

Conference Name: EPCS2006

Government Size and Unemployment: Evidence from Industrial Countries

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Abstract. Using data from 19 industrial countries for the period 1985 to 2002, this paper analyzes how the size of the government sector affects unemployment. Controlling for the impact of the business cycle as well as for the impact of all major labor market institutions and unobserved country effects, we find that a large government sector is likely to increase unemployment. It appears to have a particularly detrimental effect on women and the low skilled and to substantially increase long-term unemployment. It seems that dominant state-owned enterprises, a large share of public investment in total investment as well as high top marginal income tax rates and low income threshold levels at which they apply are particularly detrimental.

JEL classification: E24, H11, H24, H30, H40, H50, J64

Keywords: public expenditure, size of government, taxation, unemployment

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1. Introduction

This paper empirically analyzes how the size of government affects unemployment in industrial countries. It differs from previous papers in several respects. First, while almost all previous papers only used a few indicators, we use several different indicators that measure all major aspects of the size of government. Second, while almost all previous papers only analyzed the effects on the overall unemployment rate, we additionally estimate the effects on the unemployment rates among women, young people, the low skilled as well as on long-term unemployment. Third, in contrast to most previous papers, we control for the impact of all major labor market institutions and unobserved country effects.

The next section briefly discusses the unemployment effects of the size of government from a theoretical point of view. Section 3 summarizes the results of previous empirical research. Section 4 describes the data set and the econometric method used in this paper. Section 5 presents and interprets the regression results. It also discusses whether the theoretical hypotheses have been corroborated and whether the results are in line with those of previous studies. Section 6 concludes.

2. Theoretical considerations

For various reasons a large government sector is likely to increase unemployment. First, it crowds out the private sector, in particular private investment. Thus technical progress, productivity growth and the international competitiveness of the relevant economy tend to be reduced. Consequently, unemployment rises (Alesina/Perotti, 1997). Second, as the private sector is relatively small where there is a large government sector, its ability to absorb people entering working life or employees made redundant in the wake of structural changes is limited as well. This may also result in higher unemployment. Most of all, however, high government expenditure requires high taxes. These reduce the disposable income of private households and thus, *ceteris paribus*, aggregate demand. High taxes also reduce the profitability of private investment (Alesina et al., 2002). Both effects tend to increase unemployment.

A high tax burden on labor has a particularly adverse impact on unemployment. Using a general equilibrium growth model, Daveri and Tabellini (2000) have shown that an increase in labor taxes is shifted onto higher real labor costs if trade unions are strong. As a result, labor demand immediately falls and unemployment rises. Furthermore, as enterprises substitute capital for labor and as this reduces the marginal product of capital, investment and the growth rate decline in the long term. Thus unemployment rises in the long term as well. On the other hand, if unions are weak and employees thus have to bear the consequences of an increasing tax burden, net wages fall and leisure time becomes relatively more attractive. This also causes (voluntary) unemployment to rise.

To the extent that borrowing funds government expenditure, this not only crowds out private investment in the capital market. In addition, private households and enterprises are likely to anticipate that they will have to pay higher taxes sooner or later to service the growing public debt and that their disposable income will thus decrease. They already react to these prospects today by reducing their current spending on consumption and investment, thus increasing unemployment even further.¹

Of course, it is also important how the government uses its revenues. Government investment in infrastructure and education may increase growth and employment in the long term. However, as the consumption share of government expenditure is far larger than the investment share in all countries, it may not be expected that such favorable effects will more than offset the adverse effects mentioned above. All in all, it may rather be expected that with a growing government sector unemployment tends to rise.

As it is relatively easy for enterprises to relocate the jobs of low-skilled workers abroad or to substitute these workers by capital, and as demand for these workers thus has a relatively high price elasticity, a growing government sector, due to the increasing tax burden, is likely to have a particularly adverse impact on the employment situation of the low skilled and probably on women too (the latter often have lower levels of formal qualification and less vocational experience than men). Finally, a larger government sector probably leads to higher long-term unemployment, on the one hand, because it limits the private sector's ability to absorb workers and, on the other hand, because a big government is likely to grant relatively generous wage replacement benefits and thus to dampen work incentives for the unemployed.

¹ For more on these so-called non-Keynesian effects of fiscal policy, see, e.g., Bertola/Drazen (1993), Perotti (1999) and Alesina et al. (2002).

3. Previous empirical results

Several empirical studies suggest that an increase in government expenditure impairs labor market performance. For example, Karras (1993) observed negative employment effects of government spending in eight countries in his sample of 18 countries. Yuan and Li (2000) came up with the same result for the US. In a cross-country study of 15 major industrial countries, Abrams (1999) found that the government expenditure ratio was positively related to the unemployment rate. Christopoulos and Tsionas (2002) examined the relationship between the government expenditure ratio and the unemployment rate for 10 European countries over the period 1961 to 1999 and found that there was unidirectional causality from government size to unemployment rate.

According to several other empirical studies, an increase in government employment worsens the overall employment situation. For example, empirical evidence from a sample of 17 OECD countries suggests that, on average, the creation of 100 public sector jobs may have eliminated about 150 private sector jobs, slightly decreased labor force participation, and increased the number of unemployed workers by about 33 (Algan et al., 2002). Malley and Moutos (1996) have obtained similar results for Sweden, Demekas and Kontolemis (2000) for Greece, and Malley and Moutos (1998) for Germany, Japan and the US.

A large number of studies on the unemployment effects of labor taxes were carried out recently covering OECD countries. Almost all of them concluded that a larger tax burden increases the unemployment rate.² For example, Nickell et al. (2005) found that a 10

² See Nickell/Layard (1999), Daveri/Tabellini (2000), de Volkerink et al. (2002), International Monetary Fund (2003), Nickell et al. (2003; 2005).

percentage point increase in the labor tax rate leads to around a 1 percentage point rise in the unemployment rate in the long term at average levels of wage bargaining coordination. According to Daveri/Tabellini (2000), in continental Europe the rise in labor tax rates from the mid-60s to the mid-90s even accounts for half of the rise in the unemployment rate during that period. Although Scarpetta (1996) did not find statistically significant effects of labor taxes on the overall unemployment rate (nor on the youth unemployment rate), he did find such effects on the long-term unemployment rate (the latter defined as individuals with unemployment spells longer than 12 months as a percentage of the labor force).

4. Data set and estimation method

To measure the size of the government sector, this paper uses the ratings of the ‘Economic Freedom of the World (EFW)’ index (Gwartney/Lawson, 2004). The index has been developed by a group of North American economists under the auspices of the Canadian Fraser Institute with the aid of a worldwide network of further economists and institutes. It subdivides economic freedom into five areas: (1) size of government, (2) legal system and security of property rights, (3) access to sound money, (4) freedom to trade internationally, (5) regulation of credit, labor, and business. The area ‘size of government’ consists of four components:

- government consumption,
- transfers and subsidies,
- government enterprises and investment,
- top marginal income tax rate.

These four components are designed to measure all major aspects of the size of government. The rating scale of the EFW index ranges from 0 to 10, with 0 representing the lowest and 10 the highest degree of economic freedom. In the area 'size of government,' lower ratings always indicate a larger government sector.

The following regressions measure the impact of government size using the respective area ratings as well as ratings of the four components of this area. This allows us not only to determine how the size of the government sector generally affects unemployment, it also allows us to individually determine the effects of the basic types of government activities. The area ratings are calculated as the arithmetic means of the ratings for the four components.

The first component, 'government consumption,' is calculated using the formula $(V_{\max} - V_i) / (V_{\max} - V_{\min})$ multiplied by 10. V_i is the country's general government consumption as a percentage of total consumption. The values for V_{\max} and V_{\min} were set at 40% and 6%, respectively, representing the maximum and the minimum values during the 1990 base year. If a country's government consumption ratio is low, the formula generates a rating close to 10. Countries with a larger proportion of government consumption receive lower ratings. Ratings decline towards zero as the government consumption ratio approaches 40%.

The formula used to calculate the country ratings for the component 'transfers and subsidies' also is $(V_{\max} - V_i) / (V_{\max} - V_{\min})$ multiplied by 10. In this case, V_i represents the country's transfers and subsidies as a percentage of GDP. V_{\max} and V_{\min} are the maximum and minimum values of this component during the 1990 base year. Countries with smaller transfer sectors earn a higher rating score. As the size of a country's transfer sector approaches that of

the country with the largest transfer sector during the base year, the rating declines toward zero.

The component 'government enterprises and investment' takes into account, first, the role of state-owned enterprises in the economy and, second, government investment as a percentage of total investment. When there were few state-owned enterprises and the government investment rate was less than 15%, countries received a rating of 10. Ratings decline as the number of state-owned enterprises and their share of output increase and as the government investment rate rises. Countries receive a rating of zero when the economy was dominated by state-owned enterprises and government investment exceeded 50% of the total.

The ratings for the last component, 'top marginal income tax rate,' are based on the top marginal income and payroll tax rate and on the income threshold at which it applies. For example, countries with a tax rate of less than 26% and an income threshold of at least USD 50,000 earn a rating of 10. Higher tax rates and lower income threshold levels result in lower ratings. For example, countries with a tax rate that exceeds 60% and an income threshold that is below USD 25,000 receive a rating of zero.

One advantage of using the EFW ratings instead of the underlying data is that, due to the uniform scale, the magnitude of the impact of the various indicators can be compared more easily. An additional advantage of the EFW index is that in the area 'size of government' all components are based on objective data. The relevant data are translated into ratings with the aid of a formula that is published in the reports of the Fraser Institute. The sources for the data

are listed in the reports as well. Thus, the data and the ratings derived on the basis thereof may be verified by anybody.³

Applying the most recent methodology, which was further developed over the years, the EFW index has been calculated from 1970 on for every fifth year plus for the years 2001 and 2002. As no labor market institutions data compiled according to a uniform methodology are available for years prior to 1985 (see below), most of our regressions are based on data for the years 1985, 1990, 1995, 2000, 2001 and 2002. They reflect the size of government over a period of almost two decades up to the most recent past. The regressions to explain the unemployment rate among low-skilled workers are only based on data from the years 1995, 2000, 2001 and 2002 because these unemployment rates are unavailable for earlier years.

The country group consists of 19 industrial countries (see appendix 1). It includes all major industrial countries and countries with different cultural backgrounds, i.e., Anglo-Saxon countries, Scandinavian countries, countries from continental Western Europe, and Japan.

To measure the effects on unemployment, this paper uses five different endogenous variables (for definitions and sources, see appendix 2):

- unemployment rates relating to the whole labor force as well as to women, young people and the low skilled;
- the share of long-term unemployed in the total number of unemployed.

³ The Heritage Foundation has also published an index of economic freedom since 1995 (see, e.g., Miles et. al., 2005). This index is based on the assessments of in-house experts. Thus it is far less objective and transparent than the EFW index. The latter is clearly superior from a methodological point of view.

These variables enable us to measure not only how the size of government affects the overall unemployment rate but also the way it affects unemployment among three major problem groups of the labor market. Additionally, it enables us to investigate whether the size of government also affects long-term unemployment.

We use the output gap to control for the state of the business cycle. Furthermore, we attach importance to controlling for the impact of labor market institutions. As numerous empirical studies have shown, these institutions have a considerable impact on unemployment.⁴ By using adequate controls, we try to make sure as far as possible that the estimates for the government size variables are not biased due to omitted variables. To date, the OECD has undertaken the most extensive effort to quantify labor market institutions and has developed the best indicators. We use the latest OECD data covering the seven most important labor market institutions (for definitions and sources, see appendix 2):

- collective bargaining coverage,
- wage bargaining centralization and coordination,
- statutory minimum wage (as a share of average wage),
- tax burden on labor (‘tax wedge’),
- employment protection legislation,
- unemployment benefits replacement rates,
- expenditure on active labor market policies per unemployed person.

⁴ See, e.g., Scarpetta (1996), Elmeskov et al. (1998), Heckman/Pagés-Serra (2000), Feldmann (2003a; 2003b; 2005), International Monetary Fund (2003), Nickell et al. (2003; 2005), Belot/van Ours (2004), Botero et al. (2004).

The regression coefficients are estimated using the random effects, generalized least squares (GLS) procedure that incorporates time-invariant country effects (Swamy-Arora method). This enables us to exploit both the cross-country and the time-series variation included in the sample while simultaneously controlling for unobserved country effects. Allowing for cross-country differences in labor market performance that reflect the influence of omitted variables is highly desirable, but the random-effects method for doing so produces biased estimates if variables included as controls are correlated with country-specific error terms. Therefore, a Hausman test for misspecification of the random-effects model is shown for each regression. As the results from this test clearly indicate, none of our estimates is biased (Tables 1 to 5). Thus, in our case the random-effects GLS method is the appropriate choice. To avoid the problem of multicollinearity, we estimate the government size variables individually, not simultaneously. Finally, to correct for heteroskedasticity, we estimate robust t-statistics using the technique developed by White.

5. Results

5.1. Size of government

Except for the regressions to explain the youth unemployment rate, all estimates for the area variable ‘size of government’ are statistically significant. Our results indicate that as the size of government grows, the unemployment rate increases among the total labor force (Table 1), among women (Table 2) and among the low skilled (Table 4). Long-term unemployment is likely to increase as well (Table 5).

The size of these effects appears to be substantial. According to our regression results, a growth of the government sector corresponding to a decline on the rating scale by three points is associated with an increase of the unemployment rate by 2.5 percentage points, *ceteris paribus*. The effects on female and low-skilled workers appear to be particularly severe. If the rating declines by three points, the unemployment rate among women increases by 2.8 percentage points and the unemployment rate among the low skilled increases by 3.3 percentage points, *ceteris paribus*. Long-term unemployment probably also rises noticeably as the government sector grows. According to our estimates, a decrease in the rating by three points increases the share of long-term unemployed in the total number of unemployed by 6.2 percentage points, *ceteris paribus*. On average over the six years under review, the Italian ratings were exactly 3.0 points below the US ratings. The German ratings were 2.6 points and the French ratings were 4.0 points below those of the US. Thus the higher unemployment levels in these three European countries were probably to a large extent due to their larger government sectors.

A large government sector appears to significantly deteriorate the employment situation. Our regression results thus corroborate the theoretical hypotheses (section 2) and are in line with previous empirical studies (section 3). A large government sector seems to have an especially adverse effect on women and the low skilled. This insight is novel. The impact on problem group has not been analyzed before.

5.2. Government consumption

The results for the individual components indicate which types of government activities are mainly responsible for these adverse labor market effects. In most regressions, the 'government consumption' variable is statistically insignificant. In the regressions to explain the female unemployment rate and long-term unemployment, it is statistically significant. According to these regressions, unemployment among women and the share of long-term unemployed in the total number of unemployed decrease with a growing share of government consumption in total consumption (Tables 2 and 5).

In view of the results for the area variable 'size of government,' the results for the component variable 'government consumption' are initially surprising. Perhaps Keynesian demand effects are predominant with respect to government consumption. If this would be the case, a rise in government consumption demand would result in a reduction of unemployment. The results might also reflect the effects of special expenditure programs targeted at women and the long-term unemployed as part of active labor market policies. However, for three reasons one should not overrate the results for the 'government consumption' variable. First, most results for this variable are statistically insignificant. Second, the coefficient in the regression to explain the female unemployment rate is only statistically significant at the 10% level. Third, government consumption expenditure has to be funded from taxes or debt. The labor market effects of funding also need to be taken into account in an overall assessment.

5.3. Transfers and subsidies

Most results for the ‘transfers and subsidies’ variable are statistically insignificant as well. The only statistically significant result indicates that transfers and subsidies are likely to increase long-term unemployment (Table 5). This result should hardly be surprising. Transfers and subsidies weaken work incentives and distort competition. Transfers to the unemployed lower their incentive to take up a job while anti-competitive subsidies to enterprises are likely to diminish economic growth and thus reduce labor demand. Both effects are likely to result in higher long-term unemployment.

It is also noteworthy that, according to our estimates, transfers and subsidies neither lower the unemployment rate among the overall labor force nor the unemployment rates among the problem groups of the labor market. With the aid of transfers and subsidies, governments mostly intend to protect existing jobs, to create new jobs and thus to reduce unemployment. As our regression results suggest, this goal is generally not achieved.

5.4. Government enterprises and investment

The most unambiguous results of all components are those for the ‘government enterprises and investment’ variable. The more important the role of state-owned enterprises in the economy and the larger the share of government investment in total investment,

- the higher is unemployment among the total labor force (Table 1) as well as among women (Table 2) and the low skilled (Table 4);
- the larger is the share of long-term unemployed among all unemployed (Table 5).

State-owned enterprises distort competition, reduce allocative efficiency and thus are likely to lower growth and to increase unemployment. Similarly as in the case of transfers and subsidies, governments frequently use state-owned enterprises with the intention to reduce unemployment. These enterprises often record high numbers of excess staff. However, as our regression results indicate, on balance such a policy apparently does not lead to an improvement but to a deterioration of the employment situation.

Our results corroborate the hypotheses summarized in section 2. State-owned enterprises appear to crowd out private enterprises and thus to have an adverse net impact on unemployment. The results are also in line with previous empirical studies according to which an increase in public sector employment worsens of the overall employment situation (section 3).

What about the effects of government investment? Although from a theoretical point of view we may expect government investment to increase growth and to reduce unemployment in the long term (section 2), the regression results indicate that these effects at least do not overcompensate for the adverse effects of state-owned enterprises. Also, many government investments may be less conducive to economic growth and the employment situation than generally assumed.

5.5. Taxes

The estimates for the ‘top marginal income tax rate’ variable are also instructive. The higher the top marginal income tax rate and the lower the income threshold at which it applies, the higher is unemployment among the overall labor force (Table 1) as well as among women (Table 2) and the low skilled (Table 4). A high top marginal tax rate and a low income threshold level are likely to dampen investment activity as well as work incentives. Both of these effects are likely to result in higher unemployment.

These results corroborate the hypotheses outlined in section 2 and are in line with previous empirical studies on the adverse employment effects of labor taxes. We, too, find that higher labor taxes are correlated with higher unemployment. Indeed, the ‘tax wedge’ variable is statistically significant in each of our regressions (Tables 1 to 5). Remarkably, in the regressions to explain the overall unemployment rate, the female unemployment rate and the unemployment rate among low-skilled workers, the variables ‘top marginal income tax rate’ and ‘tax wedge’ are simultaneously statistically significant (Tables 1, 2 and 4), indicating that, in addition to high labor taxes, high top marginal income tax rates exert a detrimental impact of their own on unemployment. This is also a novel insight.

A rise in the tax wedge is not only associated with an increase in the unemployment rate among the total labor force, women and the low skilled; it is also associated with an increase in the youth unemployment rate (Table 3). In contrast, the government size variables proper are not statistically significant in any of the regressions to explain the youth unemployment rate. According to our estimates, the unemployment situation among young people appears to

be mainly determined by the tax wedge, statutory minimum wages, active labor market policies and the business cycle (Table 3).

6. Conclusion

In industrial countries, a large government sector appears to have an adverse impact on unemployment. According to our regression results, it has a particularly adverse impact on women and the low skilled. Furthermore, it is likely to substantially increase long-term unemployment. It seems that dominant state-owned enterprises, a large share of public investment in total investment as well as high top marginal income tax rates and low income threshold levels at which they apply are particularly detrimental. Therefore, countries with both high unemployment and a large government sector should consider a reduction of the size of the government sector as a means of fighting unemployment.

Appendix 1: List of Countries

Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

Appendix 2: Dependent and control variables – definitions and sources

I. Dependent variables

Unemployment rate: Unemployed as a percentage of the labor force. Source: International Labour Office (2003).

Female unemployment rate: Unemployed women as a percentage of the female labor force. Source: International Labour Office (2003).

Youth unemployment rate: Unemployed aged 15 to 24 years as a percentage of the labor force in the same age bracket. Source: International Labour Office (2003).

Unemployment rate among low-skilled workers: Unemployed with less than upper secondary education as a percentage of the labor force with the same educational attainment. Persons aged 25 to 64 years. Source: OECD (1998; 2002; 2003; 2004a).

Long-term unemployment: Unemployed with an unemployment duration of 12 months and more as a percentage of total unemployment. Source: European Commission (2004), International Labour Office (2003), OECD (2004a), author's calculations.

II. Control variables

Tax wedge: Income tax plus employee's and employer's social security contributions less cash benefits as a percentage of labor costs; one-earner family with two children; average production worker. Source: OECD (2004b).

Minimum wage: Statutory minimum wage as a share of average wage. Source: OECD (2004a).

Employment protection legislation: Indicator for strictness of protection against individual dismissals and for strictness of regulation of temporary employment (fixed-term

contracts, temporary work agency employment). The indicator ranges from 0 to 6, with higher values representing stricter regulation. Source: OECD (2004a).

Unemployment benefits replacement rates: Gross unemployment benefits as a percentage of previous gross wage earnings. Averages across two earnings levels, three family types, and three unemployment duration categories. Source: OECD (2004c).

Active labor market policies: Expenditure on active labor market programs per unemployed person, divided by 1,000. Source: OECD (2004a).

Collective bargaining coverage: Percentage of salaried workers subject to union-negotiated terms and conditions of employment. Source: OECD (2004a).

Wage bargaining centralization and coordination: Degree of centralization/coordination in wage bargaining. The indicator ranges from 1 to 5, with higher values representing a higher degree of centralization and coordination. Source: OECD (2004a).

Output gap: Deviations of actual GDP from potential GDP as a per cent of potential GDP. Source: OECD (various issues).

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Table 1: Regressions to explain the unemployment rate^{a)}

	(1)	(2)	(3)	(4)	(5)
Size of government	-0.83*** (-2.97)				
Government consumption		0.25 (1.20)			
Transfers & subsidies			-0.24 (-1.15)		
Government enterprises & investment				-0.21*** (-2.83)	
Top marginal income tax rate					-0.40** (-2.23)
Tax wedge	0.20*** (4.50)	0.22*** (4.70)	0.21*** (4.15)	0.22*** (5.02)	0.21*** (5.04)
Minimum wage	1.29 (0.87)	0.08 (0.05)	0.61 (0.35)	0.80 (0.50)	0.63 (0.42)
Employment protection legislation	0.22 (0.48)	0.34 (0.72)	0.44 (0.95)	0.31 (0.69)	0.05 (0.10)
Unemployment benefits replacement rates	0.02 (0.73)	0.03 (1.18)	0.02 (0.80)	0.03 (1.03)	0.03 (1.15)
Active labor market policies	-0.18*** (-7.20)	-0.16*** (-4.70)	-0.18*** (-6.87)	-0.16*** (-6.59)	-0.17*** (-6.72)
Collective bargaining coverage	-0.03 (-1.28)	-0.01 (-0.23)	-0.02 (-0.90)	-0.02 (-0.73)	-0.02 (-1.02)
Wage bargaining centralization & coordination	-0.34 (-0.62)	-0.36 (-0.55)	-0.24 (-0.37)	-0.37 (-0.62)	-0.35 (-0.62)
Output gap	-0.50*** (-4.58)	-0.57*** (-5.08)	-0.54*** (-4.17)	-0.55*** (-5.11)	-0.54*** (-5.26)
Number of observations	105	105	102	105	105
Adjusted R ²	0.65	0.62	0.62	0.64	0.65
F-statistic	22.40***	20.05***	19.45***	21.12***	22.23***
Hausman test	13.51	11.46	14.60	9.55	9.89

^{a)}Generalized least squares estimates with country-specific random effects (Swamy-Arora method). All regressions are based on data from 19 industrial countries for the years 1985, 1990, 1995, 2000, 2001 and 2002. Heteroskedasticity-consistent t-statistics in parentheses (White method). ***(**/*) denotes statistically significant at the 1%(5%/10%) level. All regressions also contain a constant term.

Table 2: Regressions to explain the female unemployment rate^{a)}

	(1)	(2)	(3)	(4)	(5)
Size of government	-0.93*** (-2.93)				
Government consumption		0.46* (1.87)			
Transfers & subsidies			-0.32 (-1.34)		
Government enterprises & investment				-0.27*** (-3.30)	
Top marginal income tax rate					-0.40* (-1.89)
Tax wedge	0.20*** (3.64)	0.22*** (4.06)	0.20*** (3.18)	0.22*** (4.17)	0.21*** (4.01)
Minimum wage	1.31 (0.66)	-0.15 (-0.07)	0.22 (0.10)	0.64 (0.31)	0.55 (0.27)
Employment protection legislation	1.30** (2.09)	1.30** (2.02)	1.56** (2.48)	1.39** (2.32)	1.13 (1.63)
Unemployment benefits replacement rates	0.03 (0.85)	0.04 (1.38)	0.03 (0.86)	0.04 (1.08)	0.04 (1.20)
Active labor market policies	-0.23*** (-6.91)	-0.20*** (-4.71)	-0.23*** (-6.67)	-0.21*** (-6.63)	-0.23*** (-6.63)
Collective bargaining coverage	-0.02 (-0.67)	0.02 (0.58)	-0.01 (-0.34)	-0.01 (-0.18)	-0.01 (-0.27)
Wage bargaining centralization & coordination	-0.72 (-0.98)	-0.74 (-0.88)	-0.55 (-0.62)	-0.72 (-0.91)	-0.72 (-0.93)
Output gap	-0.41*** (-2.94)	-0.50*** (-3.41)	-0.44*** (-2.75)	-0.47*** (-3.41)	-0.45*** (-3.45)
Number of observations	105	105	102	105	105
Adjusted R ²	0.56	0.54	0.54	0.55	0.55
F-statistic	15.69***	14.66***	13.94***	15.31***	15.27***
Hausman test	10.85	11.05	9.18	5.74	7.15

^{a)}Generalized least squares estimates with country-specific random effects (Swamy-Arora method). All regressions are based on data from 19 industrial countries for the years 1985, 1990, 1995, 2000, 2001 and 2002. Heteroskedasticity-consistent t-statistics in parentheses (White method). ***(**/*) denotes statistically significant at the 1%(5%/10%) level. All regressions also contain a constant term.

Table 3: Regressions to explain the youth unemployment rate^{a)}

	(1)	(2)	(3)	(4)	(5)
Size of government	-0.34 (-0.72)				
Government consumption		0.25 (0.67)			
Transfers & subsidies			0.05 (0.13)		
Government enterprises & investment				0.03 (0.19)	
Top marginal income tax rate					-0.53 (-1.55)
Tax wedge	0.40*** (4.44)	0.41*** (4.53)	0.44*** (4.64)	0.41*** (4.65)	0.40*** (4.62)
Minimum wage	6.00** (2.06)	5.15* (1.77)	6.22** (2.02)	5.41* (1.82)	6.19** (2.10)
Employment protection legislation	0.66 (0.71)	0.60 (0.65)	0.66 (0.70)	0.81 (0.86)	0.12 (0.13)
Unemployment benefits replacement rates	0.05 (0.93)	0.05 (1.05)	0.06 (1.13)	0.05 (0.97)	0.06 (1.13)
Active labor market policies	-0.29*** (-5.55)	-0.27*** (-4.19)	-0.30*** (-5.60)	-0.29*** (-5.43)	-0.28*** (-5.25)
Collective bargaining coverage	-0.04 (-0.77)	-0.03 (-0.61)	-0.04 (-0.71)	-0.04 (-0.67)	-0.05 (-0.93)
Wage bargaining centralization & coordination	0.29 (0.28)	0.41 (0.37)	0.20 (0.19)	0.36 (0.33)	0.34 (0.35)
Output gap	-0.97*** (-4.67)	-1.01*** (-4.70)	-1.04*** (-4.18)	-0.99*** (-4.75)	-0.97*** (-4.90)
Number of observations	104	104	101	104	104
Adjusted R ²	0.57	0.57	0.56	0.57	0.59
F-statistic	16.23***	16.33***	15.36***	16.21***	17.21***
Hausman test	10.08	8.35	14.50	8.99	8.65

^{a)}Generalized least squares estimates with country-specific random effects (Swamy-Arora method). All regressions are based on data from 19 industrial countries for the years 1985, 1990, 1995, 2000, 2001 and 2002. Heteroskedasticity-consistent t-statistics in parentheses (White method). ***(**/*) denotes statistically significant at the 1%(5%/10%) level. All regressions also contain a constant term.

Table 4: Regressions to explain the unemployment rate among low-skilled workers^{a)}

	(1)	(2)	(3)	(4)	(5)
Size of government	-1.10** (-2.21)				
Government consumption		0.20 (0.56)			
Transfers & subsidies			-0.41 (-1.17)		
Government enterprises & investment				-0.25* (-1.71)	
Top marginal income tax rate					-0.48* (-1.68)
Tax wedge	0.20** (2.64)	0.25*** (3.91)	0.22*** (2.99)	0.24*** (3.49)	0.23*** (3.88)
Minimum wage	2.25 (1.19)	0.91 (0.43)	1.86 (0.86)	1.70 (0.88)	1.06 (0.49)
Employment protection legislation	-1.14* (-1.69)	-0.88 (-1.23)	-0.77 (-1.07)	-1.09 (-1.48)	-0.99 (-1.47)
Unemployment benefits replacement rates	0.11* (1.91)	0.11* (1.86)	0.09 (1.47)	0.12* (1.98)	0.12** (2.04)
Active labor market policies	-0.31*** (-3.88)	-0.27** (-2.56)	-0.29*** (-3.04)	-0.28*** (-3.58)	-0.30*** (-3.23)
Collective bargaining coverage	-0.00 (-0.15)	0.03 (1.09)	0.00 (0.03)	0.02 (0.65)	-0.00 (-0.06)
Wage bargaining centralization & coordination	-0.79 (-1.28)	-1.10* (-1.85)	-0.73 (-1.02)	-1.01* (-1.68)	-0.88 (-1.35)
Output gap	-0.84*** (-7.04)	-0.88*** (-6.63)	-0.85*** (-5.35)	-0.88*** (-6.94)	-0.86*** (-7.58)
Number of observations	74	74	71	74	74
Adjusted R ²	0.64	0.60	0.61	0.62	0.62
F-statistic	15.31***	13.06***	13.23***	14.18***	14.06***
Hausman test	5.53	3.83	5.39	3.62	5.40

^{a)}Generalized least squares estimates with country-specific random effects (Swamy-Arora method). All regressions are based on data from 19 [regression (3) 18] industrial countries for the years 1995, 2000, 2001 and 2002. Heteroskedasticity-consistent t-statistics in parentheses (White method). ***(**/*) denotes statistically significant at the 1%(5%/10%) level. All regressions also contain a constant term.

Table 5: Regressions to explain long-term unemployment^{a)}

	(1)	(2)	(3)	(4)	(5)
Size of government	-2.07** (-2.01)				
Government consumption		2.29*** (3.03)			
Transfers & subsidies			-1.53** (-2.36)		
Government enterprises & investment				-0.99*** (-3.12)	
Top marginal income tax rate					-0.06 (-0.11)
Tax wedge	0.62*** (3.27)	0.68*** (3.99)	0.51*** (2.64)	0.65*** (3.59)	0.66*** (3.73)
Minimum wage	-12.50* (-1.66)	-15.44* (-1.85)	-17.43** (-2.04)	-13.85* (-1.82)	-15.51* (-1.96)
Employment protection legislation	2.96 (1.63)	2.01 (1.24)	3.92** (2.20)	2.85 (1.66)	3.60* (1.82)
Unemployment benefits replacement rates	-0.07 (-0.63)	-0.02 (-0.18)	-0.12 (-1.15)	-0.05 (-0.50)	-0.06 (-0.57)
Active labor market policies	-0.70*** (-5.58)	-0.53*** (-4.25)	-0.71*** (-5.48)	-0.64*** (-5.23)	-0.70*** (-5.74)
Collective bargaining coverage	0.03 (0.31)	0.14 (1.50)	0.05 (0.43)	0.05 (0.46)	0.08 (0.80)
Wage bargaining centralization & coordination	0.01 (0.00)	0.34 (0.16)	0.75 (0.36)	-0.04 (-0.02)	0.37 (0.17)
Output gap	-0.39 (-1.35)	-0.66** (-2.38)	-0.26 (-0.82)	-0.51* (-1.86)	-0.53** (-2.02)
Number of observations	103	103	100	103	103
Adjusted R ²	0.53	0.54	0.53	0.55	0.51
F-statistic	13.79***	14.39***	13.38***	15.08***	12.85***
Hausman test	9.05	16.72*	7.53	6.75	6.37

^{a)}Generalized least squares estimates with country-specific random effects (Swamy-Arora method). All regressions are based on data from 19 industrial countries for the years 1985, 1990, 1995, 2000, 2001 and 2002. Heteroskedasticity-consistent t-statistics in parentheses (White method). ***(**/*) denotes statistically significant at the 1%(5%/10%) level. All regressions also contain a constant term.