PUBLIC FINANCE, EMPLOYMENT AND GROWTH IN THE EU8

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In this paper we review the theory and international evidence on the links between public finances and growth, including through the link between taxation, employment, and investment, and look at the evidence on these relationships in the EU8 countries over the past decade – both at the aggregate and disaggregate fiscal levels. Our econometric analysis reveals a strong negative impact of "distortive" taxation on employment and growth while we find a less robust positive relationship between "productive" expenditures and growth. These findings suggest that reducing labor and other highly distortionary taxes while searching for efficiency gains in various areas of public expenditure should be a high priority for EU governments. These findings are consistent with recent research of Afonso, Schuknecht and Tanzi (2006) who find that emerging market countries with public expenditure ratios around 30 per cent of GDP – well below most EU8 countries – tend to be the most efficient.

1. Introduction

Fiscal trends in recent years have varied considerably among the EU8 countries. Two groups of countries emerge within the EU8 on the fiscal scene: those with relatively strong fiscal positions, modest debt, and small governments (the Baltic countries, and to some extent Slovakia); and those with relatively weak fiscal positions, sizeable debt, and large governments (Hungary, Poland, and the Czech Republic). Slovenia is a special case, with strong public finances but a large government (Annex, Figures 9, 10 and 11). Of the EU8 countries, only the Baltic States and Slovenia clearly satisfy the fiscal criteria for euro adoption.

In recent years, some EU8 countries pursued fiscal consolidation strategies while others allowed deficits to remain high or even widen further. In particular, the Baltic countries, Slovenia, and Slovakia all undertook a sustained adjustment effort, with general government deficits now around or below the critical Maastricht level of three percent of GDP. Debt levels are low in the Baltic countries, moderate in Slovenia, and reaching comfortable levels in Slovakia.[1] Fiscal policy has been more erratic in the other Visegrad countries.[2] The Czech Republic managed to reverse a sharp widening of the fiscal deficit in 2001-02, but new pressures are building fast.

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[1] Debt developments have generally been influenced favorably by strong output growth, lower interest rates, and currency appreciation.

[2] Fiscal outcomes in the Visegrad countries have generally fallen well short of targets agreed with the EU in the context of pre-accession economic programs and in some countries post-accession convergence programs.

Poland pursued an expansionary fiscal policy in the period 2001-04, especially in the most recent years where output growth recovered strongly, although there was some consolidation in 2005. Hungary has to a large extent lost control over its fiscal policy, with deficits exceeding 6 percent of GDP and debt levels hovering around the critical 60 percent of GDP limit.

Fiscal consolidation efforts have been supported by strong output growth and in some countries expenditure reform and/or discipline while tax reforms have tended to lower revenues (Annex, Figure 10). Several countries have been pursuing tax reforms aimed at lowering the overall tax burden, and in most EU8 countries general government revenues as a share of GDP are now significantly lower than in the EU15. Slovakia has been a frontrunner in these efforts, however starting from a relatively high level. Cuts in corporate and personal income taxes have tended to lower the share of direct to total taxes, while the reliance on social security contributions and indirect taxes has increased.[3] Overall, labor taxes remain relatively high in most EU8 countries, constituting a large part of tax wedges in these countries.

There are large divergences in public expenditure to GDP ratios ranging from 34.6 per cent in Lithuania to 51.3 per cent of GDP in Hungary in 2004 (Annex, Figure 11).[4] The Baltic States spend much less than the Central European countries which resemble the EU15 (47.9 per cent of GDP in 2004). The higher the level of public expenditures, the higher the tax burden, especially labor taxes, which are usually earmarked to finance social protection expenditures.

Slovakia has been the only EU8 country to undertake a comprehensive restructuring of its social spending programs, with more piecemeal reforms in other countries that have tended to rely on various administrative measures (notably Hungary). A planned reduction of benefit rates and tightening of eligibility criteria (the so-called *Hausner Plan*) met strong political resistance in Poland. While the more indebted EU8 countries have benefited from a decline in global interest rates and spreads, on the whole the structure of spending has not changed much over the past five years.[5] Social benefits and social transfers in kind constitute one-half or more of total spending and their levels have remained stable in the Visegrad countries, Slovenia and Estonia, while Latvia and Lithuania cut these programs from already low levels. Spending on public consumption amounts to around 10 per cent of GDP in the Visegrad countries, Slovenia and Latvia, but is somewhat lower in Estonia and Lithuania. Public investment is particularly low in Latvia.

Higher government spending, including on social protection, appears to be negatively related to output growth in the region (Figure 1, Figure 2). This lends

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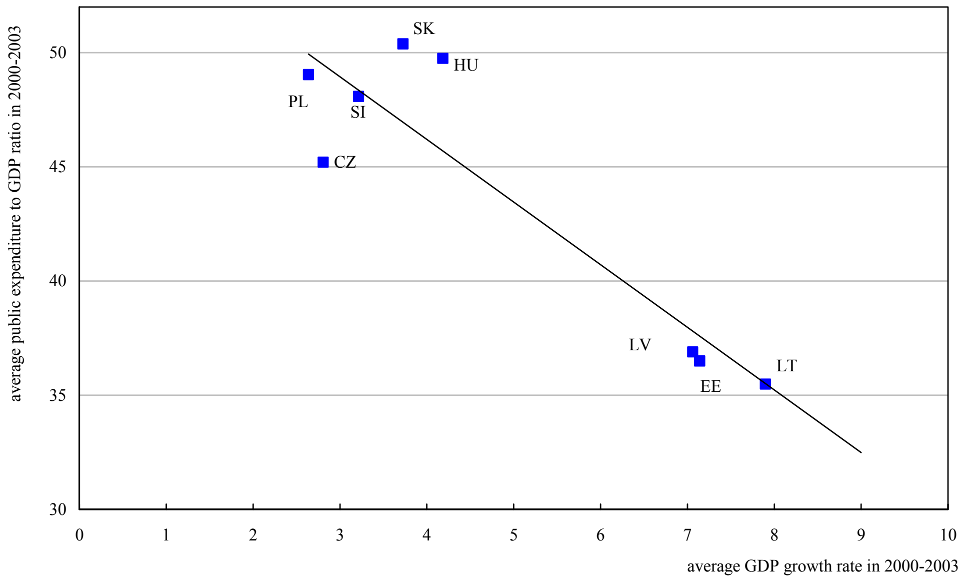
3 More recently, changes in indirect taxes have been influenced by EU accession.

4 The cross-country comparisons refer to direct public expenditures. The net public expenditure, *i.e.* gross expenditure corrected by i.a. differences in the reliance on tax expenditures, taxation of social benefits or introduction of private insurance schemes, could not be calculated because of data availability constraints.

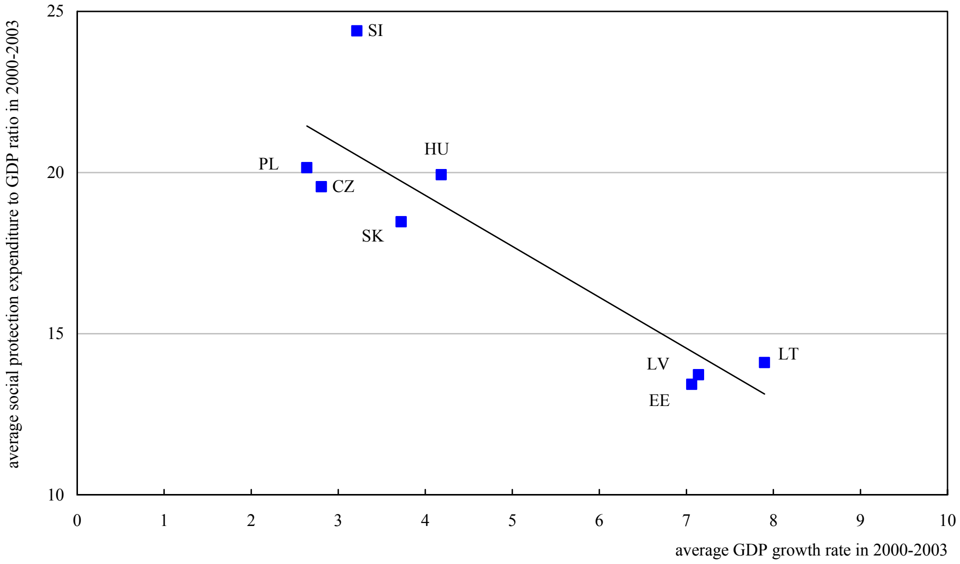
5 Several EU8 countries, including The Czech and Slovak Republics as well as Latvia, faced large fiscal costs related to bank restructuring in the second half of the 1990s.

Figure 1

Public Expenditure and Average GDP Growth Rates in 2000-03
Total Expenditure
(percent)



Social Protection Expenditure
(percent)



Source: Eurostat. Data for social protection expenditure based on ESSPROS methodology.

support to Kornai’s view (1992) on “premature welfare states” in Central and East European countries. At the same time, it is clear that there is important variation among countries. Slovakia and Hungary grew faster than suggested by their spending levels (based on the simple correlation line below), despite roughly average spending on social protection. A similar picture would emerge if we looked at total revenues and social security contributions.

The purpose of this paper is to examine these relationships in the EU8 more carefully, in particular through looking at the impact of the structure of both spending and financing on growth – including how taxes affect employment and investment in the region. The rest of the paper is structured as follows: in Section 2, we examine the theoretical arguments and international empirical evidence relating public finances to output growth, and proceed to undertake an econometric analysis of the link between public spending, taxation, and output growth in the EU8 during the period 1995-2004; in Section 3 we examine theory and evidence relating labor taxes to employment; in Section 4 we look at corporate taxes and investment; and in Section 5 we conclude.

2. Fiscal policy and medium-long-term growth

2.1 Theoretical considerations and empirical evidence

The relationship between government spending, taxation, and economic growth has been one of the most studied issues in economics. However, while it was apparent that public finances could affect output growth in both the short and longer term, the theoretical link was not clearly established in the standard neoclassical growth theory (notably Solow and Swan, 1956). According to these, the only source of long-run growth was exogenous technical change with the production function featuring decreasing marginal returns to both capital and labor. Policy changes could affect the level of output but not its steady-state growth rate.

More recent endogenous growth models such as Romer (1986), Lucas (1988) and Barro (1990) have been based on perpetual, endogenously determined increases in the productivity of human and physical capital thus implying that the marginal product of physical capital would not tend to zero when the amount of capital per worker increases and allowing for long-run per capita growth. Growth can be permanently raised by increasing aggregate savings, by accumulating inputs (labor, human, and physical capital), and by higher efficiency in the production process (including through public support to research and development).

The main ways in which fiscal policy affects growth in the endogenous models are the following:[6]

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[6] European Commission (2000).

- *production externalities*: public investment may boost production of the private sector through complementarities between public infrastructure and private investment;
- *productivity growth and differences*: fiscal policy may influence innovation and R&D while differences between public and private sector efficiency may provide growth-enhancing opportunities;
- *effects on factor accumulation*: physical/human capital; and
- *crowding out effect*: unproductive public expenditure versus productive private expenditure.

Endogenous growth theory has generated a number of models linking fiscal policy and long-term growth and demonstrating various conditions under which relations are robust (see Barro and Sala-i-Martín, 1995; Jones, Manuelli and Rossi, 1993; Devereux and Love, 1994; and Stokey and Rebelo, 1995). These models highlight the distinction between productive and non-productive expenditures and between distortionary and non-distortionary taxes.

Distortionary taxes in this context are those which affect the investment decisions (with respect to physical and/or human capital) and create tax wedges on labor. Government expenditures are differentiated according to whether they are included as arguments in the private production function or not. For example, if there are externalities from investment in physical or human capital, government intervention to increase school enrolment or capital formation may boost growth. These models envisage that shifting taxation from distortionary towards non-distortionary forms has a growth-enhancing effect, whereas switching expenditure from productive towards unproductive forms is growth-hindering. Non-distortionary tax-financed increases in productive expenditures are expected to have a positive impact on economic growth, while financing of non-productive expenditure would not have any impact. Finally, non-productive (productive) expenditures financed by distortionary taxes would have an unambiguously (ambiguously) negative growth effect.

As theoretical notions do not translate easily into operational rules, the empirical literature offers different measures of "productive" public expenditure and "distortionary" taxation. For example, Kneller, Bleaney and Gemmell (1999) treat income and property taxes as "distortionary" and consumption (expenditure-based) taxes as "non-distortionary" on the grounds that the latter do not reduce the returns to investment even though they may affect the labor/education/leisure choice (Annex, Table 6).[7]

Generally, expenditures with a substantial (physical or human) capital component are treated as "productive", but it may apply to only a narrow range of expenditures such as subsidies to R&D, education and transport (Romero De Avila and Strauch, 2003). Allocation of expenditure to productive/non-productive

[7] Mendoza, Milesi-Ferretti and Asea (1997) note that this choice may indirectly affect investment and growth.

categories may also differ between rich and poor countries. The conditions under which a change in the composition of expenditure leads to a higher steady-state growth rate of the economy depend not only on the physical productivity of the different components of public expenditure but also on their initial shares. The various programs that have been hypothesized in the theoretical literature to have positive growth effects typically amount to less than one-fifth of public expenditure in OECD countries but more than one-half of public spending in less developed countries (Fölster and Henrekson, 1997).

Finally, the fiscal deficit should be interpreted as a means to finance additional government expenditures and in this way it may indirectly effect economic growth. While in a Ricardian world there should be no difference between tax and deficit financing of government expenditures unless the tax structure would be different in the future than today (Ludvigson, 1996), in other cases (e.g., due to overlapping generations or credit imperfections) public debt can change the private incentives to invest and thus influence the rate of growth in the economy (Zagler and Durnecker, 1999).

A variety of empirical studies have examined the effect of fiscal policy on economic growth. Many have used an aggregate approach, looking at the impact of total government revenue or expenditure (in percent of GDP) on growth. Some studies have found no significant relationship between the level of spending and the rate of growth (Mendoza, Milesi-Ferretti and Asea, 1997; Tanzi and Zee, 1997), while others found either a significant positive (Holmes and Hutton, 1990; Sala-i-Martín, 1992) or negative (Barro, 1991; Weede, 1991; Hansson and Henrekson, 1994) relation between the variables. The results may also depend on the level of development (e.g., Fölster and Henrekson, 2001 point to a robust negative relationship between government expenditure and growth in rich countries). Similarly, using the aggregate tax-to-GDP ratio, many studies found a significant negative relation to growth although the size of the effect differs considerably (Engen and Skinner, 1996; Cashin, 1995; Fölster and Henrekson, 2001) (Annex, Table 7). Other studies found no significant effect.

The above results suggest that the relation between growth and "government size" is likely to be non-linear. Devarajan, Swaroop and Zou (1996) suggest that expenditures, which would normally be considered productive, become unproductive in excessive amounts. Similarly, while taxes may reduce growth by being too high, they might also constrain growth by being too low (insufficient to finance essential government services). Evidence of a "Laffer" curve has been found in several countries.

The studies mentioned above generally fail to identify channels through which fiscal policy have an effect on growth and how the composition of revenue or expenditure matters in this regard. However, other studies have picked up where these left off. For example, Kneller (1999) found that both the structure of taxation and expenditure composition influenced the rate of growth.

Consumption and social security spending are mostly found to have no or negative effect on growth (Aschauer,1989; Barro, 1990 and 1991; Grier and Tullock, 1989) although some like Cashin (1995) found a positive growth impact from welfare spending. In contrast government, regarding investment expenditure, Aschauer (1989) found that "core infrastructure" (streets, highways, airports, mass transits, etc.) had a positive relationship with private sector productivity. Many other studies have found plausible growth effects of government investment expenditure (Nourzad and Vrieze, 1995; Sánchez-Robles, 1998; Kamps, 2004), with some evidence that the law of diminishing returns holds (De la Fuente, 1997). Further, a large number of studies present evidence that public investment can be productive if it is spent on infrastructure that serves as inputs to private investment (Devarajan, Swaroop and Zou, 1996). The empirical literature on the growth-enhancing effect of expenditure on human capital is almost unequivocal (Guellec and van Pottelsbergh, 1999; Diamond, 1999; De la Fuente and Doménech, 2000; Heitger, 2001). Some studies, however, found that this required that public spending (*i.e.* on R&D) complemented rather than crowded out private spending (David, Hall and Toole, 2000). Weak links between education, health and growth, where such existed, was ascribed to poor targeting or allocation of expenditures. For other categories of public spending, the evidence is less conclusive.

Regarding tax structure and economic growth, Widmalm (2001), using a panel data set for 23 OECD countries, found that different taxes had different growth effects and that tax progressivity was bad for growth (especially personal income taxes). The harmful effects of a progressive income tax structure (compared to a flat tax) were also noted by Koester and Kormendi (1989), Cassou and Lansing (2000), Caucutt (2003), and Padovano and Galli (2001). Daveri and Tabellini (1997) and Heitger (2001) reached similar conclusions regarding the negative impact of personal income taxes. Further, Mendoza, Milesi-Ferretti, and Asea (1997) found that changes in labor income taxes had stronger effects on growth than changes in capital income taxes. Consistent with these findings, several studies (Jones, Manuelli and Rossi, 1993; Pecorino, 1993; Devereux and Love, 1994; Stokey and Rebelo, 1995) found that consumption taxation induced fewer distortions than the taxation of factor incomes.[8] A comprehensive discussion of the growth effects of consumption taxes compared with income taxes can be found in Krusell, Quadrini and Rios-Rull (1996).

2.2 *Empirical strategy*

2.2.1 *Specification of the model*

Our empirical model is based on the specification used in two of the most influential papers in the growth literature: Barro and Sala-i-Martín (1992) and Barro (1996); and similar to the specification proposed by Bleaney, Gemmell and

[8] On the other hand, Leibfritz, Thorton and Bibbee (1999) and Xu (1999) found that capital taxes were more detrimental to growth in the long term than taxes on wage taxes or consumption.

Box 1
Analytical Problems in Testing Relation Between Fiscal Variables and Growth

Empirical studies of the relation between fiscal variables and growth faces several difficulties:

First, omitting important country-specific features of revenue/expenditure policies (expenditure/revenue design, linkages with other policy instrument, *i.e.* between benefits and entitlements, specific aims of spending programs) may distort the quantitative importance of taxes and expenditures for growth. This is closely related to the fundamental issue of efficiency.

Second, failure to adequately specify the government budget constraint may introduce a bias to the growth regressions (Mofidi and Stone, 1990; Miller and Russek, 1993; De la Fuente, 1997; and Kocherlakota and Yi, 1997). According to Kneller (1999), the non-robustness of results arises also from a "widespread tendency to add fiscal variables to regressions in a relatively *ad hoc* manner without paying attention to the linear restriction implied by the government budget constraint".(1) Thus, Miller and Russek found that the growth effect of a change in expenditure depended crucially on the way in which the change in expenditure was financed, while Kocherlakota and Yi showed that tax measures affected growth only if public capital expenditures were included in regressions.

Third, correlations between economic growth and its proposed determinants are often sensitive to the inclusion of other potential growth variables. Levine and Renelt (1992) point out that over 50 different variables have been reported significantly correlated with economic growth in empirical studies, but that only two of these survive a systematic sensitivity analysis (the share of investment in GDP and the initial level of income – conditional-convergence hypothesis).

Finally, the issue of potential endogenity is, as often the case, an important concern. For example, countries tend to spend more on public services as incomes grow (Wagner's law).

(1) Source: Kneller, Bleaney and Gemmell (1999).

Kneller (2001). Following this, we assume that growth, g_{it}, in country i at time t is a function of base (non-fiscal) variables, Y_{it}, and a vector of fiscal variables, X_{jt}.

For the first set of variables, we assume a standard human capital augmented growth model where the real per capita growth rate in country i and year t (g_{it})

depends on the accumulation of physical (gross investment as a share of GDP; *INVit*) and human capital (measured as the higher education enrolment rate; *EDUhit*) as well as the population growth rate (the latter occurred to be insignificant and we subsequently excluded it from our base regression). Given the overwhelming support for (conditional) convergence in the empirical growth literature (Barro and Sala-i-Martín, 1995), we also included initial income (Y_0) as an explanatory variable.

The models noted above distinguish between "distortionary" and non-"distortionary" forms of taxation and between "productive" and "unproductive" expenditures. Further, they acknowledge the existence of the government's budget constraint. We thus include these categories of taxes and expenditures along with the budget balance in the set of fiscal variables. Given that the sum of revenues, expenditures, and the budget balance equals zero, one element must be omitted in the estimation in order to exclude perfect collinearity. The omitted variable serves as is the compensating element within the government's budget constraint (*i.e.* if we omit non-distortionary taxation, we assume that any change in expenditure will be financed by a change in non-distortionary taxes).

To put our basic growth equation formally:

$$g_{it} = \alpha + \sum_{i=1}^{k} \beta_i Y_{it} + \sum_{j=1}^{m} \gamma_j X_{jt} + u_{it}$$

Since $\sum_{j=1}^{m} X_{jt} = 0$, one of its element must be omitted from the estimation:

$$g_{it} = \alpha + \sum_{i=1}^{k} \beta_i Y_{it} + \sum_{j=1}^{m-1} (\gamma_j - \underset{\text{omitted element of the budget}}{\gamma_m}) X_{jt} + u_t$$

Productive government expenditures are expected to have a positive impact on growth while distortionary taxes should have a negative impact. Unproductive consumption and non-distortionary taxes are expected to have no growth impact and therefore might be excluded from the estimation. To test this, we estimated two equations, each time with one of these variables omitted, and then checked for the significance of the remaining one. In both cases the test supported the hypothesis that the coefficient of the growth-neutral variable was zero. Omitting both irrelevant variables yielded more precise estimates.

The empirical growth literature suggests that correlations between economic growth and included regressors are sensitive to the inclusion of other potential growth determinants (Levine and Renelt, 1992). We performed sensitivity analysis using "conditioning" regressors, including monetary policy indicators (average level of inflation, standard deviation of inflation), proxies for country openness to international trade (such imports and exports as a share of GDP), terms of trade,

Box 2
EBA Methodology[(1)]

Extreme-bounds analysis involves the following steps (see, e.g., Leamer, 1983 and 1985).

Imagine that there is a pool of variables (I and Z) that previously have been identified to be related to growth and one is interested in examining whether the inclusion of a particular variable M is robust. Thus, one would estimate an equation of the form:

$$Y = \alpha + \beta_m M + \beta_i I + \beta_z Z + \beta_d D + \varepsilon$$

where Y is per capita GDP growth, I is a set of variables always included in the regression (e.g., the initial level of income, the investment rate, the higher education enrolment rate, and the rate of population growth – following Levine and Renelt, 1992), Z is subset of variables identified by past studies as potentially important explanatory variables of growth (usually up to three variables are taken from a pool of n variables available) and M is the variable of interest.

Extreme-bounds testing involves varying the subset of Z-variables included in the regression to find the highest and lowest values for the coefficient on the variable of interest, (β_m), that standard hypothesis test do not reject (at the 0.05 or 0.1 significance level). Thus, the extreme upper bound is defined by the group of Z-variables that produce the maximum value of β_m plus two standard deviations ($\beta_m + 2\sigma_m$). A result is "robust" if β_m remains significant and of the same sign at the extreme bounds. In contrast, if one finds a single regression for which the sign of the coefficient changes or becomes insignificant, the result is "fragile." Thus, alteration in the conditioning information set may change the statistical inferences regarding the relationship between Y and M.

[(1)] It should be noted that the EBA method has been criticized for "reverse data mining" (Sala-i-Martín, 1997) and multi-colinearity.

unemployement, and a deterministic trend (similar to Folster and Henrekson, 1998). The point of departure for our robustness tests was Leamer's (1983) extreme bounds analysis (EBA), and Levine and Renelt's (1992) empirical application of this.

2.2.2 Data

We use a cross-sectional data set for the EU8 countries for the period 1995-2004. All data, with a few exceptions, are taken from Eurostat. Data on the

Table 1

Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
GDP per capita g	80	4.81	2.6	–1.63	11.97
Initial GDP	80	7606.43	2157.54	4876.28	13012.56
Higher Education	80	42.88	16.15	18.24	80.44
Openness	77	90.88	26.07	37.37	138.62
Investments	80	25.82	4.16	14.31	34.75
Budget surplus	76	–3.0	2.31	–10.00	3.22
Unproductive exp.	79	19.97	3.15	14.41	26.8
Productive exp.	79	17.22	2.09	11.86	21.97
Other expenditure	79	4.083	2.66	1.59	12.79
Distortionary taxes	80	19.94	3.92	15.48	23.9
Non-distortionary	80	11.70	2.57	9.85	15.52
Other taxes	80	5.57	3.61	0.73	16.26

(gross) school enrollment rate and fiscal variables (based on GFS methodology) come from the World Bank Databases, Government Financial Statistics Yearbooks (IMF) or Ministries of Finance in the respective countries.[9] The data are consolidated and cover all levels of government. All fiscal variables are expressed as percentages of GDP. Fiscal variables were classified into types proposed by Bleaney, Gemmell and Kneller (Annex, Table 6). We thus assume that income taxes (personal income tax, corporate income tax, and social security contributions) and property taxes are "distortionary" and that expenditures with an important (physical or human) capital component are "productive" (*i.e.*, with a functional classification, general public services expenditure, educational expenditure, health expenditure, and housing expenditure).[10]

Data on the main variables are presented in Table 1. Among the fiscal variables, our "distortionary" tax category yields about twice as much revenue (20 per cent of GDP on average) as "non-distortionary" taxes, while the two main expenditure categories each account for about 20 per cent of GDP.

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9 In the sample, data on expenditure in Estonia and Slovenia comes from different sources, but represents the same methodology.

10 Our classification differs from that of Bleaney, Gemmel, and Kneller with regard to "Transport and Communication" expenditure. In our classification, this category belongs to non-productive expenditure as we were unable to exclude it from "Economic Affairs". For those countries where data are available, this category represents 0.3-2 per cent of GDP on average in the last ten years.

2.2.3 Estimation results

Table 2 summarizes the key results. In the first column, we regress the real per capita growth rate on the non-fiscal variables (Y_0, *INV*, *EDU*) and all budget elements except unproductive expenditure (we treat this variable as the implicit financing element). Then we change the implicit financing element from unproductive expenditure to non-distortionary taxation (second column, EQ2). Next, we test the hypothesis that the neutral budget elements (unproductive consumption and non-distortionary taxes) can be omitted from our growth equation. As the hypothesis of a common coefficient was not rejected by the data, the next column omits both non-productive and non-distortionary variables, imposing a common coefficient for these two elements of the budget constraint. Finally, our base regression (EQ4) omits "neutral" and non-significant fiscal variables.

The base regression results point to a negative relationship between distortionary taxation and the growth rate of GDP per capita for EU8 countries in the period 1995-2004. The size of the estimated coefficients implies that an increase of the revenue ratio by 1pp is associated with a decrease in the growth rate in the order of 0.4pps. This number is very similar to results obtained by Kneller (1999) for a sample of 22 developed countries in the period 1970-95. At the same time, the coefficient for the level of government productive expenditure is positive and statistically significant, *i.e.*, an increase of 1pp of GDP in the ratio of productive expenditure-to-GDP boosts the growth rate per capita by about 0.3pps. We also find a large and positive relationship between the budget balance and growth[11] in line with several other studies.[12]

We proceeded to test whether the choice of implicit financing element alters the correlation between fiscal variables and growth. Instead of using "growth neutral" financing elements, we experimented with all others. We found that the choice of implicit financing element imparts the expected bias to the coefficients in

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[11] While it might have been preferable on theoretical grounds to link growth to the structural budget balance, the incorporation of the government budget constraint and difficulties in estimating structural budget balances in the EU8 countries argued for using the actual budget balance. Furthermore, budget balances in the EU8 are generally believed to be largely structural (see, e.g., Convergence Programs), so our findings are not likely to be sensitive to the choice of fiscal balance indicator.

[12] These results are in line with previous findings for the EU8 countries by the authors (World Bank, 2005) despite differences in specification of the growth model and estimation methodology. We previously found that:

a) the total tax burden was negatively related to growth, although not robustly;

b) there was a negative and robust relation between the share of direct taxes and social security contributions (presumably more distortionary taxes) and economic growth, with an increase in the share of these taxes by one pp associated with 0.3 pp lower growth; and

c) indirect (presumably less distortionary) taxes had a positive and robust correlation with economic growth.

At the same time, none of the variables reflecting expenditure structure were robustly correlated with growth, although two of these – gross fixed capital formation and social benefits other than social transfers in kind – were robust in some combination of conditional variables. In these cases, gross fixed capital formation had a positive impact on growth while social benefits other than social transfers in kind were associated with lower growth.

Table 2

Estimation Results
Estimation technique: Linear regression,
heteroskedastic panels corrected standard errors (Prais Winsten standard errors)
(dependent variable: growth GDP per capita)

	Static	Static	Static	Static	Static	Static	Dyna-amic
Variables	**EQ1**	**EQ2**	**EQ3**	**EQ4 - Base**	**EQ5 - Sensi-tivity**	**EQ6-Sensitivity**	**EQ7 – Endog-eneity**
Initial GDP per capita (Yo)	–0.0004* (0.0002)	–0.0003* (0.0002)	– 0.0003*	–0.0003* (0.0001)	–0.0004* (0.0001)	–0.0004* (0.0001)	–0.0006* (0.0004)
Investments (INV)	0.15* (0.06)	0.17* (0.06)	0.13* (0.05)	0.14* (0.05)	0.10** (0.06)	0.10** (0.06)	0.18*** (0.11)
Higher education (Eduh)	0.07* (0.02)	0.07* (0.02)	0.08* (0.02)	0.08* (0.02)	0.09* (0.03)	0.09* (0.02)	0.13* (0.05)
Budget balance (Surp)	0.53* (0.13)	0.84* (0.19)	0.58* (0.12)	0.53* (0.11)	0.51* (0.13)	0.52* (0.10)	0.55* (0.17)
Productive Expenditure (PEXP)	0.39* (0.18)	0.69* (0.22)	0.47* (0.15)	0.36* (0.16)	0.29* (0.16)	0.28* (0.16)	0.65* (0.13)
Unproductive Expenditure (UEXP)	-	0.37** (0.2)	-	-	-	-	-
Other expenditure (OEXP)	0.02 (0.13)	0.31* (0.15)	0.12 (0.11)	-	-	-	-
Taxes Distortionary (DTAX)	–0.51* (0.15)	–0.87* (0.22)	–0.47* (0.15)	–0.4* (0.12)	–0.43* (0.13)	–0.36* (0.13)	–0.78* (0.12)
Taxes Non-Distortionary (NTAX)	0.28 (0.15)	-	-	-	-	-	-
Taxes Other (OTR)	–0.04 (0.1)	–0.33* (0.17)	0.12 (0.11)	-	-	-	-
Const	2.53 (2.36)	1.79 (2.34)	3.63 (2.32)	3.8** (2.35)	338.2 (2.35)	4.7 (2.27)	-
Openness (OPE)					0.05* (0.02)	0.03* (0.02)	0.03* (0.02)
Regulations (REG)					0.86* (0.51)		
Trend					–0.17 (0.13)		–0.21 (0.23)
N	76	76	76	76	73	75	55
R^2	0.57	0.58	0.56	0.55	0.59	0.59	0.59

In parentheses the standard errors are reported.
Coefficients from EQ5 present total effects: current first difference coefficients plus lagged.
* Variables significant at 5 percent level.
** Variables significant at 10 percent level.
*** Variables significant at 15 percent level.

Table 3

Robustness Test for the EU8 Sample with Three Conditioning Variables

	Distortionary Taxes					
	Three Conditioning Variables			Three Conditioning Variables, plus Omitting Initial GDP		
	Coefficient	"*Z*" variables	Robust	Coefficient	"*Z*" variables	Robust
EBA lower bound	–0.47	Ope, CPI_dev Trend, Reg	Yes, at the 5% level	–0.59	Ope, CPI_dev Trend, Reg	Yes, at the 5% level
EBA base	–0.4	-		–0.49	-	
EBA upper bound	–0.36	Ope		–0.48	Ope	
	Productive Expenditure					
	Three conditioning variables			Five conditioning variables		
EBA lower bound	0.27	Ope, Trend	Yes, at the 10% level	0.24	Ope, Trend	No
EBA base	0.35	-		0.28	-	
EBA upper bound	0.39	CPI_dev Trend, Reg		0.36	CPI_dev Trend, Reg	

case of unproductive expenditure and changed the statistical significance in case of productive expenditure (correlation becomes insignificant). Unproductive expenditure, when financed by an increase in distortionary taxation or a widening of the budget deficit (we do not show this in the table), was significantly and negatively correlated with growth, while financing through non-distortionary taxation resulted in a positive (albeit weak) correlation with growth (EQ2). In case of distortionary taxation, the estimated negative coefficient did not seem to be sensitive to the choice of the omitted variable (choice of the compensating element within the government's budget constraint).

2.2.4 Sensitivity analysis

The regression specification in column four of Table 2 is next subjected to robustness tests. Applying the EBA methodology in our context implies the estimation of regressions of the form where I is a vector of the base variables that always appear in the regressions (Yo, INV, Eduh, Surp, PEXP (or DTAX), M denotes the variable of interest (DTAX or PEXP) and Z is a vector of four variables (openness, regulation index, standard deviation of inflation, and trend) taken from the pool of additional plausible control variables. However the more formal test was based on EBA methodology. We test whether our results are sensitive to i) the inclusion of four "conditional variables;" and ii) exclusion of initial GDP (see, e.g., Easterly and Rebelo, 1993). The results from the EBA performed on the base variables are displayed in Table 3.

The inclusion of the conditional variables did not change our results. Both tested variables were robustly correlated with growth, with the taxation coefficient generally more robust than the expenditure coefficient. Additionally, the coefficients of the fiscal variables resulting from different specifications of the growth equation remained fairly close to those in the base estimation. In Table 2 (EQ5, EQ6) we show two examples of the change in the specification of our growth equation. In contrast, excluding initial GDP from the base regression, the PEXP coefficient became fragile. Since initial GDP was a significant regressor in our base equation, this was not surprising. However, it may suggest simultaneity in our regression caused by Wagner's law (increases in per capita incomes lead to higher government spending).

There is no clear explanation of our results (less robust correlation for the expenditure than for the tax variables; small coefficient bias when we change the implicit financing element) but they may arise from:

1) the linear specification of our model while the relation between expenditure and growth is likely to be nonlinear; and
2) our model does not capture properly the efficiency of public spending.

2.2.5 Endogeneity

Potential endogeneity of regressors (investments, openness and fiscal variables) may lead to biased and inefficient coefficient estimates and misleading results. We experimented with various variables as instruments for the potentially endogenous variables, but did not find any instruments that improved our estimates (small sample size is problematic since the instrumental variables estimator is an asymptotic estimator that requires a large samples to be consist). Thus, we specified a dynamic panel model, which was estimated using the Arellano and Bond (1991) Generalized Method of Moments (GMM) technique (which uses lags of the endogenous variables as instruments). While this should yield consistent estimates of the coefficients, our small sample size might still bias estimates (downwards). EQ7 in Table 2 shows the result from the dynamic model estimation (budget

Box 3
Quantitative measures of public sector efficiency in the EU8

In recent years, a number of attempts have been made at measuring the efficiency of public sectors. The techniques developed include parametric and non-parametric methods. The parametric approach assumes a specific functional form for the relationship between inputs and outputs of government spending. It is based on econometric methods and includes the Public Sector Performance indicator (PSP) and the Public Sector Efficiency indicator (PSE). The non-parametric approach calculates the frontier from the data without imposing any specific functional restrictions. Techniques developed within this approach include Free Disposal Hull (FDH) and Data Envelopment Analysis (DEA), using mathematical programming techniques.

Afonso, Schuknecht and Tanzi (2006) conducted a pioneer quantitative analysis of public sector efficiency for the ten new Member States that acceded to the EU in May 2004. While calculating the PSP and PSE measures, the authors take into account two broad groups of indicators: process (opportunity) and traditional (Musgravian) indicators. The first group includes administrative, education, and health, each of which contains several sub-indicators (e.g., health includes the infant survival rate and life expectancy). The second group includes income distribution (measured by the Gini coefficient), economic stability (measured by the average inflation rate and the variation of GDP growth in the most recent 10 years), and economic performance (measured by the average unemployment rate and GDP growth in the most recent 10 years). All indicators are given equal weight and their values are normalized with the average set equal to one. To derive PSE values, PSP figures were weighted by the relevant category of public expenditure. Also, public spending was normalized across countries, taking the average value of one for each of the six categories.

The authors show that expenditure efficiency across the new EU Member States was diverse, especially compared to the best performing emerging markets in Asia (Annex, Table 8). Within the EU8 group PSP was better among high spenders (Slovenia and Hungary), while PSE – taking into account resources used – was better in countries with smaller governments (the Baltic States). All EU8 countries performed well below the average of the selected comparator group of countries. However, the differences between the EU8 countries was not as large as the difference between these and the much better performing non-European emerging markets like Chile, Mexico, Korea, or Thailand. At the sub-indicator level, the efficiency scores on economic performance were much better for the Baltic States than for the remaining EU8 countries, while efficiency measures in the education were near average (Poland) or even above average (remaining three Visegrad countries).

surplus, investments, productive expenditure and distortionary taxation were assumed to be endogenous in this estimation). Comparing the results of the dynamic model with the static model (our base regression) we see that coefficient signs are unchanged but of much higher magnitude in the dynamic specification.

3. Labor taxation and employment

3.1 Trends in GDP growth, employment growth and tax wedge in the EU8

Output and employment growth rates have fluctuated significantly in the EU8 during the period 1996-2003, with some tendency for the two to follow the same pattern (Figure 2). Tax wedges have, as expected, been much more stable. The largest change occurred in Hungary, which had the highest tax wedge rate in EU8 group at the outset of the period.

While the limited variations in the tax wedge within individual countries does not allow one to discern any relationship with employment, there does seem to be a negative relationship between the two across countries, albeit with significant variation (Figure 3).

3.2 Theoretical considerations

Consider a simple theoretical framework of labor demand and labor supply (Figure 4). In this framework, an increase in the tax wedge can be represented by a downward shift in the labor demand curve.[13] The more elastic is the labor supply curve (and/or demand curve), the more harmful is the tax wedge for employment. In the case of a vertical labor supply curve (demand curve), an increase in the tax wedge is fully accommodated by a decrease in the net wage (increase in total labor cost) without any employment effect meaning that workers (employers) accept the full financial burden of the higher tax. In the case of a horizontal labor supply curve, workers would not accept any net wage decrease – the tax incidence is fully on employers and they reduce employment accordingly.

Most theoretical and empirical analyses concerning the influence of the tax wedge on employment attempt to uncover the shapes of the labor demand and supply curves and the micro- and macroeconomic factors that influence these in various countries and situations. Our goal is not to examine the exact shape of labor demand and supply curves in the EU8, but rather to examine how their interrelations might affect employment in the region.

[13] In our framework, a change in the tax wedge is represented by a shift in the labor demand curve because wages are expressed in net terms (see also OECD, 2003b; Bell *et al.*, 2002, and other sources).

Figure 2

GDP, Employment and Tax Wedge Trends in EU8 Countries in 1996-2003

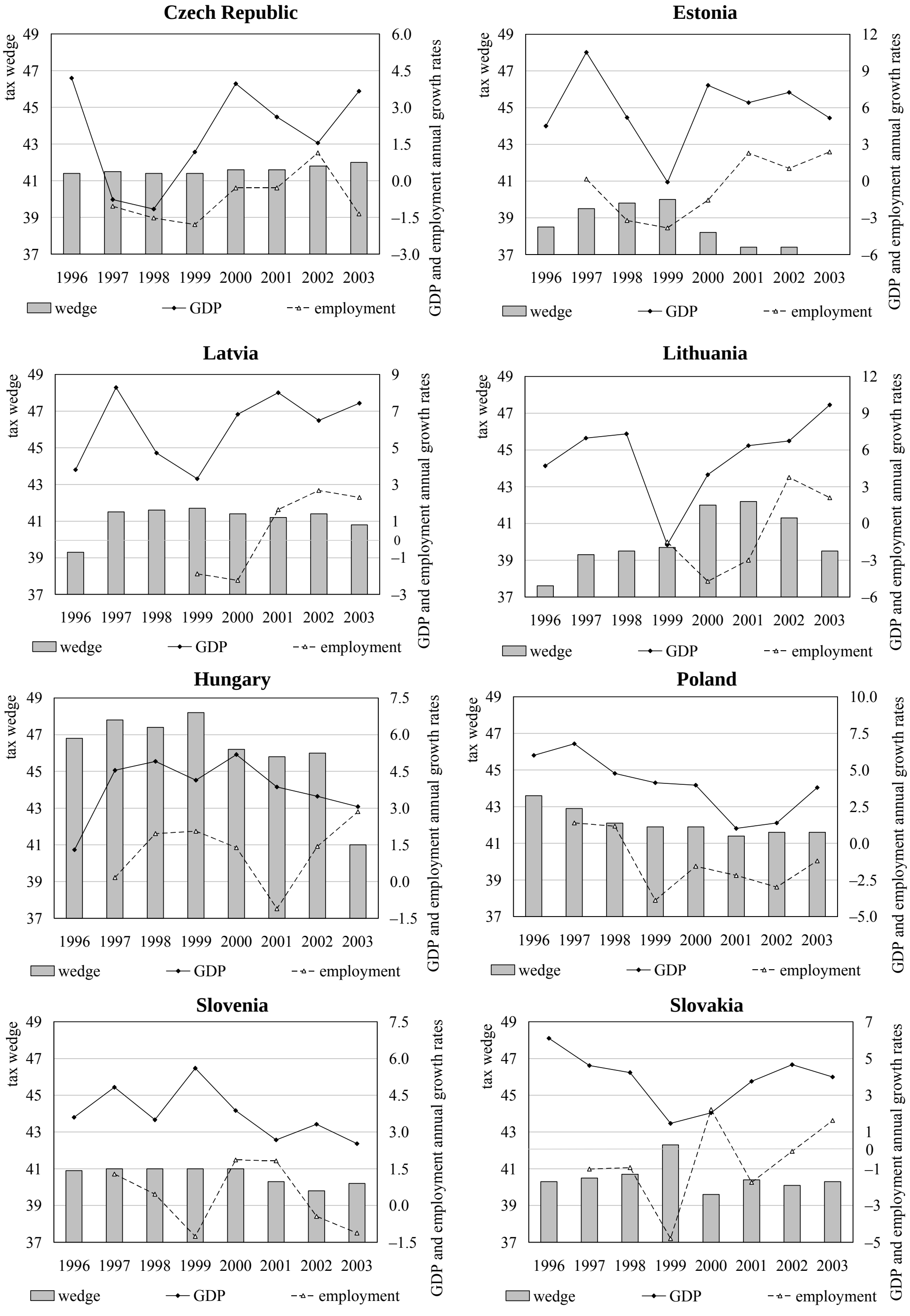
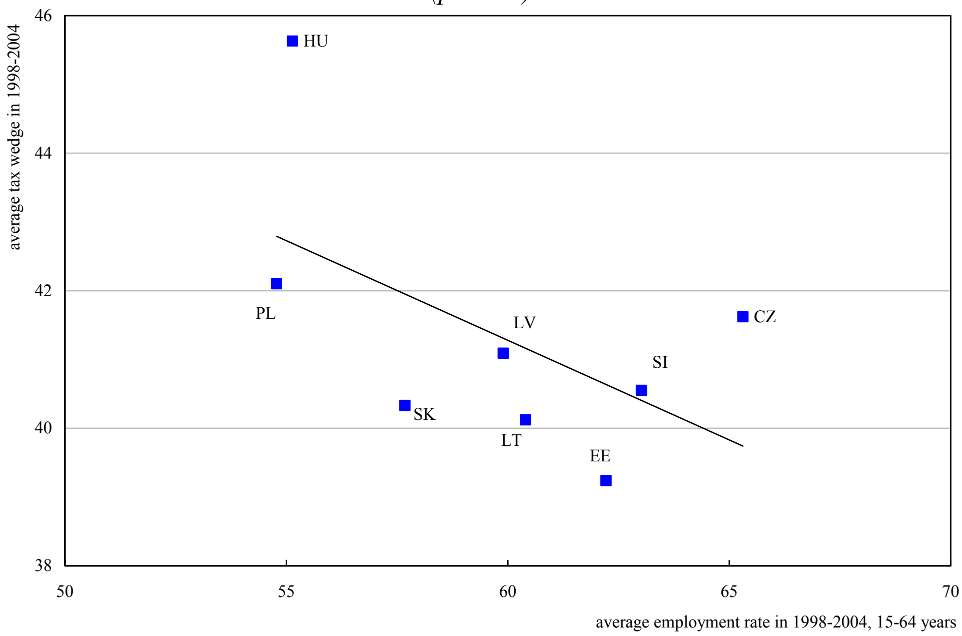


Figure 3

Average Tax Wedge and Average Employment Rate in EU8 in 1998-2004
(percent)



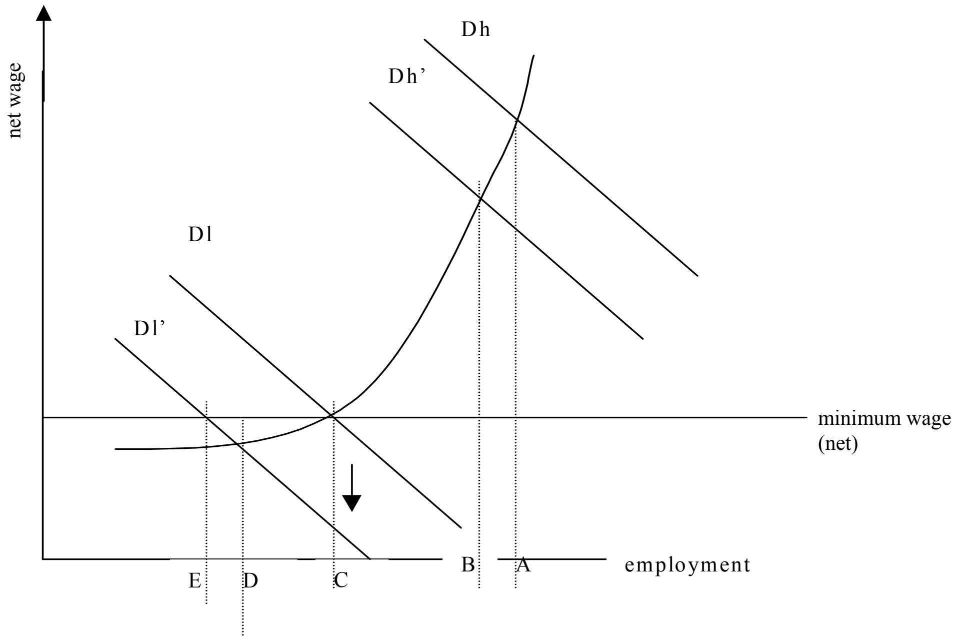
Note: the tax wedge is defined with respect to an earner of 67 per cent of the average production wage in manufacturing (APW). The tax wedge is the ratio of total labor taxes to total labor costs.
Source: Staff calculations based on EUROSTAT data.

3.2.1 *The role of skills, reservation wage and non-employment benefits*

The simple analysis in Figure 4 implies that in the case of standard convex aggregate labor supply (and demand) curves, a change in the tax wedge affects employment more for relatively low-wage earners (generally low-skill workers). This is confirmed in several empirical studies (OECD 2003a and b; EC 2003a; Kugler and Kugler, 2003). The elasticity of labor supply at the lower end of the income distribution, and thus the impact on low-skill employment of changes in the tax wedge, may be increased (the curve becomes flatter) by the presence of any kind of wage-floor, be it a statutory minimum wage or a reservation wage driven by the existence of alternative work-income sources (shadow economy or non-employment benefits). While minimum wages in the EU8 are not particularly generous, non-employment benefits (especially various early retirement and disability pensions) have been relatively generous potentially creating unemployment traps (see, e.g., Polish Ministry of Economy and Labor, 2005). Similar to the relationship between labor taxes and employment, we observe a negative correlation between pension expenditures and employment in the EU8 (Figure 5, Figure 6).

Figure 4

Labor Market – Theoretical Analysis



Dh: demand for skilled labour
Dh': demand for skilled labour after tax wedge
D1: demand for unskilled labour
D1': demand for unskilled labour after tax wedge
AB: employment reduction among skilled workers due to tax wedge
CD: employment reduction among unskilled workers due to tax wedge without bindind minimum wage
CE: employment reduction among unskilled workers due to tax wedge with binding minimum wage

Source: authors.

3.2.2 Employee versus employer taxes and wage rigidity

Even in the simple competitive framework from Figure 1, the negative employment effect of the tax wedge differs depending on which side of the market is being taxed when one introduces minimum wage regulations and/or alternative income sources. In the minimum wage case, an increase in the payroll tax (paid by employers) results in a downward shift in the labor demand curve and thus lower employment (move from point "C" to point "E"). On the other hand, an increase in income taxes can be represented as an equal downward shift of the (net) wage floor and labor demand. In this case there is both a net wage and an employment effect but there is no involuntary unemployment (move from point "C" to point "D").

The employment effect of an increase in income taxes also depends on the relative taxation of work- and alternative income. In the framework from Figure 1,

Figure 5

Pension Expenditure *(percent of GDP)*
and Employment Rates *(percent)* **in the EU8**

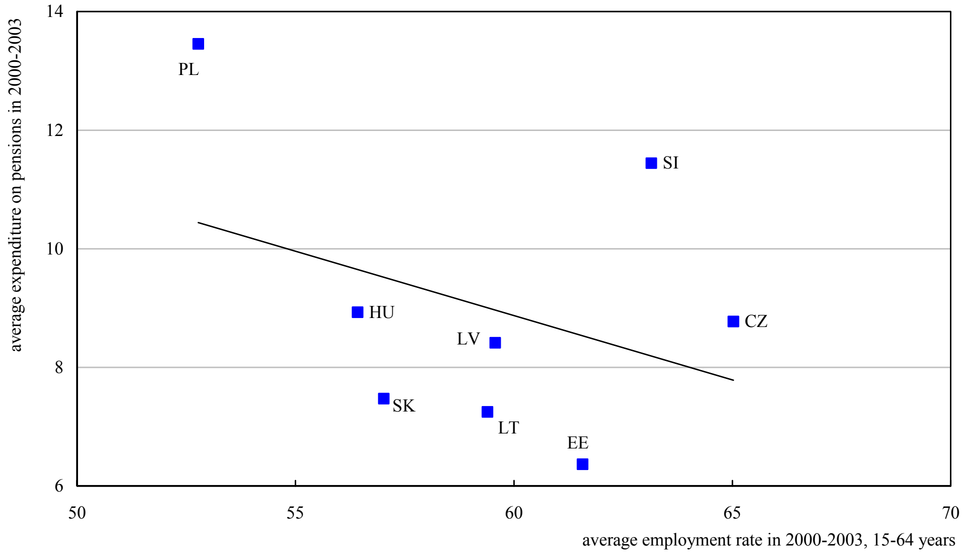
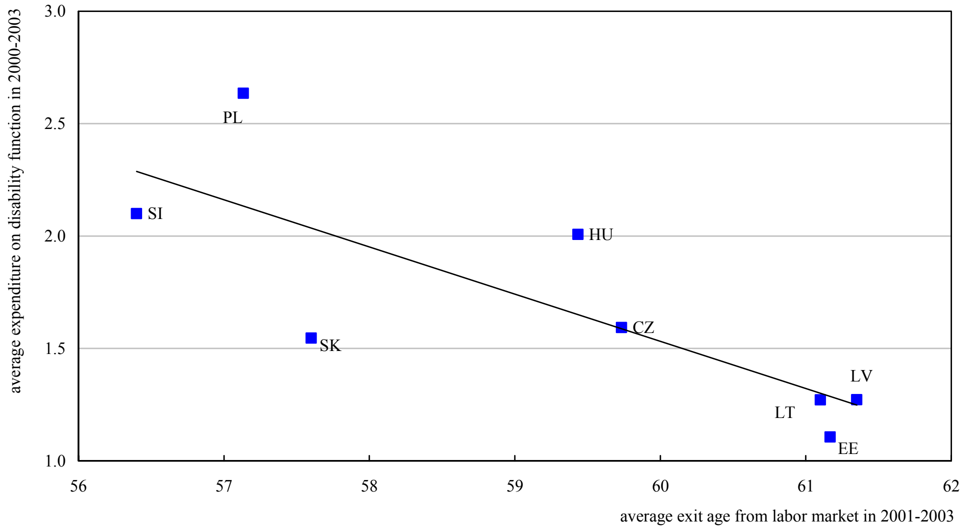


Figure 6

Disability Expenditure *(percent of GDP)*
and Exit Age from Labor Market in the EU8



Source: Eurostat data based on ESSPROS methodology.

one can replace the net wage with the difference between the net wage and alternative net income. If both are taxed with the same rates, the increase of the income tax does not shift either of the curves – there is no impact on net wages and employment. On the other hand, if non-employment benefits are tax-free or taxed at a lower rate, the increase in the tax rate on wages leads to a downward shift of the labor demand curve (as perceived by employees) and lowers employment accordingly.

As soon as one replaces our simple framework with more sophisticated theoretical models, the employment effect of income tax changes becomes lower than for payroll tax changes even without statutory minimum wages and alternative income sources. These models suggest that a shift of the tax burden from employers to employees may result in lower total wage costs and higher employment. Several studies have confirmed this applying various theoretical structures of the labor market (e.g., Goerke, 1999 and 2001; Koskela, 2001; and Nickell, 2003).

Further, both theoretical models and empirical research suggest that the overall tax-employment elasticity may depend on the direction of change in the tax-wedge as a result of real wage rigidity. Wages are often more rigid downwards than upwards and more rigid for blue-collar than for white-collar workers. Also, the existence of any kind of wage floor naturally increases wage rigidity.

3.3 Empirical analysis

3.3.1 Specification of the model

The general structure of empirical models designed to assess the relationship between tax wedges and employment is the following (see, for example, Daveri and Tabellini, 2000; Nickell, 1997; and Alesina and Perotti, 1997):

$$EMPL_{j,\,t} = \beta_0 + \beta_1 LABTAX_{j,\,t} + \beta_2 CONTROL_{j,\,t} + e_{j,\,t}$$

where: *EMPL* = employment measure, *LABTAX* = tax wedge measure, *CONTROL* = set of control variables, j = country, t = year and e = error term.

In our study of the EU8, the model has been modified slightly both due to the small size of the sample and to important structural features of the analyzed economies. We have used employment growth instead of the employment level on the left hand side of the estimated equation and GDP growth as the only explicit control variable.[14] While other variables are likely to affect employment growth (for example economic structure, trade links, the institutional setting, and various exogenous and endogenous shocks hitting individual countries), or limited sample and data do not allow the inclusion of a broader set of control variables.[15] Thus, in

[14] We also tried a specification with the employment rate (and output) in levels (for the period 1996-2004), but in this case output was not significant and the tax wedge coefficient only around 0.3.

[15] In any case, several of these factors are likely to be correlated with output growth, and this specification therefore allows us to at least partially tackle the problem of omitted variables.

our estimation, the tax wedge is treated as a factor negatively influencing the responsiveness of employment to a change in output/labor demand.

The following equation has been estimated on the pool of annual data from all EU8 countries for the period 1996-2003:

$$EMPG_{j,\,t} = \beta_{0,\,j} + \beta_1 WEDGE_{j,\,t} + \beta_2 GDPG_{j,\,t} + e_{j,\,t}$$

where $EMPG$ = employment growth, $WEDGE$ = tax wedge for low wage (50 per cent and 67 per cent of APW) earners, $GDPG$ = real GDP growth, j = country, t = year and e = error term.

Data

Data for tax wedges for 67 per cent APW earners come from EUROSTAT, while tax wedge data for 50 per cent APW earners are own calculations using EUROSTAT data and applying the same methodology. Estimations have been performed for both balanced and imbalanced samples (Table 4).[16]

Ideally, the tax wedge variable should correspond to the employment variable used, but attempts to ensure this are complicated by lack of data. In some cases, the 50 or 67 per cent may be more or less in line with median salaries or weighted average income (e.g., in Poland), whereas in other cases it may not (e.g., Slovenia, where about three-fourths of workers receive close to the APW). One could also argue that it would be more appropriate to use changes in the tax wedge (since other variables are in changes), but the case for this is not clear and test results anyway not materially different.

Estimation results

We used fixed effects estimation in order to allow for structural features of individual country labor markets that are not necessarily correlated with GDP growth (e.g., output structure, labor force structure and labor market institutions). These factors are expected to be relatively time invariant. To the extent they are not, but positively correlated with one or the other of the included variables, their effect may be partly captured by the relevant variable (and including them in the analysis would present its own set of econometric problems). Finally, if they are not correlated with any of the explanatory variables, the bias depends on the direction of change in the omitted variable relative to the direction of change in the included explanatory variables and the dependent variable.

[16] Data on the tax wedge for 67 per cent APW earners in Estonia ended in 2002; it has been assumed that the tax wedge did not change between 2002 and 2003 (estimations were also performed without assuming a tax wedge number for 67 per cent APW earners in Estonia for 2003, but results were similar). Data on the tax wedge for 50 per cent APW earners for Estonia ended in 2001 (no data have been assumed for subsequent years in this case).

Table 4

Estimation Results

Coefficients	**Dependent Variable: Employment Growth (EMPG)**			
	Tax Wedge for 67 per cent APW Earner		**Tax Wedge for 50 per cent APW Earner**	
	Balanced Sample	Unbalanced Sample	Balanced Sample	Unbalanced Sample
Wedge	–0.55 (–1.93)	–0.51 (–2.10)	–0.80 (–2.05)	–0.50 (–2.50)
GDPG	0.36 (2.26)	0.39 (3.13)	0.11 (0.57)	0.40 (3.30)
R^2	0.39	0.36	0.51	0.41
Sample used	1999-2003	1997-2003	1999-2001	1997-2003
No. of observations	40	52	20	50

t-values in parentheses.
Source: staff calculations.

The results of the panel regressions indicate that, for a given GDP growth rate, each percentage point increase in the tax wedge is associated with a decline in employment growth by 0.5-0.8 percentage points. These results thus suggest a strong and significant negative relationship between the tax wedge and employment in the EU8 countries. While the magnitude of this effect seems to be on the high side of the range estimated for other countries, and data limitations, the small sample size, and the small number of variables and related possibility of omitted variables could have biased the results, the direction and the strength of the employment effect seem plausible.

4. Corporate income taxation and FDI

FDI has been found in many studies to be a significant determinant of growth in middle-income countries. FDI not only increases the domestic capital stock, but also tends to enhance productivity through technology and knowledge transfers. Studying the determinants of FDI is therefore important.

The undertaking of FDI by multinational firms involves complex strategic decisions, based on considerations about ownership, location, and internalization. While taxes may impact on all aspects of the decision process, several studies have shown that other factors are likely to be more important. These include agglomeration economies, proximity to key markets, an attractive investment climate (political, social, and macroeconomic stability, rule of law, low levels of corruption, good infrastructure, etc.), and other production costs (including notably labor). Taxes are more likely to matter at the margin.[17]

Nevertheless, following EU enlargement in May 2004, a heated debate ensued about "tax competition." Some incumbent EU countries argued that several new Member States had lowered tax rates to a level that represented an unfair competitive advantage and there were even suggestions to reduce EU regional aid to those countries. On their side, new Member States argued that they suffered from other competitive disadvantages, needed to stimulate investment (both foreign and domestic) in order to support growth and income convergence, and that corporate income taxes in any case was not the main reason why foreign investors were interested in these new markets. In the following we look at the relative size of corporate taxes in the enlarged EU and examine the role of these in attracting FDI.

4.1 Comparison of corporate taxes in the EU

The new Member States of the EU generally have lower tax-to-GDP ratios than the old members. The average ratio in the EU8 countries was 33.8 per cent in 2004 compared to 41.9 per cent in the EU15 (all new Member States were below the average of the old Member States). The share of corporate taxation in total tax revenues varies among the EU countries, but is relatively small and on average smaller in the EU8 than in the EU15 (Figure 7) Also, effective tax rates, calculated as the ratio of corporate tax payments to gross operating profits of corporations, is much lower in the EU8 than in the EU15 on average (Figure 8).[18] From the mid-1990s, effective corporate tax rates were growing in the EU15, but falling in the EU8 countries. Since then, both trends appear to have reversed and some convergence taking place.

4.2 Econometric analysis of the role of corporate taxes in determining FDI in the EU8

Our econometric analysis for the EU8 was based on a panel covering seven of the new EU Member States (EU8 except Slovenia, for which comparable data was not available) for the period 1995-2002. The dependent variable was net inflows of FDI measured in dollars per capita (based on UNCTAD World Investment Reports). The explanatory variables included the effective corporate income tax rate (*ETR*),

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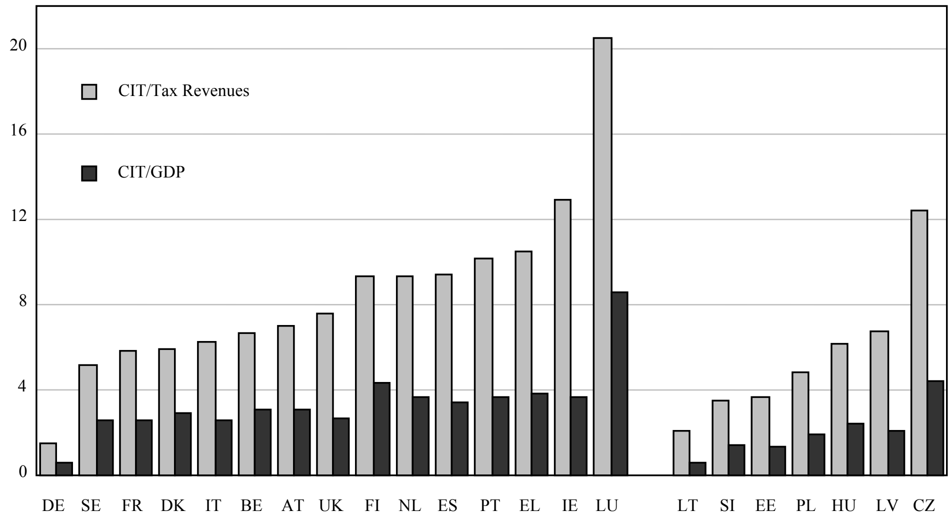
17 There are only a few studies on FDI determinants in transition countries as the time series are short and data problems significant, and tax issues have not been the focus of these studies (Kinoshita *et al.*, 2004; Garibaldi *et al.*, 2001).

18 The data on corporate tax payments were extracted from an EC database (EC, 2004b), while gross operating profits of corporations comes from the AMECO database. The gross operating surplus measures profits before depreciation, thus eliminating the distortion from differences in depreciation rules. The same concerns interest, and consequently the method of financing is irrelevant for the results. Unincorporated companies often fall under the PIT regulations and tax receipts can e reduced by loss carry-forwards which may lead to a downward bias in the estimates of effective tax rates.

Figure 7

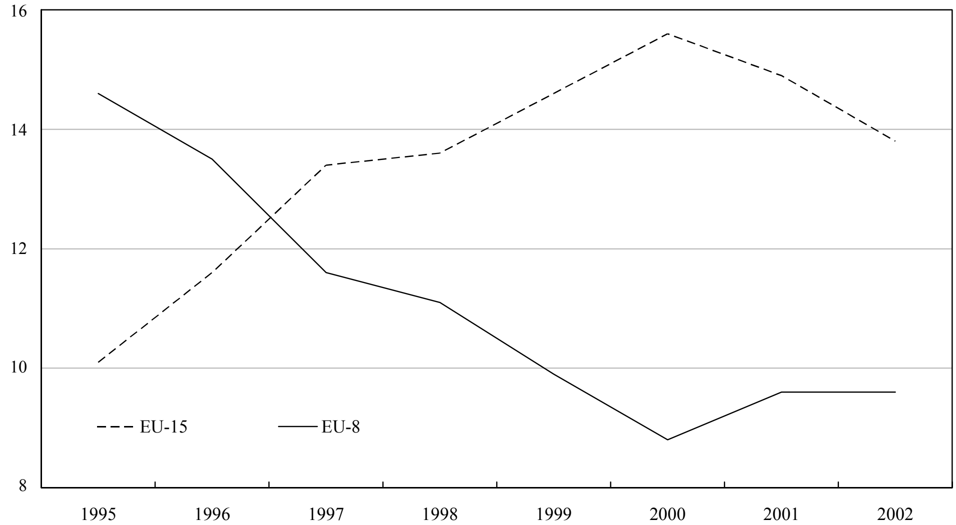
The Role of Corporate Taxation, 2002



Source: EC, 2004b.

Figure 8

Effective Tax Rates in Old and New EU Member States
(percent)



Note: Simple averages.
Source: authors' calculations.

Table 5

Regression Results for FDI Flows
(Dependent Variable: FDI)
Method: Seemingly Unrelated Regression
Total Panel (Unbalanced) Observations: 36

ETR	–11.35
	(–2.31)
NW	–1.43
	(–7.63)
TI	554.37
	–5.73
XM	3.55
	–9.57
Fixed Effects	
_CZ – C	–1,288.051
_EE – C	–1,555.104
_LT – C	–1,545.056
_LV – C	–1,450.462
_HU – C	–1,735.904
_PL – C	–1,187.758
_SK – C	–1,520.787
R^2: 0.55	
Durbin-Watson stat: 2.1	

ETR: effective tax rate.
NW: average nominal wage in USD.
TI: transition index (EBRD).
XM: share of export and import in GDP.

average nominal wages in US dollars as a proxy for labor cost (*NW*), openness of the economy measured by the share of foreign trade (exports and imports) in GDP (*XM*), and the EBRD transition index (*TI*) as a proxy for reform progress. The data set is unbalanced as certain observations for the key variables are missing. While this list of explanatory variables is hardly complete, it includes most of the main determinants of FDI identified in the literature. We estimated a fixed-effects model for the pooled sample in order to capture country specific (but time-invariant) characteristics. Such differences between countries can be represented by differences in intercepts, while we assumed that the coefficients for the explanatory variables did not differ among the included countries. The results of our estimation are presented in Table 5.

All the variables examined were found to be statistically significant and have the expected sign, although the precision of the estimation as measured by R^2 was not impressive. The results indicate that more open and advanced economic reformers attract more FDI flows. At the same time, higher labor costs and taxes hamper FDI inflows. The relative importance for FDI of the effective tax rate versus labor cost, reform progress and the openness of the economy were calculated as 1 : 2.5 : 3.2 : 1.7, respectively.

5. Conclusions and policy implications

The level and structure of taxation and expenditure appears to matter for employment, investment, and growth in the EU8. Our econometric panel data analysis covering the period 1996-2004 found a negative and robust relationship between distortionary taxation (primarily income taxes and social security contributions) and growth. Also, there appeared to be a positive relationship between productive expenditure and growth, but this was sensitive to the implicit financing element as well as to inclusion of the initial income level (supporting Wagner's law). Further, a strong fiscal position appeared to be supportive of growth. This evidence was supported by our analysis of labor taxation which revealed a relatively strong negative relationship between the size of the tax wedge and the employment rate in EU8 countries. We also found some evidence that higher corporate income tax rates are associated with lower FDI, although other factors seemed to matter more.

These findings suggest further public finance reforms in the EU8 are critical to support higher employment and growth rates. There is a need to shift taxation away from reliance on distortionary income taxes (not least high social security contributions) and find fiscal space for additional productive expenditure, not least on infrastructure and human capital development. Some countries (notably the Visegrad countries) also need to pursue further fiscal consolidation to enhance macroeconomic stability and crowd-in additional private investment. There is significant scope for enhancing the efficiency of public finances on both the revenue and expenditure sides – in some countries (Poland, Hungary, the Czech Republic, and Slovenia) through reducing the overall size of the public sector, and in all countries through broadening tax bases, introducing or increasing less distortionary taxes (notably on property), and ensuring that spending in various areas is better aligned with desired outcomes.

ANNEX TABLES AND FIGURES

Table 6

Theoretical Aggregation of Taxation and Expenditure

Theoretical aggregation	Functional classifications
Distortionary taxation	Taxation on income and profit Social security contributions Taxation on payroll and manpower Taxation on property
Non-distortionary taxation	Taxation on domestic goods and services
Other revenues	Taxation on international trade Non-tax revenues Other tax revenues
Productive expenditures	General public services expenditure Defense expenditure* Educational expenditure Health expenditure Housing expenditure Transport and communication expenditure
Unproductive expenditures	Social security and welfare expenditure Expenditure on recreation Expenditure on economic services
Other expenditures	Other expenditure (unclassified)

* Barro (1990, 1991) finds that current expenditures less education and defense expenditure is associated with lower per capita growth.

Source: Kneller, Bleaney and Gemmell (1999), "Fiscal Policy and Growth: Evidence from OECD Countries", *Journal of Public Economics*, No. 74, pp. 171-90.

Table 7

Selected Analyses of the Impact of Taxes on Economic Growth on the Example of OECD Countries

Study	Research Area	Impact of Taxation on Growth	Extent of Impact
Cashin (1995)	23 OECD countries 1971-88	negative	1pp of GDP increase in taxes/GDP ratio lowers production per employee by 2 per cent
Engen and Skinner (1996)	USA, sample from OECD countries	negative	2.5pp increase in taxes/GDP ratio reduces economic growth by 0.2-0.3 per cent
OECD - Leibfritz, Thornton, Bibbee (1997)	OECD countries 1965-95	negative	10pp increase in taxes/GDP ratio lowers GDP growth by 0.5-1 per cent
OECD (1997), European Commission	Model Quest	negative	1 per cent GDP increase of personal income tax lowers GDP growth by 2.4 per cent compared to base scenario
Bleaney, Gemmell and Kneller (1999)	17 OECD countries 1970-94	negative	1 per cent of GDP increase of distorting* tax revenues/GDP lowers GDP growth per capita by 0.4pp
Fölster and Henrekson (2001)	Sample of most affluent countries of OECD and outside OECD 1970-95	negative	10pp increase of taxes/GDP lowers GDP growth by about 1 per cent
Bassanini and Scarpetta (2001)	21 OECD countries 1971-98	negative	1pp increase in taxes/GDP lowers GDP growth/per capita by about 0.3-0.6 per cent
Price Waterhouse Coopers (2003)	18 OECD countries 1970-99	negative	1pp GDP increase of in direct taxation/GDP lowers GDP growth by 0.2-0.4 per cent

* distorting tax revenue = revenue from taxes on income and profit, social security contribution, tax on payroll, tax on property.

Source: Leach, G. (2003), *The Negative Impact of Taxation on Economic Growth*, new edition, Reform.

Table 8

Public Sector Efficiency (PSE) Indicators, 2001-03[1]

	Oppurtunity Indicators			"Musgravian" Indicators			Total Public Sector Efficiency (Equal Weights) (2)
Country	Administration	Human Capital	Health	Distribution	Stability	Economic Performance	
Brazil	0.78	0.81	1.15	0.48	0.33	0.59	0.69
Bulgaria	0.79	1.49	1.00	1.01	0.06	0.29	0.77
Chile	1.53	1.04	1.70	1.15	1.37	1.51	1.38
Cyprus		0.92	1.66		1.44	1.39	1.08
Czech Rep.	0.76	1.31	0.66	1.04	0.66	0.66	0.85
Estonia	1.09	0.83	0.91	1.21	0.57	0.87	0.91
Greece	0.97	1.32	0.83	0.83	1.23	0.56	0.96
Hungary	0.83	1.12	0.75	1.05	0.70	0.63	0.85
Ireland	1.36	1.18	0.84	1.44	1.79	1.61	1.37
Korea	1.40	1.31	1.72		1.47	2.36	1.65
Latvia	0.82	0.79	1.14	1.11	0.75	0.87	0.91
Lithuania	0.83	0.88	0.90	1.27	0.40	0.90	0.86
Malta	0.92	0.99	0.68		1.16	0.90	0.78
Mauritius	1.21	1.04	1.91		2.04	1.58	1.56
Mexico	1.18	0.72	1.52	1.90	0.55	2.01	1.31
Poland	0.89	0.98	0.97	0.80	0.69	0.68	0.83
Portugal	0.92	0.71	0.66	0.90	1.01	0.71	0.82
Romania	0.69	1.53	1.03	1.05	0.20	0.68	0.86
Singapore	2.09		2.90	1.38	5.05	2.94	2.39
Slovakia	0.82	1.23	0.77	1.18	0.90	0.64	0.92
Slovenia	0.91		0.68	0.81	1.15	0.84	0.88
South Africa	0.93	0.54	0.89		1.69	0.68	0.95
Thailand	1.58	0.86	1.68		1.91	3.11	1.83
Turkey	0.96	0.99	0.98		0.15	0.69	0.63
Average [3]	1.06	1.03	1.16	1.03	1.14	1.15	1.09
Max	2.09	1.53	2.90	1.90	5.05	3.11	2.39
Min	0.69	0.54	0.66	0.48	0.06	0.29	0.63

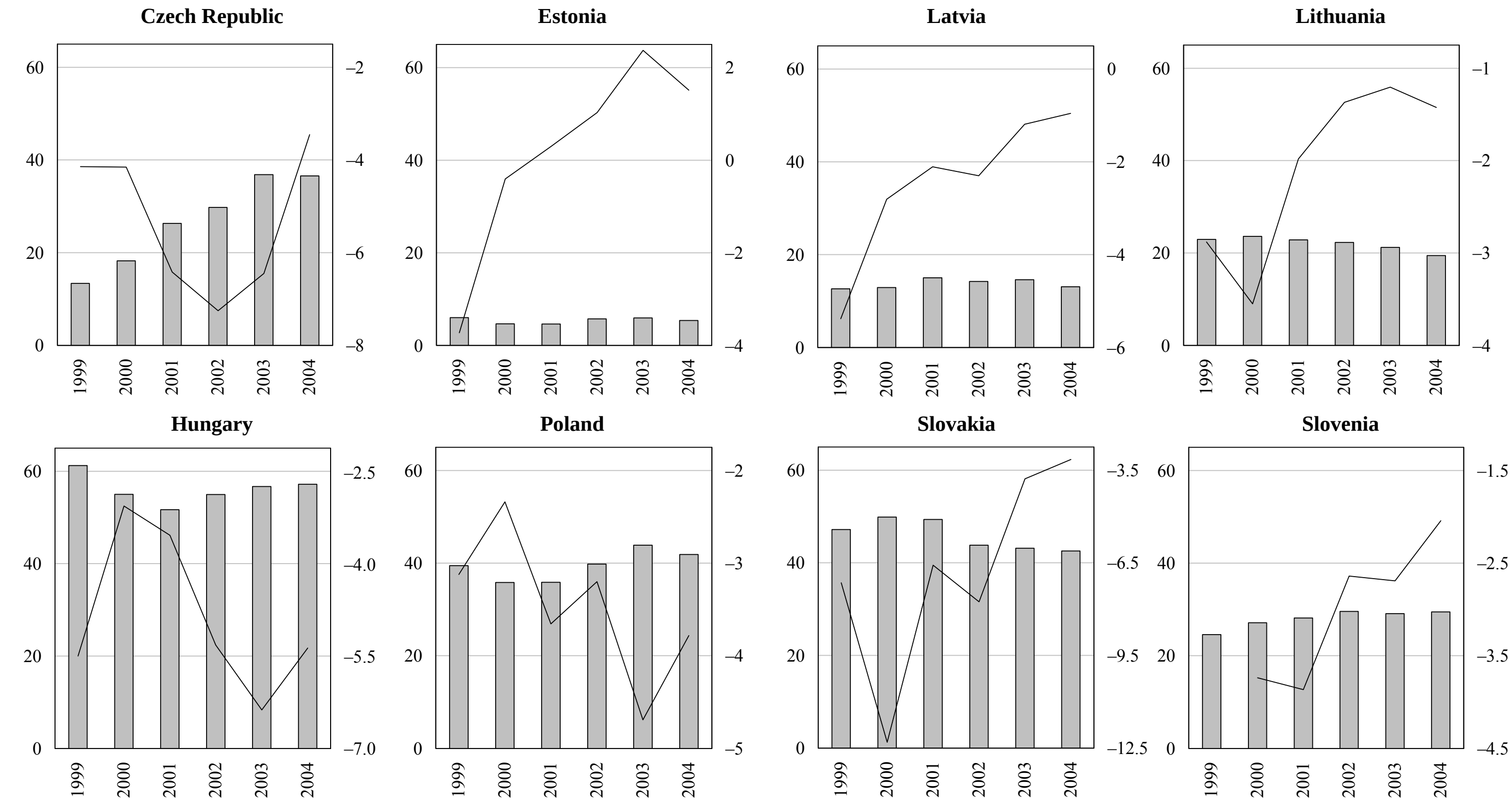
(1) These Indicators are the expenditure weighted.
(2) Each sub-indicator contributes equally to the total PSE indicator.
(3) Simple averages.

Source: Afonso, Schuknecht and Tanzi (2006), p. 33.

Figure 9

General Government Balance and Debt, 1999-2004

(percent of GDP)



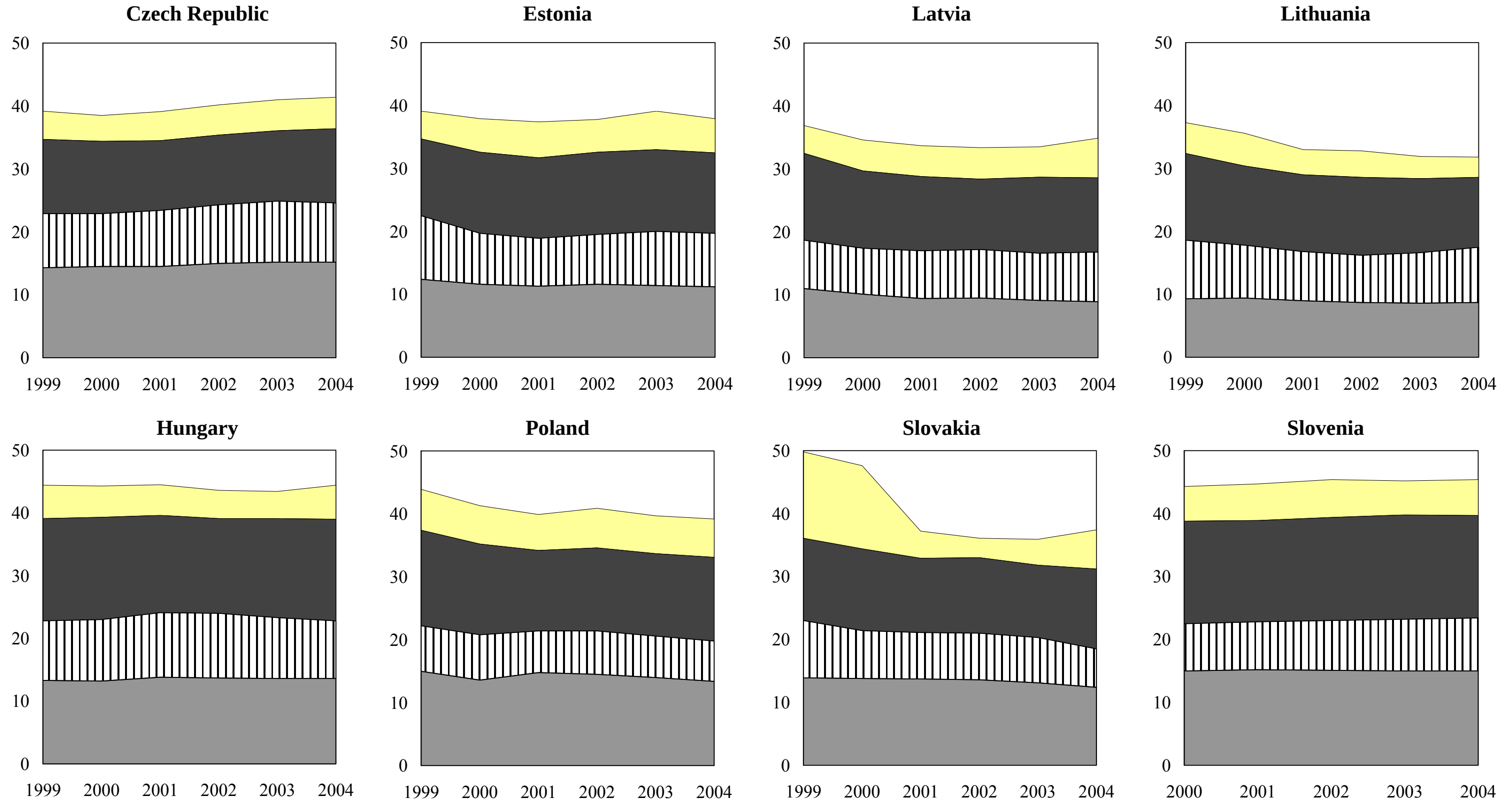
Source: AMECO, CP.

GG debt (left scale) GG balance (right scale)

Figure 10

General Government Revenues, 1999-2004

(percent of GDP)



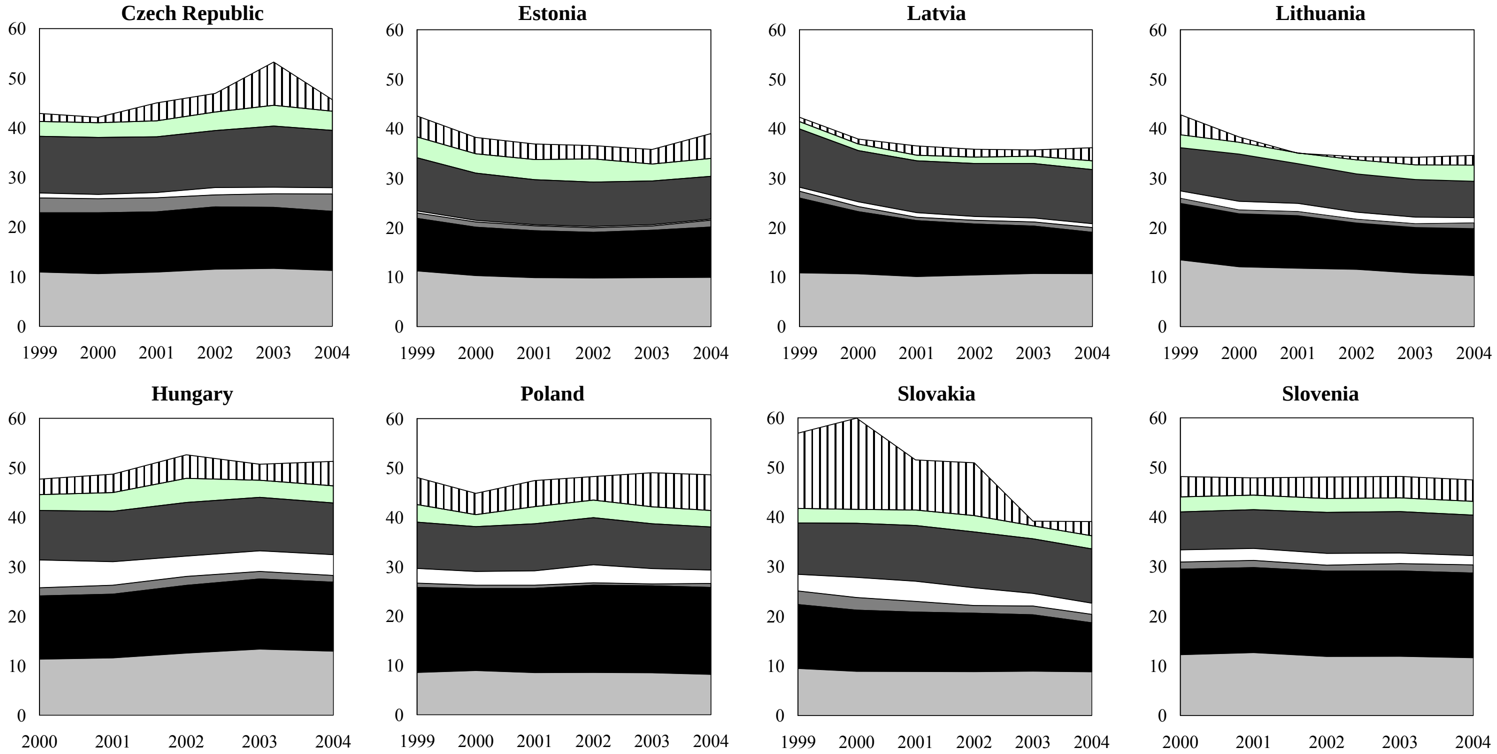
Source: Eurostat.

Other revenues Taxes on production and imports Current taxes on income and wealth Social contributions

Figure 11

Economic Classification of General Government Expenditure, 1999-2004

(percent of GDP)



Source: AMECO.

Other | Gross Fixed Capital Formation | Collective Consumption Expenditure | Interest
Subsidies | Social Benefits Other Than Social Transfers in Kind | Social Transfers in Kind

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