

# MACROECONOMIC EFFECTS OF FISCAL POLICIES IN THE ACCEDING COUNTRIES

*Gabriele Tondl*

Vienna University of Economics & BA

Althanstrasse 39-45, A-1090 Wien, Austria

e-mail: [gabriele.tondl@wu-wien.ac.at](mailto:gabriele.tondl@wu-wien.ac.at)

(preliminary version, do not quote without author's permission)

## **Abstract**

In view of the Maastricht convergence criteria most acceding countries (AC) face requirements to consolidate their budget, reduce expenditures and carry out fiscal reforms. This paper wishes to assess the likely macroeconomic effects in terms of GDP growth, consumption and investment in analysing recent experiences in the AC and in weaker EU member states. For this purpose fiscal impulses are calculated and their impacts estimated in panel data models for the whole country group as well as in regressions for individual countries. The results indicate that budgetary consolidation and expenditure cuts would not be contractionary, on the opposite. There are fairly traditional effects of personal income taxation so that tax increases may be problematic. Social transfers are mostly promoting consumption and should be reconsidered. With respect to investment effects, corporate taxes show clear non-keynesian effects in the AC which opens room for tax increases. Furthermore, reductions of subsidies may have positive effects. Consequently, fiscal reforms are likely to help the AC more than the bear in risk.

**JEL: E620, H 300**

## 1. INTRODUCTION

The public finance sector of the Eastern European countries underwent some important changes after transformation. First attempts of fiscal consolidation were started, new tax systems were introduced and tax policy was used as an active instrument. Transfer and subsidies were reduced on the one hand and extended on the other hand.

With a view to qualify for monetary union, the new EU member states will need to make strong efforts to consolidate their budgets for fulfilling the convergence criteria. This invokes several question: Must we fear that budgetary consolidation reduces economic growth? Which expenditure or revenue items may be addressed to generate this consolidation? Which are the likely macroeconomic effects of such fiscal policy changes, notably in terms of growth, consumption and investment? Consequently, which strategy for fiscal reforms can be recommended to the new EU member states?

To find an answer to these questions, the paper investigates the effects of recent policy changes in these countries during the 1990s. In addition, we compare the findings with the effects of fiscal policies of the past 30 years of a group of countries that entered the EU equally as transforming, less developed economies, the Mediterranean countries Spain, Portugal and Greece, and Ireland.

In terms of theory, the paper starts from the main arguments of the fiscal policy literature, where budgetary consolidation may be accompanied by traditional Keynesian contractionary effects or non-Keynesian effects which are based on arguments of Ricardian equivalence, expectations and credibility and propose positive growth effects of consolidation. (Alesina and Perotti 1997, Alesina and Ardagna 1995). The traditional view that taxes/transfers reduce/promote private consumption has also been challenged by the conjecture of Ricardian equivalence and expectations, proposed for example by Giavazzi and Pagano (1996). Since taxes and subsidies influence the user costs of capital, investment is considered to be sensitive to changes in these fiscal items. This proposition in particular finds empirical support for taxation (e.g. Cummins et al. 1995).

The main part of the paper contains an empirical analysis of the short term effects of fiscal policy changes in the Eastern countries on the macroeconomic aggregates GDP growth, consumption, and investment. First, regressions are estimated on a country by country bases separately for single fiscal variables. Then panel data models are estimated for the full structural specifications of GDP growth, consumption, etc. This permits to cope with the constraint of fairly short data series available for Eastern countries, which do not allow to estimated complex models for each country, but still get some idea of country specific patterns. In order to separate the fiscal policy change from current fiscal data, fiscal impulses are calculated, following the approach of Blanchard (1993). Thus we get a measure of fiscal policy changes that is free of cyclical components. The robustness of the regression results is checked in a next step by looking at "fiscal events" and the development of macroeconomic variables during such episodes.

These estimations give important results. First, the results indicate that reductions in government expenditures resulted in higher growth. In these respect the Eastern countries are similar to EU 4. In contrast, unlike EU 4, taxation was not contractionary and public investment made no significant short term contribution to GDP growth. With respect to the consumption impact of fiscal policies, the results show that income taxes had a clear traditional negative effect. The effect of government social transfers are not uniform. In some

countries social transfers acted positive on consumption, in others Eastern countries– like in EU 4 – transfers showed a negative relation with consumption. As to the investment impact of fiscal policies, we find non-keynesian effects of corporate taxes in both country groups. For the Eastern countries the same appeared for employers social security contributions. Subsidies had no uniform effect on investment, in some countries they promoted investment, in other Eastern countries a negative relationship appears, as with EU 4.

The paper is organized as follows: Section 2 describes the fiscal situation of the Eastern European countries and relates it to the group of EU 4. Furthermore, it indicates which elements fiscal policy reforms might stress. Section 3 discusses the theoretical arguments of the growth effects, consumption and investment effects of fiscal policies. Section 4 specifies the relationship that are estimated, describes the measure of fiscal impulses, the procedure for studying fiscal event, and finally the data. Section 5 provides the results of the estimation and section 6 concludes.

## 2. THE FISCAL SITUATION IN THE ACCESSION COUNTRIES

This section gives an overview of the budgetary situation in Eastern European countries. In order to get an insight of fiscal policy effects from a broad number of Eastern European transition countries, this paper does not only cover the 8 Central and Eastern European countries and the Baltic Republics, which join the EU in 2004, but also Bulgaria and Romania. This group of countries is referred to as Eastern European countries or shortly Eastern Europe. Since the cohesion countries (Spain, Portugal, Greece and Ireland) of EU 15 started from a comparable situation of weak economic development and problematic budgetary situation when entering into the EU, we use this group of countries as a reference group for making comparisons. We shall refer to this group as EU 4.

**Table 1: General facts on fiscal development in the Eastern European countries and EU 4**

	general government deficit per cent GDP			current expenditures per cent GDP		current revenues per cent GDP		government gross fixed capital form- ation per cent GDP	
<b>Eastern Europe</b>	1995	2001	2003 <sup>a</sup>	1995	2001	1995	2001	1995	2001
Hu	1.0	-3.8	-5.9	59.4	47.0	48.5	43.1	6.7	7.7
Cz	0.2	-2.4	-8.0	37.7	41.4	41.7	38.8	8.0	6.2
Pl	-1.8	-4.5	-4.3	45.2	47.2	43.5	38.5	2.9	3.4
Sl	0.1	-1.0	-1.8	38.2	39.5	41.1	41.2	4.1	4.5
Sk		-3.2	-3.6		35.5		34.5		5.6
Ee	-1.2	2.7	2.6	39.3	36.1	39.9	35.2	4.5	3.6
Lv	-3.4	-2.2	-1.8	40.0	35.4	35.7	32.6	1.9	3.9
Lt	-4.5	-0.7	-1.7	30.6	31.1	30.1	30.7	3.9	2.6
Bg	-6.9	-2.2	-	46.5	36.9	39.8	37.4	2.1	4.3
Ro	-2.9	-3.0	-	31.2	32.3	32.7	32.3	5.4	4.9
avg.	-2.2	-2.0	-3.1	40.9	38.2	39.2	36.4	4.4	4.7
<b>EU 4</b>	1985	2001	2003	1985	2001	1985	2001	1995	2001
Gr	-11.6	-1.4	-1.7	32.9	32.8	30.3	42.4	3.6	4.0
Po	-9.1	-4.3	-2.9	27.2	36.8	31.3	39.8	3.3	4.1
Ir	-10.2	0.9	-0.8	35.6	26.3	38.8	33.2	3.7	4.5
Sp	-6.2	-0.3	0.0	22.1	20.8	34.2	38.9	3.7	3.3
avg.	-9.3	-1.3	-1.4	29.5	29.2	31.9	38.6	3.6	4.0

Source: calculated with data from IMF, Government Finance Statistics; Eurostat; European Commission, Ameco database; <sup>a</sup> figures 2003 deficit Eastern Europe: Eurostat Statistics in Focus 18/03/04 (ESA 95 definition)

Let us first look at the general budgetary situation of the Eastern European countries (see table 1). Despite some efforts of budgetary consolidation in the mid and late 1990s, the budgetary position has seriously deteriorated in many Eastern countries. In 2003, Hungary, Poland and Slovakia and – above all – the Czech Republic had a budgetary deficit far above the Maastricht convergence criteria. The situation in the Baltic Republics is more favourable, all meet the convergence criteria. Estonia even has achieved a surplus since a few years. (Note that the figures in table 1 of 2003, ESA 95 figures, are not strictly comparable with the 1995 and 2001 figures which are from IMF Government Finance Statistics - GFS). Table 1 also shows that the budgetary position of the Eastern countries has significantly worsened in the central European countries, while the Baltic Republics and South Eastern European countries improved their position. If looking at EU 4, we see that these countries were facing a troublesome budgetary situation during their accession period. After considerable efforts of fiscal reforms they met the convergence criteria by the early 2000s.

The second major fact is the size of the public sector in the Eastern countries. Although the public sector was downsized in most countries, general government current expenditures reach still around 40 per cent of GDP, and above in the Central European countries and between 31 and 37 per cent in the Baltics and South Eastern European countries. Compared to the EU 4, this is in general much higher (although Portugal also reached a sizeable public sector in 2001; see table 1). If the pattern found in the EU, that richer member states have a larger public sector, applied to the Eastern countries, the government sector is definitely too large in these countries.

Looking at the components of government's revenues and expenditures, further interesting characteristics of the Eastern countries appear (see table 2). On the revenue side, the Eastern countries introduced personal income and corporate taxes only after transformation. The same applies for social security contributions and value added taxes. Revenue from value added taxes and social security contributions was by far the most important revenue source. In terms of GDP, value added taxes have reached a similar level as in EU 4. In contrast, tax revenue from personal income taxes and corporate taxes is still below the EU 4 level. With personal income taxation, problems of tax collection and tax evasion seem to be responsible for the low revenue rate (Köhler-Töglhofer et al. 2003). Marginal tax rates of personal income taxes have reached EU levels. In contrast, corporate tax rates are lower than in the EU and were reduced by governments in order to attract investors (Köhler-Töglhofer et al. 2003). The sizeable share of social security contributions reflects the fact that the Eastern countries established comprehensive welfare systems in view of persistent unemployment problems. For the stage of development of the Eastern countries, the size of the welfare systems is too big.

With respect to expenditures, all expenditure components, except wage expenditures are fairly high and lie above the expenditure levels of EU 4 (see table 3). Most striking is the substantial level of government transfers to household, a focus which may partly have its roots in the prominent role of social policies in the former communist regimes, partly reflect the response of governments to increasing social problems following the transformation. There is also still a high level of subsidies to the enterprise sector which mirrors the importance that subsidies had in the former economic system and the revival of subsidies as instruments to attract foreign investment. There is also quite a high level of public investment in the Eastern countries. The low figure of expenditures on government wages is not an evidence of a small public sector but of meagre wages in that sector.

**Table2: Components of general government current revenue in the Eastern European countries and EU 4, 2001**

	revenues in % of GDP, 2001			
	personal income taxes	corporate taxes	social security contributions	taxes on goods and services
Hungary	9.9	2.4	11.4	14.2
Cz	9.0	3.2	14.9	11.3
Pl	6.3	1.8	12.7	11.2
Sl	7.6	1.5	13.2	14.2
Sk	6.5	2.0	12.5	10.4
Ee	8.0	0.8	10.7	12.5
Lv	7.9	2.0	9.1	11.0
Lt	8.0	0.5	7.7	11.8
Bg	7.4	2.5	7.8	12.1
Ro	5.3	1.9	11.0	10.0
<b>East</b>	<b>7.6</b>	<b>1.9</b>	<b>11.1</b>	<b>11.9</b>
	revenues in % of GDP, 1997/98			
Gr	9.1	3.0	13.6	12.9
Po	10.3	3.7	9.1	13.3
Ire	13.3	3.2	4.1	11.9
Sp	9.9	2.4	10.7	8.9
<b>EU 4</b>	<b>10.7</b>	<b>3.1</b>	<b>9.4</b>	<b>11.8</b>

Source: Calculations based on government statistics from IMF, government finance statistics

**Table 3: Components of general government expenditures in the Eastern European countries and EU 4**

	expenditures in % of GDP, 2001				
	government consumption (excl. wages)	government wages	government transfers to households	government subsidies	public investment
Hu	7.0	9.3	16.0	2.6	7.7
Cz	4.5	3.7	19.3	6.9	6.2
Pl	9.5	7.9	17.8	1.2	3.4
Sl	8.1	9.7	16.9	1.2	4.5
Sk	5.1	6.0	18.9	1.8	5.6
Ee	11.6	6.7	12.0	0.8	3.6
Lv	6.3	8.1	12.3	0.7	3.9
Lt	9.2	8.5	9.6	0.1	2.6
Bg	9.1	5.0	13.3	1.8	4.3
Ro	7.4	6.3	11.5	1.1	4.9
<b>East</b>	<b>7.8</b>	<b>7.1</b>	<b>14.8</b>	<b>1.8</b>	<b>4.7</b>
Gr	3.6	11.6	16.5	0.1	4.0
Po	5.6	15.2	11.8	1.3	4.5
Ire	6.7	7.9	8.5	0.9	3.3
Sp	7.1	10.4	12.2	1.1	4.1
<b>EU 4</b>	<b>5.8</b>	<b>11.3</b>	<b>12.3</b>	<b>0.9</b>	<b>4.0</b>

Source: Calculations based on government statistics from IMF, government finance statistics;

From these facts, we can draw some important conclusions on policy issues that the Eastern countries face and raise questions concerning their effects, that will be addressed in this paper:

- Evidently, most of the Eastern European new EU member states face a big challenge to consolidate government budgets in view of the requirement to meet the Maastricht convergence criteria. Most Eastern European governments have strong objections to this idea since they fear that it would endanger the growth process that has just successfully established. This provokes the question: which are the likely effects of fiscal contraction in Eastern European countries?
- Given the large size of the government sector compared to EU levels, it will be important to reduce government expenditures.
- In view of the over-proportionate size of social policies, this area is a major candidate for policy changes. The question arises what happens if households receive less transfers. On the other side, there would be a discharge of households and enterprises from social security contributions which needs to be assessed.
- Further there would be room to reduce subsidies to enterprises and increase corporate taxes, an option which is clearly not in line with the current policy strategies. Therefore it would be interesting to see how important the present policies are for the enterprise sector.
- There is also room to increase revenues from personal income taxation by improving efficiency of tax collection. How would this affect households?
- Finally, it may be also in place to reason about the effects of public investment. The Eastern countries often stress the importance of public investment to improve the conditions for catching up. Opponents of budgetary consolidation indicate that a reduction of public investment would be very harmful. Consequently, one would like to know which are the effects of public investment for the Eastern countries.

### 3. THEORETICAL ISSUES AND FINDINGS OF THE LITERATURE

In this section we shall elaborate on the theoretical considerations regarding the described policy options. First, we consider how fiscal policy in general, i.e. expansionary or contractionary policies, affect output growth. Then we are interested in the effect of single revenue and spending categories and therefore ask, for the household sector on the one hand, how individual taxes and transfers affect consumption, for the firm sector on the other hand, how corporate taxes and subsidies affect investment.

The central issues with fiscal policies is how a fiscal expansion or a fiscal tightening acts on output. Fiscal expansion increase of the budget deficit, fiscal tightening reduces deficits. Fiscal expansions are based on increases in government expenditures and/or tax reductions. Fiscal contractions involve cuts in expenditure and/or an increase of taxes.

Looking at the short term demand side effects of fiscal policies, we can distinguish between traditional keynesian effects and non-keynesian effects, a conjecture which was proposed in the 1990s.

In the traditional keynesian view, fiscal expansions have a multiplier effect of above one, contractions would therefore reduce output. The multiplier for expenditures is higher than for taxes. However, fiscal expansions involve *crowding out* effects since they lead to higher interest rates which reduces investment and thus reduces the output effect. In the opposite case of a fiscal contraction one may therefore observe a *crowding in* effect. The reduction of government spending leads to a reduction of interest rates and therefore higher investment, which diminishes the contractionary effect of fiscal tightening. In neo-keynesian models with

flexible prices, expansions lead to higher prices that reduce the money supply and raise interest rates with the consequence that crowding out offsets the positive output effect. With fiscal contractions in contrast, crowding in offsets the negative output effect. Deficit reductions reduce prices and interest rates and thus improves the conditions for investment. In the open economy with capital mobility, higher interest rates attract capital from abroad. If *exchange rates are flexible*, the currency appreciates and crowding out is complete with rigid prices, but less with flexible prices since the appreciation lowers prices. A fiscal contraction, in contrast, leads to a lower interest rate and a depreciation of the currency, offsetting the contractionary effect of fiscal policy either fully with rigid prices or partly with flexible prices. If *exchange rates are fixed*, and prices rigid, capital inflows will prevent interest rates from rising, preventing crowding out. Fiscal expansions and contractions then have a strong positive or negative output effect. With price flexibility these effects are again reduced.

Consequently, in the Eastern European countries, where prices were only successively liberalized and exchange rates initially flexible fiscal policy changes should not have had output effects. Later, when most currencies are bound to the Euro and prices have become more flexible positive or negative output effects of fiscal policies are reduced. Therefore, we may expect that in the 1990s there were only small keynesian demand side effects in Eastern countries caused by fiscal policies. With the move to ERM II the effect of fiscal policies will stay small.

In contrast to the traditional keynesian effects there are *non-keynesian effects* which are based on rationale expectations, Ricardian equivalence, and credibility.

If individual have *rationale expectations*, a continuous fiscal expansion leads them to expect a continuous rise in interest rates which discourages investment and may lead to negative multipliers. Similarly, with a credible fiscal consolidation individuals will expect a constant reduction of interest rates which encourages investment and may significantly reduce the negative output effect of contractions and even turn it into a positive effect. Furthermore, when expenditures are reduced, individuals expect a reduction of future taxes which increases their lifetime income (wealth) and leads to an increase of present consumption (Blanchard 2003, Alesina and Ardagna 1998). Expectations may also in some cases lead to non-contractionary effect of a tax increase. If consumers consider that a tax increase implies a regime shift, they consider this as a one for all event and expect no more future wealth reducing tax increases and therefore keep consumption unchanged (Alesina and Perotti, 1997).

In the case of *Ricardian equivalence* (Barro 1974), - which is closely linked to the concept of expectations-, if the government reduces taxes, the knowledge that governments have a fiscal constraint and are bound to rules (Maastricht convergence criteria) makes individuals to expect future tax increases which would reduce their wealth. Consequently, they would reconsider their life time consumption, increase savings for future consumption and reduce present consumption. Tax cuts will therefore not lead to an increase of consumption. In contrast, as indicated in the previous paragraph, with a reduction of government expenditures, individuals expect future taxes to decrease which should increase present consumption.

The *credibility* argument stresses that governments which signal a credible consolidation of the budget, i.e. if the effort is large enough and continuous, or – even better – backed by rules such as the convergence criteria, interest rate premia would diminish and the reduced interest rates would stimulate investments. By such, the contractionary effects of budgetary consolidation can be prevented, a fiscal contractions can become expansionary.

In addition to demand side effects fiscal policy changes imply supply side (labour market) effects which were particularly emphasized by Alesina and Perotti (1997), Alesina and

Ardagna (1998), Ardagna (2002) and Alesina et al 2002. In this view, taxes also have an impact on labour supply. A tax increase leads to a decline in real income and will thus increase labour supply to maintain consumption, tax cuts will reduce labour supply. In unionized labour market, however, a different effect becomes important as well. Tax increases will lead to higher wage demand as real after tax wages decline, reducing competitiveness and output growth. With expenditures, negative output effects are associated with government employment/ wages and government transfers. A high level of government employment increases union's power and the reservation wage. Equally, higher unemployment benefits increase the reservation wage. Consequently, equilibrium wages increase, reducing competitiveness and output. (Ardagna 2002)

The size of multipliers was investigated in the empirical literature by simulations in macroeconomic models, in general equilibrium models, times series analysis and VAR models.

In macroeconomic models, the range of short term multipliers was found to vary between 0.8 and 1.3 in European countries (Roeger and in't Veld 2002 with the Commission's Quest model, Hunt and Laxton (2003) with the IMF multimod, Dalsgaard et al. (2001) with the OECD interlink model).

Fiscal policy effects for OECD countries were also analysed in structural VAR models (van Aarle et al. 2002, Blanchard and Perotti 2002, Perotti 2002). Perotti (2002) employs a structural VAR model with quarterly series on output and government expenditures and taxes per capita as well as prices and short term interests for five OECD countries. He argues that fiscal expenditure multipliers are small, seldom larger than one and have become negative in the post 1980 period. Negative effects of taxation have also become weaker. Van Aarle et al. (2002) use a structural VAR model with quarterly series of output, government expenditures and revenues, short term interest rates and prices for OECD countries between 1980 and 2001 to test for the effects of fiscal (and monetary) policies. They find that the effect of fiscal policies is small and can also show some non-Keynesian response. Government spending must not necessarily increase output and tax increases must not necessarily lead to output reduction.

In contrast there also exists now a sizeable empirical literature based on the study of fiscal episodes and cross section regressions, which provides evidence for non-keynesian effects and thus for expansionary effects of fiscal contractions.

Alesina and Perotti (1995) investigate the effects of fiscal expansions (an increase of the government's deficit) and fiscal contractions (deficit reduction) in OECD countries since the 1960s, based on Blanchard fiscal impulses. They found that in general expansions are based on increases in expenditures while contractions are based on tax increases. Alesina and Ardagna (1998) showed that sizeable and lasting fiscal consolidations, successful adjustments in their terminology, were primarily based on expenditure cuts and less on tax increases. Such consolidations were accompanied by output growth, a reduction of interest rates and a notable increase of private investment. There was also a sizeable increase of consumption. In contrast, they found that output reductions and a decline of investment was paired with small scale, soon reversed consolidations.

Alesina and Perotti (1995) and Alesina and Ardagna (1998) emphasized that the composition of government consolidation was important for the success. With successful adjustments, an important reduction of government transfers and public wages was achieved, but also a decline of public investment and subsidies. On the revenue side, according to these studies, successful adjustments increased corporate taxes but reduced individual taxes and social security contributions, while unsuccessful adjustments increased individual and value added taxes. The support of supply side arguments on government wages and transfers of this study

is contested in De Arcangelis and Lamartina (2003) who find in a structural VAR model for four OECD countries that increases of wages and transfers have a positive effect on output.

The possibility of non-negative output effects of fiscal consolidations is also supported by von Hagen et al. (2001) who find in a panel data model for EU countries that consolidations produce output effects insignificantly different from zero.

Which are the effects of fiscal policy on *consumption*? In common macroeconomic theory, income tax and employee's social security contributions reduce the disposable income for consumption. Policy changes therefore influence current disposable income. Since, in the view of the life cycle concept of consumption, consumption also depends on the consumers wealth, i.e. the present value of his future income net of taxes, we also need to consider that changes of tax policy and expectations will alter consumer's wealth. Social transfers should lead to consumption smoothing, maintaining consumption when current income declines, - the common situation in the Eastern European countries in the course of transition when output fell and unemployment rose. There may be also opposite non-keynesian effects. Under Ricardian equivalence, tax reductions lead to no increase of consumption since consumers know that the government will increase taxes, so that they save in order keep future consumption at the same level. Similarly, if the government increases social transfers, consumers know that it will have to raise taxes in the future to finance them and those who do not live on social benefits will save, so that in the economy as a whole consumption may not increase. (Of course, taxes and social benefits also have an effect on the labour supply, but we shall not further investigate this possible effect).

The empirical evidence on the consumption effects of fiscal policy is mixed. Giavazzi and Pagano (1996) and Giavazzi et al. (2000) find non-Keynesian effects of tax increases. In contrast, Fatas and Mihov (2001), who estimate various VAR specifications find that government expenditures have a Keynesian, positive consumption effect arguing that increases in government expenditures raise output and income which is then spent on higher consumption. Wilcox (1989) investigates the responsiveness of consumption to social transfers in the US over the period 1965-85. He finds that consumption increases by a factor of 0.14 when social benefits increase, rejecting the postulate of Ricardian equivalence.

Which are the effects of fiscal policy on *private investment*? The first channel already stressed above, how fiscal policies affect investment runs through the interest rate. A loose fiscal policy raises interest rates – in the short run and through the inflationary process also in the medium run. The result is crowding out of private investment. The second channel focuses on how fiscal policy components like corporate taxes, employer's social security contributions and subsidies affect the investment decision. Assume that the firm decides to realize an investment according to the rule that profits of an investment need to exceed investment costs. First, effective profits are after tax profits. Thus they depend on the level of corporate income taxation. Second, profits are given by sales of the firm minus the production costs of which wages and wage related contributions, in the Eastern countries above all social security contributions (payroll taxes play a subordinate role), form a major item. Increasing social security contributions will thus reduce profits. Investment costs increase with financial costs, i.e. higher interest rates, and decrease with investment incentives that the government offers. Again, the firm will not base its investment decision on deterministic variables but will act according to its expectations on future interest rates, future tax rates, etc. If the government signals a permanently loose fiscal policy, the firm will expect a future rise of

interest rates. A credible budgetary consolidation would reduce the expected interest rate and thus stimulate investment. With respect to taxes, the introduction of corporate taxes in the Eastern countries could have been considered as a single event with no further expectations of additional tax increases. Therefore it is also likely to observe non-traditional effects of taxes, contributions and subsidies on investment decisions.

There are extensive empirical studies in the tax literature that tested the investment impact of taxes. Most of these studies start from the concept of user costs of capital (Hall and Jorgenson 1967) and the tax adjusted  $q$  (Summers 1981) and tested the impact of changes in tax rates. While the early literature that tested time series models using macro data remained inconclusive on the investment effects of tax policies, more recent studies such as Cummins et al. (1995) who use a cross-section specification and firm level data find an important effect of tax policies. Their analysis looks at tax reforms in OECD countries and finds that investment responds with a factor of 0.6-1.5 to tax reforms. A particularly important issue with the Eastern countries is the question how corporate taxes affect FDI inflows, since FDI constitutes an important component of investment in these countries. These studies generally use macro data. Altshuler et al. (1998) investigated the impact of taxes on FDI inflows from the US in a cross-section of 58 countries and found that the tax elasticity increased from  $-1.5$  in 1984 to  $-2.8$  in 1992. These results are similar to the findings of other studies that investigate the tax impact for FDI flows into the US (Hines 1996) and into developing countries (Gastanaga et al. 1998). Hines (1999) points out that that FDI has become highly sensitive to tax treatment gearing competition of the recipient countries in tax policy. Bénassy-Quéré et al. (2000) investigate the impact of effective tax rates on FDI inflows in 9 EU countries and find that differences in corporate tax rates have a significant impact. (In contrast, they find no impact of differences in employer's social security contributions on FDI). Hubert and Pain (2002) estimate the impact of governments subsidies, EU Structural Funds payments, public investment and corporate taxes – all measured as a share of GDP – on total FDI inflows in 8 EU countries in a panel data model. They find no evidence of a positive impact of subsidies (and even a negative of Structural Funds payments), however a significant impact of corporate tax rates and government investment.

Finally, we are interested in the effects of *government investment* on output. First, in a keynesian sense, investment spending should have an immediate multiplier effect on current output. Another important argument on the effects of public investment starts from a production function view where public investment is considered to be complimentary to private investment and to have positive externalities (Aschauer 1989). Consequently, increases in public investment should gear private investment and thus improve output growth in the medium term. Erenburg (1993) considers public investment in a rationale expectations model where private investment is instantly geared as firms expect future externalities from present public investment.

Erenburg (1993) finds for the US that public investment has a significant positive impact on private investment with a lag of one period. For the OECD, Mittnik and Neumann (2001) find that public investment partly induces positive present effects on private investment. The present and lagged effects of public investment on output are tested in several studies estimating VAR models. Mittnik and Neumann (2001) perform a VAR analysis for 6 OECD countries with quarterly data and find significant positive immediate and long-run effects of public investment on output. Fatas and Mihov (2001), however, find that public investment has no significant effect on output.

#### 4. ESTIMATION: MODELS AND PROCEDURES

The objective of our empirical study is to provide an assessment of the impact of fiscal policies on macroeconomic aggregates, output consumption and investment.

- First, we shall analyse how changes of the fiscal stance in general, and more specifically changes of government current expenditures, government investment and government revenues affect output growth.
- Second, we shall investigate the impact of changes in taxation and social transfers to private households on private consumption.
- Third, we will make an assessment of the impact of changes in taxation and government subsidies on private investment.

##### 4.1 Output effects of fiscal policy

We start from an output – demand relationship where output  $Y$  is a function of the consumption  $CON$ , private and public investment  $INV_p/Y$  and  $INV_g/Y$  and net government spending, given by the fiscal stance  $G_{def}$ . The latter is also broken up into government current expenditures  $G_{exp}$  and government current revenues  $T$ .  $G_{def}$  is measured by the rate of the current government surplus or deficit in GDP,  $G_{exp}$  is measured by the effective rate of government current expenditures, i.e. by the share in GDP, and  $T$  is measured by the share of government current revenues in GDP. Since we measure fiscal magnitudes as a share of GDP, we also use the other variables  $CON$ ,  $INV_p$  and  $INV_g$  as GDP shares. This gives the following relationships:

$$Y = a_0 + a_1(CON/Y) + a_2(INV_p/Y) + a_3(INV_g/Y) + a_4G_{def} \quad (1)$$

$$Y = a_0 + a_1(CON/Y) + a_2(INV_p/Y) + a_3(INV_g/Y) + a_4G_{exp} - a_5T \quad (2)$$

Taking the GDP shares of consumption and investments has the advantage that differences in the shares fluctuate less than the growth rates of the absolute value, which therefore introduces less noise in the process. Furthermore, the simultaneity issue which arises between consumption or investment and GDP is eliminated.

Consequently discretionary changes in fiscal policy  $\Delta G_{def}$ ,  $\Delta G_{exp}$  and  $\Delta T$  are regarded. These fiscal policy changes are measured by fiscal impulses calculated according to the methodology proposed by Blanchard (1993, see below). The effect on output growth is then given by the following structural model:

$$\Delta \log Y = \alpha_0 + \alpha_1 \Delta(CON/Y) + \alpha_2 \Delta(INV_p/Y) + \alpha_3 \Delta(INV_g/Y) + \alpha_4 \Delta G_{def} \quad (3)$$

$$\Delta \log Y = \alpha_0 + \alpha_1 \Delta(CON/Y) + \alpha_2 \Delta(INV_p/Y) + \alpha_3 \Delta(INV_g/Y) + \alpha_4 \Delta G_{exp} + \alpha_5 \Delta T \quad (4)$$

## 4.2 Consumption effects of fiscal policy

In a simple set-up consumption expenditures  $CON$  can be viewed to depend on current disposable income  $I$ . We refrain from modelling the full consumption decision and thus neglect the impact of future income and financial wealth and the consumer's decision on saving. Disposable income corresponds to income minus taxes paid to the government plus received transfers. Since disposable income is not available for the Eastern countries it is proxied by output  $Y$ . The considered taxes are personal income taxes  $T_{pers}$  and employee's social security contributions  $T_{soc1}$ . Transfers to household  $G_{trans}$  are roughly social benefits. Furthermore, taxes on goods and services  $T_{vat}$  also reduce income and consequently consumption expenditures. This gives the basic equation for consumption in the economy:

$$CON = b_0 + b_1Y - b_2T_{pers} - b_3T_{soc1} + b_4G_{trans} - b_5T_{vat} \quad (5)$$

Fiscal policy innovations in taxes and transfers,  $\Delta T_{pers}, \Delta T_{soc1}, \Delta G_{trans}, \Delta T_{vat}$  should affect consumption growth in the following relationship:

$$\Delta \log CON = \beta_0 + \beta_1 \Delta \log Y - \beta_2 \Delta T_{pers} - \beta_3 \Delta T_{soc1} + \beta_4 \Delta G_{trans} - \beta_5 \Delta T_{vat} \quad (6)$$

Growth of real consumption expenditures depends on real income growth and should be negatively related to increases in income tax, social security contributions and taxes on goods and services, but positively related to increases in government transfers. Again, fiscal variables are measured as a share of GDP and fiscal policy innovations  $\Delta T_{pers}$ , etc. are measured by calculated fiscal impulses.

## 4.3 Investment effects of fiscal policies

We use an extremely simple version of a user cost of capital model. Private investment  $INVp$  depends positively on the present and expected output level and negatively on the production costs and costs of financing. For practical reasons it is assumed that past output can proxy expected sales. Wage costs and depreciation is neglected, so that the only costs are taxes and interest costs.

Investment in the economy therefore depends positively on past year's output (using the previous year's output is meant to avoid simultaneity problems), negatively on corporate taxes  $T_{corp}$ , employer's social security contributions  $T_{soc2}$  and the interest rate  $i$ , and positively on government subsidies. Henceforth we shall simply write  $INV$  instead of  $INVp$  in this part.

$$INV = c_0 + c_1Y_{-1} - c_2T_{corp} - c_3T_{soc2} + c_4G_{sub} - c_5i \quad (7)$$

Considering that the interest rate depends on the level of government deficit,  $i = f(G_{def})$  one could also write

$$INV = c_0 + c_1Y_{-1} - c_2T_{corp} - c_3T_{soc2} + c_4G_{sub} - c_5G_{def} \quad (8)$$

Consequently, innovations in the respective fiscal variables will affect investment growth in the following way:

$$\Delta \log INV = \gamma_0 + \gamma_1 \Delta \log Y_{-1} - \gamma_2 \Delta T_{corp} - \gamma_3 \Delta T_{soc2} + \gamma_4 \Delta G_{sub} - \gamma_5 \Delta i \quad (9)$$

$$\Delta \log INV = \gamma_0 + \gamma_1 \Delta \log Y_{-1} - \gamma_2 \Delta T_{corp} - \gamma_3 \Delta T_{soc2} + \gamma_4 \Delta G_{sub} - \gamma_5 \Delta G_{def} \quad (10)$$

where all fiscal variables are taken as a share of GDP and fiscal innovations are measured by fiscal impulses.

#### 4.4 Measurement of discretionary fiscal policy

Most fiscal variables vary with economic activity. For example, tax revenue increases when output grows, social benefits increase when the economy is stagnating. To measure discretionary fiscal policy, therefore the cyclical component needs to be removed from the data. Sophisticated methods for computing cyclically adjusted data were proposed by the OECD, the European Commission and the European Central Bank. In general, one starts from trend output, that is obtained in removing the cyclical component from output data, usually with a HP filter. The second point is the elasticity of revenue/expenditure components to output. Finally, cyclically adjusted revenues/expenditures are obtained in calculating with these elasticities what revenues/expenditures would be if output were at its trend level. From cyclically adjusted fiscal series, one can calculate e.g. the effective tax rate, i.e. taxes in per cent of GDP, and see whether the tax load has decreased or increased mirroring changes in fiscal policy.

Unfortunately, this method meets serious constraints with the Eastern European countries. First, output series are too short to permit a reasonable calculation of trend output. (This is not a problem of the number of observations, but of the fact that no observations covering one or two cycles are available. Therefore, an estimation of trend output based on quarterly data, as e.g. in Coricelli and Ercolani (2002), does not make sense neither.) Second, there is no full set of tax elasticities available for the Eastern countries.

Consequently, a different method is required to obtain a measure for fiscal policy changes. A simple and straightforward method proposed by Blanchard (1993), which has been used in a number of fiscal policy analyses, e.g. Alesina and Perotti (1995), Alesina and Ardagna (1998). Blanchard (1993) calculates fiscal impulses in the following fashion: First, an equation is estimated where e.g. government expenditures are regressed on GDP – as an indicator for economic activity (Equ. 11). With the obtained coefficients  $\alpha_1, \alpha_2, \alpha_3$  and the estimation error  $\mu_t$  one then estimates what government expenditures would be if economic activity was at last year's level (Equ. 12). The difference between the calculated series if activity was at last year's level,  $\hat{G}_{exp(t)}$ , and the actual series of last year  $G_{exp(t-1)}$  is the fiscal impulse (Equ. 13) and measures discretionary fiscal policy changes between period (t-1) and t. In contrast,  $G_{exp(t)} - \hat{G}_{exp(t)}$  measures the cyclical fluctuation.

$$G_{exp(t)} = \alpha_1 + \alpha_2 * trend + \alpha_3 * GDP_{(t)} + \mu_t \quad (11)$$

$$\hat{G}_{exp(t)} = \hat{\alpha}_1 + \hat{\alpha}_2 * trend + \hat{\alpha}_3 * GDP_{(t-1)} + \hat{\mu}_t \quad (12)$$

$$\Delta G_{exp(t)} = \hat{G}_{exp(t)} - G_{exp(t-1)} \quad (13)$$

In order to obtain a reliable measure for the fiscal impulse, the estimated equation (11) needs to show a good fit. To assure this, different indicators are taken as a measure for economic activity, either GDP, total employment, or the unemployment rate. Similarly, the constant  $\alpha_1$  and the trend is included only if statistically significant.

With our data series, we started from series expressed as a share of GDP. The best variables to explain cyclical variations proved to be GDP for the personal income tax, GDP for taxes on goods and services, total employment for social security contributions and employment/unemployment rate for government transfers. The obtained fiscal impulses indicate changes in fiscal policy expressed e.g. as changes of tax rates in percentage points.

#### **4.5 Data**

Empirical work on fiscal policy in Eastern Europe is difficult since detailed data series available only from national sources which follow quite different definitions. Furthermore, national data generally covers only the central government budget and is reported on a cash basis. Joining the European Union, these countries are requested to collect data according to the ESA 95 definition. So far, ESA 95 data is only available for the most recent years and for the key fiscal indicators. The only source which provides fiscal data for Eastern countries following largely harmonized definitions is IMF's Government Finance Statistics. It reports detailed fiscal data. The data covers all government sectors, central government, local governments and extrabudgetary items as well as social security funds. It is reported at an accrual basis. Unfortunately the recent figures are published with a considerable delay. Therefore the fiscal series for Eastern countries used in this study start in 1992/93, sometimes later, and end in 2001.

#### **4.6 Estimation method**

Estimating the effects of fiscal policy changes in Eastern Europe meets some constraints in view of the short time series. This prevents us from performing a VAR analysis which would be appropriate to capture dynamic effects of fiscal policies and estimate the interaction between fiscal variables and macro variables in both direction.

Consequently, we estimated the postulated relationships in regressions, first on a country by country basis to check the heterogeneity of fiscal variables coefficients across countries, then in a panel data analysis to make inference from a richer data set and to estimate full structural models. The panel data estimation assumes fixed country specific effects. The estimation needs to refrain from instrumental variables estimation in order not to lose further observations. Therefore the specification of the estimated model needs to consider carefully possible endogeneity problems.

Since we use fiscal impulses for fiscal variables, the data should be free of cyclical components and therefore the endogeneity issue should not arise between fiscal regressors and the dependent variables output, consumption or investment. Another simultaneity issue arises between macroeconomic variables. To prevent this, the output model uses consumption and investment shares on the right hand, the consumption and the investment model use lagged output as explanatory. There may also be an endogeneity problem between fiscal policy variables. For example, fiscal impulses of current expenditures and current revenues may be related. In such a case, the effect of these variables is estimated separately.

**Table 4: Definition of variables and data source**


---

$Y$	gross domestic product at current market prices
$\Delta \log Y$	real growth of gross domestic product
$I$	national income
$\Delta \log I$	real growth of national income
$CON$	private final consumption expenditures
$\Delta \log CON$	real consumption growth
$\Delta s\_CON$	change of consumption share (consumption in per cent of GDP), in percentage points
$INVp$	private gross fix capital formation
$\Delta \log INVp$	real private investment growth
$\Delta s\_INVp$	change of private investment share (investment in per cent of GDP), in percentage points
$INVg$	general government gross fix capital formation (government investment)
$\Delta \log INVg$	real growth of government investment
$\Delta s\_INVg$	change of government investment share (investment in per cent of GDP), in percentage points
$Gdef$	overall deficit or surplus (includes interest payments), $\Delta Gdef$ is the fiscal impulse
$Gexp$	general government current expenditures: compensation of employees, expenditures on goods and services, consumption of capital, interest payments, subsidies, grants, social benefits. $\Delta Gexp$ is the fiscal impulse
$T$	general government current revenues: Taxes, tariffs, social security contributions (excluding grants of international organisations and capital revenue), $\Delta T$ is the fiscal impulse.
$T_{pers}$	personal income taxes as share of GDP, $\Delta T_{pers}$ fiscal impulse
$T_{soc1}$	employee's social security contributions as share of GDP, $\Delta T_{soc1}$ fiscal impulse
$G_{trans}$	government transfers to private households as share of GDP, $\Delta G_{trans}$ fiscal impulse
$T_{vat}$	taxes on goods and services as share of GDP, $\Delta T_{vat}$ fiscal impulse
$T_{corp}$	corporate income taxes, $\Delta T_{corp}$ fiscal impulse
$T_{soc2}$	employer's social security contributions, $\Delta T_{soc2}$ fiscal impulse
$G_{sub}$	government subsidies to firms (grants, labour market subsidies, interest subsidies), $\Delta G_{sub}$ fiscal impulse
$i$	interest rate, treasury bill rate

---

data sources: National accounts data: Eurostat; European Commission Ameco database.

Fiscal data: Eastern European countries: IMF, Government Finance Statistics. Spain, Portugal, Greece, Ireland: current expenditures, current revenues, deficit Ameco database, rest IMF, Government Finance Statistics.

#### **4. 7 Checking the robustness of results – the study of fiscal events**

The regression results are checked in studying fiscal events. These are substantial and sustained changes in fiscal policy, e.g. of government expenditures. Then the performance of macroeconomic variables theoretically related to the policy change is observed, before the fiscal policy change, during it and after.

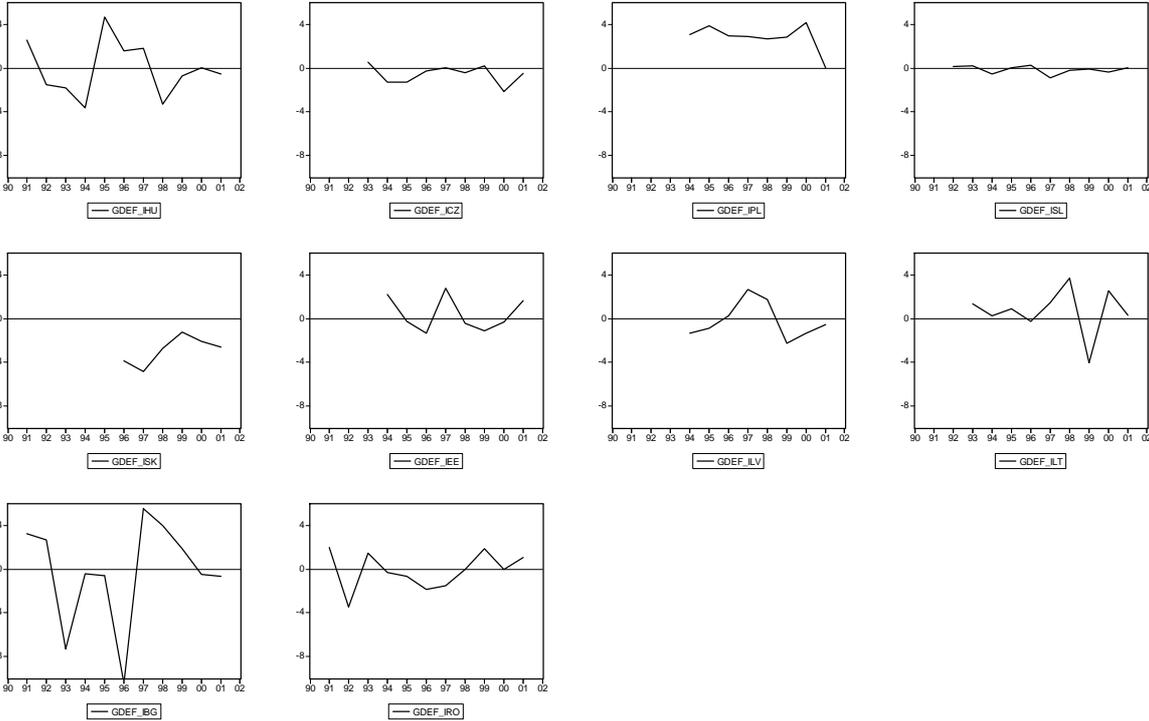
We define fiscal events somewhat differently according to the variable concerned. With government current expenditures and current revenues an event is characterized by a fiscal impulse of more than 3 percentage points and no reversal in the consecutive 2 years. An event of fiscal consolidation/expansion is a fiscal impulse in the deficit of more than 2 percentage points that is not reversed in the two following years. For all other expenditure/ revenue components a fiscal event is defined as a change of the fiscal impulse of more than 0.5 percentage points, not reversed in the two following years.

# 5. ESTIMATION RESULTS

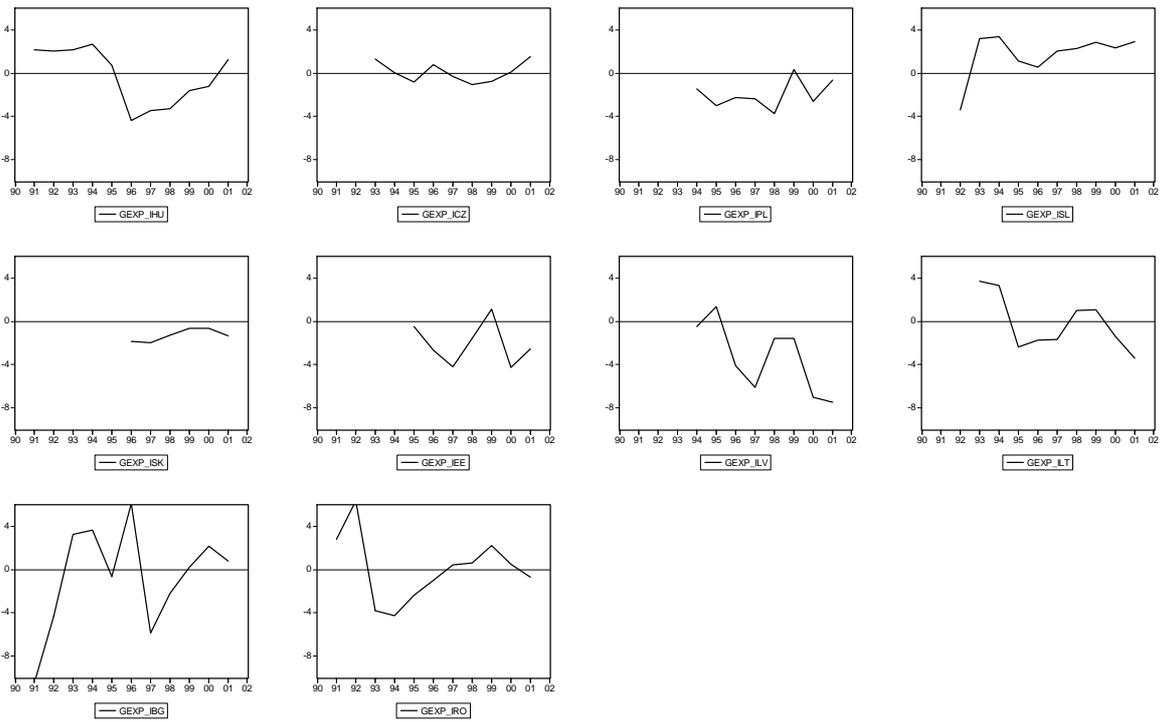
## 5.1. THE EFFECTS OF CHANGES IN FISCAL POLICY ON GDP GROWTH

Before discussing the results of the output effect of fiscal policies, we would like to describe briefly the general development of fiscal policies in the Eastern countries in the period concerned.

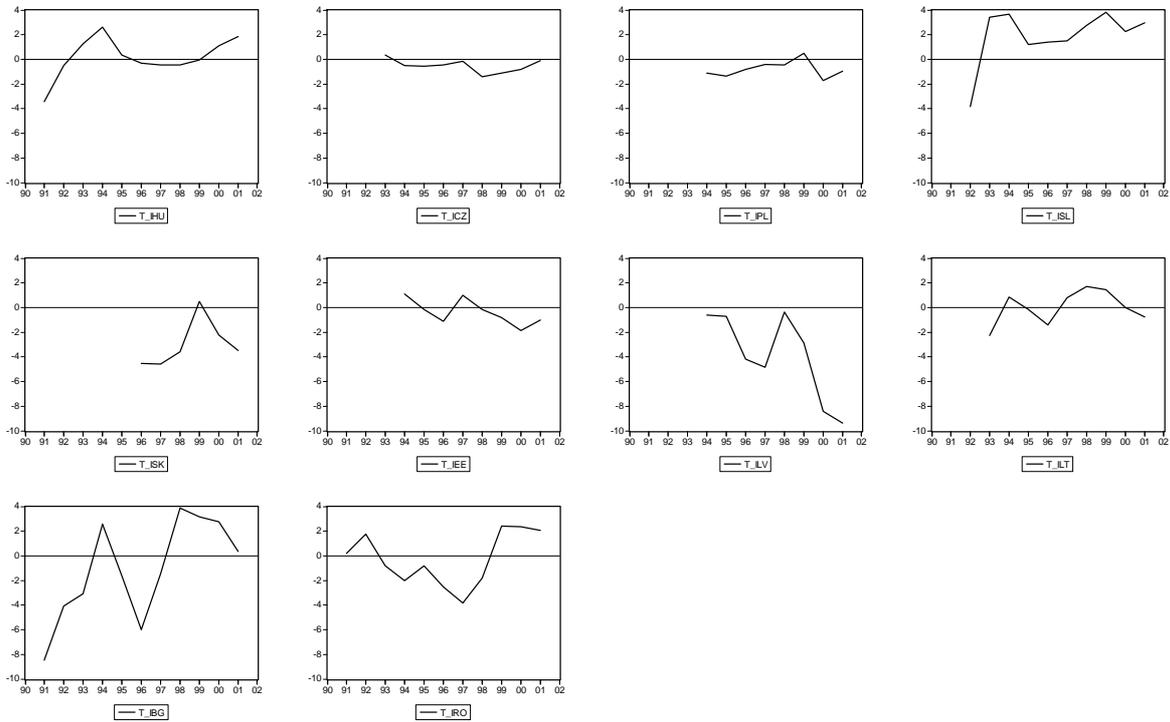
**Figure1: Changes in general government deficit (fiscal impulse) in the Eastern European countries**



**Figure 2: Changes in general government current expenditures (fiscal impulse) in the Eastern European countries**



**Figure 3: Changes in general government revenues (fiscal impulse) in the Eastern European countries**



In the late 1990s, in many Eastern countries fiscal policy aimed to reduce current expenditures. Thus in Hungary, Poland and the Baltic Republics budgetary consolidation rested on cuts in government expenditure (see figure 2), although there was a temporary break of this policy in 1998/99 in Poland and the Baltics. In all these countries, except for Lithuania, government revenues were reduced at the same time, again with a break in 1998/99 (see Figure 3). The Russian crisis evidently led to a discontinuity of consolidation policies. Slovenia is the only country where the budgetary situation remained rather balanced while both expenditures and revenues were constantly increased. The pattern of budgetary consolidation was quite different in Bulgaria and Romania. Consolidation of the late 1990s was effected by an increase in government revenues while expenditures were increased.

Analysing the effects of these policy changes, we estimate first the effect of an impulse in government's deficit on GDP growth in the specification of Equ. 3, where consumption, private investment as well as public investment are additional explanatory variables.

**Table 5: Growth effects of fiscal impulse in government deficit**

	$\Delta s\_CON$		$\Delta s\_INVp$		$\Delta s\_INVg$		$\Delta Gdef$		$\Delta Gef(-1)$		$R^2$	obs.
<b>panel East</b>	<b>-0.44**</b>	(-2.12)	<b>0.90***</b>	(4.33)	<b>0.32</b>	(0.68)	<b>0.10</b>	(0.54)			<b>0.45</b>	<b>79</b>
	<b>-0.38**</b>	(-2.07)	<b>0.66***</b>	(3.64)	<b>0.01</b>	(0.03)	<b>0.32**</b>	(1.93)	<b>0.12</b>	(0.71)	<b>0.48</b>	<b>77</b>
countries												
Hu							-0.63	(-0.99)			0.09	11
Cz							-1.61*	(-1.88)			0.33	9
Pl							1.07**	(2.60)			0.52	8
Sl							-3.26	(-1.14)			0.13	10
Ee							0.52	(0.54)			0.05	8
Lv							0.93	(1.26)			0.21	8
Lt							0.80	(0.53)			0.04	9
Bg							0.33	(0.91)			0.09	10
Ro							0.17	(0.13)			0.00	11
<b>panel EU 4</b>	<b>-0.68***</b>	(-6.00)	<b>0.72***</b>	(6.76)	<b>0.88**</b>	(2.17)	<b>0.35***</b>	(5.62)			<b>0.62</b>	<b>128</b>
	<b>-0.70***</b>	(-6.50)	<b>0.72***</b>	(7.34)	<b>0.99**</b>	(2.44)	<b>0.25***</b>	(2.69)	<b>0.06</b>	(0.70)	<b>0.66</b>	<b>124</b>
countries												
Gr	-0.23	(-0.60)	0.50**	(2.19)	4.01**	(2.33)	0.25*	(1.85)			0.21	31
Po	-0.64***	(-3.21)	0.72***	(2.92)	0.93	(1.09)	0.60***	(3.18)			0.56	32
Ire	-0.86***	(-3.70)	0.68**	(2.41)	1.41*	(1.70)	0.42***	(2.83)			0.60	32
Sp	-0.19	(-0.65)	0.59***	(2.79)	0.61	(1.45)	0.53***	(2.99)			0.76	31

Notes: With country estimates constants not reported. No estimates for Slovakia since too few observations.

In the Eastern countries, improvements in the government deficit act positively on growth as shown by results of the panel estimates. The country results, however, indicate some difference. In particular there is a significant positive relation between improvements in deficit and growth in Poland, whereas a significant negative relation appears in the Czech Republic. The country equations are not estimated for the full specification but only with the fiscal variable as explanatory because to the small number of observations.

The panel results of the deficit coefficients resemble those of EU 4 and indicate that an improvement of the government deficit by one percentage point improves the growth rate by around 0.30 percentage points. With respect to the other macroeconomic variables, we see that growth is significantly positively related to changes in the private investment rate but not

to public investment. This stands in contrast to EU 4, where changes in the public investment rate are significantly positive for growth and where the size of the coefficient of public investment is also larger than that of private. We see that in both groups, changes in the consumption rate are significantly negative related to growth. An increase of the consumption rate thus would lead to lower growth

The positive relationship between changes in government's deficit and GDP growth is confirmed by the study of fiscal events (see below). We observe events of deficit reduction, i.e. an impulse of more than two percentage points without reversal in the two consecutive years, with Hungary (1995), Poland (1994-99) and Bulgaria (1997). During that episodes, GDP growth improved. By contrast, the event of fiscal expansion in Slovakia (1996-98) was accompanied by a decline of GDP growth.

In the next models, the effect of fiscal impulses in government current expenditures and revenues on GDP growth are estimated, first in a specification which contains only the fiscal impulse as explanatory, then in a full structural specification.

**Table 6: Impact of the fiscal impulse in general government expenditure on GDP growth**

	c		$\Delta$ Gexp		$\Delta$ Gexp(-1)		R <sup>2</sup>	obs.
<b>panel East</b>			<b>-0.85***</b>	<b>(-4.29)</b>			<b>0.32</b>	<b>89</b>
					<b>-0.28</b>	<b>(-0.89)</b>	<b>0.21</b>	<b>90</b>
countries								
Hu	0.87	(0.61)	-0.96	(-1.69)			0.24	11
	2.39	(4.90)			-0.66***	(-3.40)	0.56	11
Cz	1.86	(2.22)	0.38	(0.42)			0.02	9
	2.14	(2.67)			-0.32	(-0.36)	0.02	9
Pl	3.27	(2.90)	-0.74	(-1.54)			0.28	8
	3.72	(2.40)			-0.27	(-0.41)	0.02	8
Sl	0.68	(0.97)	1.37***	(5.03)			0.75	10
	3.61	(8.74)			0.17	(1.10)	0.13	10
Lt	0.06	(0.04)	-2.96***	(-4.39)			0.73	9
	2.99	(1.92)			-1.47**	(-2.28)	0.42	9
Bg			0.08	(0.17)			0.00	10
	0.19	(0.11)			0.26	(0.73)	0.05	11
Ro	-0.94	(-0.65)	-1.59**	(-3.22)			0.53	11
	0.69	(0.44)			-0.66	(-1.24)	0.14	11
<b>panel EU 4</b>			<b>-0.76***</b>	<b>(-6.87)</b>			<b>0.36</b>	<b>128</b>
					<b>-0.44***</b>	<b>(-3.77)</b>	<b>0.25</b>	<b>124</b>
countries								
Gr	2.61	(5.11)	-0.61**	(-2.44)			0.16	32
	2.21	(4.09)			-0.09	(-0.34)	0.00	31
Po	3.12	(6.26)	-0.80***	(-2.95)			0.22	32
	2.79	(5.50)			-0.24	(-0.91)	0.03	31
Ir	5.22	(12.09)	-0.79***	(-4.40)			0.39	32
	5.18	(10.69)			-0.68***	(-3.36)	0.28	31
Sp	2.94	(11.82)	-0.96***	(-5.05)			0.45	32
	2.77	(13.28)			-0.90***	(-5.74)	0.53	31

Notes: Country estimates exclude Sk, Ee, Lv due to insufficient number of observations.

The models estimated need to take account of possible correlations between regressors. Since impulses in expenditures and revenues are correlated in some cases we enter them separately in our regressions. Similarly we do not enter current values and lags together in a regression since government policies typically have a related pattern over some years.

It should be remembered that the use of the fiscal impulse of expenditures and revenues guarantees to show the pure policy impact in the estimations. There is no possibility of reverse causality.

The panel estimates for the Eastern countries indicate that growth is significantly negatively related to government expenditures. The negative sign of the relationship also holds for the one period lag of the fiscal impulse, although the coefficient loses its significance. These results indicate that a cut of expenditures would not dampen growth in the Eastern countries, neither in the current nor in the next period. As the country results show, there is however one exception from this general result. In Slovenia, the results indicate a positive relationship between expenditures and growth.

Also with the EU 4 countries, the results show that GDP growth is negatively related to current government expenditures and its one period lag. Estimation for single countries show that government expenditures have a significant negative growth impact in each of them.

Interestingly, the size of the coefficient of government expenditures is fairly equal between the Eastern countries (-0.85) and the EU 4 countries (-0.76). This indicates that a reduction of the government expenditure share by one percentage point would lead to additional output growth of 0.85 per cent in Eastern countries.

The results provide strong evidence that government expenditures have no expansionary growth impact in the two country groups. Reducing government expenditures is not contractionary. Consequently, downsizing the government sector would not reduce the growth prospects of Eastern countries.

Estimating the effects of government revenues, i.e. taxation in a broad sense, on GDP growth, the panel estimates suggest that taxation does not have a negative growth effect in the Eastern countries. Nevertheless, as the country estimates show, the effect of taxation is still significantly negative in some countries. The size of the coefficient also varies much and exceeds 1 in some cases.

In EU 4, unlike the Eastern countries, revenues practically always have a significantly negative effect on growth. there is less variation in the size of the coefficient than in the Eastern countries. With both groups, the impact of taxation can occur with a lag.

The results indicate that at present taxation has no keynesian effects in the Eastern countries. Positive expectations on a catching up economy may gear economic activity and thus outweigh the negative impact of taxation. This should, however, be regarded with caution. Over time the effect may become similar to the EU 4 countries.

**Table 7: Impact of fiscal impulse in general government current revenues on GDP growth**

	c		$\Delta T$		$\Delta T(-1)$		$R^2$	obs.
<b>panel East</b>			<b>0.57**</b>	<b>(2.23)</b>			<b>0.20</b>	<b>90</b>
countries					<b>0.42**</b>	<b>(2.43)</b>	<b>0.23</b>	<b>91</b>
Hu	0.71	(0.60)	2.27 <sup>y</sup>	(2.96)			0.49	11
	2.46	(3.63)			0.59	(1.33)	0.16	11
Cz	2.14	(1.76)	0.44	(0.27)			0.01	9
	1.95	(1.67)			-0.29	(-0.18)	0.01	9
Pl	4.67	(4.18)	-0.08	(-0.07)			0.00	8
	4.58	(3.50)			0.39	(0.30)	0.01	8
Sl	0.63	(0.99)	1.27***	(5.63)			0.79	10
	3.55	(8.93)			0.19	(1.39)	0.19	10
Lv	1.15	(0.86)	-0.73**	(-2.82)			0.57	8
	2.41	(1.67)	-0.58*	(-2.06)			0.41	8
Lt	0.46	(0.15)	2.35	(1.00)			0.12	9
	3.17	(1.64)			1.42	(0.92)	0.10	9
Bg	0.01	(0.01)	1.32***	(4.42)			0.71	10
	1.03	(0.83)			0.92**	(3.02)	0.50	11
Ro	-1.06	(-0.49)	-0.01	(-0.00)			0.00	11
	0.91	(0.58)			0.98	(1.33)	0.16	11
<b>panel EU 4</b>			<b>-0.40**</b>	<b>(-2.42)</b>			<b>0.16</b>	<b>128</b>
countries					<b>-0.29*</b>	<b>(-1.78)</b>	<b>0.18</b>	<b>124</b>
Gr	2.33	(4.29)	0.29	(0.68)			0.01	32
	2.03	(4.19)			0.99**	(2.53)	0.18	31
Po	3.00	(5.50)	-0.59	(-1.47)			0.06	32
	2.78	(6.00)			-0.89**	(-2.53)	0.18	31
Ir	5.14	(10.26)	-0.84**	(-2.55)			0.17	32
	5.17	(9.34)			-0.50	(-1.39)	0.06	31
Sp	2.83	(8.81)	-0.32*	(-1.72)			0.09	32
	2.70	(9.93)			-0.42**	(-2.72)	0.20	31

Notes: Country estimates exclude Slovakia and Estonia due to insufficient number of observations.

Next, the growth impact of expenditures and revenues is estimated in the full structural specification as given in Equ. 4, including also consumption and investment as explanatory variables. However, note that we can not enter expenditures together with revenues, or currents variables together with their lags in the estimated equations since those series are correlated and would cause multi-collinearity. The model is estimated as a panel for both country groups. For the EU 4 countries, the number of observations permits also to estimate it individually for each country.

In this full structural model, the estimated coefficients of the fiscal variables expenditures and revenues confirm the results of the previously estimated reduced models for both country groups. Growth is still negatively related to government expenditures. However, in the full specification with additional explanatory variables, the size of the coefficient of fiscal variables is lower. The coefficient of revenues becomes insignificant in both country groups, while the sign remains the same, positive with the Eastern countries and negative with EU 4.

**Table 8: Compound effect of fiscal impulse government expenditure /revenue and macroeconomic variables on GDP growth**

c		$\Delta s\_CON$		$\Delta s\_INVp$		$\Delta s\_INVg$		$\Delta Gexp$		$\Delta Gexp_{(-1)}$		$\Delta T$		$\Delta T_{(-1)}$		$R^2$	obs.
<b>panel East</b>		-0.38**	(-21.1)	0.78***	(4.11)	0.03	(0.08)	-0.64***	(-3.77)							0.55	79
		-0.59***	(-3.29)	0.65***	(3.65)	0.15	(0.38)			-0.28**	(-2.01)					0.48	77
		-0.41**	(-2.08)	0.89***	(4.29)	0.34	(0.76)					0.28	(1.30)			0.46	79
		-0.40**	(-2.30)	0.69***	(3.88)	0.32	(0.80)						0.23	(1.39)		0.47	77
<b>panel EU 4</b>		-0.71***	(6.49)	0.71***	(6.89)	0.81**	(2.08)	-0.57***	(-6.55)							0.64	128
		-0.82***	(-7.60)	0.82***	(8.57)	0.61	(1.55)			-0.41***	(-4.82)					0.65	124
		-0.74***	(-5.85)	0.86***	(7.34)	0.84*	(1.87)					-0.20	(-1.59)			0.51	128
		-0.76***	(-6.52)	0.83***	(7.85)	1.05***	(2.55)						-0.13	(-1.12)		0.59	124
countries																	
Gr	2.89	(8.22)	-0.76***	(2.67)	0.75***	(4.74)	1.44	(1.23)	-0.40**	(-2.21)						0.65	32
	2.87	(7.37)	-1.00**	(-3.52)	0.73***	(4.21)	1.17	(0.92)				0.08	(0.28)			0.59	32
Po	3.16	(7.85)	-0.63***	(-3.14)	0.72***	(2.87)	0.54	(0.66)	-0.70***	(-3.08)						0.55	32
	3.08	(6.68)	-0.66***	(-2.89)	0.79***	(2.69)	-0.01	(-0.02)				-0.32	(-0.93)			0.41	32
Ire	4.49	(11.82)	-0.91***	(-4.42)	0.45	(1.60)	1.11	(1.42)	-0.70***	(-3.75)						0.65	32
	4.48	(10.04)	-0.85***	(-3.40)	0.76***	(2.38)	2.02**	(2.36)				-0.53	(-1.68)			0.53	32
Sp	4.68	(11.62)	-0.78**	(-3.44)	0.76***	(2.94)	2.15***	(2.80)	-0.94**	(-3.19)						0.62	32
	4.64	(10.41)	-0.74***	(-2.94)	0.93***	(3.40)	2.13***	(2.53)				-0.456*	(-1.91)			0.54	32



For the other macroeconomic variables, the estimated coefficients are very similar to the results of the full specification with deficit (Equ. 3, compare table 5). The coefficient of consumption is negative, indicating that an increase in the consumption share would reduce growth. Private investment has a significantly positive impact on growth in both country groups, with a very similar coefficient of about 0.80. An increase of the private investment rate by 1 percentage point would lead to an increase of GDP growth rate by 0.80. Public investment acts also positively on growth. However, while in the EU 4 countries the coefficient is equal to that of private investment (at least in Spain and Ireland), it is much lower and insignificant in the Eastern countries.

Since, according to the estimates, government investment is not significant for growth in the Eastern countries, this provokes the question: Is public investment less effective in the Eastern countries? Must an expansion of public investment be cautioned?

The results provide a strong argument that cuts in expenditures in Eastern countries, or in other words a downsizing of the oversized government sector, would not reducing growth.

Which are the possible explanation for the non-contractionary effect of fiscal consolidation and of cuts in fiscal expenditures? In section 3 we argued that the traditional keynesian effects are likely to turn to zero with exchange rate flexibility and rigid prices, which was in some cases the regime in the early nineties. Further, we argued that with fixed exchange rate regimes, which many Eastern countries approached later on (exchange rate pegs to the Euro) and flexible prices a reduction of short term keynesian effects was possible as well. Further, we saw that rationale expectations and credibility effects can also turn output effects of fiscal contractions, expenditure cuts, positive. The later seem to have been at work in EU 4 and may have started to work in the Eastern countries as well, probably to enforce even in the future with the convergence criteria to enter monetary union.

**Table 9: Growth performance during fiscal events: Increase/reduction of government deficit, government current expenditures and government current revenues (based on fiscal impulse)**

	Period	Δ GDP year before	Δ GDP during event	Δ GDP 3 years after	Total development of growth
<b><i>Reduction of deficit</i></b>					
Hungary	1995	2.80	1.48	4.74	+
Poland	1994-99	3.60	5.50	1.00	+(short term)
Bulgaria	1997	-9.85	-5.52	5.25	+
<b><i>Increase of deficit</i></b>	1996-98	6.27	5.01	1.31	-
<b><i>Cut of expenditures</i></b>					
Hungary	1996	1.48	1.33	4.43	+
Poland	1995	5.15	6.71	5.10	+(short term)
Latvia	1996/97	-1.66	3.61	5.16	+
<b><i>Increase of expenditures</i></b>					
Slovenia	1993/94	-5.61	4.60	4.00	+
<b><i>Increase of revenues</i></b>					
Slovenia	1993/94	-5.61	4.60	4.04	+
Slovenia	1999	3.60	5.73	3.24	+(short term)
Bulgaria	1998	-5.5	3.82	3.85	+

Note: Fiscal event government deficit: Fiscal impulse of more than two per cent, without reversal in the two consecutive years. Fiscal event expenditures/revenues: Fiscal impulse of more than three per cent, without reversal in two consecutive years.

Finally, in view of the limited number of observations for the Eastern countries it is important to check the robustness of the estimation results by a study of fiscal events as outlined in section 4.

In countries with an important reduction of the budget deficit (Hungary, Poland, Bulgaria) or substantial cuts of expenditures (Hungary, Poland and Latvia), growth did not deteriorate. This confirms the results of the regression analysis.

In the case of Slovenia, we see that an expansion of the government sector, i.e. an increase of government expenditures took place in 1993/94, coinciding with the start of catching up. This also replicates the results of the regression analysis where a positive coefficient was estimated for that country.

There were also important increases in taxation, namely in Slovenia and Bulgaria. In both countries growth did not slow down during this period. Again this lends support to the results of the regression analysis where a positive coefficient for fiscal impulses in revenues was found.

It is not the goal of this paper to explain how governments formulate fiscal policy. However, from the timing of fiscal events some interesting points appear. First, there is reason to assume that a part of fiscal policy that appears as an increase in taxation is not due to discretionary policy but rather a matter of improved efficiency in tax collection and less tax evasion that arises after the transformation crisis was overcome. Second, governments may have opted to benefit from an improving growth climate to raise taxes (Bulgaria, Slovenia).

In summary, the analyses of this section showed that reductions of government deficits and cuts of expenditures have not been contractionary in the Eastern countries. Supported by the results of other weaker EU countries this heavily supports policy recommendation to reduce deficits and the size of the government sector as proposed by EU institutions to the Eastern countries. Further, from the perspective of short term growth there is no support that Eastern countries should maintain or increase their present level of public investment. There are barely any short term growth effects. In contrast, private investment seems to be much more substantial for growth. Finally, Eastern countries should be cautious to increase revenues. Although, so far such policies did not have contractionary effects, the experience of the weaker EU countries shows that this may be temporary.

### 5.2. THE EFFECT OF CHANGES IN FISCAL POLICY ON CONSUMPTION

In this section the effect on private consumption of fiscal policy changes in income taxation, social security contribution, taxes on goods and services and government transfers to private households is analysed. First, the effect of effect of each fiscal source on consumption is estimated separately, both in panel models and for individual countries. Then a full structural model as specified in Equ. (5) is estimated where consumption growth is explained by income growth, the tax variables, and transfer payments. All policy variables are measured as a share of GDP and as fiscal impulses. Thus the pure effect of discretionary policy can be estimated. Note that taking fiscal impulses also prevents endogeneity between fiscal variables and income.

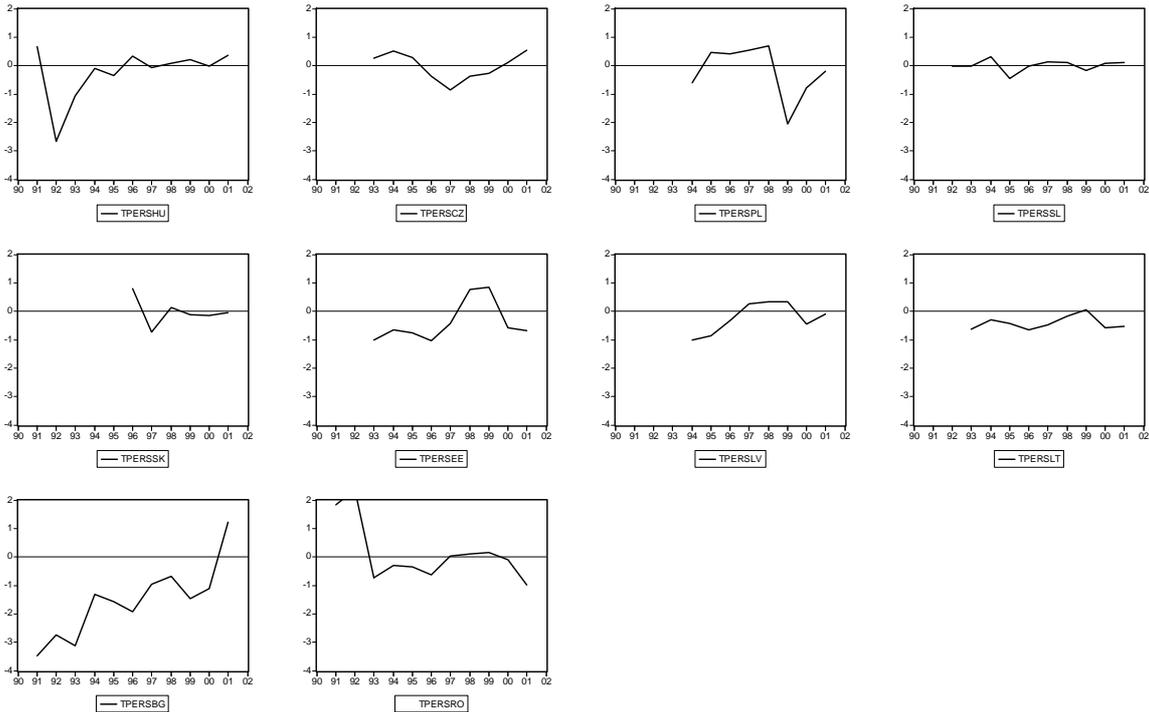
Let us first briefly describe the policy development in these fiscal variables by looking at the trend of fiscal impulses. As an example figure 4 shows the fiscal impulse in personal income taxation. To save space, we refrain from presenting charts of all fiscal variables.

With respect to income taxation, in most countries the level of taxation went down initially, so in Hungary, the Baltic Republics and Bulgaria, later also in the Czech Republic and Poland. The effective tax rate (income taxes in per cent of GDP) decreased by between -1 and -4 percentage points. The few increases in personal income taxation are less pronounced.

As to employee' s social security contributions its GDP share increased in most countries, except for the Baltic Republics, in the late 1990s, the most in Poland (+ 2.5 percentage points) and Romania (+ 3 percentage points).

Social transfers to private households show a similar pattern in all Eastern countries and mirror the development of social security contributions. The development of fiscal impulses indicates that transfers were increased in the early 1990s, reduced by mid 1990 and increased again at the end of the decade. Increases ranged between +1.5 and +2 percentage points in the Czech Republic and Hungary and +3 and +4 percentage points in Bulgaria and Latvia.

**Figure 4: Eastern Europe: Fiscal impulse in personal income tax**



We start with estimating the impact on consumption growth of changes in personal income taxation, measured by fiscal impulses. This is done in a structural equation including income, at least in the panel model. For the Eastern countries, income can only be proxied by output, for which the one period lag is used to prevent simultaneity. For EU 4, national income is used. With the individual countries we renounce from estimating the structural model with income since there would be too few degrees of freedom with the Eastern countries.

**Table 10: Effect on consumption growth of fiscal impulse in personal income tax**

	c		$\Delta Y(-1)$		$\Delta Tpers$		$R^2$	obs
<b>panel</b>					<b>-1.28**</b>	<b>(-1.93)</b>	<b>0.19</b>	<b>87</b>
<b>East</b>			<b>0.34</b>	<b>(3.62)</b>	<b>-1.02*</b>	<b>(-1.66)</b>	<b>0.27</b>	<b>83</b>
countries								
Hu	0.96	(0.64)			-0.45	(-0.28)	0.01	11
Cz	3.19	(3.30)			1.54	(0.71)	0.06	9
Po	4.74	(6.10)			0.57	(0.65)	0.07	8
Sl	3.92	(2.76)			-9.21	(-1.23)	0.16	10
Sk	4.24	(2.88)			3.03	(0.92)	0.17	6
Ee	3.17	(2.43)			-3.06	(-1.74)	0.33	8
Lv	5.07	(3.55)			1.84	(0.70)	0.07	8
Lt	3.55	(5.14)			-3.56*	(-2.39)	0.58	6
Bg	1.66	(0.57)			0.99	(0.60)	0.04	10
Ro	0.63	(0.41)			-6.15***	(-4.05)		11
<b>Panel</b>					<b>-0.62*</b>	<b>(-1.82)</b>	<b>0.07</b>	<b>94</b>
<b>EU 4</b>			<b>0.56***</b>	<b>(6.85)</b>	<b>-0.00</b>	<b>(-0.00)</b>	<b>0.39</b>	<b>94</b>
countries								
Gr	3.22	(5.44)			-0.65	(-0.77)	0.02	26
Po	2.51	(4.77)			-1.49**	(-2.33)	0.21	22
Ire	3.36	(5.83)			-1.65**	(-2.35)	0.19	25
Sp	1.90	(4.68)			0.88**	(2.14)	0.19	21

Notes: With EU 4 national income is used instead of GDP

For the Eastern countries, the panel estimates indicate that tax increases have a significant negative impact on consumption growth. Looking at individual countries, it appears that the effect is only significantly negative in Lithuania and Romania. In the other Eastern countries, the coefficients of income tax vary in sign but are not statistically significant.

The panel estimates for EU 4 countries indicate equally that consumption is significantly negatively related to income taxation. Looking at country results, this is obviously only true for Portugal and Ireland, while for Spain there is a significantly positive relationship between taxation and consumption. Unlike the Eastern countries, the effect of taxation loses in importance if income is added as explanatory. (The size of the coefficient of taxation can be expected to be lower in the specification with income since estimation with the tax variable alone will be affected by an omitted variable bias.) Also is the size of the coefficient larger in the Eastern countries than in EU 4. Reductions of incomes taxation are approximately one to one passed to consumption growth.

Consequently, it appears that in the Eastern countries even more than in the more developed EU 4 countries taxes act in a very traditional way on consumption. Taxes reduce disposable income and therefore induce consumers to spend less. The number of tax relieves taking place

in these countries, either through discretionary policy or tax evasion, supported consumption growth.

**Table 11: Effect on consumption growth of fiscal impulse in employee' s social security contributions**

	c		$\Delta Y(-1)$	$\Delta Tsoc1$	$R^2$	obs		
<b>panel</b>				<b>-0.43</b>	<b>(-0.64)</b>	<b>0.15</b>	<b>83</b>	
<b>East</b>			<b>0.31<sup>***</sup></b>	<b>(3.16)</b>	<b>0.19</b>	<b>(0.33)</b>	<b>0.24</b>	<b>79</b>
countries								
Hu	1.20	(0.87)		2.98	(0.99)	0.09	11	
Cz	3.02	(4.12)		-11.62 <sup>**</sup>	(-2.47)	0.46	9	
Sl	3.83	(2.47)		0.75	(0.21)	0.01	10	
Sk	4.24	(3.45)		6.47	(1.71)	0.42	6	
Lv	6.52	(3.71)		26.06	(1.42)	0.25	8	
Lt	4.94	(8.38)		-0.18	(-0.08)	0.001	6	
Bg				4.48 <sup>**</sup>	(2.49)	0.40	10	
Ro	0.53	(0.22)		-1.67	(-1.30)	0.15	11	
<b>Panel</b>				<b>-2.51<sup>***</sup></b>	<b>(-2.95)</b>	<b>0.09</b>	<b>102</b>	
<b>EU 4</b>			<b>0.47<sup>***</sup></b>	<b>(6.15)</b>	<b>-1.85<sup>***a</sup></b>	<b>(-2.76)</b>	<b>0.36</b>	<b>102</b>
countries								
Greece	3.30	(5.45)		-0.93	(-0.93)	0.03	26	
Portugal	3.10	(5.02)		-6.57 <sup>**</sup>	(-2.52)	0.20	26	
Ireland	3.42	(7.01)		-13.15 <sup>***</sup>	(-4.10)	0.42	25	
Spain	2.54	(5.56)		-4.22 <sup>*</sup>	(-1.79)	0.12	25	

Notes: With EU 4 national income is used instead of GDP. <sup>a</sup> one period lag, no estimates for Poland and Estonia since too few observations

In the next model, the consumption impact of employee' s social security contributions is estimated. Whereas social security contributions have a clear and substantial negative effect on consumption in the EU 4 countries, the effect is unclear in the Eastern countries. The panel estimate gives a non-significant coefficient, the country results give different effects, either highly negative (Czech Republic with -11.7) or highly positive (Bulgaria with + 4.5).

How should we interpret the different signs of the coefficient? In a traditional sense, increases in social security payments should have a negative effect on consumption. If people expect that the increase is temporary, the effect may be reverse. Further, if the increase in social security contributions is used to finance social assistance, the effect may be positive, but must not be. For example, both in the Czech Republic and in Bulgaria social security contributions and social transfers were increased fairly simultaneously, with a negative effect in the Czech Republic and a positive in Bulgaria (see also the negative coefficient of transfers for the Czech Republic and the positive for Bulgaria in the next estimation in table 12). Given the strong evidence from EU 4 countries, one would expect a negative long term effect of social security payments.

The results for both country groups indicate that the effects of social security payments on consumption are higher than with income tax. The panel coefficient in EU 4 amounts to - 1.85, indicating that an increase/reduction of social security contributions by 1 percentage point would lead to a reduction/increase of consumption growth by 1.85. However that factor can reach 4 to over 10.

In view of the high share of social security payments in Eastern countries, which are often criticized, and our estimation results, we can follow that a reduction of social security contributions would not necessarily stimulate consumption.

**Table 12: Effect on consumption growth of fiscal impulse in government transfers to households**

	c		$\Delta Y(-1)$		$\Delta G_{trans}$		$R^2$	obs
<b>panel</b>					<b>0.44</b>	<b>(1.05)</b>	<b>0.16</b>	<b>85</b>
<b>East</b>			<b>0.33<sup>***</sup></b>	<b>(3.40)</b>	<b>0.37</b>	<b>(1.00)</b>	<b>0.27</b>	<b>82</b>
countries								
Hungary	0.95	(0.61)			1.55	(1.26)	0.18	9
Czech Rep.	4.01	(5.13)			-2.53 <sup>**</sup>	(-2.62)	0.49	9
Poland	4.63	(5.96)			1.10	(0.37)	0.02	8
Slovenia	3.73	(2.44)			2.75	(0.62)	0.04	10
Slovakia	5.01	(2.82)			-2.52	(-0.86)	0.15	6
Estonia	4.16	(2.88)			-0.44	(-0.18)	0.01	8
Latvia	4.74	(3.64)			-0.37	(-0.71)	0.07	8
Lithuania	4.58	(8.11)			-1.98	(-1.27)	0.28	6
Bulgaria	-0.53	(-0.33)			1.61 <sup>*</sup>	(2.09)	0.35	10
Romania					0.73	(0.26)	0.01	11
<b>Panel</b>					<b>-0.91<sup>***</sup></b>	<b>(-4.80)</b>	<b>0.20</b>	<b>113</b>
<b>EU 4</b>			<b>0.60<sup>***</sup></b>	<b>(8.10)</b>	<b>-0.21</b>	<b>(-1.30)</b>	<b>0.46</b>	<b>110</b>
countries								
Greece	3.10	(6.61)			-0.24 <sup>*</sup>	(-0.98)	0.03	32
Portugal	2.78	(6.11)			-2.14 <sup>***</sup>	(3.48)	0.38	21
Ireland	3.61	(9.34)			-2.85 <sup>***</sup>	(-6.60)	0.62	28
Spain	2.86	(10.42)			-1.61 <sup>***</sup>	(-5.56)	0.50	32

Notes: With EU 4 national income is used instead of GDP.

When estimating the consumption effect of government transfers to households, we find contrasting results for the Eastern countries and EU 4. In the Eastern countries, the panel estimates indicate a positive but not significant effect, with individual countries showing either a positive or negative effect. In many cases, transfers have a very low power in explaining consumption. In contrast, government transfers have throughout a negative and significant effect in EU 4.

In the observed period, EU 4 countries experienced important, steady reductions of government transfers: Greece in 1985-2000, Portugal in 1980-1990, Ireland constantly since 1982 and Spain in 1980-85 and 1994-2000. In contrast, we remember that in most Eastern countries transfers were initially reduced but subsequently increased again.

How should we interpret the different coefficients of government transfers? The evidence of EU 4 countries and probably also the Czech Republic suggests that transfers are associated with non-keynesian, Ricardian effects in more developed countries. When transfers were reduced in EU 4 countries, consumers may have expected that future taxes to finance them would go down, leaving them more income to spend on consumption. The increase of transfers in the Czech Republic may have been seen by consumers as a sign for future tax increases, curbing consumption. In poorer economies like Bulgaria traditional effects are

more plausible. Transfers are more likely to raise the buying power of the poor and permit to maintain consumption.

**Table 13: Effect on consumption growth of fiscal impulse in value added tax**

	C		G_Y(-1)		Tvat		R2	Obs
<b>panel East</b>					<b>0.66</b>	<b>(1.22)</b>	<b>0.17</b>	<b>87</b>
countries			<b>0.31<sup>***</sup></b>	<b>(3.33)</b>	<b>0.53</b>	<b>(1.10)</b>	<b>0.26</b>	<b>83</b>
Hungary					6.48 <sup>***</sup>	(4.65)	0.66	11
Czech Rep.	2.79	(3.07)			-4.10 <sup>a</sup>	(-1.64)	0.27	9
Poland	0.34	(0.32)			4.09 <sup>***</sup>	(4.35)	0.75	8
Slovenia	2.92	(1.88)			2.05	(1.38)	0.19	10
Estonia	4.32	(2.47)			0.41	(0.18)	0.01	8
Latvia	1.99	(1.18)			-1.91 <sup>*</sup>	(-2.01)	0.40	8
Lithuania	4.96	(6.76)			-0.03	(-0.05)	0.00	6
Bulgaria					1.21	(0.95)	0.08	10
Romania					0.26	(0.14)	0.00	11
<b>Panel EU 4</b>					<b>0.07</b>	<b>(0.22)</b>	<b>0.04</b>	<b>94</b>
countries			<b>0.60<sup>***</sup></b>	<b>(7.64)</b>	<b>0.52<sup>**</sup></b>	<b>(2.00)</b>	<b>0.42</b>	<b>94</b>
Greece	3.18	(5.48)			-0.41	(-0.78)	0.02	26
Portugal	2.24	(3.59)			-1.41 <sup>a</sup>	(-1.56)	0.10	22
Ireland	3.18	(4.36)			-0.13	(-0.19)	0.001	25
Spain	1.75	(4.60)			1.53 <sup>***</sup>	(2.92)	0.31	21

Notes: With EU 4 national income is used instead of GDP. <sup>a</sup> one period lag, no estimate Slovakia since too few observations

Next, the consumption impact of value added is estimated. It shows that the obtained coefficient of value added taxes is statistically not significant in the panel estimates for both country groups and has a low explanatory power in single country estimations, except for Hungary, Poland and Latvia in the Eastern countries and Spain in EU 4.

In Hungary, Poland and Spain, we find a significantly positive relation between consumption and value added taxes, evidence for non-traditional, non-keynesian effects. In that case, tax increases are considered as a one shot event which leaves wealth unchanged. Therefore consumption is not negatively affected by tax increases.

Given the framework of EU regulations and effective tax rates which are fairly equal to EU 4 (see table 2) there remains fairly little room for policy changes in value added taxes.

**Table 14: Compound effect on private consumption growth of income growth and fiscal impulses**

	$\Delta Y(-1)/\Delta I$	$\Delta Tpers$	$(\Delta Gtrans - \Delta Tsoc1)$		$\Delta Tvat$	$R^2$	obs.
panel East	0.34*** (3.31)	-0.99 (-1.42)	0.23 (0.67)		0.44 (0.89)	0.29	78
panel EU 4	0.54*** (5.97)	-0.17 (-0.55)	-0.41 (-1.64)		0.51* (1.91)	0.47	89

Finally, we estimate the consumption impact of fiscal variables and income in the full specification of Equ. (5). This requires some considerations to keep the model parsimonious and to prevent correlation between fiscal variables. In principle, burdens on disposable income such as personal income tax and social security contributions, which had the same negative sign in the single variable estimations, can be combined under a single variable. However, there is the potential correlation between government transfers and social security contributions. We find considerable correlation between the two variables in a number of countries, such as the Czech Republic, Poland, Bulgaria, Ireland and Greece. Furthermore, there is also strong correlation in some countries with transfers on the one side, and the variable: income tax plus social security contributions on the other side. Therefore, we use a new variable, net transfers, defined as transfers minus social security contributions.

In this full specification, the previously obtained relationships are confirmed. All variables have the same sign as in the separate estimations and do not differ much in size, the coefficient of income being remarkably stable across all estimations. Income taxes have a negative consumption impact in both country groups, again more in Eastern countries than in EU 4. Net transfers have a positive impact on consumption in Eastern countries and a negative in EU 4. Value added taxes do not act negatively on consumption. However, in the full specification, practically none of the coefficients of fiscal variables remains statistically significant.

It remains to check the robustness of the regression results by the study of fiscal events (see table 15).

With respect to changes in income tax, the regression results that income tax reduction improved growth, are confirmed. As concerns social security contributions, the evidence from the regressions that consumption growth is negatively related to contributions, are confirmed as well, at least with respect to increases of social security payments. There are less clear developments associated with events of social security reductions. In Bulgaria, the reduction coincides with the fall in employment and of income tax and may rather reflect tax evasion and a growing black market economy. Benefits in consumption from cuts in social security contributions are short term at best.

As to government transfers, the regression results are also largely confirmed. In the majority of cases, government transfers lead to higher consumption. However, the effect may diminish quickly after the impulse. The reduction of transfers in the early transition periods may have been caused by a lack of revenues and seems to have reduced consumption (Bulgaria). Later, when growth has established, reduction in transfers do not seem to harm (Latvia).

**Table 15: Fiscal events: income tax, social security contributions, transfers, value added tax (events based on fiscal impulse) and development of consumption growth**

	period	Δ CON year before	Δ CON during event	Δ CON 3 years after	Total consumption development
<b><i>Reduction income tax</i></b>					
Hungary	1992	-5.7	1.4	1.8	+
Czech Rep.	1997	7.6	2.4	0.0	-
Poland	1999	4.7	5.2	2.3	-
Estonia	1995	0.6	3.3	8.1	+
Latvia	1994	-7.7	3.1	4.1	+
Bg	1998	-11.7	2.7	5.9	+
Romania	1993-95	-7.8	0.9	7.2	+
<b><i>Reduction social sec. contr.</i></b>					
Slovenia	1995	4.0	8.9	2.6	+(short)
Bulgaria	1996	-0.5	-4.0	0.2	
Romani	1994/95	0.9	7.2	-1.5	+(short)
<b><i>Increase social sec. contr.</i></b>					
Hungary	1993	1.4	3.4	-3.4	-
Slovenia	1999	2.9	5.7	1.2	-
Bulgaria	2000	9.2	4.2	5.1	-
Romania	1998	-3.5	1.0	1.0	+
<b><i>Increase transfers</i></b>					
Hungary	1998/99	1.8	5.1	6.8	+
Czech Republic	1997/98	7.6	0.3	2.6	-
Slovakia	1999	5.6	2.9	2.4	-
Estonia	1996	3.3	8.8	3.8	+
Latvia	1994	-7.7	3.1	4.0	+
Bulgaria	1999	2.7	9.2	4.5	+
<b><i>Reduction transfers</i></b>					
Latvia	2000	3.8	5.9	6.9	+
Bulgaria	1994/97	-0.7	-4.5	5.4	-
				(reversal of policy)	
<b><i>Increase value added tax</i></b>					
Poland	1994-99	5.2	5.3	2.6	-
Slovenia	1994-98	13.1	4.1	2.8	-
Romania	1999	1.0	-2.1	2.8	+
<b><i>Reduction value added tax</i></b>					
Slovakia	1996-99	3.5	5.7	2.4	+
Latvia	1998/99	-7.7	3.8	6.9	+
Romania	1995	2.3	12.1	6.9	+

Notes: Fiscal event is defined as a of the fiscal impulse of more than 0.5 which is not reversed in the next two years.

For changes in value added tax there is some evidence that reductions have promoted consumption in the short term.

These results permit to draw some important conclusions.

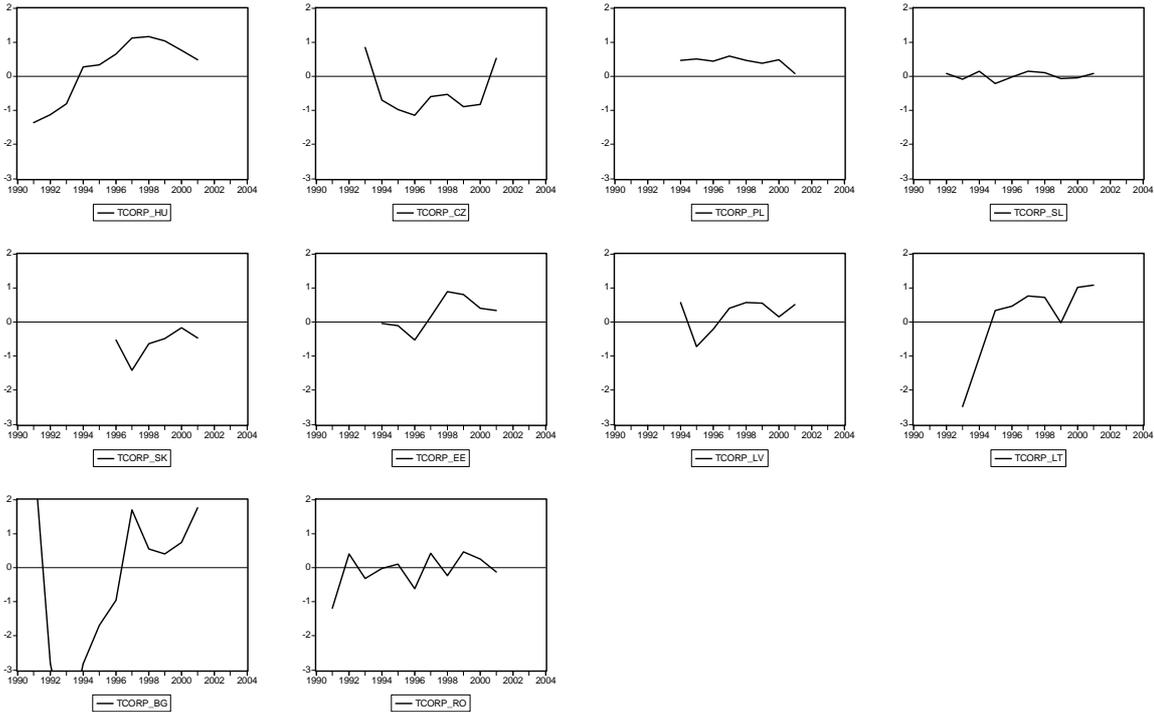
First, in Eastern countries, income taxes act in a very traditional way on consumption. Taxes further reduce the low disposable income and – in view of little or uncertain wealth – reduce consumption directly. Consequently, increases of income taxation, - which in view of already standard marginal tax rates would mean better efficiency in tax collection – may reduce consumption.

Second, evidently social policies act differently across Eastern countries. In some, probably the poorer countries, social transfers promote consumption, in other countries they reduce consumption. Given however the experience of EU 4, where steady reductions of social policies took place, non-keynesian effects are likely in the long run. A reduction of social policies could result in higher consumption. Individuals would expect tax reductions when social policies are reduced and spend more.

### 5.3 THE EFFECT OF CHANGES IN FISCAL POLICY ON PRIVATE INVESTMENT

In this section, we analyse the impact on private investment growth of fiscal impulses in corporate income tax, employer's social security contributions and subsidies. As before, regressions for each fiscal item are first estimated separately, then the compound impact is estimated, as specified in Equ. (9) and (10). Furthermore, GDP growth – a proxy for sales development - is used as an explanatory variable. Again, the lag of GDP growth is used to avoid simultaneity problems (instrumental variables estimation would sacrifice observations of the short fiscal data series).

**Figure 5: Fiscal impulse in corporate income tax**



Looking at the fiscal impulse in corporate income tax in the Eastern countries (see figure 5), one notes that a number of them increased income taxes in the second part of the 1990s. The increase of taxes was most pronounced in Hungary where the share of corporate taxes in GDP rose by about over one percentage point annually from 1996-2000, followed by the Baltic Republics and Poland. In contrast, there was a constant decline of corporate taxes particularly in the Czech Republic but also in Slovakia. In EU 4, important tax changes occurred in particular in Spain where corporate taxes increased through the whole 1980s period, but decreased in the 1990s.

There were also important changes in the other fiscal variables likely to influence investment (no charts are shown on their development in order to save space).

Many Eastern governments raised also employer's social security contributions in addition to employee's contributions, in order to expand social policy. Thus the Czech Republic, Poland and Estonia increased social security contributions charged to firms in the mid 1990s, Hungary and Bulgaria in the late 1990s. Poland and the Czech Republic cut back contributions again in the second half of the 1990s.

Government subsidies, which are a good share above the level in EU 4, were reduced in Poland and Estonia. In contrast, the Czech Republic increased subsidies in the first half of the 1990s, Slovenia and Slovakia followed later.

**Table 16: Effect on investment growth of fiscal impulse in corporate income tax**

	c		$\Delta Y(-1)$		$\Delta T_{corp}$		$R^2$	obs
<b>panel</b>					<b>4.73***</b>	<b>(2.38)</b>	<b>0.13</b>	<b>81</b>
<b>East</b>			<b>0.67</b>	<b>(1.78)</b>	<b>2.03</b>	<b>(0.96)</b>	<b>0.13</b>	<b>78</b>
countries								
Hu	4.53	(0.66)			11.28	(1.58)	0.24	10
Cz	4.65	(0.88)			-2.88	(-0.44)	0.03	8
Pl	-16.19	(-2.30)			63.39***	(4.10)	0.76	7
Sl	12.73	(4.94)			-34.83	(-1.55)	0.25	9
Sk	-6.34	(-0.51)			-16.71	(-1.03)	0.26	5
Ee	13.22	(1.61)			-9.15	(-0.65)	0.09	6
Lv	17.70	(2.76)			4.41	(0.33)	0.02	7
Lt	1.82	(0.35)			13.97***	(2.08)	0.41	8
Bg	5.54	(0.67)			3.02	(0.84)	0.08	10
Ro	7.77	(1.66)			20.39***	(2.11)	0.33	11
<b>panel</b>					<b>5.58**</b>	<b>(2.11)</b>	<b>0.06</b>	<b>102</b>
<b>EU 4</b>			<b>1.08***</b>	<b>(2.98)</b>	<b>2.56</b>	<b>(0.94)</b>	<b>0.14</b>	<b>98</b>
countries								
Gr	1.06	(0.44)			4.05	(0.61)	0.01	26
Po	3.15	(1.74)			5.7	(1.25)	0.06	26
Ire	4.96	(2.17)			3.16	(0.439)	0.01	25
Sp	2.59	(1.95)			8.11**	(2.53)	0.22	25

When estimating the impact of corporate tax changes on investment growth, the results from the panel estimation for the Eastern countries suggest that investment growth was significantly positively related to corporate tax changes, - a result that also appears with EU 4 countries. (The significance of the tax coefficient, however, decreases in the more complete specification of the investment model with lagged GDP growth, although without change of

the sign of the coefficient). Regarding the results of single countries, there are a few interesting cases where tax changes had a statistically significant negative or positive impact. On the one hand, there were important, significantly positive relationships between tax increases and investment in Poland, Romania and Lithuania and Spain. Thus there were sizable non-keynesian effects associated with tax increases in these countries. Probably companies considered that tax increases were a one time policy change, necessary to establish a modern government budget, and therefore did not change their investment behaviour. Another explanation may be that firms were expecting booming future business which outweighed possible negative tax effects and which we cannot measure correctly. On the other hand, one also finds a significant traditional effect of tax policy in the Czech Republic, where the reduction of corporate income tax had a positive impact on investment growth. Comparing the effects in Eastern countries with those in EU 4, one notes from the  $R^2$  that corporate taxes have a better power in explaining private investment in the East than in EU 4. Also are the coefficients corporate taxes in many of the Eastern countries higher than in EU 4.

Consequently, there is no reason to expect that increases of corporate taxation, which would bring taxation levels in Eastern countries closer to those of the comparable EU 4 group, would harm investment.

Next, the investment impact of employer's social security contributions is estimated.

**Table 17: Effect on investment growth of fiscal impulse in employer's social security contributions**

	c		$\Delta Y(-1)$		$\Delta Tsoc2$		$R^2$	obs
<b>Panel East</b>					<b>3.57</b>	<b>(1.46)</b>	<b>0.11</b>	<b>79</b>
			<b>0.50</b>	<b>(1.32)</b>	<b>3.59</b>	<b>(1.48)</b>	<b>0.13</b>	<b>77</b>
Hu	12.02	(1.88)			15.57	(1.16)	0.18	8
Cz	7.15	(2.68)			13.60	(1.67)	0.31	8
Pl	11.74	(2.70)			9.94	(1.24)	0.23	7
Sl	13.14	(4.41)			-3.47	(-0.70)	0.06	9
Sk	4.08	(0.33)			-1.07	(-0.02)	0.00	5
Ee	17.59	(3.05)			37.96***	(2.20)	0.54	6
Lv	19.41	(3.16)			-3.66	(-0.53)	0.05	7
Lt	7.19	(1.20)			-3.77	(-0.23)	0.01	8
Bg	3.34	(0.40)			-1.42	(-0.14)	0.00	10
Ro	7.30	(1.43)			5.69	(1.53)	0.20	11
<b>Panel EU 4</b>					<b>-4.40**</b>	<b>(-2.23)</b>	<b>0.07</b>	<b>102</b>
			<b>1.15***</b>	<b>(3.39)</b>	<b>-2.77</b>	<b>(-1.36)</b>	<b>0.15</b>	<b>98</b>
countries								
Gr	0.79	(0.32)			2.83	(0.32)	0.01	26
Po	-1.36	(-0.46)	0.70	(0.94)	7.17	(0.75)	0.06	25
	3.05	(1.709)			8.68	(1.50)	0.08	26
Ire	-0.31	(-0.12)	0.87	(1.65)	9.20	(1.59)	0.22	25
	5.57	(2.76)			-13.51**	(-2.61)	0.22	25
Sp	-2.39	(-0.58)	1.81**	(2.28)	-10.87*	(-1.98)	0.38	24
	2.88	(2.37)			-5.15***	(-3.57)	0.35	25
	-0.21	(-0.10)	0.97	(1.62)	-3.78**	(-2.44)	0.36	24

There were important increases of social security contributions, in the Czech Republic, Poland and Estonia in the mid 1990s, in Hungary and Bulgaria in the late 1990s. Poland and the Czech Republic reversed these policies in the second stage.

Looking at the investment effect of employers social security contributions, the results from the panel estimates suggest that there is a positive, but not significant relationship between social security contributions and investment. In the country specific estimates, social security contributions are mostly no significant explanatory for investment. Only in the case of Estonia, there was a positive relation with investment. The increase of social security contributions in that country did not harm investment. This suggests that there are also non-keynesian effects with social security contributions and investment. The rise of contributions in many countries may have been considered as a one time, non-repeated effect and was not included in the investment decision.

With EU 4 the impact differed considerably. All countries increased employers social security contributions until 1985, and reduced them thereafter. Whereas policy changes had no significant impact in Greece and Portugal, shown by the insignificant coefficients, increases/decreases of employers social security contributions had a significant negative/positive impact on private investment in Ireland and Spain, indicating traditional tax effects.

Although, in the Eastern countries one finds no clear indication that increases in the burden of social security contributions harm investment, these results should be seen with caution, the more if considering the traditional effects seen in EU 4 countries. It would be wrong to conclude that this secures Eastern governments from not having to reduce the load of such contribution on companies, given an oversized government's social policy.

Next the investment impact of government subsidies is estimated. Subsidies have become increasingly popular in some Eastern countries with a view to attract foreign investors. Fiscal impulses show that government subsidies were increased in the Czech Republic in the first half of the 1990s, later in Slovenia and Slovakia. In contrast, Poland and Estonia reduced subsidies to a large extent.

The investment impact of subsidies can be positive or negative. In Hungary, the Czech Republic and Slovenia subsidising enhanced investment significantly. In Poland, in contrast, the constant reduction of subsidies and consequently the strong cut in state intervention during the 1990s significantly improved investment. In all other cases subsidies are not significant for investment and estimations have a low explanatory power. In the panel, the impact of subsidies on investment is positive but not significant.

In EU 4, in general, countries increased government subsidies until the late 1980s and reduced them thereafter. The reaction of investment differed within this country group. Whereas subsidies had no significant impact in explaining investment in Greece and Portugal, shown by insignificant coefficients and low  $R^2$ , there is a significant negative impact discernible in Ireland and Spain, suggesting that the reduction of subsidies promoted investment.

The investment impact of subsidies can be positive or negative. In Hungary, the Czech Republic and Slovenia subsidising enhanced investment significantly. In Poland, in contrast, the constant reduction of subsidies and consequently the strong cut in state intervention during the 1990s significantly improved investment. In all other cases subsidies are not significant for investment and estimations have a low explanatory power. In the panel, the impact of subsidies on investment is positive but not significant.

**Table 18: Effect of fiscal impulse in government subsidies on investment growth**

	c		$\Delta Y(-1)$		$\Delta G_{sub}$		$R^2$	obs
<b>Panel East</b>					<b>1.50</b>	<b>(1.13)</b>	<b>0.08</b>	<b>81</b>
			<b>0.79</b>	<b>(2.18)</b>	<b>1.48</b>	<b>(1.18)</b>	<b>0.13</b>	<b>78</b>
countries								
Hu	6.70	(1.12)			41.58**	(2.10)	0.35	10
Cz	1.59	(0.84)			12.88***	(4.47)	0.76	8
Pl	-5.95	(-0.66)			-26.78*	(-2.04)	0.45	7
Sl	3.79	(0.32)			8.33	(0.77)	0.07	9
Sk	13.61	(1.40)			-14.55	(-1.25)	0.34	5
Ee	5.74	(0.79)			-20.42	(-1.09)	0.22	6
Lv	19.40	(3.20)			1.43	(0.59)	0.06	7
Lt	4.36	(0.80)			-28.08	(-1.44)	0.25	8
Bg	4.15	(0.49)			1.22	(0.37)	0.01	10
Ro	5.75	(1.04)			1.94	(0.74)	0.05	11
<b>panel EU 4</b>					<b>-2.60*</b>	<b>(-1.71)</b>	<b>0.04</b>	<b>117</b>
			<b>1.30***</b>	<b>(4.03)</b>	<b>-0.82</b>	<b>(-0.55)</b>	<b>0.16</b>	<b>114</b>
countries								
Gr	1.98	(0.93)			0.69	(0.15)	0.00	32
	-0.66	(-0.24)	0.84	(1.28)	2.61	(0.54)	0.06	31
Po	3.03	(1.42)			-1.62	(-0.85)	0.04	21
	-2.84	(-0.80)	1.86*	(1.99)	0.68	(0.32)	0.21	21
Ire	5.23	(2.97)			-8.14**	(-1.99)	0.11	32
	-2.15	(-0.64)	1.41**	(2.569)	-6.23	(-1.56)	0.28	31
Sp	3.15	(2.90)			-20.82***	(-3.00)	0.23	32
	-0.76	(-0.39)	1.25**	(2.18)	-13.18*	(-1.88)	0.31	31

In EU 4, in general, countries increased government subsidies until the late 1980s and reduced them thereafter. The reaction of investment differed within this country group. Whereas subsidies had no significant impact in explaining investment in Greece and Portugal, shown by insignificant coefficients and low  $R^2$ , there is a significant negative impact discernible in Ireland and Spain, suggesting that the reduction of subsidies promoted investment.

How can we explain the different sign of the coefficient? A positive coefficient indicates that subsidies reduce investment costs and therefore firms invest more. In the case of a negative relation, increasing subsidizing may indicate too much regulation and state intervention which discourages firms to invest. Consequently, a reduction of subsidies would enhance investment. Another explanation for a negative coefficient in the Eastern countries may be that firms consider the business climate as promising and invest despite a reduction of subsidies.

**Table 19: Compound effect of fiscal impulses on private investment growth**

	$\Delta g_Y(-1)$		$\Delta T_{corp}$		$\Delta T_{soc2}$		$\Delta G_{sub}$		$R^2$	Obs
<b>panel East</b>	0.49	(1.26)	0.45	(0.19)	3.82	(1.56)	1.50	(1.08)	0.15	77
<b>panel EU 4</b>	1.24***	(2-99)	1.75	(0.61)	-2.73	(-1.25)	-0.04	(-0.02)	0.17	94

When estimating the full specification, coefficients keep their sign but are no longer significant.

**Table 20: Effects on private investment of fiscal events: Corporate tax and employer's social security contributions (events based on fiscal impulse)**

	period	$\Delta INVp$ year before	$\Delta INVp$ during	$\Delta INVp$ 2 years after	development investment
<b>Corporate tax</b>					
<b>Reduction</b>					
Hungary	1991/92	-22	-23	15.2	+
Cz	1994-98	3.2	9.9	3.0	+ (short term)
Bulgaria	1992-94	-14.7	-8.7	-13.4	+ (short term)
<b>Increase</b>					
Hungary	1996-99	-3.4	10.2	5.9	+
Poland	1995-98	n.a.	18.7	0.3	-
Estonia	1998/99	23.5	-3.0	17.4	-
Latvia	1998/99	20.3	15.8	22.7	-
Bulgaria	1997	-19.7	-37.9	23.8	-
<b>Employers soc. sec.contr.</b>					
<b>Reduction</b>					
Czech Rep.	1998	0.3	2.7	3.0	+
Poland	1999	15.5	9.5	-4.0	-
Slovenia	1996	23.8	13.3	16.6	-
Estonia	1997	8.0	23.5	5.5	-
Romania	1998	-14.0	2.8	-13.4	+
<b>Increase</b>					
Hungary	1997/98	2.5	16.5	5.6	+
Poland	1996	18.7	19.4	18.3	-
Bulgaria	1998	-37.9	33.5	21.2	+
Romania	1994	11.4	16.1	8.0	-

The evidence from fiscal events confirms the regression results of negative tax effects on investment. Again, as most of reductions take place in the in the early years of transition, corporate tax reduction may stem from tax evasion rather than discretionary policy. With respect to employer's social security contributions fiscal events provide no clear evidence on their effects.

To conclude, these estimates have shown that in the Eastern countries there are mostly non-keynesian effects associated with corporate taxes and employer's social security contributions. This indicates that an increase of the still low corporate income tax may not harm investment. Although the positive business climate may be an important factor that stimulates investment and therefore outweighs negative effects of social security contributions this requires caution. As the experience of EU 4 tells us, social security contributions may discourage investment in the long run. It also indicates that a high level of subsidies may be harmful for investment. Therefore, governments can be recommended to reduce both employer's social security contributions and subsidies.

## 6. CONCLUSIONS

In this paper, we wished to shed some light on the likely macroeconomic effects of budgetary consolidation and fiscal policy reforms in Eastern European countries. For this purpose, an empirical analysis of the effects of policy changes in the 1990s is carried out, in order to draw some conclusions for future policy options.

We started with analysing the present fiscal situation in Eastern European countries and positioned it in relation to the weaker EU member states, EU 4: Spain, Portugal, Greece and Ireland. Those countries entered the EU also as "transforming economies", with a considerable income backlog and high budget deficits, which they reduced with considerable efforts. This country group also served as a control group in the empirical investigation. Evidently, the majority of Eastern countries, - an exception are the Baltic Republics -, show mounting budget deficits which can not reconcile with the Maastricht convergence criteria. Moreover, they show a considerably oversized public sector in relation to EU 4 countries. Tax shares remain a good deal beyond those of EU 4 countries. In contrast social security contributions and its mirror, social assistance are considerably higher than in EU 4, evidence for generous social policies. Similarly are subsidies to enterprises above EU 4 levels. This situation offers ample possibilities for fiscal measures to achieve a consolidation of budget deficits.

The theoretical literature proposes either traditional, keynesian effects of fiscal policies, where consolidation and expenditure cuts are contractionary, or non-keynesian effects. The latter are based on the arguments of Ricardian equivalence, rational expectations and credibility effects. Non-keynesian effects can result in positive growth effects of effects of consolidation. In the case of taxes, non-keynesian effects lead to positive consumption and investment effects of taxes and other burdens. The effect of transfers or subsidies may turn negative.

In the empirical analysis, we specify models for output growth, consumption and investment where fiscal variables enter together with other macro variables as explanatory variables. Fiscal innovations, i.e. changes in fiscal policy variables, are measured by fiscal impulses where the cyclical component is eliminated from the series. The effects of fiscal policies is then measured in the three models (output growth, consumption, investment) with panel data regressions for the full models and simple regressions for each country with the fiscal variable as only explanatory. This permits to make optimal use of the short data basis. Regression results were verified by studying the development of macro variables during fiscal events.

The panel data and country regression analyses deliver a number of insightful and useful results. First, we found that the short episodes of budget consolidation in Eastern countries in the 1990s were associated with gains in output growth. Also did expenditure cuts have positive growth effects. This experience is similar to that of EU 4 countries and suggests that the pending budget consolidations may not be expected to harm economic growth. (See table 21 for the possible policy measures of fiscal reforms in Eastern Europe and the likely effects.)

Second, with respect to the consumption effects of fiscal policies, we found that income taxes and largely employee's social security contributions act in a traditional sense, negatively on consumption. This indicates that consumption could be sensitive to an increase of personal income taxes. Social transfers may have a positive or negative impact on consumption. In poorer economies the positive impact seems to prevail, in the better developed Eastern countries the negative. The latter proposes non-keynesian effects of transfers. Given the experience of EU 4, where consumption growth was positively related to the reduction of social transfers and the reduction of employee's social security contributions, the reduction of social policies seems to be a viable policy option for Eastern countries.

**Table 21: Guidelines for fiscal reforms in Eastern European countries**

measure	effect	potential size <sup>a</sup> of effect with fiscal impulse of 1 percentage point
<b>GROWTH EFFECTS</b>		
• reduction of budget deficit	positive	0.10-0.30
• reduction of general government current expenditures	positive	0.30-0.60
• renouncing to increase government investment	from past experience of these countries: forgive a small but unsure growth effect	no reliable indication possible
<b>CONSUMPTION EFFECTS</b>		
• increase of personal income tax	negative	- 1.0
• reduction of social security contributions	positive (exceptions)	EU 4: 1.85
• reduction of government transfers to households	positive for higher income countries negative in poor countries	no reliable indication possible
<b>INVESTMENT EFFECTS</b>		
• increase of corporate taxes	mostly non-negative effect	-
• reduction of social security contributions	experience of EU 4 suggests positive effect	EU 4: 2.7
• reduction of subsidies	unclear effect: negative or positive	-

Notes: <sup>a</sup> potential size based on estimated coefficient for group of Eastern countries and EU 4.

Third, concerning the investment effect of fiscal policies, the estimates indicate a strong non-keynesian effect of corporate taxes and employer's social security contributions in Eastern countries. The increase in these fiscal variables did not reduce investment growth. This leaves room for an increase of the relatively low corporate taxes without risk of investment. The present non-negative effect of social security contributions should be regarded with a warning. The lessons from EU 4 tell us that employer's social security contributions discourage investment. Consequently, Eastern governments should be aware that the high level may sooner or later become a problem for investment. The investment effect of subsidies is unclear from the estimates, their impact can be both positive or negative. A negative relation can occur if subsidies indicate regulation and state intervention so that investment is discouraged. There may also be a negative relation if the business climate is promising and investment increases despite a decline of subsidies, which then are redundant.

Consequently, Eastern European countries should regard the tight framework that is imposed to them by the Maastricht convergence criteria as a chance to increase the credibility to push forward fiscal reforms which – as this study has shown – may be much less burdensome as commonly assumed.

## References

- Alesina, A., Perotti, R. (1997), The welfare state and competitiveness, *American Economic Review*, vol. 87, 921-939.
- Alesina, A., Perotti, R. (1995), Fiscal adjustment. Fiscal expansions and adjustments in OECD countries, *Economic Policy*, October 1995, 205-248.
- Alesina, A., Ardagna S. (1998), Fiscal adjustments. Why they can be expansionary, *Economic Policy*, October 1998, 489-545.
- Alesina, A., Ardagna, S., Perotti, R., Schiantarelli, F. (2002), Fiscal Policy, profits and investment, *American Economic Review*, vol. 92, no. 3, 571-589.
- Altshuler, R., Grubert, H., and Newlon, T.S. (1998), Has US investment abroad become more sensitive to tax rates?, NBER working paper no. 6383, National Bureau of Economic Research.
- Ardagna, S. (2002), Fiscal stabilizations: When do they work and why, Wellesley College, mimeo.
- Aschauer, D. (1989), Is public expenditure productive?, *Journal of Monetary Economics*, vol. 23, 177-200.
- Barro, R.J. (1974), Are government bonds net wealth?, *Journal of Political Economy*, December 1974, 1095-1117.
- Bénassy-Quéré, A., Fontagné, L., Lahrèche-Révil, A. (2000), Foreign direct investment and the prospects for tax co-ordination in Europe, CEPII document du travail, no. 2000-06, Centre d' Etudes Prospective et d'Informations Internationales, Paris.
- \*Blanchard 2003, Macroeconomics
- Blanchard, O., Perotti, R. (2002), An empirical characterization of the dynamic effects of changes in government spending and taxes on output, *Quarterly Journal of Economics*, \*
- Blanchard, O. (1993), Suggestions for a new set of fiscal indicators, OECD working paper.
- Coricelli, F., Ercolani, V. (2002), Cyclical and structural deficits on the road to accession: Fiscal rules for an enlarged European Union, CEPR discussion paper no. 3672, London, Centre for Economic Policy Research.
- Cummins, J., Hassett, K., Hubbard, R. (1995) Tax reforms and investment: A cross country comparison, C.V. Starr Center for Applied Economics working papers, New York University.
- Dalsgaard, T., André, C., Richardson, P. (2001), Standard shocks in the OECD Interlink model, OECD working paper no. 306, Paris, Organisation for Economic Cooperation and Development.
- De Arcangelis, G., Lamartina, S. (2003), Identifying fiscal shocks and policy regimes in OECD countries, ECB working paper no. 281, Frankfurt, European Central Bank.
- Erenburg, S.J. (1993), The real effects of public investment on private investment, *Applied Economics*, vol. 25, no. 6, 8311-837.
- European Commission, Ameco database.
- Eurostat, National Accounts.
- Fatás, A., Mihov, I. (2001), The effects of fiscal policy on consumption and employment: Theory and Evidence, CEPR discussion paper no. 2760, London, Centre for Economic Policy Research.
- Gastanaga, V.M., Nugent, J.B., Pashamova, B. (1998), Host country reforms and FDI inflows: how much difference do they make?, *World Development*, vol. 26 (7), 1299-1314.
- Giavazzi, F., Pagano, M. (1996), Non-keynesian effects of fiscal policy changes: International evidence and the Swedish experience, *Swedish Economic policy Review*, vol. 3, no.1, 67-112.
- Giavazzi, F., Jappelli, T., Pagano, M. (2000), Searching for non-linear effects of fiscal policy: Evidence from industrial and developing countries, *European Economic Review*, vol.44, no.7, 1259-1289.
- Hall, R., Jorgenson, D. (1967), Tax policy and investment behaviour, in Jorgenson, D. (ed.), *Investment*. vol. 2: Tax policy and the cost of capital, London, MIT Press, 1-26.
- Hines, J.R. (1996), Altered states: Taxes and location of foreign direct investment in america, *American Economic Review*, vol. 86, 1076-1084.

- Hines, J.R. (1999), Lessons from behavioral responses to international taxation, *National Tax Journal*, vol. 52, 305-322.
- Hubert, F., Pain, N. (2002), Fiscal incentives, European integration and the location of foreign direct investment, NIESR discussion paper, National Institute of Economic and Social Research, London,
- Hunt, B., Laxton D. (2003), Some simulation properties of the major Euro area economies in MULTIMOD, IMF working paper 03/31, Washington, International Monetary Fund.
- International Monetary Fund, Government Finance Statistics Yearbook (databank).
- Köhler-Töglhofer, W., Backé, P., Schardax, F. (2003), Fiscal developments in Central and Eastern European EU Accession Countries – An overview one-and-a-half years before the May 2004 enlargement of the European Union, Focus on Transition, 1/2003, Wien, Oesterreichische Nationalbank, 84-111.
- Mittnik, S., Neumann T. (2001), Dynamic effects of public investment: Vector autoregressive evidence from industrialized countries, *Empirical Economics*, vol. 26, no. 2, 429-446.
- Perotti, R. (2002), Estimating the effects of fiscal policy in OECD countries, Florence, European University Institute, mimeo.
- Roeger, W., in 't Veld, J. (2002), Some selected simulation experiments with the European Commission's QUEST model, Brussels, \*mimeo.
- Summers, L.H. (1981), Taxation and corporate investment: A q-theory approach, *Brookings Papers of Economic Activity* 1981, 67-127.
- van Aarle, B., Garretsen, H., Gobbin, N. (2002), Monetary and fiscal policy transmission in the Euro area: evidence from a structural VAR analysis, *Journal of Economics and Business*\*
- Von Hagen, J., Hughes-Hallet, A., Strauch, R. (2001), Budgetary consolidation in EMU, CEPR discussion paper no. 148, London, Centre for Economic Policy Research.
- Wilcox, D.W. (1989), Social Security benefits, consumption expenditure, and the life cycle hypothesis, *The Journal of Political Economy*, vol. 87, no. 2, 288-304.