Determinants of Non-Linear Effects of Fiscal Policy on Output: The Case of Bulgaria

Vladimir Vladimirov, Maria Neycheva*

Abstract:

The paper illuminates the non-linear effects of the government budget on short-run economic activity. The study shows that in the Bulgarian economy under a Currency Board Arrangement the tax policy impacts the real growth in the standard Keynesian manner. On the other hand, the expenditure policy exhibits non-Keynesian behavior on the short-run output: cuts in government spending accelerate the real GDP growth. The main determinant of this outcome is the size of the discretionary budgetary changes. The results imply that the balanced budget rule improves the sustainability of public finances without assuring a growth-enhancing effect.

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1. Introduction

The Keynesian view of fiscal stabilization implies that budgetary expansions foster economic growth in the short-run. When an economy is operating below its potential output, governments should either increase spending or cut taxes in order to reduce fluctuations in demand. On the contrary, recent studies point out that fiscal consolidations could stimulate aggregate activity in the short-run and improve public finances. These effects are called “non-Keynesian fiscal policy effects”. Empirical research gives evidence of both traditional Keynesian and non-Keynesian effects of budgetary categories on real growth. This implies that *fiscal policy influences short-run economic activity in a non-linear fashion*.

This study presents the theoretical background as well as empirical evidence of the non-linear effects of government budget. It focuses on the Bulgarian experience under the Currency Board Arrangement (1998-2004) - a few years prior to its EU accession. The analysis shows the presence of non-Keynesian influence of government outlays on output and looks at the factors that determine it. Also, tax policy affects

short-run real growth in a traditional Keynesian manner. The non-linearity in the effects of budgetary categories implies that the balanced budget accompanied by growing government could decelerate short-run real growth. In light of this, it is not enough to focus on the budgetary result only, the regulations regarding the budgetary categories themselves should also be considered.

Section 2 of the paper presents the theoretical background as well as empirical research on non-linear fiscal policy effects on output. Section 3 analyzes the effects of fiscal categories in the Bulgarian economy. It focuses also on the determinants of the non-Keynesian

Vladimir Vladimirov

University of Economics – Varna
Varna, Bulgaria
e-mail: vladimir@mail.ue-varna.bg

Maria Neycheva

Burgas Free University
Burgas, Bulgaria
e-mail: mneicheva@abv.bg

effects of government spending. The main findings of the study and their practical implications are presented in Section 4.

2. Non-Linear Effects of Fiscal Policy: Theoretical Background and Empirical Research

According to the traditional Keynesian view, fiscal consolidations achieved by a higher tax burden or government expenditure cuts lower GDP growth. In contrast with this view, recent studies emphasize the expansionary influence of budget consolidations on output in the short-run. Studies on non-Keynesian fiscal policy effects show that the response of output in a case of discretionary budgetary interventions depends on a number of circumstances, such as the size and persistency of the fiscal impulse and the composition of the budget adjustments. The level of government debt, as well as the accompanying monetary stance, also matter. Examples of both traditional Keynesian results and non-Keynesian outcomes can be found in European economies. The output responds *in a non-linear fashion* to the fiscal fine-tuning.

According to the *theory* of non-Keynesian effects, fiscal policy affects output either through the demand-side channel or the supply-side channel. One of the explanations of non-Keynesian results on the demand-side is based on the *wealth effect on consumption* (Giavazzi and Pagano, 1990, Alesina and Perotti, 1996, Perotti, 1999). Restrictive budget policy triggers expectations for a future tax cut and a higher present value of household income, which stimulates private consumption and thus output. Opposite to the traditional view, the wealth effect entails an increase in consumption as a result of an expenditure cut. This explanation represents the “expectation view of the fiscal policy”.

The effect is stronger when the fiscal changes are perceived as permanent. In addition, the presence of a positive wealth effect might depend on the debt-to-GDP ratio. Economic agents expect that when this ratio reaches a certain high level, an upward jump in taxation will occur. If fiscal restriction is undertaken before this expected level of debt-to-GDP ratio, the

probability of a tax increase is lower. These positive expectations generate, in turn, a positive wealth effect on household consumption.

The second strand of expansionary fiscal contractions calls attention to the *credibility effect on interest rates* (McDermott and Wescott 1996, Alesina et al. 1992). This effect works when the debt/GDP ratio is high, that is, during periods of fiscal stress. At high levels of public debt, investors may face an interest rate premium due to the default risks or inflation. Fiscal consolidation can bring a downward pressure on interest rates by reducing the risk premium, which will crowd in private investments.

In addition, there is a *supply-side channel* at work (Alesina and Ardagna 1998, Alesina et al. 2002). According to the *labor market view*, cuts in government employment or transfer payments may increase employment in the private sector and stimulate the economy when it is near its full employment level. Also, higher wages in the government sector put an upward pressure on the business sector wages and increase unit labor costs. This is equivalent to a negative supply shock, leading to a contraction of output. In open economies with a flexible exchange-rate regime, reduced labor costs, resulting from a fiscal restriction, increase the competitiveness of the companies and raise the net export.

The supply-side channel operates in both competitive and unionized labor markets, although in a different manner (Ardagna 2007). An increase in public employment or government wages in the competitive labor markets leads to a fall in private sector employment. As was noted earlier, this results in a real wage increase and a decline in profits, investments, and thus output, in the business sector.

With unionized labor markets, an increase of public employment, wages of public sector employees or unemployment benefits raises unions' wage claims in the private sector, boosts wages and reduces profits and investments. The final result is the same – a negative relationship between government spending, specifically its wage component, and the short-run GDP growth. Table 1 summarizes the expected outcomes (Keynesian vs. non-Keynesian) of a fiscal

adjustment according to the relevant theoretical literature.

The *empirical studies* examine the effects of budgetary interventions either on the short-run output or on the state of public finances. They confirm that the presence of non-Keynesian effects depends on a number of factors such as initial conditions, fiscal impulse's characteristics and macroeconomic environment. The key findings are summarized below.

The *composition of budget impulse* is one of the factors that determine the outcome of fiscal intervention. Restrictions on government wages and transfers are more successful in stimulating economic activity in a short-run than a tax increase or a capital spending cut. This result is consistent with the abovementioned labor market view.

According to Perotti (1996), the adjustments of social expenditure and wage government consumption are more persistent and are associated with rising rates of growth and investments than the labor-tax increases or the capital spending cuts. The reason is that *bigger and persistent fiscal adjustments* point to the government's commitment to a longer lasting change of the fiscal regime and, in consequence, are more likely to expand private demand and output.

Another important determinant of expansionary fiscal contractions is the debt-to-GDP ratio. Most European economies in which fiscal adjustments occur have extremely high *debt-to-GDP levels* or rates of debt accumulation. In such periods, a negative shock to government purchases stimulates consumption and output. Conversely, when the fiscal situation in the

Criteria		Level	Outcome
Fiscal framework	Debt/GDP	Low	Keynesian
		High	Non-Keynesian
	Liquidity constraints	Liquidity constrained consumers	Keynesian
		Liquidity unconstrained	Non-Keynesian
	Government consumption/GDP	Low	Keynesian
		High	Non-Keynesian
Characteristics of fiscal impulse	Size	Low	Keynesian
		High	Non-Keynesian
	Composition	Expenditure cut (government wages, employment)	Non-Keynesian
		Tax increase or public investments reduction	Keynesian
	Permanence	Permanent	Non-Keynesian
		Temporary	Keynesian
Economic conditions	Monetary policy	Expansionary	Non-Keynesian
		Tightening	Keynesian
	Macroeconomic environment	Unfavorable (recession, high interest rates)	Keynesian
		Favorable	Non-Keynesian

Table 1: Non-linear effects of fiscal adjustments

Sources: Giavazzi and Pagano, 1990, Bertola and Drazen, 1993, Alesina and Perotti, 1996, McDermott and Wescott, 1996, Perotti, 1999, Ardagna 2004.

country is sound, the traditional Keynesian effects dominate. The share of liquidity-constrained consumers in the economy is also important: the higher the share, the lower the probability of a non-Keynesian outcome (Perotti 1999).

Bertola and Drazen (1993) point out that the effect of public outlays on consumption depends on the initial *government consumption-to-output ratio*. When that ratio approaches a “trigger” value, households expect a further expenditure cut, designed to ensure the sustainability of public finances. The present value of their net income, and hence consumption, grows. If the cut does not materialize, consumption falls significantly. When government spending continues to rise above the “trigger value”, agents anticipate a tax cut in the near future and boost their consumption. At the moment of fiscal stabilization, government expenditure falls significantly while private consumption is at a high level.

Alesina et al. (2002) find a strong negative impact of government expenditure on profits and investments in the private sector. Government wages have the largest negative effect on profit, bigger than that of taxes. The study places an emphasis on the positive impact of lower government wage spending and labor tax reductions on labor costs. This evidence is consistent with the labor market view discussed above.

In addition, the paper demonstrates that changes in business investments explain to a great extent the expansionary effect of large fiscal stabilizations in developed economies: prior to the expansionary fiscal adjustment, the growth rate of business investments is negative and contributes negatively to the GDP growth, the latter in this case being small. During and after the adjustment, the growth of private investments is positive and significantly contributes to the high GDP growth. This pattern cannot be observed when fiscal consolidations affect output in the Keynesian (negative) manner.

The studies underline the importance of *accompanying policies*. Monetary stabilizations, falls in real interest rates and currency devaluations play a significant role for the expansionary fiscal consolidations in Denmark (1983-1986) and Ireland (1987-1989). Supporting evidence of this view has

been given by McDermott and Wescott (1996), who consider the case of an unsuccessful fiscal adjustment in the UK. Despite the consolidation efforts, the ratio of public debt to GDP increased by 7 percentage points between 1980 and 1984. This outcome reflected the domestic tight monetary policy, which resulted in a sharp appreciation of the national currency. Also, the consolidation was attempted during times of world recession and very high interest rates. Third, fiscal policy mix was not favorable: net capital outlays were reduced while social security benefits rose.

Some authors express a different view about the role of monetary policy for the appearance of non-Keynesian effects. Ardagna (2004) shows that successful and expansionary fiscal contractions have not been the result of expansionary monetary policy or exchange rate devaluations. Hemming et al (2002) point out that alternative monetary regimes have relatively little effect on the size of short-term fiscal multipliers.

The amount of research on the non-Keynesian effects in post-communist countries is limited. Purfield (2003) explores large fiscal adjustments in a number of transition economies, including Bulgaria, between 1992 and 2000. The study analyzes the countries' overall primary balances, rather than the cyclically adjusted ones, as a measure of the fiscal stance. The large and expenditure-based fiscal adjustments are more successful in sustainable improvements in the primary balance within two years of the adjustment. The author does not find episodes of expansionary fiscal consolidations in transition economies. Bulgaria is given as an example of successful fiscal contraction in 1994.

Siwinska and Bujak (2006) focus on the consumption effects of fiscal policy for a sample of 14 transition countries between 1990 and 2001 (Bulgaria included). Budget balances of consolidated central governments that are not cyclically adjusted serve as a measure of the fiscal stance. Consumption reacts in a non-linear fashion to the discretionary budgetary interventions. The households tend to behave in a Keynesian manner when the level of the fiscal deficit is small (within the limits of the mean value plus one standard deviation, calculated for the time period). In “bad times”, fiscal

expansions stimulate private consumption but on a much smaller degree than in “good times”. In general, the non-Keynesian response of consumption during the periods of fiscal stress does not outweigh the Keynesian effects, observed during normal times. The authors explain this outcome by the bigger portion of liquidity-constrained and myopic consumers in transition countries.

Von Hagen (2004) surveys the fiscal episodes in the New Member States between 1999 and 2002 on the basis of cyclically adjusted general government budget deficits. The author uses “the growth-accounting approach” to calculate the discretionary fiscal impulse. The budget deficit is corrected with the rate of real GDP growth in order to isolate the exogenous from endogenous changes in the fiscal stance. Large expenditure-based budgetary expansions dominate; only five large fiscal consolidations have been observed, all of them in the Baltic States.

Afonso et al (2005) study fiscal consolidations in the eight New Member States, Bulgaria and Romania over the period 1991-2003. They focus on the substantial improvements in the structural budget balances. A Logit model helps to assess the determinants of the successful fiscal adjustments. The results confirm that, similar to advanced European economies, the expenditure-based adjustments tend to be more successful in reducing the general government budget deficits for two consecutive years than the revenue based ones. Three examples of successful fiscal contractions are given for Bulgaria (1992, 1994 and 1997) and one example of an unsuccessful consolidation (1998). According to the authors, expenditure-based consolidations prevail due to the limited administrative capacity of post-communist countries to increase tax revenues and, in comparison with advanced EU economies, start out from higher overall deficit levels when fiscal stabilization seems “inevitable”.

On the basis of data for the New Member States from CEE (NMS) between 1993 and 2002, Rzonca and Cizkowicz (2005) find evidence that fiscal adjustments accelerate short-run output growth. The study identifies only the export channel as a source of non-Keynesian effects. The descriptive analysis shows that

an important determinant of these effects is the size of the fiscal impulse. Large fiscal consolidations have been almost always accompanied by higher rates of output growth. In support of the relevant studies mentioned above, the study confirms that fiscal consolidations in the NMS have been achieved mainly through expenditure cuts.

3. The Effects of Fiscal Policy in The Bulgarian Economy

This paper investigates the effects of fiscal policy in the Bulgarian economy under the Currency Board Arrangement. The analysis is based on quarterly data for the primary government spending and for the total tax revenue of the general government budget and for the real GDP over the period 1998-2004. The data are first deflated by the GDP deflator (1995=100) and seasonally adjusted. The primary government spending includes wages and social insurance payments, subsidies, expenditure on goods and services, social expenditure and capital outlays.

This study differs from the relevant studies on transition economies mentioned in the previous section in its methodology. In order to isolate the endogenous changes from the exogenous (discretionary) movements of the budgetary categories we apply the HP filter (Hodrick-Prescott filter) with a smoothing parameter $\lambda=480$ to the seasonally adjusted quarterly series for the total primary government spending and the total tax revenue.

The HP filter computes the cyclically adjusted measure (X^*) of a variable (X) by minimizing the expression:

$$\sum (X_t - X_t^*)^2 + \lambda \sum [(X_{t+1}^* - X_t^*) - (X_t^* - X_{t-1}^*)]^2,$$

where λ is the weighting factor (Hodrick and Prescott 1997).

The cyclically adjusted budgetary items are expressed as a share of real GDP. The coefficient $\lambda=480$ for quarterly data corresponds to a value $\lambda=30$ for annual data, which is the value used by the European Central Bank (Bouthevillain et al. 2001). The lower the value of the weighting parameter the better the discretionary

policy shocks are captured. The HP filter has been chosen among a number of alternatives for cyclical adjustment because of its popularity, transparency and suitability for international comparisons. For a description of other popular methods, see Giorno et al. 1995 or Blanchard 1993.

The discretionary impulse for government expenditure (Δg_t) is defined as the difference between the cyclically adjusted value of primary government outlays (expressed as a share of GDP) in the given period (g_t) and the cyclically adjusted value of primary government outlays in the previous period (g_{t-1}):

$$\Delta g_t = g_t - g_{t-1} \quad (1),$$

where the cyclically adjusted government outlays (g_t) is calculated using the HP filter. A positive/negative value of Δg_t indicates an expansionary/restrictive fiscal impulse.

The discretionary tax impulse (Δt_t) can be calculated in an analogous way. It is the difference between the cyclically adjusted value of tax revenues (expressed as a share of GDP) in the given period (t_t) and the cyclically adjusted value of tax revenues in the previous period (t_{t-1}):

$$\Delta t_t = t_t - t_{t-1} \quad (2),$$

where t_t is the HP filtered tax revenue expressed as a share of GDP.

First, the Granger test was implemented in order to check the causality between the discretionary expenditure impulse and the real GDP growth. We did a regression of the change in expenditure impulse ($\Delta^2 g$) to its lagged values as well as to the lagged values of change in the GDP growth (Δy_{growth}) with a lag interval of three periods. The regression result ($F=2.3$) rejected at 0.1 level of significance the hypothesis that the output growth Granger-causes the discretionary fiscal policy.

Figure 1 gives evidence of a negative relationship between the discretionary expenditure changes and the real GDP growth on impact, which implies the presence of non-Keynesian influence of government expenditure. In addition, the correlation between the

Figure 1: Discretionary expenditure changes and real GDP growth
Source: author's calculations on the basis of quarterly data from the Ministry of Finance and National Statistical Institute

discretionary expenditure impulse and the real GDP growth is strong and negative (correlation coefficient of -0.97). As can be seen from the graph, the restrictive fiscal impulse has always been accompanied by a positive rate of growth. Such a negative relationship is not observed for all cases of a positive spending shock, but the negative rates of real growth have occurred during periods of larger fiscal expansions.

The descriptive analysis illuminates the behavior of tax policy as well (Figure 2). The lower average tax burden in the economy leads to positive rates of

Figure 2: Discretionary tax changes and real growth
Source: author's calculations on the basis of quarterly data from the Ministry of Finance and National Statistical Institute

output growth (correlation coefficient of -0.92). So, the fiscal categories influence economic activity in Bulgaria *in a non-linear fashion*: while a typical Keynesian result prevails for the tax payments, a non-Keynesian outcome is valid for the government outlays.

Despite the data limitation, the descriptive analysis with yearly data also gives some evidence for existence of non-Keynesian effects. Figure 3 plots the change of annual growth of discretionary expenditure interventions and the rate of change of year-to-year GDP growth. The year-to-year real GDP growth was positive during the whole period under investigation but the growth momentum accelerated when annual budgetary spending was growing at a slower pace. This pattern is observed during the years 2000, 2002 and 2004. In 2000, the real growth was higher than that in the previous year by 3 percentage points: in 1999 the output growth was 2.3%, while in 2000 it rose to 5.4%. During 2002, the growth was 4.9%, which was 0.9 percentage points larger than in 2000. During 2003, the increase of cyclically-adjusted government spending slightly accelerated (0.3 percentage points), while the rate of yearly growth fell by 0.5 percentage points to 4.4%.

Figure 3: Discretionary expenditure policy and real output growth (annual data)

Source: author's calculations on the basis of annual data from the Ministry of Finance and National Statistical Institute

However, the negative relationship between the growth of government spending and the real GDP growth is not observed during the whole period under investigation. In several cases, the discretionary expansions have been accompanied by higher positive rates of GDP growth (Figure 1). Also, in 2001 the lower share of government purchases in output did not lead to faster real economic growth. In this vein, the study should answer the question: what are the determinants of non-Keynesian effects of government expenditure on aggregate output in Bulgaria?

An appropriate instrument for evaluating the determinants of non-Keynesian effects of government spending is the Logit regression. The model has the following form:

$$P = E(y = 1 | X_i) = \frac{e^{\beta_1 + \beta_2 X_i}}{1 + e^{\beta_1 + \beta_2 X_i}} \quad (3),$$

where X_i are factor variables, while y is a binary variable reflecting the influence of the discretionary expenditure impulse on output. It takes the following values:

$y = 1$ in case of non-Keynesian influence of government expenditure on output, that is, the discretionary fiscal impulse (Δg) and the real GDP growth (y_{growth}) are moving inversely: the restrictive expenditure impulse leads to a positive rate of real GDP growth, while the expansionary expenditure interventions are accompanied by negative rates of output growth;

$y = 0$ in case of traditional Keynesian impact of government spending on short-run economic activity, that is Δg and y_{growth} are moving in the same direction: the positive interventions on government spending are accompanied by a positive rate of real GDP growth, while the negative expenditure impulse results in a negative rate of real GDP growth.

$E(y=1 | X_i)$ is the conditional probability of a presence of non-Keynesian effect of the discretionary fiscal impulse. The choice of the factor variables (X_i) depends on the relevant theoretical and empirical findings as well as on the descriptive analysis presented above. According to previous studies, the main determinants of non-Keynesian effects are the size of fiscal impulse and the government debt-GDP-ratio. Also, as discussed above, fiscal restrictions are more likely than fiscal expansions to demonstrate a non-Keynesian impact on output. Each of these likely determinants is tested through the Logit model. A description of factor variables (X_i) is presented in Table 2.

The inclusion of the variable TYPEIMPU in the model would show whether the non-Keynesian effects of government expenditure on output would prevail in case of tight expenditure policy or in case of accommodating expenditure policy. Most of the studies explore the output effects of fiscal consolidations.

Variable	Description	Values
TYPEIMPU	<i>Type of the discretionary expenditure impulse</i>	1 in case of an expansionary fiscal impulse ($\Delta g > 0$)
		0 otherwise
SIZEIMPU	<i>Size of discretionary expenditure impulse</i>	1 in case of large discretionary changes in government expenditure $-\infty < \Delta g < \mu_g - \frac{1}{2} \sigma_g$ or $\mu_g + \frac{1}{2} \sigma_g < \Delta g < \infty$ *
		0 otherwise $\mu_g - \frac{1}{2} \sigma_g \leq \Delta g \leq \mu_g + \frac{1}{2} \sigma_g$
SIZET	<i>Size of discretionary tax impulse</i>	1 in case of a large discretionary change in tax revenues $-\infty < \Delta t < \mu_t - \frac{1}{2} \sigma_t$ or $\mu_t + \frac{1}{2} \sigma_t < \Delta t < \infty$ **
		0 otherwise $\mu_t - \frac{1}{2} \sigma_t \leq \Delta t \leq \mu_t + \frac{1}{2} \sigma_t$
GOVDEBT	<i>Level of government debt</i>	Nominal variable equal to the debt-to-GDP ratio

Table 2: Definition of the factor variables in the LOGIT model

* μ_g is the sample average of discretionary expenditure impulse (Δg), σ_g is the standard deviation of the sample;

** μ_t is the sample average of discretionary tax impulse (Δt), σ_t is the standard deviation of the sample.

The variable SIZEIMPU presents the size of discretionary fiscal impulse (Δg). Fiscal intervention is defined as “significant” if the discretionary expenditure impulse (Δg) in a given period lies outside the interval of the mean value (μ_g) plus/minus one half standard deviation (σ_g). Otherwise, the fiscal intervention is insignificant and is defined as “neutral”. The discretionary expenditure impulse is defined as expansionary if its value is greater than 0.47% of GDP ($0.47 = \mu_g + \frac{1}{2} \sigma_g$). The expenditure intervention is restrictive if Δg is negative and smaller than -0.07% of GDP ($0.07 = \mu_g - \frac{1}{2} \sigma_g$). If the size of discretionary impulse is between -0.07 and 0.47, the fiscal stance is defined as neutral.

Respectively, SIZEIMPU is 0 when $-0.07 < \Delta g < 0.47$, i.e. when the primary government spending has changed between -0.07% and nearly 0.5% of GDP. If the fiscal intervention is outside these limits, it is regarded as significant and SIZEIMPU equals 1. In this way, the hypothesis that the size of discretionary impulse is an important factor for the appearance of non-Keynesian effects would be verified. The relevant literature concludes that the larger the fiscal impulse,

the greater the probability of a non-Keynesian outcome.

The cut-off points for the variable SIZEIMPU are chosen in order to obtain comparable results with the relevant studies (see, for example, Alesina and Perotti, 1996). According to the definitions, during large fiscal expansions/contractions the cyclically adjusted balance improves/worsens by at least 1.5 percentage points of GDP in one year. This results approximately in 0.45 percentage points of GDP in one quarter and completely matches our results. Giavazzi and Pagano (1996) use similar cut-off criteria when defining the size of the fiscal impulse.

The next exogenous variable, SIZET, reflects the size of discretionary tax changes. It is introduced in order to test the relationship between the tax policy and the non-Keynesian response of output to the expenditure policy. SIZET is a binary variable, similar in nature and definition to the variable SIZEIMPU. Its value is based on the size of discretionary tax revenue impulse (Δt). SIZET is equal to 1 in case of significant tax changes, that is, when the discretionary tax impulse lies outside the interval $(-0.14, 0.30)$.

	SIZEIMPU	TYPEIMPU	SIZET	GOVDEBT
ai	5.05 (1.47)*	10.05 (37.66)	1.49 (0.85)	-0.03 (0.03)
stat. significance (p-value)	0.00	0.79	0.08	0.30
Wald statistics	11.80	0.07	3.07	1.06
exp.(b)	155.96	23156	4.44	0.96
pseudo R ²	0.77	0.51	0.16	0.05

*st. error of the estimate

Table 3: Determinants of non-Keynesian effects: econometric results

The variable GOVDEBT reflects the role of initial conditions, specifically the level of government debt. According to the theoretical explanations, a non-Keynesian result is more probable when the debt-to-GDP ratio is high. In such times of “fiscal stress”, economic agents appreciate the authorities’ efforts to improve the long-term sustainability of public finances through budget consolidations, which stimulate private demand and output. GOVDEBT is a nominal variable equal to the government debt/GDP ratio.

The Logit model takes the following form:

$$\ln \frac{P_i}{(1 - P_i)} = a_0 + a_1 * TYPEIMPU + a_2 * SIZEIMPU + a_3 * SIZET + a_4 * GOVDEBT \quad (4)$$

The results are presented in Table 3. Two of the exogenous variables have statistically significant regression coefficients: SIZEIMPU and SIZET. The type of discretionary impulse (TYPEIMPU) is not among the factors that determine the appearance of non-Keynesian effects, since these effects have occurred during episodes of both fiscal expansions and fiscal contractions. In addition, the level of government debt does not influence the non-Keynesian response of real output. Such a conclusion is not unreasonable in light of the fact that the non-Keynesian effects in the Bulgarian economy appear as a result of accommodating budget policy as well as restrictive budget policy.

The size of discretionary expenditure intervention presented by the variable SIZEIMPU is a statistically significant determinant of non-Keynesian effects. Similar to the results from relevant studies, the larger the changes in the cyclically adjusted expenditure, the

higher the probability of non-Keynesian effects. This probability is equal to:

$$P = E(y = 1|Z) = \frac{\exp(-2.56 + 5.05 * SIZEIMPU)}{1 + \exp(-2.56 + 5.05 * SIZEIMPU)} \quad (5)$$

If the value of the expenditure impulse is outside the limits of mean value plus/minus one half standard deviation, the probability of a non-Keynesian outcome is approximately 0.9. By contrast, small changes in expenditure policy result in traditional Keynesian behavior of aggregate activity in the short run. This implies that larger expenditure cuts could more successfully stimulate the aggregate activity in the Bulgarian economy. The regression coefficient for the variable SIZET is also statistically significant. If the variable SIZET lies outside the interval $(\mu_t - \frac{1}{2}\sigma_t; \mu_t + \frac{1}{2}\sigma_t)$, the probability of a non-Keynesian response is near 0.6. It is equal to:

$$P = E(y = 1|Z) = \frac{\exp(-0.98 + 1.49 * SIZET)}{1 + \exp(-0.98 + 1.49 * SIZET)} \quad (6)$$

Figure 4. Probability of non-Keynesian effects of government expenditure

Source: author's calculations (SPSS output)

Figure 4 presents the probability of a non-Keynesian response of output to a discretionary expenditure shock as a function of the size of expenditure impulse as well as of the size of tax revenue impulse in the same period. It implies that the probability of a non-Keynesian result is higher when both discretionary impulses are higher.

Larger increases in the tax revenue-GDP ratios have been accompanied by non-Keynesian effects of budgetary purchases on output. This outcome is due to the fact that under the Currency Board Arrangement, introduced on 1st July 1997, the Bulgarian authorities keep a budget close to balance or in surplus. Both spending and taxes have been moving in an upward direction: in order to keep the government's budget constraint, higher spending requires a higher tax burden. Tax revenue accounted for 30.9% of GDP in 1998 and 33.8% in 2005. During the same period, the primary spending has been growing faster - from 32% to 37.4%, respectively.

The results of this study imply that the balanced-budget policy in countries with a growing public sector could have a negative impact on macroeconomic activity. Thus, the imposition of fiscal rules on the overall budget balance only is not enough with a view to accelerating growth prospects. It is important to evaluate how the country meets the budget balance, by raising taxes and spending or by lowering both, because an expenditure expansion accompanied by a tight tax policy is not likely to create a growth-enhancing environment.

4. Conclusion

This study illuminates the macroeconomic effects of fiscal policy in Bulgaria during the period of EU accession. The descriptive analysis shows a negative (non-Keynesian) relationship between the discretionary expenditure interventions and the short-run output growth. On the other hand, the tax policy affects output in the standard Keynesian manner. The size of discretionary impulse is the main determinant of non-Keynesian influence of government outlays: the

stronger fiscal expansions/contractions are more likely to decelerate/accelerate GDP growth. This result supports the conclusions of relevant research on both advanced and post-communist economies.

The findings of this study have some important practical implications for Bulgaria's fiscal policy. Due to the fiscal discipline during the Currency Board Regime, introduced in mid-1997, the government debt has been constrained below 60% of GDP. The primary budgetary balance has remained positive since the beginning of the century. Nonetheless, the study suggests that although the balanced budget ensures the sustainability of public finances, it could not guarantee a stimulating effect on output - the fiscal policy mix is a crucial factor for economic growth as well. The government's size was continuously growing during the period under observation. The share of Bulgaria's government sector is among the highest ones in the transition economies, including those countries under a Currency Board Arrangement (Estonia and Lithuania). The presence of non-Keynesian effects of government spending shows that in view of accelerating growth prospects the balanced budget should be achieved by expenditure restrictions and lower taxes rather than a growing government share in the economy.

References

- Afonso, A., C. Nickel, P. Rotner. 2005. Fiscal Consolidations in the Central and Eastern European Countries. European Central Bank WP 473.
- Alesina, A., R. Perotti. 1996. Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects. NBER WP 5730.
- Alesina, A., S. Ardagna. 1998. Tales of Fiscal Adjustment. Economic Policy 13:489-517.
- Alesina, A., S. Ardagna, R. Perotti, F. Schiantarelli. 2002. Fiscal Policy, Profits and Investments. American Economic Review 92:571-589.
- Alesina, A., M. de Broeck, A. Pratti, G. Tabellini. 1992. Default risk on government debt in OECD countries. Economic Policy 7:427-463.
- Ardagna, S. 2004. Fiscal Stabilizations: When Do They Work and Why. European Economic Review 48:1047-1074.
- Ardagna, S. 2007. Fiscal policy in a Unionized Labor Market. Journal of Economic Dynamics and Control 31:1498-1534.
- Bertola, G., A. Drazen. 1993. Trigger Points and Budget Cuts. American Economic Review 83:11-26.

Blanchard, O. 1993. Suggestion for a New Set of Fiscal Indicators. in *The Political Economy of Government Debt*, edited by H.Verbon and F. van Winden, 307-325. North-Holland, Amsterdam.

Bouthevillain, C., P. Cour, G. van den Dool, P. de Gos, G. Langeus, M. Mohr, S. Momigliano, M. Tujula. 2001. Cyclically adjusted budget balances: an alternative approach. European Central Bank WP 77.

Giavazzi, F., M. Pagano. 1990. Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries. NBER WP 3372.

Giavazzi, F., M. Pagano. 1996. Non-Keynesian Effects of Fiscal Policy Change: International Evidence and the Swedish Experience. *Swedish Economic Policy Review* 3:67-103.

Giorno, C., P. Richardson, D. Roseveare, P. van den Noord. 1995. Estimating potential output, output gaps and structural budget balances. OECD WP 152.

Hemming, R., M. Kell, and S. Mahfouz. 2002. The effectiveness of fiscal policy in stimulating economic activity – a review of the literature. IMF WP/02/208.

Hodrick, R., E. Prescott. 1997. Post-war U.S. business cycles: an empirical investigation. *Journal of Money, Credit and Banking* 29:1-16.

McDermott, J., R. Wescott. 1996. An Empirical Analysis of Fiscal Adjustments. IMF WP 59.

Perotti, R. 1996. Fiscal Consolidation in Europe: Composition Matters. *American Economic Review* 86:105-110.

Perotti, R. 1999. Fiscal Policy in Good Times and Bad. *Quarterly Journal of Economics* 114:1399-1436.

Purfield, C. 2003. Fiscal Adjustment in Transition. Evidence from the 1990s. *Emerging Markets Finance and Trade* 39:43-62.

Rzonca A., P. Cizkowicz. 2005. Non-Keynesian Effects of Fiscal Contraction in New Member States. European Central Bank WP 519.

Siwinska, J., P. Bujak. 2006. Short-Run Macroeconomic Effects of Discretionary Fiscal Policy Changes. in *The eastern enlargement of Eurozone*, edited by Dabrowski, M., J. Rostowski, 131-145, Springer, US.

Von Hagen, J. 2004. Fiscal Policy Challenges for EU Acceding Countries. ECSA Conference, Vienna, 21 February.