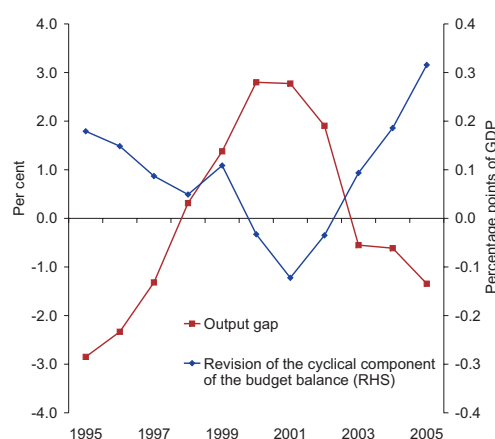
Chart 11

| REVISED CYCLICAL COMPONENTS |
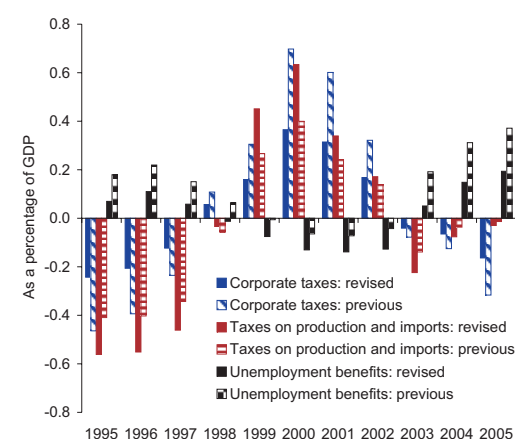
sult from a macroeconomic scenario featuring a 'balanced' growth of the various GDP components. In the period under review, this effect reached a maximum absolute value of around 0.3 per cent of GDP, i.e. of a fairly small magnitude.

Moreover, Chart 12 also illustrates the semi-elasticity of the budget balance with respect to GDP implicit in the cyclical component of the balance obtained by applying the ESCB methodology. Given that the composition effect is calculated as previously described, the fact of it being positive (negative) only translates into a semi-elasticity above (below) 0.5 if the output gap is positive, as explained in equations (10) and (11). On average, in the period analysed, the implicit semi-elasticity is in fact very close to the 0.5 value estimated in subsection 3.6, in spite of the non-zero cumulative value of composition effects.

Chart 12

COMPOSITION EFFECT AND THE IMPLICIT
SEMI-ELASTICITY

$$Composition\ effect = Cyclical\ component_{ESCB} - 0.5 * output\ gap \tag{10}$$

$$Implicit\ semi-elasticity = \frac{Cyclical\ component_{ESCB}}{output\ gap} \tag{11}$$

5. THE APPLICATION OF THE DISAGGREGATED FRAMEWORK

The update of some of the parameters considered in the cyclical adjustment methodology used by ESCB allows for an improvement of the disaggregated framework for assessing public finances introduced by Kremer *et al.* (2006). This approach was recently applied to the analysis of the 2005 fiscal developments in the 2005 *Annual Report* of Banco de Portugal.[5]

In analytical terms, this approach is based on the analysis of the change in the ratio of the main revenue and expenditure items to nominal trend GDP, excluding the effects of the economic cycle and temporary measures. With regard to taxes and social contributions, the change in their structural ratios is broken down, for every item, into four explanatory factors: (i) the fiscal drag, which given nominal growth of the trend macroeconomic base, corresponds to the automatic effect on tax revenue resulting from an elasticity of the fiscal item *vis-à-vis* the respective base not equal to one; (ii) the decoupling of the macroeconomic base from GDP that accounts for the effect of the growth differential between the trend macroeconomic base and nominal trend GDP on tax revenue; (iii) legislation changes, whose fiscal impact corresponds to official estimates or, in their absence, is calculated on the basis of data available; and (iv) the residual, which allows to quantify the part of the developments in structural ratios of taxes and social contributions that is not explained by the previous three factors. The residual component is an important element of this framework and it may contribute to a better understanding of past developments, by indicating the quantitative importance of particular unsystematic events. It may also show favourable or unfavourable trends in specific fiscal items. Moreover, it may reveal the need to reassess the impact of legislation changes or fiscal elasticities.

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(5) See "Box 6.1 A disaggregated framework for the analysis of public finances", 2005 *Annual Report*, Banco de Portugal.

Beyond the adjustments resulting from the new cyclically adjusted figures for the different fiscal items, the breakdown of taxes on production and imports into the categories defined in this article may also be included. Table 6 shows the structure used in the disaggregated framework, incorporating all updates and improvements.[6]

Three factors are particularly relevant regarding this structure. Firstly, the effects of legislation changes considered correspond to those assumed in Section 3 for the estimation of elasticities and the graphical display of results. Secondly, the impact of the fiscal elasticity in the case of VAT, the Tax on Oil Products and the Car Tax is nil, although the elasticities used in the calculation of the cyclical component of the budget balance are above one. Indeed, the small number of observations considered, as well as the insufficient breakdown of the different cyclical and non-cyclical factors that influence revenue from these taxes, do not allow, in structural terms, to assume that revenue reacts more than proportionally to trend values of the respective macroeconomic bases. This procedure corresponded to that initially adopted in the implementation of the disaggregated framework for taxes on production and imports as a whole, which also presented a cyclical elasticity higher than one. Finally, in the case of the Tax on Oil Products, the effect of the decoupling of the macroeconomic base from GDP is likely to be systematically negative, given that, in addition to the impact of changes in the average tax rates, fully regarded as a legislation change, tax revenue seems to depend only on the consumption of fuel, whose developments are measured by the volume of the private consumption of services and non-durable goods. By contrast, in the case of the Car Tax, it is assumed that the annual update of the tables of this tax, proxied by the private consumption deflator of durable goods, is part of the tax base and, as such, its effect on the change in the structural ratio of the revenue is captured in the decoupling of the macroeconomic base from GDP.

With regard to results, and focusing the analysis on the residuals of the breakdown of taxes on production and imports, mention should be made to: (i) the very favourable behaviour of VAT revenue, in particular from 1996 to 2000, which may be partly due to the factors mentioned in subsection 3.3; (ii) the residuals of the Tax on Oil Products and the Car Tax that are virtually nil for all years, indicating that legislation changes with identified impact, macroeconomic bases chosen and estimated elasticities explain very satisfactorily developments observed during this period; (iii) the positive residual in almost every year of other taxes on production and imports, as expected, given that legislation changes in these taxes, which tend to lead to an increase in taxation, were not explicitly considered in this analysis.

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(6) It should be referred that, *vis-à-vis* the figures shown in Box 6.1 of the 2005 *Annual Report* of Banco de Portugal, Table 6 takes into account the revised general government accounts, compiled within the framework of the excessive deficit procedure notification of September 2006.

Table 6

CHANGES IN GENERAL GOVERNMENT BALANCES, REVENUE AND EXPENDITURE, ADJUSTED FOR CYCLICAL EFFECTS AND TEMPORARY MEASURES As a percentage of trend nominal GDP										

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Actual balance (improvement +, deterioration -) [a]	**0.7**	**1.1**	**0.5**	**0.2**	**-0.2**	**-1.4**	**1.4**	**-0.1**	**-0.3**	**-2.9**
Cyclical component	0.2	0.2	0.9	0.8	0.6	-0.4	-0.4	-1.1	0.0	-0.1
Temporary measures	0.0	0.4	-0.4	0.0	0.3	-0.3	1.3	1.0	-0.2	-2.1
Structural balance (improvement +, deterioration -)	**0.5**	**0.4**	**-0.1**	**-0.7**	**-1.2**	**-0.7**	**0.6**	**0.1**	**0.0**	**-0.6**
Interest payments	-0.7	-1.0	-0.7	-0.2	0.0	0.0	-0.2	-0.2	-0.1	0.0
due to changes in the average interest rate on public debt	*-0.8*	*-0.8*	*-0.4*	*-0.1*	*0.0*	*-0.1*	*-0.3*	*-0.3*	*-0.1*	*-0.1*
due to changes in the debt stock	*0.1*	*-0.2*	*-0.2*	*-0.1*	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*
Structural primary balance (improvement +, deterioration -)	**-0.2**	**-0.6**	**-0.7**	**-0.9**	**-1.1**	**-0.7**	**0.4**	**-0.1**	**-0.1**	**-0.5**
Total revenue	**1.5**	**-0.2**	**0.0**	**0.9**	**-0.2**	**0.3**	**0.5**	**-0.3**	**0.9**	**0.3**
Taxes on household income	**0.2**	**-0.2**	**-0.2**	**0.0**	**0.3**	**0.0**	**-0.3**	**0.1**	**-0.1**	**0.1**
Fiscal drag	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0
Legislation changes	0.0	0.0	0.0	0.0	0.0	-0.3	-0.3	0.3	0.0	-0.1
Residual	0.0	-0.3	-0.3	-0.1	0.2	0.1	-0.1	-0.1	-0.1	0.1
Taxes on corporate income	**0.3**	**0.3**	**-0.2**	**0.4**	**0.1**	**-0.4**	**-0.1**	**-0.6**	**0.6**	**0.0**
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0
Legislation changes	0.0	0.0	-0.2	0.0	0.3	-0.2	0.0	-0.1	0.1	-0.4
Residual	0.3	0.4	0.0	0.3	-0.2	-0.1	-0.1	-0.5	0.5	0.5
VAT	**0.4**	**-0.1**	**0.2**	**0.0**	**0.2**	**0.0**	**0.3**	**0.2**	**0.0**	**0.6**
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.2	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	0.1	0.0
Legislation changes	-0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.3
Residual	0.6	0.0	0.2	0.1	0.3	0.0	0.0	-0.2	0.0	0.3
Tax on oil products	**0.0**	**-0.2**	**0.1**	**-0.2**	**-0.6**	**0.3**	**0.3**	**0.1**	**-0.1**	**-0.1**
Impact of budget elasticity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0
Legislation changes	0.0	-0.1	0.1	-0.1	-0.6	0.3	0.3	0.1	0.1	0.0
Residual	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1
Car tax	**0.1**	**0.0**	**0.0**	**0.0**	**-0.1**	**0.0**	**0.0**	**-0.1**	**0.0**	**0.0**
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Legislation changes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual	0.0	0.0	0.0	0.0	-0.1	0.1	0.0	0.0	0.0	0.0
Other taxes on production and imports	**-0.1**	**0.1**	**0.1**	**0.1**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.2**
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
Legislation changes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual	-0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.1	-0.1	0.2
Social contributions	**0.0**	**0.3**	**0.1**	**0.1**	**0.5**	**0.2**	**0.2**	**0.5**	**0.2**	**0.1**
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.1
Legislation changes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual	-0.2	0.4	0.2	0.2	0.6	0.3	0.3	0.6	0.1	0.2
Memo item: included in expenditure [b]	*0.1*	*0.0*	*0.1*	*0.0*	*0.3*	*0.0*	*0.2*	*0.3*	*0.3*	*0.0*
Total taxes and social contributions	**1.0**	**0.2**	**0.1**	**0.5**	**0.4**	**0.1**	**0.2**	**0.3**	**0.6**	**0.9**
Fiscal drag	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Decoupling of the macroeconomic base from GDP	0.6	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2	0.0	-0.1
Legislation changes	-0.3	-0.1	-0.1	-0.1	-0.3	-0.2	0.4	0.6	0.2	-0.3
Residual	0.6	0.5	0.4	0.7	0.8	0.5	0.1	-0.1	0.3	1.2
Memo item: included in expenditure [b]	*0.1*	*0.0*	*0.1*	*0.0*	*0.3*	*0.0*	*0.2*	*0.3*	*0.3*	*0.0*
Other revenue	**0.5**	**-0.4**	**-0.1**	**0.4**	**-0.6**	**0.1**	**0.3**	**-0.6**	**0.3**	**-0.6**
of which: from the EU [c]	0.5	-0.4	0.0	0.2	-0.6	0.3	0.3	-0.2	-0.2	-0.1
Primary expenditure	**1.7**	**0.4**	**0.7**	**1.7**	**0.9**	**1.0**	**0.1**	**-0.2**	**0.9**	**0.8**
Social payments	0.3	0.1	0.3	0.4	0.7	0.4	0.6	1.8	0.4	0.8
of which: Pension payments	0.1	0.1	0.1	0.2	0.4	0.3	0.3	0.5	0.5	0.5
Unemployment benefits	-0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0
Social benefits in kind	0.1	0.1	0.0	0.1	0.0	0.1	0.1	1.1	0.0	0.4
Compensation of employees	0.2	0.2	0.3	0.6	0.7	0.1	0.3	-0.9	0.1	0.1
Intermediate consumption	0.1	-0.1	-0.1	0.3	0.3	0.0	-0.2	-0.5	0.2	0.0
Subsidies	0.2	-0.2	0.3	0.2	-0.5	0.1	0.2	0.2	-0.3	0.1
Investment	0.4	0.2	-0.3	0.3	-0.3	0.4	-0.4	-0.5	0.0	-0.3
Other expenditure [d]	0.5	0.3	0.2	-0.1	-0.1	0.2	-0.3	-0.4	0.6	0.0

Notes: (a) Change in the actual balance, the cyclical component and the effects of temporary measures as a percentage of nominal GDP. Due to differences in the denominator, the change in the structural balance as a percentage of nominal trend GDP may differ slightly from the change in the ratio of actual balance excluding cyclical effects and temporary measures to nominal GDP. **(b)** Part of the residual of actual social contributions relating with social contributions of the civil servants system and imputed social contributions, both recorded on the expenditure side under the item compensation of employees. **(c)** Includes other current revenue, sales and capital revenue. **(d)** Includes other current primary and capital expenditure.

6. CONCLUSIONS

The analysis of National Accounts data is very important for understanding the relationship between fiscal variables affected by the economic cycle in the ESCB methodology and the respective macroeconomic bases. In the case of taxes on corporate income, this analysis let to the conclusion that private GDP, although shifting away from the actual base of these taxes, is able to capture revenue developments more accurately. Given that this macroeconomic variable growth is, on average, below that of revenue from taxes on corporate income, the new estimate for the elasticity of revenue, based on a series from 1995 to 2005 adjusted for the effects of discretionary measures, is higher than one.

As regards taxes on production and imports, which up until now had been dealt with as a whole in studies on the cyclical adjustment of fiscal variables, the present article explains the developments of the main taxes – VAT, Tax on Oil Products, and Car Tax – using the most appropriate National Accounts aggregates. Therefore, similarly to the description made above when commenting taxes on corporate income, elasticities were estimated for the three taxes with respect to private consumption, private consumption of services and non-durable goods and private consumption of durable goods, respectively. The values obtained were, in all cases, above one. As regards the remaining part, consisting of very different taxes, a unit elasticity with respect to private consumption was assumed. As a whole, the new elasticity of taxes on production and imports with respect to private consumption reflects a more significant response of this revenue to the economic cycle than that initially assumed in the implementation of this methodology.

Turning to unemployment benefits, the changes introduced over recent years made it possible that the series of the number of unemployed registered in the IEFP currently describes more appropriately its development than the number of unemployed obtained from the Labour Force Survey. In the calculation of the cyclical component, it was also necessary to adjust accordingly the average value of the ratio of the registered number of unemployed to the labour force.

In this article, the elasticities of taxes on household income and social contributions of the private sector system were kept unchanged *vis-à-vis* the assumptions considered in the initial implementation of the ESCB cyclical adjustment methodology. Actually, it was confirmed that they explain the developments of these items of revenue much satisfactorily, in particular in the most recent period.

As a whole, the changes introduced led to a negligible increase in the semi-elasticity of the budget balance as a percentage of GDP with respect to GDP, when compared to the value obtained when repeating the procedures adopted in 2001. Indeed, although the revision of the elasticities indicate more sensitivity regarding the respective macroeconomic bases, an update of the elasticities of the macroeconomic bases with respect to GDP points in the opposite direction and partly offsets the initial effect. Presently, the value obtained for the semi-elasticity of the budget balance is 0.50, standing relatively close to the ones used by the European Commission and the OECD.

Banco de Portugal had already introduced some of the above-mentioned changes in the calculation of the cyclically adjusted balances. Therefore, in view of the latest figures made public, the revisions of the total balance adjusted for cyclical effects and temporary measures, an indicator usually used in the assessment of the underlying budgetary position, are relatively negligible in the period under review. Differences in the change of the primary balance adjusted for cyclical effects and temporary measures are also insignificant. As regards the latest estimations made public, the cyclical component of the balance is now of a smaller magnitude, i.e., less positive (negative) in periods of strong (weak) economic growth.

Improvements introduced in the calculation of the cyclically adjusted balances also make it possible to further develop the analysis based on the disaggregated framework of public finances. This article il-

lustrates, in particular, the advantages of the breakdown of taxes on production and imports for a better understanding of the fiscal developments in the last few years.

Experience in recent years has revealed that, regarding the calculation of the cyclically adjusted balances, a higher number of observations and the deeper knowledge of data on public finances and the macroeconomic scenario allows updating the procedures previously adopted, with unambiguous gains in analytical terms. Against this background, further updates are likely to occur in the future.

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