



World Bank EU-8 Quarterly Economic Report April 2005 Part II

EU-8

SPECIAL TOPIC: LABOR TAXES AND EMPLOYMENT IN THE EU8¹

1. Introduction

The objective of this study is to assess the size of the tax wedge in the EU8 countries as well as to analyze the impact of the tax wedge on employment and/or unemployment.² Several EU8 countries are contemplating reductions in labor taxes—not least on lower-skilled workers—to enhance competitiveness and employment. Similar policies have been recommended by the OECD and the EC. However, little is known about the possible effects of such policies, not least in transition economies where analysis so far has been limited. Furthermore, there is obviously a concern regarding how to finance such a reduction in taxes, not least in countries where fiscal deficits are already sizeable and further pressures are foreseen, including from prospective demographic changes. Meeting the fiscal conditions for Euro adoption further limits the room for easing taxes.

In the following we look at current statutory and effective tax rates (both income tax and social security contributions) as well as the tax wedge across EU8 countries, the theoretical foundations of the tax wedge-employment relationship, findings from previous empirical studies (mainly for OECD countries), and how various factors affecting the relationship appear in the EU8 countries. Further, we perform a simple panel regression analysis of the tax wedge-employment relationship in the EU8. Our results support the existence of a strongly negative relationship between employment growth and the size of the tax wedge in this group of countries.

2. Labor taxes in the EU8

2.1. Statutory and hypothetical effective labor tax rates

Table 1. Statutory PIT rates in EU8 countries in 2004

Country	Upper limits of income bracket (EUR/year) and tax rate within the respective bracket						
Czech Rep	income bracket	1200	3413	6825	10350	> 10350	
	tax rate	0	15	20	25	32	
Estonia	income bracket	1074	> 1074				
	tax rate	0	26				
Hungary	income bracket	2381	3177	5957	> 5957		
	tax rate	0	18	26	38		
Latvia	income bracket	360	> 360				
	tax rate	0	25				
Lithuania	income bracket	994	> 994				
	tax rate	0	33				
Poland	income bracket	620	8228	16455	> 16455		
	tax rate	0	19	30	40		
Slovakia	income bracket	2019	> 2019				
	tax rate	0	19				
Slovenia	income bracket	1477	6669	13338	20007	26676	40014 > 40014
	tax rate	0	17	35	37	40	45 50

Sources: Czech Republic - www.czechinvest.org ; Estonia - www.investinestonia.com ; Hungary - Investment in Hungary, KPMG 2004 ; Latvia - www.liaa.gov.lv ; Lithuania - www.finmin.lt and www.lda.lt ; Poland - www.pit.pl ; Slovakia - www.finance.gov.sk and www.sario.sk ; Slovenia - Slovenian investment agency (TIPO) - www.investslovenia.si

¹ This section is based on background paper prepared by Mateusz Walewski, CASE Foundation, and is part of a broader World Bank work program on links between labor markets and public finances.

² The tax wedge is the ratio of total labor taxes to total labor costs. The tax rate is the ratio of labor taxes to gross wages (net wage and all taxes paid by an employee). The tax wedge can be split into payroll taxes (all taxes paid by an employer) and (general) income taxes (all taxes paid by an employee). Given the characteristics of the (European) labor tax system, the tax wedge consists of personal income taxes (PIT) (paid by the employee) and social security contributions (SSC), the latter paid partly by the employee and partly by the employer. General income taxes are the sum of PIT and the employee's part of SSC. The tax rate (or wedge) can be statutory (based on a headline tax rates only, disregarding deductions etc.) or hypothetical (calculated for a hypothetical, representative worker, based on detailed existing legislation and taking into account deductions etc.). The tax rate/wedge is effective, as opposed to statutory, when it indicate a *de facto* rate (to be paid).

Classical progressive PIT systems operate in four countries: the Czech Republic, Hungary, Poland, and Slovenia (Table 1). The other four countries (Estonia, Lithuania, Latvia and Slovakia) have adopted single tax rates but with a minimum income threshold thus including some effective progressivity. In Estonia, Latvia and Lithuania the tax free income ceiling is explicitly stipulated by law, while in Slovakia it is related to the national poverty line.

It is clear from the table that differences in marginal tax rates say little about differences in average tax rates as income brackets are very different. Figure 1 presents statutory average PIT rates calculated using only the above tax schedules (i.e. without tax allowances, tax base reductions, credits etc.) for a minimum wage earner and APW (Average Production Wage in manufacturing) earner in each country. It also presents the hypothetical effective average PIT rates³ for 2003 calculated from EUROSTAT earnings data for a single person earning 50% of APW (which for most countries with the exception of Czech Republic and Poland is similar to the minimum wage) and for the APW earner.

The first observation is that statutory rates are much higher than hypothetical effective rates. This is mainly the result of numerous deductions, exceptions, tax credits and other country specific regulations concerning the calculation of taxable incomes and tax liabilities. This proves that looking only at statutory tax rates can be very deceiving when comparing the real tax burden across countries.

Figure 1. Statutory Personal Income Tax rates for minimum wage earners and Average Production Wage earners in EU8 countries in 2004 and hypothetical effective Personal Income Tax rates for 50% APW earners and 100% APW earners in EU8 countries in 2003.⁴

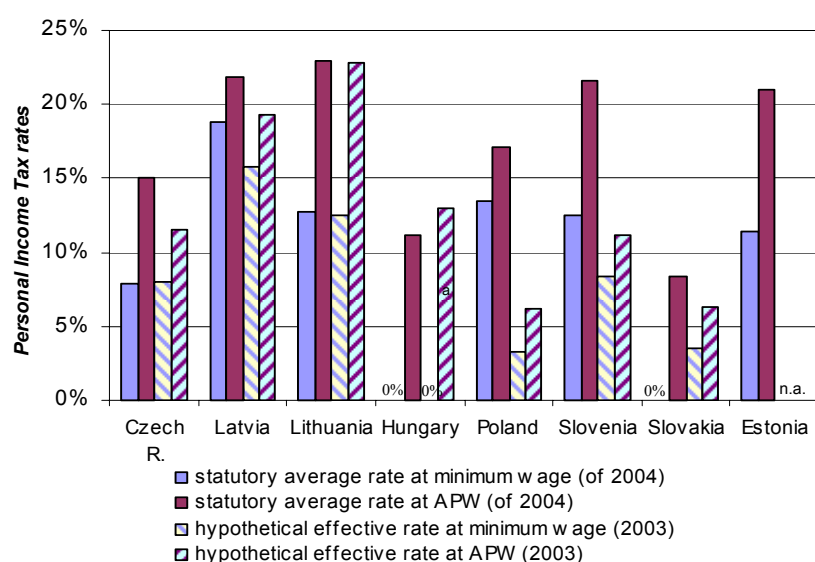


Table 2. Statutory rates of social security contributions in EU8 countries in 2004⁵

Country	emplo yer	emplo yee	total
Czech R.	35	13	48
Estonia	34	1	35
Hungary	32	14	46
Lithuania	31	3	34
Latvia	24	9	33
Poland	21	25	46
Slovakia	35	13	49
Slovenia ⁶	16	22	38

Source: Figure: Own calculations based on Table 1 for statutory rates and EUROSTAT for hypothetical effective rates. For social security contributions: various sources (as in Table 1)

Hypothetical effective PIT rates in EU8 countries vary widely both for low-wage earners and for average wage earners. For low-wage earners, the lowest rate (0%) in 2003 was in Hungary, while the highest rates were in Latvia and Lithuania (both single tax rate countries; in Slovakia the single tax was only introduced in 2004). Single rate systems resulted also in high hypothetical effective

³ This is the hypothetical tax to be paid by a representative single person earning x% of APW divided by her/his gross earnings (EUROSTAT data; these take into account not only tax rates/brackets but also other regulations concerning tax payments including transfers paid from the state to this representative person.

⁴ Data are not yet available for 2004.

⁵ Standard rates, including second pillar pension contributions. In some countries, there are income ceilings for certain social security contributions or exemptions for certain groups (e.g. working students).

⁶ Slovenia also has a payroll income tax levied on monthly gross wages above EUR 668 with rates ranging from 3.8% to 14.8%.

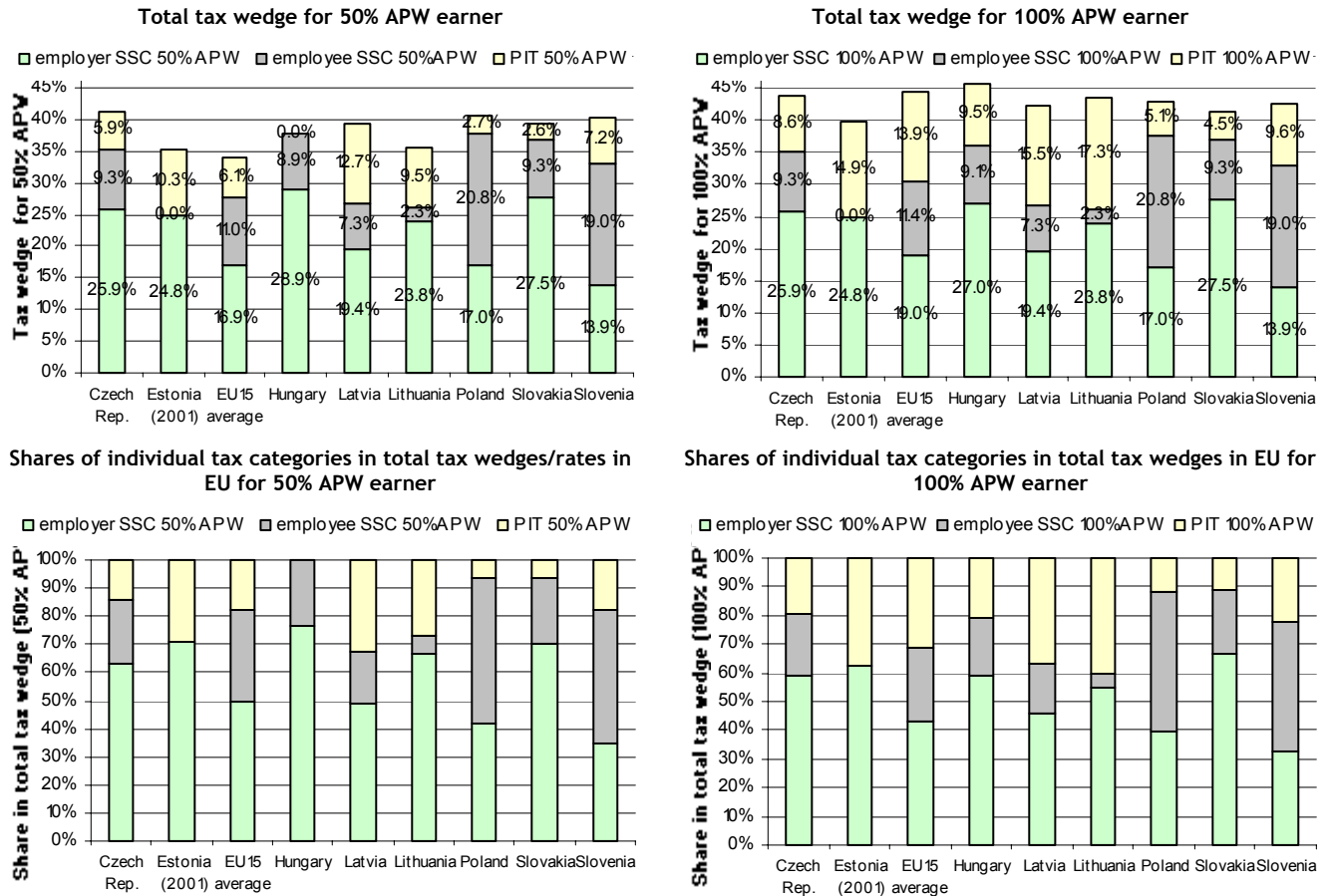
tax rates for average wage earners, while rates were very low for this group in Poland and Slovakia (before shift to flat tax).

The PIT, however, is only part of the total tax wedge. In all EU8 countries, but also in most of the EU15, Social Security Contributions (SSC) paid both by employers and employees constitute the major part of taxes paid. Table 2 presents the statutory rates of both employee's and employer's SSC in EU8 countries for 2004. Since legal rules defining taxable income definitions in the case of SSC are normally much less sophisticated than in the case of PIT, statutory rates of SSC are very close to hypothetical effective rates (at least for 100% APW employees). As can be seen, total statutory SSC rates are highest in the Visegrad countries at over 45%.

2.2. Hypothetical effective tax wedge in EU8

The effective tax wedge is comparable across EU8 countries, typically in the range of 35-40% for low-wage income earners and 40-45% for average-wage income earners (Figure 2). Social security contributions account for the largest portion of the tax wedge in all countries, and within these the employers' contributions dominate (only in Poland and Slovenia is the employee's contribution larger than the employers'). The relatively large share of payroll taxes in the total tax wedge in EU8 countries is one of the key concerns in view of their likely more detrimental impact on employment (compared to income taxes).

Figure 2. Total labor tax wedges and shares of individual tax categories in the total tax wedge for 50% APW earner and 100% APW earner in EU8 countries in 2003.

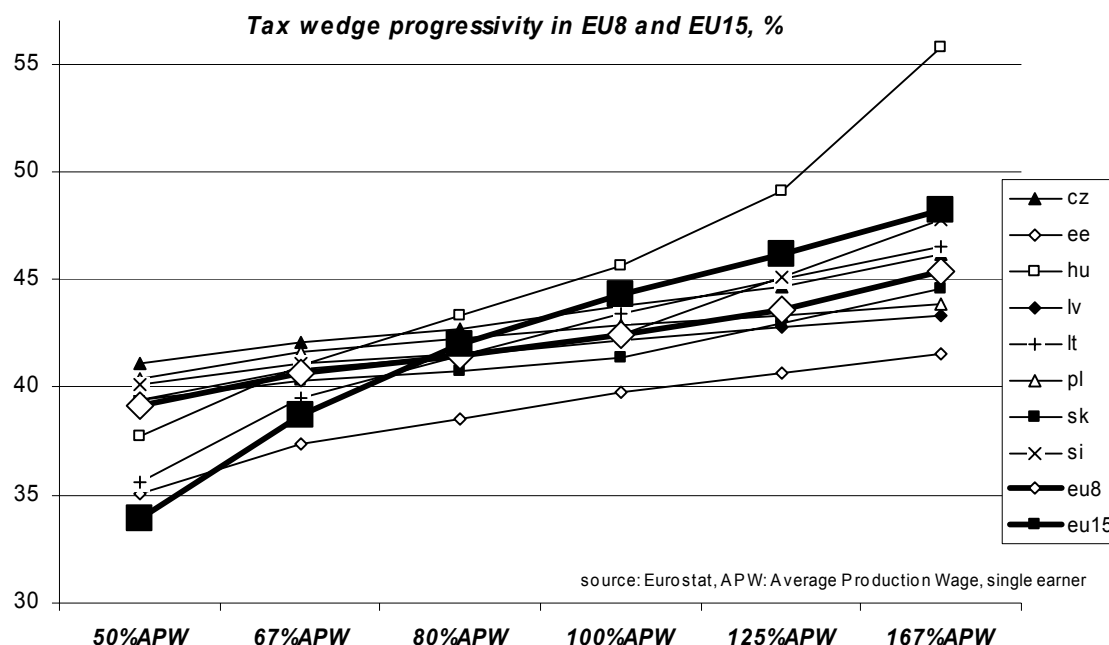


Source: Own calculations based in EUROSTAT data

The progressive nature of the PIT means that its share in the total tax wedge increases with incomes in all countries and also determines the total tax wedge progressivity. With the exception of Lithuania and Hungary, the tax wedges in EU8 are much less progressive than the EU15 average, at least up to the average income level (Figure 3). The average tax wedge for a 50% APW earner in EU8 countries is 38.6%, whereas in EU15 it is on average 4.7 percentage points lower. At the same time, the tax wedge for APW earners in EU15 at 44.3% is 1.6 percentage points higher than in EU8. Accordingly, the relative tax burden for low wage earners is much higher in EU8 than in EU15 and this is one of the other main concerns given the expected more negative employment consequences

of the tax wedge for low-wage income earners (than for higher-wage earners). The tax wedge for 50% APW earners is higher than the average in EU15 in all EU8 countries, ranging from a high of 41% in the Czech Republic to a low of 35% in Estonia and Lithuania. The tax wedge for average-wage (100% APW) earners is higher than that of 50% APW earners in all EU8 countries, but the difference between the two varies significantly between countries. The largest differences are in Hungary and Lithuania.

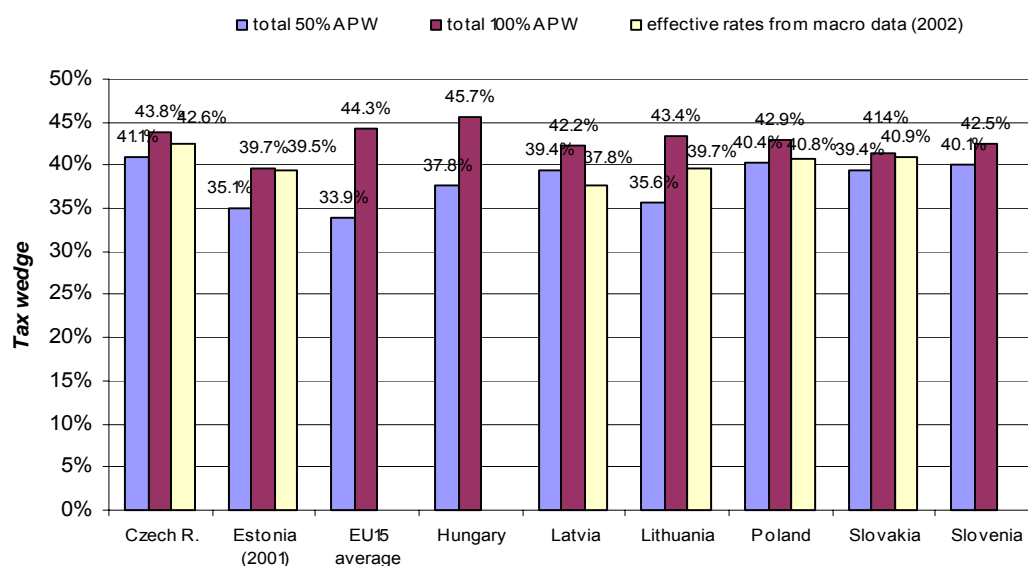
Figure 3. Tax wedge progressivity in EU8 and EU15



2.3. Implicit effective tax wedge in EU8 from macroeconomic accounts

Implicit effective tax wedges calculated from national accounts (using 2002 ESA95 data) are similar to those based on representative wage earners (Figure 4). These macroeconomic ratios are defined as the share of total labor taxes (PIT, Employers' SSC and Employees SSC) in total labor costs as measured by national accounts. The macroeconomic labor tax ratios seem to be well correlated with microeconomic hypothetical wedges for low and average wage earners. Macroeconomic ratios tend to be higher than the hypothetical tax wedge for 50% APW earners and lower than the wedge for 100% APW earners in most countries.

Figure 4. Tax wedges for a 50% APW earner and for 100% APW earner in EU8 in 2003

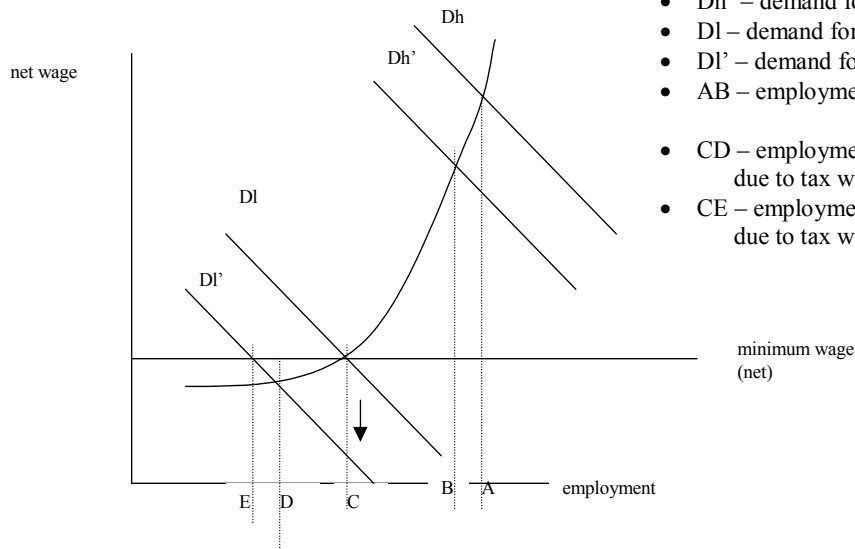


Source: Own calculations based on EUROSTAT earnings structure and National Accounts data. The macroeconomic PIT variable from European Commission (2004b).

3. Theoretical analysis: tax-wedge and labor demand and supply

In a simple theoretical framework of labor demand and labor supply (Figure 5), the introduction (increase) of a tax wedge can be represented by a downward shift in the labor demand curve.⁷

Figure 5. Theoretical analysis



- Dh – demand for skilled labour
- Dh' – demand for skilled labour after tax wedge
- Dl – demand for unskilled labour
- Dl' – 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 binding minimum wage
- CE – employment reduction among unskilled workers due to tax wedge with binding minimum wage

It is clear from this simple graph that 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 effects meaning that workers (employers) accept the full financial burden of the higher tax. In the case of a horizontal labor supply, workers would not accept any net wage decrease—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 various microeconomic and macroeconomic factors influencing the relative and absolute shapes of labor demand and supply curves and a search for their effective shapes in various countries and situations. At the individual level, labor supply according to standard theory is determined as the optimal choice between work and leisure, given preferences between the two, wages, and non-working income. An upward-sloping labor supply curve implies that the substitution effect dominates the income effect—in other words, that people choose to work more if wages rise rather than work less because income rises.

There is also an important issue relating to the impact of the tax wedge on the form of employment. The higher the tax wedge, the more of this is likely to be in the informal sector rather than the formal sector. This distinction is important at least from a fiscal point of view. At the same time, changes in the tax wedge may have a smaller effect on total employment and larger effect on wages in the presence of informal employment, but this, of course, does not invalidate the potential benefits of shifting employment from the informal to the formal sector.

Further, this framework by nature does not address such important issues as the role of how labor taxes are spent and other taxes on economic behavior in general and in the labor market in particular. For example, it is clear that changes in corporate income taxes affect the relative cost of capital and labor and thus employment irrespective of any changes in labor taxes. Also, some argue that changes in taxes do not matter at all as the future implications are fully anticipated by economic agents (e.g., lower taxes today mean higher taxes in the future given the government's solvency constraint, and thus agents save now to pay for higher taxes later). This is the famous Ricardian Equivalence theory. These are complex issues that are very difficult to incorporate into

⁷ 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).

the analysis, and for which the empirical basis in any case would be very weak in the countries studied here.

Finally, it does not explicitly incorporate the important role of labor market policies (notably employment protection legislation) and institutions as well as other important features of the labor market such as labor mobility. We discuss some of these issues below.

3.1 The role of skills

The simple analysis in Figure 1 suggests that in case of standard convex aggregate labor supply (and demand) curves, a high tax wedge affects employment especially for relatively low wage earners. Since one of the main factors explaining real wage differentials between individuals is the skill level, one can argue that the negative employment effect of the tax wedge would be most severe for low-skilled workers. This is confirmed by the latest research (OECD 2003a+b; EC 2003a). Countries introducing special payroll tax reductions for low-wage earners such as Belgium, Netherlands and France have managed to increase their respective employment considerably. Also Kugler&Kugler (2003) in their study analyzing the employment results of the Colombian payroll tax increase over the period 1980-1990 find a more negative employment effect among blue-collar workers than among white-collar workers.

3.2 The role of reservation (minimum) wages and non-employment benefits

The elasticity of labor supply may be increased 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.⁸ If such a wage floor is commonly recognized and binding (meaning that some persons are working at this wage level), the labor supply curve becomes horizontal and results in the maximum negative employment effect of a tax wedge.

In case of a binding minimum wage, the negative employment consequences of an increase in the tax wedge have been widely acknowledged by researchers (see for example Kugler&Kugler 2003; Nickell 2003; OECD 2003; and Gruber 1997).

The existence of non-employment financial assistance (for example unemployment benefits) increases reservation wages as well and results in a higher effective elasticity of labor supply and hence higher tax-employment elasticity. It has been shown by George (1999), Koskela (2001) and Nickell (2003) that the higher is the replacement rate of non-employment benefits, the bigger is the negative employment effect of an increase in the tax wedge.

3.3 Taxed party makes a difference

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 alternative income and/or minimum wage regulations. In the minimum wage case, an increase in the payroll tax 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 the equal downwards 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 (we move from point “C” to point “D”).

The employment effect of an income tax increase also depends on the relative taxation of work income and alternative income. In the simple framework from Figure 1 one can replace net wage with the difference between net wage and alternative net income. If both are taxed with the same rates, the increase of the income tax does not move 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 tax rates on wages leads to a downward shift of the labor demand curve (as perceived by employees) and lowers employment accordingly.

The relatively larger impact on employment of an increase in payroll taxes in the presence of a reservation wage has been confirmed in a number of studies using various models of the labor market (e.g. Gruber 1997; Koskela 2001; and Kugler&Kugler 2003).

⁸ The reservation wage is the minimum wage required to provide individuals with an incentive to enter the formal labor market in the presence of non-formal work income sources, including unemployment and social benefits. The reservation wage may in some case exceed the formal minimum wage.

As soon as one replaces our simple framework from Figure 1 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 incomes. Muysken and others (1999) explore a theoretical model in which employees are able to shift part of their tax burden forward to employers, resulting in a lowering of their net income but also in higher labor costs and lower employment. On the other hand, if employers are not able to shift their tax burden backward to employees, any payroll tax increase has thus to be fully accommodated by lower employment, (since the net wage cannot be lowered). In estimating a wage equation for the Netherlands for the period 1962-1993, the authors find that 44% of the income tax increase was shifted forward by employees to employers in the form of higher gross wages.

These findings also 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 point by applying various theoretical structures of the labor market, including those taking into account minimum wages and/or alternative incomes (e.g. Goerke 1999 and 2001; Koskela 2001; and Nickell 2003).

3.4 Direction of change can make a difference - wage rigidity.

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.

Despite similar methodologies, findings have varied somewhat between different studies. Gruber (1997) in a study of a large reduction in payroll taxes in Chile in the early 1990s found that lower taxation had been fully shifted to higher wages with no effect on employment. Bell and others (2002) in a study of the British tax reform in 1999 (which shifted the tax burden from low-wage to high-wage earners) also concluded that payroll tax reform had not had any significant impact on employment but only on real wages, although in industries where effective rates increased average working hours declined. Kugler&Kugler (2003), on the other hand, found that the 10% increase of payroll taxes in Colombia in the late 1980s and early 1990s resulted in a 1.4-2.3% decrease in net wages and a 4-5% reduction in employment.

The magnitude of real wage rigidity is closely related to the prevailing wage bargaining structure (see e.g. Calmfors&Driffil 1988). The “Calmfors-Driffil” curve relates wage bargaining structure to real wage rigidity: wages are most rigid for medium concentration of bargaining (normally branch level), while wage rigidity is lower both when negotiations become more decentralized (towards firm level) and more centralized (towards country level). The role of the wage bargaining structure in the tax-employment relationship has also been studied by Muysken and others (1999) and confirmed in various empirical studies.

3.5 The role of other labor market policies, institutions, and features.

Other labor market policies, institutions and features also play an important role in shaping the relationship between labor taxes and employment. For example, hiring and firing rules and limits on the use of flexible forms of employment constrain labor market flexibility and thus, *ceteris paribus*, weaken the impact of changes in labor taxes on employment. The same is true in the presence of informal labor markets, skills mismatches and structural unemployment, and constraints to labor mobility.

4. Selected results of macroeconomic empirical studies for OECD countries

Short of the “natural experiments” quoted above, where countries undertook deep and rapid reforms of their labor tax systems, the analysis of smaller labor tax changes in individual countries is complicated by the influence of other factors on labor market outcomes in the longer run.

One common method has been to pool data from different countries. Most studies of this nature have used data from a group of OECD countries. They typically estimate a reduced form model in which employment or unemployment is the dependent variable and various measures of the tax wedge along with a set of control variables such as macroeconomic performance and institutional features of country labor markets are on the right hand side of the equation. A comprehensive summary of these studies can be found in De Haan and others (2003) and Nickell (2003). Although the studies differ with respect to the used definition and measure of the tax wedge (see Box 1), set

of control variables, and geographical range and time horizon, they do produce quite similar results.

Box 1. Measurement issues

The first measurement issue in calculating tax wedges is to determine which taxes to include. Theoretical considerations suggest that payroll taxes (paid by employers) may be most suitable to explain unemployment since they tend to result in involuntary unemployment, while income taxes should be included if the dependent variable is employment since they affect employment but to a lesser extent involuntary unemployment. There is also some controversy regarding whether or not one should include consumption taxes.

The second issue is whether to use average or marginal tax rates. The marginal tax rate affects decisions regarding working hours, while the average rate affects decisions regarding labor market participation (Koskela 2001). The interaction of the two affect the total labor market outcome.

The third issue is whether to use statutory or effective tax rates for some representative worker or a macroeconomic tax ratio reflecting the economy-wide average taxes paid. The former may say something about the tax rates for wage earners at different income levels, but say nothing about actual taxes paid or the average tax wedge in a country (and further are not comparable across countries or even within countries in a time series setting). The latter avoids these problems, but does not allow for effective differentiation between taxes on labor and other income sources such as capital gains and social transfers (and of course says nothing about the progressivity of the tax system). If one uses the “representative” worker, it would be difficult to include consumption taxes in the tax wedge as one would need to know detailed consumption patterns for different income groups. Regarding the use of statutory versus effective tax wedges, the latter seems preferable: while individuals may not be fully aware ex-ante of the final tax allowances, the key ones are likely to be fairly predictable (e.g. child allowances) and in any case less important when considering the total tax wedge as there are few deductions available for social security taxes.

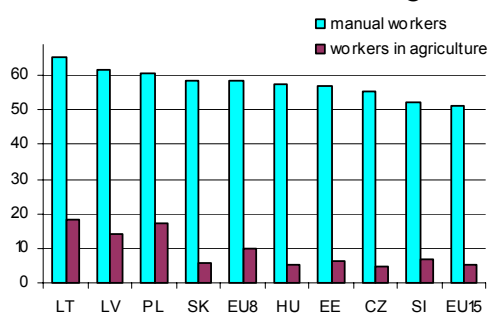
There are no clear guidelines on the choice of measures, and different studies have not surprisingly used different measures and are thus not directly comparable. However, the problem may appear larger than it is. De Haan and others (2003) analyze the correlation between various measures of the tax burden on labor and find that this is strong (generally higher than 0.75).

Most of these studies find a negative relationship between the tax wedge and employment, but the elasticities differ significantly. The highest is found in Daveri&Tabellini (2000) at -0.55, while the lowest is found in Nickel and others (2003) at -0.11. According to Nickell (2003), about one-fourth of the difference in employment performance between Germany, Italy and France on the one side and USA on the other between the 1960s and 1990s can be explained by the increase of the tax wedge in the former three countries.

5. Determinants of the tax wedge-employment relationship in EU8

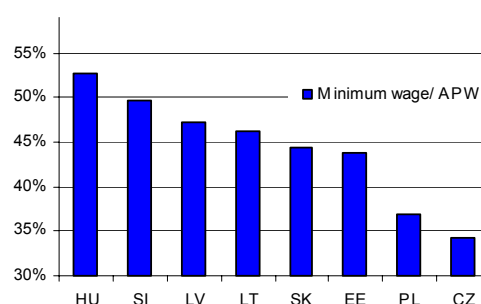
Four of the structural and institutional factors discussed above that influence the existence and magnitude of a negative tax wedge-employment relationship seem to be especially important in the EU8 countries: (i) structure of the labor force (skilled versus unskilled labor); (ii) national minimum wage; (iii) unemployment (and other social) benefits policies; and (iv) wage bargaining structure.

Figure 6. The share of manual workers and agricultural employment in total employment in EU8 countries and EU15 average



Source: Own calculations based on EUROSTAT data

Figure 7. Minimum wages as percent of Average Production Wage in manufacturing in EU8 countries in 2003



On average the skill composition in EU8 countries differs from the rest of the EU. The average share of manual workers (i.e. those with presumably lower wages) in total employment in EU8 is higher than the EU average, as is the share of agricultural employment (Figure 6). The latter is an important indicator of low skills of the labor force. Three of the EU8 countries seem to have an especially disadvantageous employment structure from this point of view: Lithuania, Latvia, and Poland. In all of these countries the share of manual workers in total exceeds 60% while the average for EU25 is less than 51%. The share of agricultural employment in these three countries is also much higher than in other European countries, including the rest of EU8 group. The lower skills of the labor force suggest a stronger negative labor tax-employment relationship in these countries.

Minimum wages are more likely to be binding in EU8 countries than in the rest of the EU. The minimum wage is set by national legal regulation. It constitutes about 35% of APW in the Czech Republic and Poland and is close to 50% of APW in the rest of the EU8 countries (Figure 7). While minimum wages are not high compared to the rest of Europe (minimum wages vary from 32% of the average wage in Spain to 60% in France; European Commission 2003a), they apply mainly to low skilled workers which are more abundant in the EU8 countries. Thus, the minimum wage is more likely to be binding in these countries. The minimum wage affects about 13% of workers in France, which has the highest relative minimum wage in Europe (EC 2003a). In Poland this share is similar at 12-15% (CASE 2004), despite the fact that the ratio of minimum to average wage in Poland is much lower than in France.

Unemployment benefit systems in EU8 countries are not particularly generous (Vodopivec and others 2003). At the end of 1990s the average generosity index (measuring the combination of benefit replacement rates and benefit duration) in a group of CEEC countries was 11.3 compared to 26.3 for a group of OECD countries.⁹ Replacement rates were highest in Slovenia at about 37%, but only around 20%-25% in most other countries in the region. The ratio of unemployed eligible for unemployment benefits to total unemployment varied from 24% in Poland¹⁰ to 61% in Slovenia. Thus, the generosity of unemployment benefit systems in EU8 countries should not be a major concern regarding the tax-employment relationship. However, other social benefits are in some cases quite generous and this may raise the reservation wage. For example, in the Czech Republic the unemployment benefit level is close to the subsistence minimum for a single person, making this person eligible for social assistance benefits.

Wage negotiations in the EU8 are characterized by a mix of centralized and decentralized forms (EC 2002 and 2003b). Trade unions and particularly employers' organizations are relatively weak in almost all countries, while central social dialogue institutions (such as the Tripartite Commission in Poland) are well developed in most countries although the results of central negotiations are more of an indicative than obligatory character and often apply only to large (typically state-owned) companies and to state administration and other public sector employees. Bi-partite dialogue along branch, regional or other multi-company level is generally weak except in Slovenia. Otherwise, negotiations take place mainly at the company level. Thus, wage bargaining systems in most EU8 countries can be characterized as a mixture of centralized wage bargaining (mainly for the State sector) and decentralized bargaining (for most of the private sector). Recalling the Calmfors-Driffil relationship, this blend should be positive from the point of view of wage rigidities and the tax-employment elasticity.

The lower skill level in the EU8 countries is even more of a concern in the Single Market. Although there is not yet full labor mobility, and the structural features of individual labor markets differ in important respects (including different tax wedges, minimum wage levels, etc.), the relevant issue would tend to become the distribution of wages within the EU rather than within individual countries. With an aggregate EU labor supply curve, the EU8 countries are undoubtedly at the bottom end of the income distribution.

On the whole, there are good reasons to believe that the tax wedge-employment relationship may be stronger in the EU8 than in more advanced economies, not least for the lower end of the income distribution.

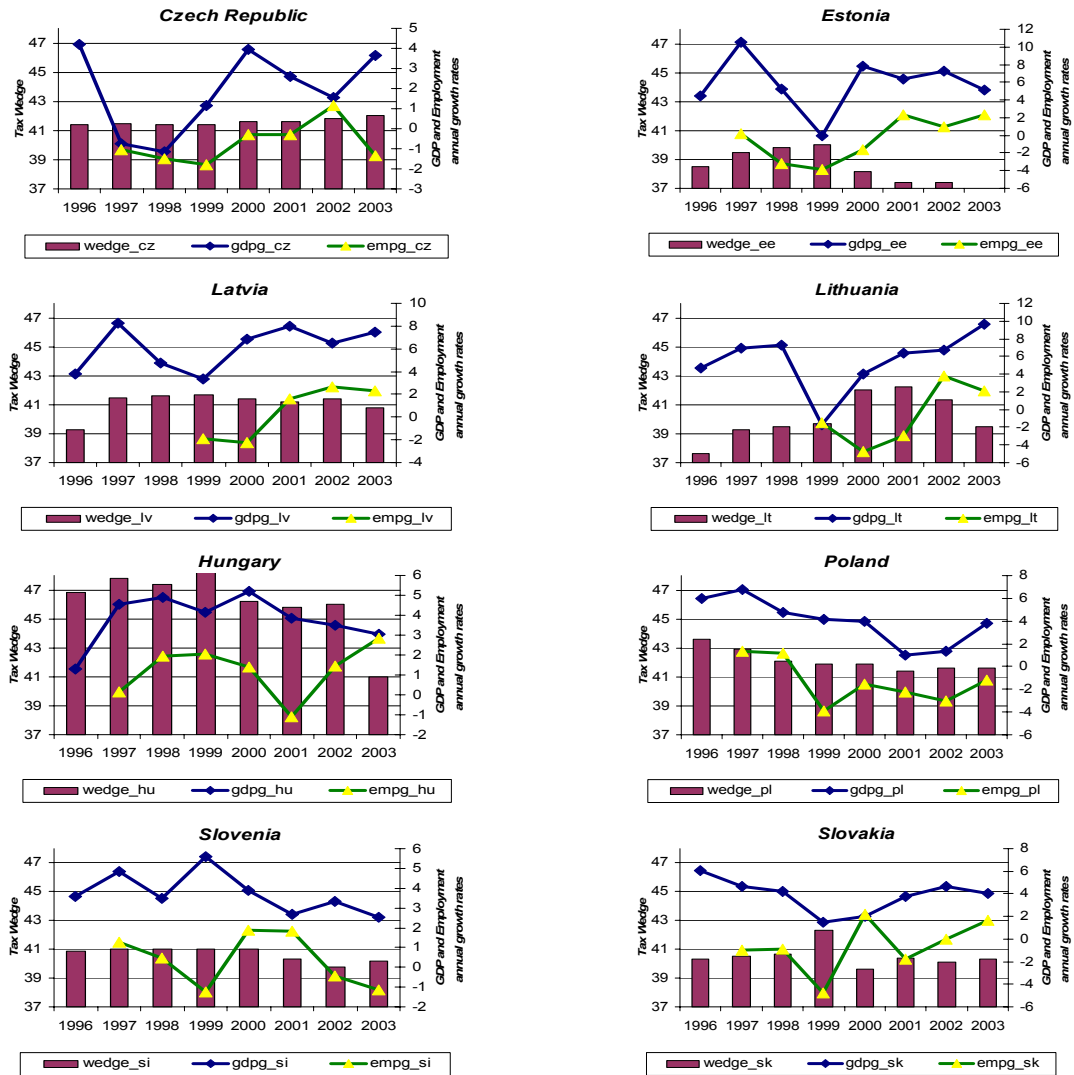
⁹ The group of CEEC countries comprised: the Czech Republic, Hungary, Poland, Slovakia, Slovenia, Estonia and Bulgaria, while the OECD group comprised Belgium, Denmark, France, Germany, Greece, Ireland, Netherlands, Portugal, Spain, the UK and the US.

¹⁰ Currently (2005) in Poland it is even lower - around 15%.

6. Pooled regression analysis of the tax wedge-employment relation in EU8

Figure 8 does not show any clear relationship between changes in the tax wedge and employment growth in the individual EU8 countries.

Figure 8. GDP, employment and tax wedge trends in EU8 countries in years 1996-2003



Source: Own calculations based on EUROSTAT data. Note: tax wedge defined with respect to 67% APW earner

A more detailed statistical analysis, however, reveals a different picture (Box 2). The results of the panel regressions and the size of the coefficients indicate that, for a given GDP growth rate, each percentage point difference in the tax wedge is associated with a decrease 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 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.

It is not clear in which direction any bias might be—some factors actually suggest that we may be underestimating the impact of changes in labor taxes on employment: (i) what we are measuring as employment is probably somewhere between formal and total employment which would be less sensitive to changes in the tax wedge than if we had “pure” formal employment data since there is likely to be some shift between formal and informal employment associated with a change in the tax wedge; (ii) we have some measure of total employment which is likely to be less sensitive to changes in the tax wedge on low- or average wage earners than employment of this group of wage earner. Other factors point to the overestimation of the tax-on-employment impact, most notably the omitted employment protection legislation (EPL). To the extent EPL changes are positively

correlated with labor tax changes, which seems to be the case in the EU8 (recent moves towards greater flexibility of EPL), we would be overestimating the magnitude of the relationship under analysis. In any case, further investigation is needed, including more detailed examination of country factors influencing the strength of the tax wedge-employment relationship.

Box 2. Econometric analysis

The general structure of empirical models designed to assess the relationship between tax wedges and employment is the following (see for example Daveri&Tabellini 2000, Nickell 1997, and Alesina&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. Thus, in our estimation the tax wedge is treated as a factor negatively influencing the responsiveness of employment to a change in labor demand.

This specific representation is motivated by the structural and dynamic features of individual transition economies that would be expected to influence their employment rates and which can not be taken into account given the small size of our data-set (for example economic structure, trade links, the institutional economic environment, and various exogenous and endogenous shocks hitting individual countries). It seems reasonable to assume that similar factors determine also the average output growth rates and therefore can be strongly correlated with the control variable used. This model allows us to at least partially tackle the problem of omitted variables.

We have also 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. For example, if labor markets were becoming more flexible while labor taxes were being reduced and employment was expanding, the estimated impact of changes in the tax wedge would tend to be exaggerated. However, data availability and comparability prevents us from pursuing these issues further—we can only note that other studies with and without inclusion of these variables have produced similar results (see e.g. Nickell 2003).

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

$$EMPG_{j,t} = \beta_0 + \beta_1 WEDGE_{j,t} + \beta_2 GDPG_{j,t} + e_{j,t}$$

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

Data for tax wedges for 67% APW earners come from EUROSTAT, while tax wedge data for 50% APW earners are own calculations using EUROSTAT data and applying the same methodology. Estimations have been performed for both balanced and imbalanced samples (Table 3 and Annex).¹¹

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% APW 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).

¹¹ Data on the tax wedge for 67% 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% APW earners in Estonia for 2003, but results were similar). Data on the tax wedge for 50% APW earners for Estonia ended in 2001 (no data have been assumed for subsequent years in this case).

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.

Table 3. Estimation results

Coefficients	Estimations results			
	Tax Wedge for 67% APW earner		Tax wedge for 50% APW earner	
	Balanced sample	Imbalanced sample	Balanced sample	Imbalanced sample
WEDGE	-0.77 (-2.73)*	-0.70 (-3.00)**	-0.80 (-2.05)	-0.50 (-2.50)*
GDPG	0.36 (2.34)*	0.41 (3.38)**	0.11 (0.57)	0.40 (3.30)**
R²	0.45	0.41	0.51	0.41
Sample used	1999-2003	1997-2003	1999-2001	1997-2003
Total observations	40	52	20	50

t-values in parenthesis, *-significant at 5% level, ** - significant at 1% level)

Tax wedge coefficients are insignificant only in one case (the balanced sample estimation for wedge on 50% APW earners). In this case, however, the size of the sample was strongly limited due balanced sample requirements.

7. Conclusions and policy implications

According to some theoretical models and earlier empirical results mainly from OECD countries there exists a negative relationship between the size of the tax wedge and employment. This study suggests the existence of a relatively strong relationship for the EU8 countries.

The structure of the labor force (with a relative abundance of low-skilled workers), the likely more binding minimum wages, the relatively larger share of payroll taxes, and the lower progressivity of the tax system all suggest that the tax wedge might be more harmful in EU8 countries than in the rest of Europe. At the same time, neither unemployment benefits nor the wage bargaining structure would appear particularly harmful in the EU8.

Our econometric results confirm this highly negative relationship between the tax wedge and employment growth in the EU8. Each percentage point difference in the tax wedge is associated with a decrease in employment growth by 0.5-0.8 percentage points, at the higher end of typical findings for OECD countries but with no clear direction in bias: while some omitted variables may have led to an upward bias, other factors may have had the opposite effect.

Lowering labor taxes, not least payroll taxes, may thus raise employment and output in the EU8. This, of course, begs the question of how to finance such a reduction in taxation given the tight fiscal constraints in most countries in the region. While there are no easy answers to this issue, policymakers should keep the following considerations in mind when contemplating the feasibility of moving along this road: (i) lowering of the tax wedge may partly finance itself through higher employment and output; (ii) while there will be significant pressures on social security spending in the future in part as a result of population aging, it is not a given that such spending must be financed from social security contributions (could be partially financed from general taxes as is the case in several countries in Europe, including Poland and Latvia); (iii) in most countries there is still some scope for broadening the tax base or raising consumption and/or wealth taxes; and (iv) in most countries there is considerable room for rationalizing expenditures, including through better targeting of social transfers and reduction in subsidies.

In the end, our analysis should obviously be seen as very preliminary and an insufficient basis for risky policy experiments, not least in countries with precarious fiscal positions. In addition to further analysis, the safest way forward would clearly be to reduce expenditures before cutting taxes.

References:

- Alesina A., and R. Perotti (1997), "The Welfare State and Competitiveness," *American Economic Review* Vol.87 No.5.
- Bell B., J. Jones, and J. Thomas (2002), "Estimating the impact of change in employers National Insurance Contributions on wages, prices and employment," *Bank of England Quarterly Bulletin*, Winter.
- Calmfors L., and J. Driffill (1988), "Bargaining structure, corporatism and macroeconomic performance," *Economic Policy*, Nr 6.
- CASE (2004), "Elastyczny rynek pracy w Polsce. Jak sprostać temu wyzwaniu?" (Flexible labor market in Poland. How to cope with this challenge?), *Zeszyty BRE-Bank CASE Series No. 73*, Warsaw.
- Daveri F., and G. Tabellini (2000), "Unemployment and Taxes: Do taxes affect the rate of unemployment?" *Economic Policy* Vol. 15 Issue 30.
- European Commission (2002), "Industrial Relations in Europe 2002," *EC Directorate-General for Employment and Social Affairs*, Brussels.
- European Commission (2003a), "Employment in Europe 2003," *DG Employment, Brussels*.
- European Commission (2003b), "Progress in the implementation of the Joint Assessment Papers on employment policies in candidate countries-supporting document for the communication," *Commission Staff Working Paper SEC(2003)200*, 18 February.
- European Commission (2004), "Employment in Europe 2004," *European Commission, DG Employment*.
- European Commission (2004b), "Structures of the taxation systems in the European Union."
- Goerke L. (1999) „The Wedge,” *IZA Discussion Paper No. 71*, Bonn.
- Gruber J. (1997), "The Incidence of Payroll Taxation: Evidence from Chile," *Journal of Labor Economics*, Vol. 15, No.3.
- De Haan J., J.E. Sturm, and B. Volkerink (2003), "How to Measure the Tax Burden on Labor at the Macro-Level," *CESifo Working Paper No. 963*, June.
- Koskela, E. (2001), "Labor Taxation and Employment in Trade Union Models: A Partial Survey," *Bank of Finland Discussion Papers 19*, September.
- Kugler A., and M. Kugler (2003), "The Labor Market Effects of Payroll Taxes in a Middle-Income Country: Evidence from Colombia," *IZA Discussion paper No. 852*, Bonn, August.
- Muysken and others (1999), "Does a Shift in the Tax Burden Create Employment?" *Applied Economics*, 31.
- Nickell S. (1997), "Unemployment and Labor Market Rigidities: Europe versus North America," *The Journal of Economic Perspectives*, Vol.11, No. 3.
- Nickell S. (2003), "Employment and Taxes," *CESifo Working Paper No.1109*, December.
- Nickell S., and R. Layard (1999) "Labor Market Institutions and Economic Performance," in O.Ashenfeller and D. Card (eds.) *Handbook of Labor Economics*, Vol. 3, North Holland, Amsterdam.
- OECD (2003a), "OECD Employment Outlook 2003," Paris.
- OECD (2003b), "OECD Economic Surveys: Belgium."
- OECD (2004), "OECD Employment Outlook 2004," Paris.
- Vodopivec M., A. Wörgötter, and R. Dhushynath (2004), "Unemployment Benefit Systems in Central and Eastern Europe: A Review of the 1990s," *Social Protection Discussion Paper Series No. 0310*, World Bank.

Annex: Data used in estimations

Table with observations in unbalanced sample estimation for 50% APW earner wedge								
obs	Czech R.	Hungary	Estonia	Lithuania	Latvia	Poland	Slovenia	Slovakia
1996								
1997	*	*	*			*	*	*
1998	*	*	*			*	*	*
1999	*	*	*	*	*	*	*	*
2000	*	*	*	*	*	*	*	*
2001	*	*	*	*	*	*	*	*
2002	*	*		*	*	*	*	*
2003	*	*		*	*	*	*	*

Table with observations in balanced sample estimation for 50% APW earner wedge								
obs	Czech R.	Hungary	Estonia	Lithuania	Latvia	Poland	Slovenia	Slovakia
1996								
1997								
1998								
1999	*	*	*	*	*	*	*	*
2000	*	*	*	*	*	*	*	*
2001	*	*	*	*	*	*	*	*
2002								
2003								

Table with observations in unbalanced sample estimation for 67% APW earner wedge								
obs	Czech R.	Hungary	Estonia	Lithuania	Latvia	Poland	Slovenia	Slovakia
1996								
1997	*	*	*			*	*	*
1998	*	*	*			*	*	*
1999	*	*	*	*	*	*	*	*
2000	*	*	*	*	*	*	*	*
2001	*	*	*	*	*	*	*	*
2002	*	*	*	*	*	*	*	*
2003	*	*	*	*	*	*	*	*

Table with observations in balanced sample estimation for 67% APW earner wedge								
obs	Czech R.	Hungary	Estonia	Lithuania	Latvia	Poland	Slovenia	Slovakia
1996								
1997								
1998								
1999	*	*	*	*	*	*	*	*
2000	*	*	*	*	*	*	*	*
2001	*	*	*	*	*	*	*	*
2002	*	*	*	*	*	*	*	*
2003	*	*	*	*	*	*	*	*

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