Czech Economic Review
Acta Universitatis Carolinae
Oeconomica

vol. 1 *no.°3, pp. 324-334*

*Jan ZÁPAL**

THE RELATION BETWEEN THE CYCLICALLY ADJUSTED BUDGET BALANCE AND THE GROWTH ACCOUNTING METHOD OF DERIVING 'NET FISCAL EFFORT'

This paper deals with the growth accounting method used to derive "net fiscal effort". Net fiscal effort can then provide a clue about whether fiscal policy is expansionary or not, and, together with data on economic performance, can answer the question of the pro- or anti-cyclicality of the fiscal stance. Traditionally, the answer to such questions has been provided via the cyclically adjusted budget balance. I argue that the relatively computationally intensive and data demanding process of estimation of the cyclically adjusted budget balance can be replaced by the simple growth accounting method without significant loss of information. I argue that in the general case, the answers provided via the growth accounting method will not differ widely from the conclusions provided via the cyclically adjusted budget balance. I then illustrate the use of growth accounting on Czech fiscal data and compare the outcomes of both methods. The conclusions reached in the empirical part fit nicely with the conclusions of the theoretical part of the paper..

Keywords: expansionary/contractionary fiscal policy, cyclically adjusted budget balance, growth accounting, net fiscal effort

JEL classification: C82, H62

Acknowledgements*:*Financial support from the IES (Institutional Research Framework 2005–2010, MSM0021620841) is gratefully acknowledged.

1. Introduction

One of the roles often ascribed to government is that it should conduct a stabilizing economic policy to prevent periods of deep economic downturns and periods when the economy is overheated. Generally, two basic tools may allow government to do so, the first being monetary policy and the second being fiscal policy. It is the fiscal part of stabilization policy which this paper examines.

Since governments in most developed countries redistribute more than 40 percent of GDP through their budgets, government decisions about the size and com-

* Institute of Economic Studies, Faculty of Social Sciences, Charles University, Prague, and London School of Economics and Political Science (PhD programme); (j.zapal@lse.ac.uk) or (j.zapal@gmail.com).

I would like to thank Vladimír Bezděk, whose suggestions initiated the search for the answers to the questions I deal with in this paper.

position of the budget can have considerable repercussions for economic activity. In the optimal case, fiscal policy is anti-cyclical, contracting in periods of high economic activity and expanding in periods of low economic activity.

Traditionally, the question of whether fiscal policy is expansionary or contractionary is addressed via the cyclically adjusted budget balance (CABB) and its development over time. An increase in the CABB (a higher cyclically adjusted surplus) is associated with contractionary fiscal policy, and a decrease in the CABB (a lower surplus or higher deficit) with expansionary fiscal policy.

Estimation of the CABB itself is a tedious job. The usual procedure is to take the budget balance in a given year and subtract its cyclical component, usually defined as the product of the output gap and the elasticity of the budget balance with respect to the output gap. The problem arises in the procedure for estimating this elasticity. This is usually done in such a way that the elasticities of the different components of the budget with respect to the output gap are econometrically estimated and then added together, weighted by the shares of those components in the whole budget. This aggregate elasticity is then used in the computation of the cyclical component of the budget balance and subsequently of the CABB. Throughout this paper, I refer to this method as the "traditional method" (TM).[1]

The growth accounting method (GAM) that this paper tries to introduce takes a rather different approach. Originally proposed by Hagen, Hallett, and Strauch (2001) and used, for example, in (Hallett, Lewis, Hagen, 2004), the GAM takes the observed change in the government budget balance and "corrects" it for the effect of growth of the economy and for the effect of change in the monetary conditions[2] in order to derive the net fiscal effort (NFE) directly. The NFE can then be interpreted as a measure of the expansiveness or contractiveness of fiscal policy in a given country and a given year.

Since the GAM leads directly to the NFE, it cannot in general be used for deriving the CABB. However, as I try to show in what follows, under certain circumstances, even the GAM can be used to derive the CABB.

The approaches of the two methods are therefore quite different. Through the GAM, the NFE is directly calculated and under certain conditions even the CABB can be derived. The TM, on the other hand, derives the CABB first and through its change between consecutive years arrives at the NFE.

In what follows, I try to explain the GAM more deeply and compare the two methods on theoretical grounds by explicitly identifying aspects in which they differ.

[1] See (Suyker, 1999) or (Noord, 2000) for a description of the methodology and estimates of the OECD; (Röger, Ongena, 1999) or (European Commission, 2000) and (European Commission, 2002) for the approach to the CABB in the context of the Stability and Growth Pact (SGP); (Bouthevillain et al., 2001) for the methodology and estimates of the European Central Bank (ECB); (Hagemann, 1999) for the IMF's approach; and (Bezděk, Dybczak, Krejdl, 2003) for estimates in the case of the Czech Republic.

[2] The monetary conditions, especially the interest rates applied to government debt, can have a considerable effect on the final budget balance. Thus the GAM, in order to derive the net fiscal effort, tries to correct the observed change in the budget balance for the change in the cost of servicing government debt, which reflects the change in the external conditions not directly caused by government.

This is the content of section 2. Section 3 derives the NFE using Czech fiscal data and the GAM and compares the results with the NFE derived using the TM. Since the conditions under which the GAM can be used to derive the CABB are in fact fulfilled for the case of the Czech Republic, I derive the CABB using both methods and compare the outcomes in section 4. Section 5 concludes the paper.

2. Theoretical Issues

2.1 Traditional Method

In this part, I try to explain how both methods under consideration actually proceed. Let us take the traditional method first. As its basic step, this method takes the budget balance to GDP ratio in a given year, s_t (surplus as a positive number and deficit as a negative number), and subtracts the cyclical component calculated as the product of the elasticity of the budget balance with respect to the output gap, ε, and the output gap itself, GAP_t. More specifically,

$$CABB_t = s_t - \varepsilon \cdot GAP_t \tag{1}$$

The CABB calculated in this way can then be used to calculate the NFE, which has been traditionally used as the measure of expansive or contractionary fiscal policy. It is given by the equation $NFE_{t+1}^{TM} = CABB_{t+1} - CABB_t$, or, after substitution of (1), by

$$NFE_{t+1}^{TM} = \Delta s - \varepsilon \cdot \left(GAP_{t+1} - GAP_t\right) \tag{2}$$

2.2 Growth Accounting Method

To explain how the NFE can be derived through the GAM, consider the budget balance to GDP ratio in a given year, *s*,

$$s = \frac{T - G}{Y} = \left(t - g\right) \tag{3}$$

where *T* stands for government budget revenues, *G* for government budget expenditure, and *Y* for GDP (all in real terms) and *t* and *g* are the ratios of the relevant variables to GDP. Now, the change in *s* between consecutive years, Δs, is given by

$$\Delta s = \frac{\Delta T - \Delta G}{Y} - \frac{\Delta Y}{Y}\left(t - g\right) \tag{4}$$

The next step in the GAM is to define constant or neutral fiscal policy. One possible approach is to state that government expenditure should be kept constant in real terms, i.e., $\Delta G = 0$, and that the ratio of budget revenues to GDP, *t*, should be kept constant as well, implying $\Delta T = t\Delta Y$. Substituting into (4) implies[3]

$$\Delta s^C = \gamma\left(t - s\right) \tag{5}$$

where γ denotes percentage growth of real GDP.

[3] The superscript *C* denotes the change in the budget balance to GDP ratio under the constant fiscal policy definition.

The second possible way of defining neutral fiscal policy is to allow the government to spend all additional revenues, which gives $\Delta G = \Delta T$ and, after substitution into (4), yields

$$\Delta s^C = -\gamma s \tag{6}$$

The third possibility is to state that neutral fiscal policy is that which keeps the ratio of revenues to output constant and at the same time to allow the government to increase its expenditure in real terms only by the rate of growth of potential output, $\bar{\gamma}$. Under this definition $\Delta G = G\bar{\gamma}$ and $\Delta T = t\Delta Y$, which, after substitution into (4), yields

$$\Delta s^C = g(\gamma - \bar{\gamma}) \tag{7}$$

Since equations (5), (6), and (7) define neutral fiscal policy, they can be interpreted as the change in the budget balance which stems from growth of the economy itself, in other words, in order to judge the restrictiveness or expansiveness of fiscal policy, the growth of the economy should be taken into account. Therefore, taking the observed change in the budget balance and subtracting either equation (5), (6) or (7) expresses the change in the budget balance which is due solely to the government's actions, i.e. the NFE, which is thus given by

$$NFE_{t+1}^{GAM} = \Delta s - \Delta s^C \tag{8}$$

As an illustration, suppose that the change in the budget balance to GDP ratio is zero between two consecutive years, but over the same period the economy under consideration grows by 5 percent. This implies that the budget balance in real terms increased by the very same 5 percent, implying, depending on the definition used, expansive or restrictive fiscal policy. Under the first definition, which requires budget expenditure to be kept constant in real terms, equation (8) becomes $NFE_{t+1}^{GAM} = -0.05(t - s)$, implying expansive fiscal policy.[4]

Under the second definition of neutral fiscal policy, (8) yields $NFE_{t+1}^{GAM} = 0.05s$, which can be either positive or negative. When the government runs two consecutive surpluses, the NFE will be positive, denoting restrictive fiscal policy (since the budget balance to GDP ratio is constant under growth conditions, we have an increase in the budget surplus in real terms). On the other hand, when the government runs a deficit in both years, the NFE will be negative, denoting expansionary fiscal policy, by the same argument as for the surplus case.

Lastly, when we take into account the third definition of neutral fiscal policy, equation (8) becomes $NFE_{t+1}^{GAM} = -g(0.05 - \bar{\gamma})$, which is negative unless potential output grows faster than actual output. If $\bar{\gamma} > 0.05$, the NFE will be positive, denoting fiscal contraction, because the government managed to keep its budget balance at the same level despite being allowed, by the third definition of neutral fiscal policy, to increase its expenditure in real terms faster than real GDP growth, which would cause a decrease in the budget balance to GDP ratio.

[4] The term in brackets, i.e. the difference between the budget revenues to GDP ratio and the budget balance to GDP ratio, will under normal circumstances be positive.

What remains is to decide which definition of neutral fiscal policy should be used. The first one, as our example showed, seems too restrictive, if not for any other reason than such neutral fiscal policy would eventually lead to the government expenditure to GDP ratio approaching zero. The second definition, on the other hand, seems too generous and has the disadvantage of the sign of Δs^C being dependent on whether the government runs a budget surplus or deficit. The third definition, in terms of strictness, is somewhere between the two previous ones and also has the advantage of taking into account not only real GDP growth, but also growth of potential GDP. For this reason, I shall use the third definition of neutral fiscal policy in what follows.[5] Substituting (7) into (8) then yields

$$NFE_{t+1}^{GAM} = \Delta s - g\left(\gamma - \overline{\gamma}\right) \tag{9}$$

2.3 Comparison of the Two Methods

To compare the outcomes of the two methods, let's restate the two basic equations of both. In the case of the TM, the NFE is given by

$$NFE_{t+1}^{TM} = \Delta s - \varepsilon \cdot \left(GAP_{t+1} - GAP_t\right) \tag{2}$$

and in the case of the GAM, the NFE is given by

$$NFE_{t+1}^{GAM} = \Delta s - g\left(\gamma - \overline{\gamma}\right) \tag{9}$$

A visual inspection of the two equations reveals that there are two sources of differences between the two methods. The first source of differences is the use of change in the output gap in the TM, as opposed to the difference between real and potential output growth in the GAM. The second difference stems from the use of ε in the TM as opposed to g in GAM. Subtracting (9) from (2), the relevant expression becomes

$$NFE_{t+1}^{TM} - NFE_{t+1}^{GAM} = g\left(\gamma - \overline{\gamma}\right) - \varepsilon \cdot \left(GAP_{t+1} - GAP_t\right) \tag{10}$$

To take a closer look, note that $GAP_t = \frac{Y_t}{\overline{Y}_t} - 1$, where Y_t and $\overline{Y}_t$ denote GDP and potential GDP in real terms, respectively. In a similar spirit, $\gamma = \frac{Y_{t+1}}{Y_t} - 1$ and $\overline{\gamma} = \frac{\overline{Y}_{t+1}}{\overline{Y}_t} - 1$. Then, defining $\rho = \frac{Y_{t+1}\overline{Y}_t - \overline{Y}_{t+1}Y_t}{\overline{Y}_t}$ and $g = \varepsilon + \beta$, where β is the difference between the elasticity of the budget balance with respect to the output gap and the ratio of government expenditure to GDP, equation (10) can be rearranged as

$$NFE_{t+1}^{TM} - NFE_{t+1}^{GAM} = \varepsilon\rho\left(\frac{1}{Y_t} - \frac{1}{\overline{Y}_{t+1}}\right) + \beta\rho\frac{1}{Y_t} \tag{10'}$$

[5] In order to derive the NFE, Hagen, Hallett, and Strauch (2001) also subtract from the observed change in the budget balance the effect of change in public debt and also the effect of change in interest rates. I omit these two channels for the reason which should become apparent later on. See next footnote.

from which the difference between the two methods is more explicit. The first term on the RHS corresponds to the first source of error just mentioned, and the second term on the RHS corresponds to the second source of error.[6]

Unfortunately, we cannot say anything about the sign of the two terms on the RHS of (10'). All that can be said is that the first term on the RHS will typically be very small (just think about the order of actual and potential GDP in real terms – Y 's)[7], whereas the second term might not. Therefore, the conclusion regarding the difference between the TM and the GAM is that its major source lies in the use of ε as opposed to *g*.

Fortunately, there is a relationship between those two variables. To give the intuition for this, it is reasonable to expect that countries with bigger governments will experience a higher elasticity of the budget with respect to the output gap. The next two graphs in fact confirm this intuition. They plot the elasticity of the budget balance with respect to the output gap, ε, as a function of the ratio of government expenditure to GDP, *g*, averaged over five years prior to the estimation. *Figure 1* plots the "old EU member states" and *Figure 2* plots the "new EU member states".

What the graphs reveal is that, although not in general equal, the elasticity of the budget balance with respect to output and government size as measured by the ratio of government expenditure to GDP will not differ significantly, especially in the case of the new EU member states, which seem to be more clustered near the 45 degree line depicting points where the two variables indeed coincide.

Thus to summarize, at first glance, and based only on a theoretical comparison of the TM and the GAM, it seems most likely that the two methods of deriving the NFE will not yield significantly different results. A major source of error lies in the use of the government expenditure to GDP ratio in the GAM instead of the need to estimate the elasticity of the budget balance with respect to the output gap in the TM. Therefore, simplicity comes at a price.

On the other hand, if one thinks about ε as a regression coefficient estimate, at some point in its estimation it must have been true that $\left|\frac{\hat{\varepsilon}}{s.e._{\hat{\varepsilon}}}\right| > t_{\frac{\alpha}{2};n-k-1}$. Adding a hat

[6] Equation (10') also reveals the fact that adding the effect of change in public debt and change in interest rates to the GAM mentioned in the previous footnote adds another "disturbance", which might cause further divergence of the results. Unfortunately, the word "might" in the last sentence cannot in general be replaced by the word "will". During the work on the next section, where I compare the outcomes of the two methods for actual data, I experimented with adding those two effects to the GAM and concluded that the inclusion of the effect of change in public debt and the effect of change in interest rates does cause a bigger difference in the results provided by the GAM and TM. Since the present work is concerned with searching for a simple method capable of close approximation of the CABB and the NFE, results with additional effects are not reported (available upon request).

[7] To confirm the intuition, I calculated the term $\rho\left(\frac{1}{Y_t} - \frac{1}{\overline{Y}_{t+1}}\right)$ for Czech data for the period 1997 through 2006 and the highest absolute value turned out to be 0.0014, or 0.14 %. This term subsequently enters (10') multiplied by ε, which will typically be around 0.5, which even lowers the error stemming from the first term on the RHS of (10'). For a description of the source and type of data used, see the next section.

Budget Elasticity and Size of Government

FIGURE 1 Old EU Member States

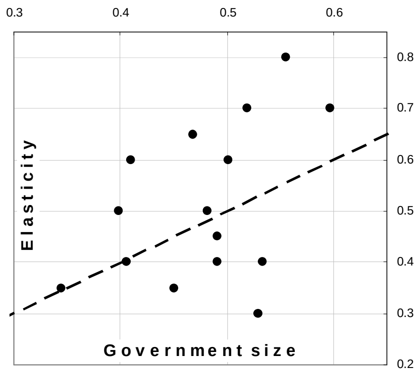
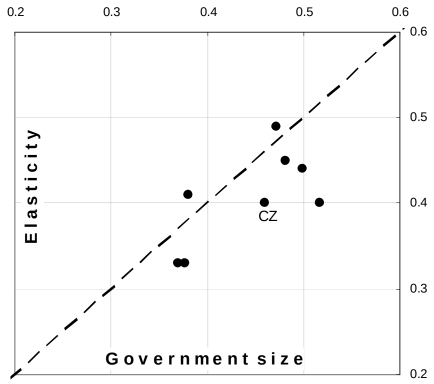


FIGURE 2 New EU Member States



Source: Author's calculation. Elasticities taken from (European Commission 2002) for Figure 1 and (Orban, Szapary, 2004) for Figure 2.

above $\hat{\varepsilon}$ stresses the fact that the elasticity of the budget balance with respect to the output gap is a regression estimate, with $s.e._{\hat{\varepsilon}}$ as its standard deviation.

What the inequality says is that at some point in the estimation, in order to judge $\hat{\varepsilon}$ significant, its *t*-statistics must have exceeded the $\alpha/2-th$ percentile of a *t*-distribution with $n-k-1$ degrees of freedom, where *n* is the number of observations and k the number of independent variables in the model. Taking into account only positive values, approximating the *t*-distribution with a standard normal distribution[8] taking for example $\hat{\varepsilon}=0.5$ and setting α equal to 10 %, we get $s.e._{\hat{\varepsilon}}<0.30$ (using $z_{0.95}=1.6$ for a standard normal distribution).

But note also that for the given example, the 90% confidence interval will be $\left(0.5\pm1.6\cdot s.e._{\hat{\varepsilon}}\right)$, bordering zero for $s.e._{\hat{\varepsilon}}=0.30$ and being narrower for more significant estimates (lower standard deviation).

This highly stylized example tries to show that even for $\hat{\varepsilon}$ being a highly significant regression estimate at the 1% level, the 90% confidence interval just mentioned will still be $\left(0.5\pm0.3\right)$, because in this case $s.e._{\hat{\varepsilon}}<0.19$, and therefore, referring to the graphs above, most of the elasticity estimates in this confidence interval will include the 45 degree line along which $\varepsilon=g$. But in this case, the second term on the RHS of (10') equals zero and the only difference between the GAM and the TM is the minor first term.

[8] Approximation of a *t*-distribution with a standard normal distribution is usually considered to be valid for more than 30 degrees of freedom. Since the estimation of budget balance elasticity is usually done on quarterly data with *k* being typically equal to two or three, for the pproximation to be valid, the estimation procedure must have been based on at least a 10-year time period, which is not an unrealistic assumption.

TABLE 1 Comparison of NFE Computed by TM and GAM

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Based on change of budget balance									
TM $\varepsilon = 0.35$	-1.64	1.44	-0.81	-2.58	-0.55	-5.23	8.30	-1.73	0.11
TM $\varepsilon = 0.40$	-1.50	1.45	-0.93	-2.63	-0.51	-5.28	8.25	-1.77	0.06
TM $\varepsilon = 0.45$	-1.37	1.46	-1.04	-2.67	-0.47	-5.32	8.20	-1.80	0.01
GAM	-1.32	1.44	-1.02	-2.68	-0.49	-5.41	8.21	-1.86	0.00
Based on change of primary budget balance									
TM $\varepsilon = 0.35$	-1.64	1.27	-0.97	-2.37	-0.13	-5.41	8.23	-1.71	0.27
TM $\varepsilon = 0.40$	-1.50	1.28	-1.08	-2.41	-0.09	-5.45	8.18	-1.74	0.22
TM $\varepsilon = 0.45$	-1.37	1.29	-1.20	-2.46	-0.05	-5.50	8.13	-1.78	0.17
GAM	-1.32	1.26	-1.18	-2.46	-0.06	-5.59	8.14	-1.84	0.16

Note: A negative entry represents fiscal expansion and a positive entry fiscal contraction. Percentage of GDP.
Source: Author's calculations. Estimates of ε taken from sources indicated in the text.

It is therefore natural to expect that the two methods, when subject to an analysis based on real data, will yield very similar conclusions. The next section deals precisely with this question for the case of the Czech Republic .

3. Empirical Comparison – NFE

The preceding section tackled the issue of the similarity of the GAM and TM in terms of the results provided on theoretical grounds. This section, on the other hand, tries to convey the message of the similarity of the two methods using Czech data.

The basic economic and fiscal data for the period 1997 through 2006 come from the European AMECO database and were downloaded after the spring fiscal notification, which implies that the data until 2004 represent final values and those for 2005 and 2006 are predictions of the European Commission based on information provided by the Czech authorities.

In order to compute the NFE using the TM, against which the results provided by the GAM could be measured, I used the elasticity of the budget balance with respect to the output gap from (Orban, Szapary, 2004), who estimated $\varepsilon = 0.4$. As alternative estimates, $\varepsilon = 0.35$ was taken from (Bezděk, Dybczak, Krejdl, 2003) and $\varepsilon = 0.45$ from the OECD.

The estimation of the NFE using the TM, once an appropriate estimate of ε is available, involves just simple substitution of the data into (2). Similarly, GAM estimates of the NFE can be obtained by substitution of the data into (9). The results are given in *Table 1*.

As is apparent from the upper part of *Table 1*, where the NFE is based on change in the budget balance, using the GAM does not provide significantly different results from those derived by the TM. In 5 out of 9 cases, the NFE based on the GAM lies within the interval delimited by the different TM results depending on the ε used, and in those cases where it lies outside this interval it differs by only a small margin.

The biggest divergence in the absolute value of the GAM-based NFE is to be found in 1998 when compared to the NFE based on the TM and $\varepsilon = 0.35$.

Similar conclusions hold for the lower part of *Table 1*, where the NFE is calculated based on the primary budget balance. The NFE calculated by the GAM lies within the interval defined by the NFE based on the TM with different ε's in 5 cases, differing in the remaining cases only insignificantly. The largest absolute difference between the results provided by the GAM and the TM is again to be found in 1998 for $\varepsilon = 0.35$.

Thus it seems that the GAM can be used to estimate the NFE without any chance of making a large error. It has the advantages of simplicity and no need to estimate the elasticity of the budget balance with respect to the output gap, which is virtually impossible without deep econometric knowledge and possession of the relevant data. But can the GAM also be used to estimate the CABB? We shall see in the next section.

4. Empirical Comparison – CABB

As already mentioned, the GAM cannot in general be used for computation of the CABB. The reason behind this is that in

$$\begin{aligned} NFE_{t+1}^{TM} \approx NFE_{t+1}^{GAM} &= s_{t+1} - s_t - g\left(\gamma - \overline{\gamma}\right) \\ &= CABB_{t+1} - CABB_t \end{aligned} \tag{11}$$

which is an expanded version of (9), only the variables in the first row are known. For the GAM to be used to derive the CABB, one of the variables in the second row of (11) must be known. One possibility is to use the TM and derive one of the variables in the second row. Once, however, the TM has been used to derive the CABB in one year, ε must then be estimated and subsequent calculation of the CABBs for further years becomes an easy task.

The second possibility is to determine one of the CABBs in the second row of (11) based on the inference that when the economy is at its potential, $s_t = CABB_t$. This is seen easily from the expression $CABB_t = s_t - \varepsilon \cdot GAP_t$, with $GAP_t = 0$. Once one of the CABBs has been determined in this way, iterating (11) over time gives the CABB for all subsequent and preceding years in any given time series. In other words, the sufficient and necessary condition for the GAM to be used to derive the CABB is that there must be one year when the economy of the country under consideration was at its potential.

In the case of Czech Republic, the condition $GAP_t = 0$ is not fulfilled as a strict equality in the data used. Luckily, the Czech economy in 2004 was only slightly below its potential, with the gap between actual and potential output equal to 0.3 percent of GDP. Therefore, setting $s_{2004} = CABB_{2004}$ and iterating (11) in time provides an alternative, GAM-derived, estimation of the CABB for the Czech Republic. This is given in *Table 2*.

An inspection of the results in *Table 2* reveals that both the CABB and the primary CABB estimates based on the GAM do not differ significantly from the estimates provided by the TM. The GAM estimates lie within the interval defined by the TM estimates in 6 out of 10 cases, deviating in the remaining cases only slightly.

TABLE 2 Comparison of CABB Computed by TM and GAM

	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Cyclically adjusted budget balance										
TM ε = 0.35	-1.84	-3.48	-2.03	-2.85	-5.43	-5.98	-11.21	-2.91	-4.64	-4.53
TM ε = 0.40	-1.76	-3.26	-1.80	-2.73	-5.36	-5.87	-11.15	-2.90	-4.66	-4.60
TM ε = 0.45	-1.67	-3.04	-1.57	-2.62	-5.29	-5.76	-11.08	-2.88	-4.68	-4.67
GAM	-1.75	-3.07	-1.63	-2.65	-5.33	-5.82	-11.23	-3.02	-4.88	-4.88
Cyclically adjusted primary budget balance										
TM ε = 0.35	-0.64	-2.28	-1.02	-1.99	-4.35	-4.48	-9.88	-1.65	-3.36	-3.09
TM ε = 0.40	-0.56	-2.06	-0.79	-1.87	-4.28	-4.37	-9.82	-1.64	-3.38	-3.16
TM ε = 0.45	-0.47	-1.84	-0.56	-1.76	-4.21	-4.26	-9.75	-1.62	-3.40	-3.23
GAM	-0.56	-1.87	-0.61	-1.79	-4.25	-4.31	-9.90	-1.76	-3.60	-3.44

Note: percentage of GDP
Source: Author's calculations. Estimates of ε taken from sources indicated in the text.

As in the case of the NFE, the largest absolute difference occurs in 1998 when compared to the TM with $\varepsilon = 0.35$.

Table 2 also reveals that the GAM estimates are, in terms of the squared differences between the GAM and the TM for the whole period, closest to the TM estimates derived using $\varepsilon = 0.45$ and differ most from the TM estimates for $\varepsilon = 0.35$. This is hardly surprising, since a higher ε is closer to g which for the Czech Republic and the period under consideration averages at 45.3 percent. Thus *Table 2* empirically confirms the statement in section 2 that biggest source of the difference between the two methods lies in the use of g in the GAM as opposed to ε in the TM.[9]

5. Conclusions

This paper tried to convey the message that simple solutions to complicated problems can provide results which are not inferior to the results obtained by sophisticated methods. More specifically, the traditional derivation of the CABB using estimates of the elasticity of the budget balance with respect to the output gap can be replaced by GAM-based estimates without significant loss, with the advantage of there being no need to estimate the budget elasticity itself.

On the other hand, a major disadvantage of the GAM is that in general it can be used only to derive the NFE directly and that special circumstances – the occurrence of a zero output gap – are needed to compute CABB estimates. However, since the occurrence of a zero output gap over a sufficiently long period is very likely, this drawback of the GAM seems to be outweighed by the simplicity of this method.

Simple or not, it is natural to demand from any method results which are sufficiently close to the truth. Since CABB and NFE estimates based on the TM are a widely accepted means of judging the expansiveness or restrictiveness of fiscal policy, what is needed is for the GAM estimates to follow closely those provided by the TM. It has been shown that this is the case.

[9] Since the output gap is never exactly equal to zero in the data used, for this particular case another source of error is the approximation of the CABB with the budget balance in (11).

A theoretical comparison of the two methods revealed that a major source of error between them is that the TM uses the elasticity of the budget balance to the output gap, whereas the GAM uses the size of the public sector instead. Fortunately, these two variables are linked to each other in a close relationship, which minimizes the chances of the TM and GAM yielding diverging results.

On empirical grounds, it has been shown that for Czech economic and fiscal data, the two methods deliver estimates which closely match each other, despite the fact that the condition for the use of the GAM for CABB estimation is fulfilled only approximately.

REFERENCES

Bezděk V, Dybczak K, Krejdl A (2003): Czech Fiscal Policy: Introductory Analysis. *Czech National Bank Working Paper*, no. 7.

Bouthevillain C et al. (2001): Cyclically Adjusted Budget Balances: An Alternative Approach. *ECB Working Paper*, no. 77.

European Commission (2000): Public Finances in EMU – 2000. *European Economy Reports and Studies*, no. 3.

European Commission (2002): Public Finances in EMU – 2002. *European Economy Reports and Studies*, no. 3.

Hagemann R (1999): The Structural Budget Balance: The IMF's Methodology. *Proceedings of the Indicators of Structural Budget Balances Conference*, Banca d'Italia, 53–70.

Hagen J von, Hallett AH, Strauch R (2001): Budgetary Consolidation in EMU. *European Commission Economic Paper*, no. 148.

Hallett AH, Lewis J, Hagen J von (2004): *Fiscal Policy in Europe 1991–2003: An Evidence--based Analysis*. CEPR.

Noord P (2000): The Size and Role of Automatic Fiscal Stabilizers in the 1990s and Beyond. *OECD Economics Department Working Paper*, no. 230.

Orban G, Szapary G (2004): The Stability and Growth Pact from the Perspective of the New Member States. *William Davidson Institute Working Paper*, no. 709.

Röger W, Ongena H (1999): The Commission Services' Cyclical Adjusted Method. *Proceedings of the Indicators of Structural Budget Balances Conference*, Banca d'Italia, 17–52.

Suyker W (1999): Structural Budget Balances: The Method Applied by the OECD. *Proceedings of the Indicators of Structural Budget Balances Conference*, Banca d'Italia, 71–96.