Chapter 46

LABOR MARKET INSTITUTIONS AND ECONOMIC PERFORMANCE

STEPHEN NICKELL*

London School of Economics

RICHARD LAYARD*

London School of Economics

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Abstract

Barely a day goes by without some expert telling us how the continental European economies are about to disintegrate unless their labor markets become more flexible. Basically, we are told, Europe has the wrong sort of labor market institutions for the modern global economy. These outdated institutions both raise unemployment and lower growth rates. The truth of propositions such as these depends on which labor market institutions really are bad for unemployment and growth, and which are not. Our purpose in this chapter is to set out what we know about this question. Our conclusions indicate that the labor market institutions on which policy should be focussed are unions and social security systems. Encouraging product market competition is a key policy to eliminate the negative effects of unions. For social security the key policies are benefit reform linked to active labor market policies to move people from welfare to work. By comparison, time spent worrying about strict labor market regulations, employment protection and minimum wages is probably time largely wasted.

JEL codes: J18; J64

1. Introduction

Barely a day goes by without some expert telling us how the continental European economies are about to disintegrate unless their labor markets become more flexible. Basically, we are told, Europe has the wrong sort of labor market institutions for the modern global economy. These outdated institutions both raise unemployment and lower growth rates. The truth of propositions such as these depends on which labor market institutions really are bad for unemployment and growth, and which are not. Our purpose here is set out what we know about this question. One reason for doing this is to try and focus future attention on those institutions that really do make a difference, so that less time is wasted worrying about those that do not.

We restrict ourselves to the OECD countries. In Section 2, we show the substantial

differences in performance across the different countries. As is well known, the US has had lower unemployment than many European countries, but by no means all. On productivity per hour worked, the US and core Europe are now at much the same level. But the US has had much lower productivity growth (per hour) than Europe. These are among the facts to be investigated.

In Section 3 we lay out the main institutional differences that might explain the facts. We focus on five main sets of institutions – the levels of labor taxation; the systems of employment protection; trade union activity and minimum wages; income support for the unemployed and active labor market policy; and education and skill formation. We then see how far these institutional differences are able to explain the cross-country range of differences in unemployment and productivity growth. In Section 4, we develop some theory as to how these factors might affect the outcomes, and in Section 5, we provide some general empirical evidence in the form of cross-sectional cross-country regressions. After this we look in detail at each of the five main kinds of institutions, assembling evidence from a variety of sources. Section 11 summarizes our conclusions.

The section on skills and education (Section 10) goes rather further than the other sections, since it looks not only at unemployment but also at wage inequality. Some writers have tended to assume that in all countries the demand for skill has outrun the supply, and the only difference lies in the differential response of wages and employment (caused by institutional factors, e.g., Krugman, 1994). Instead we first document the movements of demand and supply in different countries and show a greater problem in the US and the UK than elsewhere. Then we examine how this movement explains changes in unemployment rates and wage differentials. We also examine how far, in terms of levels, the distribution of skills alone can explain the level of wage inequality.

All the issues we discuss have been looked at many times before (see e.g., Layard et al., 1991) but not always within such a unified framework and much more in relation to unemployment than growth. Some of these issues are also discussed in other chapters of this book (chapters by Blau and Kahn, Bertola, Machin and Manning, and Bound and Burkhauser). The conclusions they reach seem to be much in line with our own.

2. Economic performance

It is commonplace to summarize the economic performance of countries by GDP per capita. This probably subsumes a bit too much, so here we split this variable into productivity and the employment/population rate. Furthermore variations in the latter are generated by many factors of which perhaps the most interesting is the unemployment rate, because it is probably the least voluntary. Other important contributing factors include female participation rates and early retirement rates. With these, however, it is harder to say that more work is "better" whereas few would want to argue that about unemployment. The unemployed are looking for work, by definition,

as well as being notoriously unhappy about not having it (see Clark and Oswald, 1994). In particular, the average unemployed person is much more unhappy, ceteris paribus, than the average person who is out of the labor force. This suggests that, on average, being out of the labor force is a different state from being unemployed and it is best not to combine the two. Nevertheless, it is clear that some individuals who are recorded as unemployed in some countries would be out of the labor force in others. For example, some of the large number of working age individuals on disability pensions in the Netherlands would probably be classified as unemployed in other countries.[1] In the light of this, we consider other aspects of labor input although our main focus will be on unemployment.

In Table 1, we present some measures of unemployment. The first point to notice is the enormous variation in rates across countries despite the fact that they are as close to being comparable as we can get.[2] Taking the longterm average from 1983–1996, the rates stretch from 1.8% in Switzerland to 19.7% in Spain. This variation means that, over the long term, around 30% of people in OECD Europe live in countries where unemployment is, on average, lower than the United States. However, at the precise time of writing, this number is much lower. Second, it is worth noting that the variation in shortterm unemployment is substantially smaller than that in longterm unemployment. Indeed the latter seems to be a bit of an optional extra, the reason being that longterm unemployment, in contrast to the shortterm variety, contributes very little to holding down inflation (see OECD, 1993, p. 94).

As we have already indicated, alternative measures of labor input are also important, so we present a number of different aspects of this variable in Table 2. The overall measure of labor supply in column (7) is based on total hours worked per member of the population of working age and combines both annual hours per worker (column (3)) and the employment population ratio (column (5)). The enormous variation in this variable explains the large differences between GDP per hour and GDP per capita which we shall see in Table 3.

The cross country variation in employment/population ratios in column (5) is due to three main factors. First, variations in the participation of married women, which are very low in southern Europe and very high in Scandinavia and the United States (see column (2)). Second, variations in the retirement rates for men over the age of 55 (column (1)) and third, variations in the employment rates of prime age men (column (6)). These latter are generated by differing unemployment and disability rates. As we have already indicated, some of the non-participants in one place might well appear as unemployed in another depending on the structure of the benefit system. For example, if you have been out of work for a year in the United States or Italy, you will not be entitled to any benefits

[1] In the Netherlands, the number of disability pensioners aged 15–64 in 1990 was over 15% of the labor force. This compares with around 5.5% in Germany and just over 4% in Britain and the United States (see the chapter by Bound and Burkhauser in this volume).

[2] To be unemployed, you have to be without work, to be ready to take up a job and to have looked actively for work within the last 4 weeks.

Table 1
Unemployment rates in the OECD (%)[a]

	1997 (Spring)	1983–1996	1983–1988			1989–1994		
	Total	Total	Total	Shortterm	Longterm	Total	Shortterm	Longterm
Austria	4.5	3.8	3.6	na	na	3.7	na	na
Belgium	9.6	9.7	11.3	3.3	8.0	8.1	2.9	5.1
Denmark	6.3	9.9	9.0	6.0	3.0	10.8	7.9	3.0
Finland	15.4	9.1	5.1	4.0	1.0	10.5	8.9	1.7
France	12.5	10.4	9.8	5.4	4.4	10.4	6.5	3.9
Germany (W)	7.7	6.2	6.8	3.7	3.1	5.4	3.2	2.2
Ireland	11.7	15.1	16.1	6.9	9.2	14.8	5.4	9.4
Italy	8.2	7.6	6.9	3.1	3.8	8.2	2.9	5.3
Netherlands	5.7	8.4	10.5	5.0	5.5	7.0	3.5	3.5
Norway	4.8	4.2	2.7	2.5	0.2	5.5	4.3	1.2
Portugal	7.2	6.4	7.6	3.5	4.2	5.0	3.0	2.0
Spain	21.4	19.7	19.6	8.3	11.3	18.9	9.1	9.7
Sweden	10.9	4.3	2.6	2.3	0.3	4.4	4.0	0.4
Switzerland	4.0	1.8	0.8	0.7	0.1	2.3	1.8	0.5
UK	7.3	9.7	10.9	5.8	5.1	8.9	5.5	3.4
Japan	3.2	2.6	2.7	2.2	0.5	2.3	1.9	0.4
Australia	8.8	8.7	8.4	5.9	2.4	9.0	6.2	2.7
New Zealand	6.0	6.8	4.9	4.3	0.6	8.9	6.6	2.3
Canada	9.3	9.8	9.9	9.0	0.9	9.8	8.9	0.9
US	4.9	6.5	7.1	6.4	0.7	6.2	5.6	0.6

[a] These rates are OECD standardized rates with the exception of Austria, Denmark and Italy. For Austria and Denmark we use national registered rates. For Italy we use the US Bureau of Labor Statistics (BLS) "unemployment rates on US concepts". Aside from Italy, the OECD rates and the BLS rates are very similar. For Italy, the OECD rates appear to include the large numbers of Italians who are registered as unemployed but have performed no active job search in the previous 4 weeks. Longterm rates refer to those unemployed with durations over 1 year. The data are taken from the OECD Employment Outlook and the UK Employment Trends, published by the Department of Employment and Education.

whether or not you say you are looking for work. So there is no strong incentive to classify yourself as unemployed (looking for work) in the relevant survey. In countries with longer durations of benefit availability (see Table 10), the incentive to look for work and hence to be classified as unemployed is obviously stronger. It is, however, important not to make too much of this. The measured unemployment rates used here are all based on sample surveys which bear no official or unofficial relationship to formal unemployment registration and the benefit system. Thus, in Britain, for example, large numbers of individuals record themselves as unemployed on the survey based definition used here who are not counted in the official statistics and vice-versa. That is, a substantial number of people who receive unemployment benefit are perfectly happy to report in the survey that they are not actively searching for work (around 19% of the registered unemployed according to the 1995 UK Labour Force Survey).

Table 2
Measures of labor input in the 1990s

	Early retirement[a] (1)	Participation[b] (2)	Annual hours[c] (3)	Growth rate (% pa)[d] (4)	Emp./pop.[e] (5)	Emp./pop.[f] (6)	Total hours[g] (7)	Self-employment[h] (8)
Austria	60	58.7	1610	0.4	67.3	86.8	51.6	6.7
Belgium	65	55.2	1580	0.3	56.1	87.4	42.6	14.3
Denmark	31	78.3	1510	0.3	75.0	86.6	54.5	6.8
Finland	55	70.0	1768	0.5	67.1	82.4	57.1	8.8
France	54	59.0	1654	0.7	59.8	87.9	47.4	9.1
Germany (W)	42	55.2	1610	0.5	65.2	87.0	50.0	8.0
Ireland	35	46.1	1720	0.9	53.2	80.3	44.8	12.8
Italy	64	43.3	1730	0.2	54.0	84.3	44.9	22.2
Netherlands	54	56.0	1510	0.7	62.2	86.5	45.2	8.1
Norway	27	70.8	1437	0.5	73.3	87.4	50.4	6.1
Portugal	33	62.0	2004	0.1	69.3	90.6	66.6	15.9
Spain	38	43.0	1815	0.7	47.5	81.5	41.6	17.5
Sweden	25	75.8	1485	0.3	75.6	88.2	52.0	7.1
Switzerland	18	67.6	1637	0.6	78.6	94.7	62.0	–
UK	32	65.3	1720	0.4	69.6	86.7	58.6	12.4
Japan	17	61.8	1965	0.6	73.4	95.9	69.2	11.6
Australia	37	62.3	1850	1.4	68.2	86.5	61.3	12.5
New Zealand	43	63.2	1812	0.7	68.0	86.6	59.8	14.7
Canada	35	67.7	1714	2.1	70.6	84.7	59.0	7.5
US	32	69.0	1919	0.8	73.1	88.2	68.2	7.7

[a] OECD Employment Outlook (1996, Table B, p. 188). Defined as (100 less the percent participation rate in 1990 for males aged 55–64).

[b] OECD Employment Outlook (1996, Table K, p. 197). Female labor force divided by the female working age population (15–64) in 1993. West Germany is for 1990.

[c] OECD Employment Outlook (1996, Table C, p. 190). Average annual hours worked per employee (1992). Austria is set equal to Germany, Ireland to UK, Denmark to Netherlands.

[d] OECD Employment Outlook. Growth rate of the population of working age, 1988–1993.

[e] OECD Employment Outlook (1996, Tables A, B). (Average of 1990 and 1994.) Employment/population ratio (whole working age population).

[f] OECD Employment Outlook (1996, Tables A, B). (Average of 1990 and 1994.) Employment/population ratio (males age 25–54).

[g] [(Average annual hours worked per employee × employment) / (2080 × population of working age)] × 100.

[h] OECD Jobs Study (1994a, Table 6.8). Percentage share of self-employment in total employment in the non-agricultural sector, 1990.

Table 3
Productivity levels for the whole economy (1994) (US = 100)[a]

	GDP per capita	GDP per worker	GDP per hour worked		
			(a)	(b)	(c)
	(1)	(2)	(3)	(4)	(5)
Austria	79	87	–	–	100
Belgium	79	103	–	–	116
Denmark	81	80	–	–	96
Finland	64	75	82	78	80
France	76	92	109	104	114
Germany (W)	77	85	105	100	111
Ireland	60	82	–	–	86
Italy	73	98	111	105	87
Netherlands	73	89	124	118	114
Norway	86	87	118	112	108
Portugal	48	54	52	49	49
Spain	53	84	90	86	88
Sweden	68	72	91	98	98
Switzerland	94	82	97	92	106
UK	70	75	84	80	86
Japan	81	74	76	72	79
Australia	72	76	79	75	93
New Zealand	64	68	71	67	–
Canada	80	83	93	88	101
US	100	100	100	100	100

[a] Sources: columns (1)–(4). Pilat (1996). Column (3) uses annual hours from OECD Employment Outlook (1996, Table C). Column (4) adjusts US hours from 1945 to 1850. Column (5) is from Crafts (1997, Table 5, column 1).

On the hours front (column (3)), the numbers are dominated by the extent of part-time working and variations in weekly hours and annual holiday entitlements. Many countries in continental Europe have low annual hours actually worked even excluding part-time workers, essentially because of their low weekly hours and long annual holidays compared particularly to the US and Japan. And this does not imply that European workers would like to work more paid hours per year. Indeed, across the EC, more people would like to work *fewer* paid hours than would like to work more paid hours, holding constant the hourly rate of pay (see European Economy, 1995, Table 25a). This is probably due, at least in part, to higher marginal tax rates. Overall, we can see by comparing unemployment rates over the period 1989–1994 in Table 1 with the index of total labor input in column (7) of Table 2 that the latter is not the mirror image of the former. Norway, Germany, Sweden and the Netherlands have a much lower total labor input than the United States and Portugal but their unemployment rates are all much the same. So it is probably worth investigating the impact of labor market institutions on some measures of labor

input as well as on unemployment. However, we should emphasize again that the unemployment rate is an important measure of performance in the sense that more probably means worse. Total labor input, on the other hand, is not an unequivocal measure of performance. More does not necessarily mean better and can easily mean worse.

Turning now to measures of productivity performance, in Table 3, we list some measures of productivity levels. The obvious point here is the enormous difference between GDP per capita and GDP per hour worked. The latter is, of course, a pure productivity measure and here we see that the major countries of northern and central Europe are at a higher level than the United States, despite being well down in GDP per capita. This simply reflects the far lower level of labor input in most European countries that we have already noted. In the next table we turn to measures of productivity growth using both total factor and labor productivity measures. There are few outstanding features

Table 4
Percentage productivity growth after the first oil shock[a]

	Whole economy (1976–1992)			Business sector (1986–1993)	
	Labor productivity (1)	Labor productivity with hours (2)	TFP with hours (3)	Labor productivity (4)	TFP (5)
Austria	1.51	2.17	1.20	1.5	0.5
Belgium	1.03	2.21	2.00	1.7	0.9
Denmark	1.23	1.73	1.31	1.8	0.7
Finland	1.93	2.44	1.65	3.5	1.5
France	1.43	2.14	1.81	2.2	1.4
Germany (W)	1.38	2.04	1.91	1.6	1.0
Ireland	2.60	3.14	2.73	3.9	3.3
Italy	2.15	2.51	1.79	2.1	1.3
Netherlands	0.77	1.60	0.74	1.2	1.1
Norway	1.72	2.61	2.19	1.2	0.0
Portugal	2.79	2.79	1.28		
Spain	1.42	2.12	2.18	2.2	1.0
Sweden	0.80	0.92	0.52	2.1	0.8
Switzerland	1.13	1.79	0.95	1.6	0.5
UK	1.76	2.30	1.66	1.9	1.5
Japan	3.09	3.51	1.60	2.2	0.8
Australia	0.91	1.13	0.74	0.9	0.4
New Zealand	0.13	0.09	−0.33		
Canada	1.35	1.76	0.57	0.9	0.2
US	1.17	1.08	0.22	0.9	0.6

[a] Sources: columns (1), (2) from Summers-Heston with hours of work from OECD Employment Outlook, various issues. Column (3) uses the Centre for Economic Performance OECD dataset. Columns (4), (5) are from Englander and Gurney (1994b, Table 3). In Columns (2), (3), the hours correction involves subtracting $\Delta \ln(\text{hours})$.

here (Table 4) with the exception of some tendency for those with low levels of productivity in Table 3 to have high growth rates in Table 4 (except for New Zealand).

The overall picture of performance in the OECD is quite a complex one. The United States has the highest GDP per capita but many countries of central and northern Europe appear to have higher levels of productivity. Broadly speaking these same countries have low levels of labor input, particularly in the form of low hours per year and low employment rates for women and older men. The employment/population ratios for prime age males are much the same in central and northern Europe as in the United States.

3. Labor market institutions

It is difficult to define precisely what we mean by labor market institutions, so we simply provide a list of those features of the labor market which we shall consider. The boundaries of this list are somewhat arbitrary. For example, we exclude product market regulations even though many of these are introduced at the behest of employees (e.g., regulations on shop opening hours). However, we include certain parts of the tax system, because they impact heavily on the operation of labor market even though they are not normally thought of as labor market institutions.

The "institutions" we consider are first, labor taxes; second, laws and regulations covering employees' rights; third, trade unions and the structure of wage bargaining including minimum wages; fourth, the social security system and the treatment of the unemployed; fifth, the system of education and training, and finally, barriers to regional mobility. We look at each of these in turn.

3.1. Taxes on labor

Under this heading we include payroll taxes, income taxes and consumption taxes. Of course, this is to some extent an arbitrary choice since some income taxes fall on capital income and some consumption taxes are paid by individuals who are out of the labor force. However, taxation on labor typically operates via the wedge between the real cost of a worker to an employer and the real consumption wage of the worker. Consider a representative firm in a closed economy producing GDP. Then real labor cost per worker is W/P where W is nominal labor cost per worker and P is the GDP deflator (at factor cost). The corresponding consumption wage, assuming workers consume GDP, is $W(1 - t_1)(1 - t_2)/P(1 + t_3)$ where t_1 is the payroll tax rate, t_2 is the income tax rate and t_3 is the consumption tax rate. The tax wedge is $(1 - t_1)(1 - t_2)/(1 + t_3) \simeq [1 - (t_1 + t_2 + t_3)]$.

So, in general, we may expect the labor market consequences of taxation to operate via the sum of the three tax rates, $(t_1 + t_2 + t_3)$. However, their are some exceptions. For example, because unemployed individuals are not liable for payroll taxes, but do pay income and consumption taxes, the payroll tax rate alone (t_1) is sometimes considered important. Furthermore, the above analysis is based on proportional linear tax schedules. If, for example, the income tax schedule is progressive, then marginal tax rates may have

Table 5
Tax rates on labor: 1989–1994

	Payroll tax rate (%) t_1[a] (1)	Total tax wedge (%) ($t_1 + t_2 + t_3$)[b] (2)	Marginal tax wedge (%) 1991–1992[c] (3)
Austria	22.6	53.7	–
Belgium	21.5	49.8	66.3
Denmark	0.6	46.3	72.1
Finland	25.5	65.9	66.1
France	38.8	63.8	63.4
Germany (W)	23.0	53.0	63.8
Ireland	7.1	34.3	–
Italy	40.2	62.9	62.0
Netherlands	27.5	56.5	70.8
Norway	17.5	48.6	62.9
Portugal	14.5	37.6	–
Spain	33.2	54.2	53.4
Sweden	37.8	70.7	62.6
Switzerland	14.5	38.6	–
UK	13.8	40.8	50.4
Japan	16.5	36.3	22.2
Australia	2.5	28.7	43.5
New Zealand	–	34.8	–
Canada	13.0	42.7	–
US	20.9	43.8	38.5

[a] Centre for Economic Performance (LSE) OECD Dataset. Defined as the ratio of labor costs to wages (less unity). Note that this includes pension and other mandated payments by employers.

[b] Centre for Economic Performance (LSE) OECD Dataset. Defined as the sum of the payroll tax rate, the income tax rate and the consumption tax rate. The latter are average rates derived from national income accounts including total tax receipts from different types of taxes. See "Data Sources" in Bean et al. (1986) for details.

[c] OECD Jobs Study (1994a, Table 9.1, last column (1991–1992)). Calculated by applying the tax rules to the average production worker. Includes employees' and employers' social security contributions, personal income taxes and consumption taxes. Non-wage labor costs other than social security contributions are not included; neither are payroll taxes not earmarked for social security or social security contributions paid to the private sector.

an impact which is independent of the average tax rates and the degree of progressivity may be important.

So in Table 5, we present some information on tax rates across the OECD. In the first column, we have the payroll tax rate, defined as the ratio of labor costs to wages (less unity). In the second, we add to this the average income and consumption tax rates derived from aggregate tax and income data. Finally, in the third column we give an OECD estimate of the marginal tax wedge for an average production worker. In some cases, this is lower than the figures in the second column because, in column (3), the payroll tax is

restricted to social security payments to public sector schemes, rather than the total of non-wage labor costs used in the other columns.

The key features of these numbers are first, the enormous variation in payroll tax rates stretching from Denmark, where the government levies no social security taxes on firms, to France and Italy with rates close to 40%. Second, while there is less variation in the other two columns, it is clear that the total rates in continental Europe are, with the exception of Switzerland and Portugal, higher by 10–20 percentage points than other OECD countries. This is mainly the consequence of higher levels of public expenditure in continental Europe than elsewhere, primarily focused on more generous social security and pension benefits and the public provision of health care and higher education.

3.2. Laws and regulations on employee rights

Laws referring to the treatment of employees by companies include regulations on working hours, annual leave, health and safety, employee representation rights (on consultative committees, boards of directors, etc.), workers compensation insurance, fixed term contracts and employment security.[3] Aside from the last two items, these regulations are generally equivalent to an increase in labor costs although they may have additional effects on labor productivity. Regulations under the last two headings typically change the cost to employers of adjusting the size of their labor force.

To give some idea of how these regulations vary across the OECD, we present a number of variables which attempt to capture overall labor standards and job security. In the first column of Table 6 is a labor standards index. This was produced by the OECD and refers to the strength of the legislation governing a number of aspects of the labor market. Each country is scored from 0 (lax or no legislation) to 2 (strict legislation) on five dimensions: working hours, fixed-term contracts, employment protection, minimum wages and employees' representation rights. The scores are then summed, generating an index ranging from 0 to 10. The second column is the OECD employment protection index based on the strength of the legal framework governing hiring and firing. Countries are ranked from 1 to 20, with 20 being the most strictly regulated. These rankings are based on a variety of indicators set out in OECD (1994a, pp. 70–74). The picture generated by both these indices is one in which the countries of southern Europe have the toughest regulations and these tend to weaken as one moves further North (except for Sweden). Switzerland, Denmark and the United Kingdom have the weakest regulations in Europe, comparable to those in place elsewhere.

In the third and fourth columns of Table 6, we present some additional information of a more specialized kind simply for background detail. In column (3) are the regulations on minimum paid annual leave (in addition to public holidays) and, in column (4), we have parental leave entitlement on the birth of a child. The overall impression here is one of minimal legal entitlement in the United States and the United Kingdom and relatively

[3] Minimum wage legislation is discussed later in the section on wage determination although one of the index measures of labor standards we discuss here does include minimum wages.

Table 6
Employee rights

	Labor standards 1985–1993[a] (1)	Employment protection 1990[b] (2)	Minimum annual leave (weeks) 1992[c] (3)	Duration of parental leave (weeks) 1995[d] (4)
Austria	5	16	5	104
Belgium	4	17	4	(260)[e]
Denmark	2	5	5	28
Finland	5	10	5	156
France	6	14	5	156
Germany (W)	6	15	3	156
Ireland	4	12	3	18
Italy	7	20	None	46
Netherlands	5	9	4	40
Norway	5	11	4.2	52
Portugal	4	18	3–4.4	40
Spain	7	19	5	52
Sweden	7	13	5.4	78
Switzerland	3	6	4	14[f]
UK	0	7	None	40
Japan	1	8	2	52
Australia	3	4	4	52
New Zealand	3	2	3	52
Canada	2	3	2	38
US	0	1	None	12

[a] OECD Employment Outlook (1994b, Table 4.8, column 6) extended by author. This is a synthetic index whose maximum value is 10 and refers to labor market standards enforced by legislation on, successively, working time, fixed-term contracts, employment protection, minimum wages and employees representation rights. Each of these is scored from 0 (lax or no legislation) to 2 (strict legislation) and the scores are then added up.

[b] OECD Jobs Study (1994a, Part II, Table 6.7, column 5). Country ranking with 20 as the most strictly regulated.

[c] In addition to public holidays which range from 8 days in Switzerland to 13 in Austria. OECD Jobs Study (1994a, Part II, Table 6.12).

[d] OECD (1995, Table 5.1) and Ruhm (1996, Table 1).

[e] This is not comparable to the other numbers since it refers to the career break total, which can be allocated at will.

[f] 1988.

generous legal entitlements in continental Europe, with the exception of Italy. (While Italians are legally entitled to annual paid leave, its length is generally determined via collective bargaining.) Finally, it is worth remarking that while southern Europe has the most regulated labor markets in the OECD, it also has the highest rates of self-employment, which is more or less unregulated (see Table 2).

3.3. Trade unions, wage bargaining and minimum wages

Outside the United States, most workers in the OECD have their wages determined by collective agreements which are negotiated at the plant, firm, industry or national level. In the first two columns of Table 7, we present the percentage of employees who belong to a trade union and an indicator of the percentage of employees covered by collective agreements (3 means over 70%, 2 means 25–70%, 1 is under 25%). The main point which emerges here is that even if the number of union members is very low, as in France and Spain, it is still possible for most workers to have their wages set by union agreements. This occurs because, within firms, non-union workers typically get the union negotiated rate and because, in many countries, union rates of pay are legally "extended" to cover non-union firms (see OECD, Jobs Study, Part II, 1994a, p. 15 for details).

Table 7
Trade unions and wage bargaining (1988–1994)

	Union density (%)[a] (1)	Union coverage index[b] (2)	Union coordination[b] (3)	Employer coordination[b] (4)	Centralization[c] (5)
Austria	46.2	3	3	3	17
Belgium	51.2	3	2	2	10
Denmark	71.4	3	3	3	14
Finland	72.0	3	2	3	13
France	9.8	3	2	2	7
Germany (W)	32.9	3	2	3	12
Ireland	49.7	3	1	1	6
Italy	38.8	3	2	2	5
Netherlands	25.5	3	2	2	11
Norway	56.0	3	3	3	16
Portugal	31.8	3	2	2	7
Spain	11.0	3	2	1	7
Sweden	82.5	3	3	3	15
Switzerland	26.6	2	1	3	3
UK	39.1	2	1	1	6
Japan	25.4	2	2	2	4
Australia	40.4	3	2	1	8
New Zealand	44.8	2	1	1	9
Canada	35.8	2	1	1	1
US	15.6	1	1	1	2

[a] OECD Jobs Study (1994a, Table 5.8, column 3). Trade union members as a percentage of all wage/salary earners.

[b] Layard et al. (1991, Annex 1.4) and OECD Employment Outlook (1994b, pp. 175–185). Union coverage is an index, 3 = over 70% covered, 2 = 25–70%, 1 = under 25%. Union and employer coordination in wage bargaining is an index with 3 = high, 2 = middle, 1 = low.

[c] Calmfors and Driffill (1988, Table 3). A ranking of the centralization of wage bargains with 17 being the most centralized.

An important aspect of union based pay bargaining is the extent to which unions and/or firms coordinate their wage determination activities. For example, in both Germany and Japan, employers' associations are actively involved in the preparation for wage bargaining even when the bargaining itself may ostensibly occur at the level of the individual firm. Coordination may be distinguished from centralization which refers strictly to the level at which bargaining occurs; plant, firm, industry, economy. Of course, economy-wide bargaining, say, must be coordinated but highly coordinated bargaining need not be centralized (as in Japan or Switzerland). In the last three columns of Table 3, we present indices of union coordination and employer coordination, and a centralization ranking due to Calmfors and Driffill (1988). The coordination indices go from a low level of 1 to a high of 3. The most centralized economy has a score of 17, the least centralized a score of 1. The most coordinated and centralized economies are those of Scandinavia and Austria followed by continental Europe and Japan. The Anglo-Saxon economies, including that of Ireland, exhibit little or no coordination, despite having quite high levels of union density and coverage in some cases.

Since this notion of coordination is going to prove to be important, it is perhaps worth digressing at this point on the issue of whether coordination/centralization makes any significant difference to the workings of the labor market. To put it bluntly, is there any evidence that the distinctions between high and low levels of coordination/centralization are real ones? First, we have evidence that firm/industry level wages are more responsive to firm/industry level shocks in economies where wage bargaining is less coordinated/centralized. Thus, in Layard et al. (1991, Chapter 4, Table 4), we see that in the United States, firm wages are highly responsive to firm specific shocks, in Germany and the UK, their responsiveness is moderate and in the Nordic countries, their responsiveness is negligible. A second piece of evidence on the distinctiveness of coordinated wage bargaining systems is the fact that average wages are far more responsive to the state of the labor market in countries where wage determination is coordinated (see Layard et al., 1991, Chapter 9, Table 7). Finally, and not surprisingly, higher centralization/coordination is associated with lower levels of earnings inequality at given levels of union density and coverage (see OECD, 1997, Chapter 3, Table 3.B.1).

Turning now to minimum wages, the picture here is by no means uniform, because some countries have statutory minimum wages whereas others rely on extending collective bargaining agreements. The pattern across countries is set out in Table 8 and then, in Table 9, we report the ratio of the minimum wage to average earnings as well as an estimate of the percentage of workers at or near the minimum.

A number of points are worth noting. First, since 1993, the United Kingdom has been the only country in the OECD without a minimum wage of any kind. Even before 1993, minimum wage rules covered only a small minority of workers and were never very effectively enforced. However, a statutory minimum wage is to be introduced by 1999. Second, there is substantial variation in the ratio of the minimum to the average wage, although the number of workers affected depends also on the spread of the

Table 8
The pattern of minimum wages in the 1990s[a]

Statutory minimum wages	Extension of collective agreements	Statutory minima for selected industries[b]	Collective agreements covering most of the workforce
France	Belgium	Ireland	Austria
Netherlands	Germany	United Kingdom	Denmark
Portugal	Italy	(until 1993)	Finland
Spain	Australia		Norway
United Kingdom (from 1999)			Sweden
Japan			
New Zealand			
Canada			
United States			

[a] Source: Dolado et al. (1996, Table 1); OECD Jobs Study, Part II (1994a, pp. 46–51); OECD (1997, p. 13).
[b] These cover a small minority of the labor force.

Table 9
The significance of the minimum wage, 1991–1994[a]

	Ratio of minimum to average wage	Percent of workers at or near minimum
Austria	0.62	4
Belgium	0.60	4
Denmark	0.54	6
Finland	0.52	
France	0.50	11
Germany	0.55	
Ireland	0.55	
Italy	0.71	
Netherlands	0.55	3.2
Norway	0.64	
Portugal	0.45	8
Spain	0.32	6.5
Sweden	0.52	0
United Kingdom	0.40	
New Zealand	0.46	
Canada	0.35	
United States	0.39	4

[a] Source: Dolado et al. (1996, Table 1). OECD Jobs Study, Part II (1994a, Chart 5.14). Note: The minimum wage levels for the UK and Ireland refer only to a small group of "low pay" industries. Minimum wages were almost completely abolished in the UK in 1993. However, by 1999, the UK is set to have a universal statutory minimum wage.

earnings distribution. Thus it appears that no-one receives the minimum wage in Sweden despite the fact that it is over 50% of the average wage. By contrast, around 4% of the workforce in the United States is at or near the minimum wage even though it is less than 40% of the average. Third, there are crucial differences between countries on the application of minimum wage rules to young people. Thus, for example, in New Zealand and the Netherlands the minimum wage for those aged under 20 is only 60% or less of the adult rate. In the United States and France, by contrast, there is hardly any such adjustment (details can be found in Dolado et al. (1996, Table 1) and OECD Jobs Study, Part II (1994a, p. 46)).

3.4. Benefit systems and active labor market policies

The key features of the unemployment benefit system are the amount of benefit and the length of time for which the benefit is available. In the first two columns of Table 10, we present the replacement rate (the share of income replaced by unemployment benefits) and the duration of these benefits (4 years means indefinite duration). Benefit systems come in five main types. Barely existent, as in Italy. Miserly but indefinite, as in Britain, Ireland, Australia and New Zealand. Averagely generous but fixed term as in Japan and North America. Generous but fixed term, as in Scandinavia. And generous and longterm or indefinite, as in much of continental Europe.

In addition to the level of benefits, the systems in place to get the unemployed back to work are also significant. In columns (3) and (4) of Table 10 we present a measure of the expenditure on active labor market policies and the number of unemployed per staff member in employment offices and related services. The former include expenditures for the unemployed on labor market training, assistance with job search and employment subsidies. The variable itself is active labor market spending per unemployed person as a percentage of GDP per member of the labor force. Turning to the variable in column (4), the staff members concerned are those in employment offices plus those dealing with network and program management, and the administration of unemployment benefit. Generally speaking, the pattern of these two variables indicates a higher than average expenditure on the unemployed in most European countries with Spain and Ireland being notable exceptions.

3.5. Skills and education

In Table 11, we present an overall picture of the educational levels attained by the adult populations of most OECD countries. Of course, there are serious issues of comparability here which are hard to address although Table 12 gives some idea of the differences. Here we record the average scores by educational level in a uniform test of (quantitative) literacy which was taken by a random sample of the working age population in a variety of countries. While the scores for degree level individuals are quite similar, the scores vary dramatically at the lowest education level, with Sweden's ISCED2 individuals actually doing better than those at ISCED5 (some College) in the United States. With this impor-

Table 10
The benefit system, 1989–1994

	Benefit replacement ratio (%)[a] (1)	Benefit duration (years)[a] (2)	Active labor market policies (1991)[b] (3)	Unemployed per staff member in employment offices (1992)[c] (4)
Austria	50	2	8.3	34
Belgium	60	4	14.6	44
Denmark	90	2.5	10.3	–
Finland	63	2	16.4	–
France	57	3	8.8	79
Germany (W)	63	4	25.7	39
Ireland	37	4	9.1	100
Italy	20	0.5	10.3	–
Netherlands	70	2	6.9	32
Norway	65	1.5	14.7	40
Portugal	65	0.8	18.8	51
Spain	70	3.5	4.7	191
Sweden	80	1.2	59.3	27
Switzerland	70	1	8.2	50
UK	38	4	6.4	72
Canada	59	1	5.9	68
US	50	0.5	3.0	–
Japan	60	0.5	4.3	93
Australia	36	4	3.2	89
New Zealand	30	4	6.8	76

[a] Mainly US Department of Health and Social Services, Social Security Programmes throughout the World, 1993. See Layard et al. (1991, Annex 1.3) for precise details of the definitions. 4 years = indefinite.

[b] OECD Employment Outlook (1995). The variable is dated 1991 and measures current active labor market spending as % of GDP divided by current unemployment. Expenditure on the disabled is excluded.

[c] OECD Jobs Study, Part II (1994a, Table 6.16).

tant caveat in mind, Table 11 appears to indicate that the countries of southern Europe have the lowest educational standards whereas middle Europe, Scandinavia and North America have the highest.

3.6. Barriers to geographical mobility

Barriers to mobility are clearly important for the functioning of an economy and many of these are institutional. In Table 13, we present some mobility data for a small number of countries, where the numbers reflect the percentage of the population who change region in each year. It is worth pointing out that, with the exception of Sweden, the regions are of comparable geographical size in each country, so the figures themselves are reasonably

Table 11
Educational attainment (%) of the adult population, 1988[a]

	A		B/C		D		E	
	M	F	M	F	M	F	M	F
Austria	26.8	50.7	67.0	45.9			6.2	3.4
Belgium	64.0	70.8	21.4	17.2			14.0	12.0
Finland	73.7	73.9	15.3	16.6			11.0	9.5
Germany (W)	18.7	43.0	71.4	52.6	3.9	1.2	6.0	3.2
Italy	71.9	75.6	22.6	20.7			5.5	3.7
Netherlands	48.2	60.1	31.5	27.7	14.1	10.2	6.1	1.9
Norway	47.9	63.8	32.6	20.4			19.5	15.8
Portugal	87.4	89.0	8.4	6.3	0.8	2.5	3.4	2.0
Spain	67.3	73.9	24.3	19.5	4.3	4.5	4.1	2.1
Sweden	41.1	50.1	37.7	28.4	9.8	11.3	11.5	10.2
Switzerland	21.7	35.3	58.7	50.9	5.9	2.3	13.8	11.6
UK	48.2	72.1	35.3	13.1			16.6	14.8
Japan	32.6	37.1	42.8	46.3	5.3	11.6	18.9	4.4
Australia	41.2	55.2	37.5	14.7	11.1	23.7	9.6	5.5
Canada	33.6	32.5	30.4	33.9	21.8	23.3	14.1	10.3
US	22.9	23.0	36.2	41.7	18.4	19.0	22.4	16.3

[a] A, first stage secondary, end of compulsory schooling ~ ISCED2; B/C, second stage or higher secondary ~ ISCED3; D, non-degree level tertiary ~ ISCED5; E, first degree or above ~ ISCED6/7. ISCED, International Standard Classification of Education. For full details see OECD (1989, Chapter 2, Table 2.1 and Annex 2C). For ISCED definitions, see OECD Jobs Study, Part II (1994a, Annex 7B).

Table 12
Average literacy test scores by education level (1994)[a]

	ISCED 2 minimal compulsory	ISCED 3 higher secondary	ISCED 5 non-degree tertiary	ISCED 6/7 degree	Total
Germany	2.42	2.97	3.11	3.39	2.84
Netherlands	2.52	2.96	–	3.27	2.74
Sweden	2.96	3.07	3.31	3.56	3.04
Switzerland	2.20	2.82	3.09	3.16	2.67
Canada	2.20	2.67	2.97	3.55	2.62
US	1.92	2.44	2.86	3.31	2.56

[a] Source: Literacy, Economy and Society, OECD/Statistics Canada (1995, Table B9c). The average score is based on setting level 1 = 1, level 2 = 2, level 3 = 3, level 4/5 = 4 and uses the quantitative literacy test. Switzerland refers to the arithmetic average of French and German Switzerland. The literacy levels are based on marks in the literacy test with the same tests and mark schemes used in all the countries. ISCED levels are described in the notes to Table 11.

Table 13
Regional mobility (% who change region per year)[a]

	1973–1979	1980–1987
Finland	1.8	1.5
France	–	1.3
Germany (W)	1.4	1.1
Italy	0.8	0.6
Norway	2.8	2.5
Spain	0.5	0.4
Sweden	4.4	3.7
UK	1.1	1.1
Japan	3.3	2.7
Australia	1.8	1.7
Canada	1.8	1.6
US	3.0	2.9

[a] Excludes persons who change country of residence. Source: OECD Employment Outlook (1990, Table 3.3). For Spain, Bentolila and Dolado

comparable.[4] What we find is that geographical mobility is lowest in southern Europe and about four or more times higher in Scandinavia and the United States. That people are very mobile in the United States is well known. The fact that mobility is also high in Norway and Sweden is quite surprising although encouraging people to move has long been a feature of labor market policy in these countries.

In Oswald (1996), it is suggested that one of the most significant barriers to mobility is home ownership because it is so much easier to move when living in rented accommodation. So, in Table 14, we present the percentage of households who are owner–occupiers, a variable which Oswald finds to be significantly correlated with unemployment, both across countries and across US States. The most notable feature of these data is the low level of owner-occupation in middle Europe with Austria, Germany, Switzerland and the Netherlands being the four bottom countries.

This completes our survey of labor market "institutions". Our next step is to look at the theoretical foundations of the relationship between labor market institutions and performance.

4. Unemployment, growth and labor market institutions

In order to pursue fruitfully the relationship between labor market institutions and economic performance, it is helpful to set out briefly some of the theoretical background

[4] For example, in a simple gravity model, $M_{ij} = \theta(P_i P_j / D_{ij})^{1/2}$ where M_{ij} is the number migrating from region i to region j, P is population, D is distance. This implies $M_{ij}/P_i = \theta(P_j/P_i)^{1/2} D_{ij}^{1/2}$. So if all the regions within a country (but not across countries) have comparable levels of population, the geographical size of the regions should be the same across countries to ensure comparability of migration rates.

Table 14
Percent of households who are owner–occupiers (1990)[a]

Austria	54	Italy	68	UK	65
Belgium	65	Netherlands	45	Japan	59
Denmark	55	Norway	78	Australia	70
Finland	78	Portugal	58	New Zealand	71
France	56	Spain	75	Canada	63
Germany (W)	42	Sweden	56	US	64
Ireland	76	Switzerland	28		

[a] Source: Oswald (1996, Table 3).

on the interactions between growth, unemployment and the labor market. We begin with a simple model of equilibrium unemployment.

4.1. The determination of equilibrium unemployment

Consider an economy with a large number of identical firms. Wage setting goes on independently within each firm and workers in the ith firm are concerned with their employment prospects, N_i, and the excess of their net wages, $w_i(1-\tau)$, over their outside opportunities, A. Note that w_i is labor cost per employee and τ is the sum of the payroll and income tax rates. Outside opportunities, A, we specify as

$$A = \phi(n,s,c)w(1-\tau) + (1-\phi(n,s,c))bw(1-\tau), \tag{1}$$

where w is the aggregate labor cost per employee, b is benefit replacement rate (benefits relative to net wages), ϕ is the probability of working in an alternative job (or the proportion of the relevant period spent in working) and $(1-\phi)$ is the probability of being unemployed. ϕ is increasing in the aggregate employment rate, n, and in the exogenous part of the separation rate out of employment, s. It is decreasing in the search effectiveness of the unemployed, c. The reasoning underlying these last two effects is as follows. If s increases, more people are leaving their jobs for exogenous reasons, there are more vacancies, and, *at given levels of aggregate employment*, it is easier for someone leaving the firm to get an alternative job, so ϕ goes up. Search effectiveness, c, covers the ability and willingness of the unemployed to make themselves available for unfilled vacancies. If search effectiveness increases *at given aggregate employment* (c increases), then a new entrant into unemployment finds it harder to get a new job because the existing unemployed provide more competition for the available vacancies.

So we assume that the representative worker's objective is to maximize $N_i^{\gamma}(w_i(1-\tau) - A)]$ where the worker knows that if he and his co-workers obtain a wage w_i, employment in the firm will be determined by profit maximizing behavior on the part of the firm, taking wages as given. The parameter γ measures the extent to which the worker takes account of the employment effects of the wage bargain. Purely individualistic bargaining would be associated with low levels of γ. Collective bargaining with high levels of γ. The firm is, of

course, keen to achieve as high a value of profit, π_i, as possible. Suppose that wages emerge by some mechanism of individual or collective bargaining as the solution to

$$\max_{w_i,N_i} [N_i^{\gamma}(w_i(1-\tau) - A)]^{\beta}\pi_i,$$

subject to the firm choosing N to maximize profit at given w_i. The parameter β may be thought of as reflecting the power of the worker(s) in this bargain. Note that increased coordination on the part of workers within a firm is likely to increase both their power in the wage bargain, β, and their concern over total employment in the firm as captured by γ.

The first order condition for the above problem reduces to

$$\frac{w_i(1-\tau)}{w_i(1-\tau) - A} = \frac{\beta\gamma\eta s_{\pi} + (1 - s_{\pi})}{s_{\pi}}, \tag{2}$$

where s_{π} is the share of profits in value added and η is the wage elasticity of demand for labor. Since all firms are identical, $w_i = w$ and so using Eq. (1), Eq. (2) reduces to an equation for equilibrium unemployment, u*, which has the form

$$\phi(1 - u^*, s, c) = 1 - \frac{\beta s_{\pi}}{(\beta\gamma s_{\pi}\eta + (1 - s_{\pi}))(1 - b)}. \tag{3}$$

In general s_{π}, η will depend on the level of employment in each firm and hence on u^*, but in the simple model where each firm has a Cobb–Douglas production function with labor exponent α and faces a product market demand curve with elasticity ε, then s_{π}, η are both constants. Indeed $s_{\pi} = 1 - \alpha\kappa$, $\eta = (1 - \alpha\kappa)^{-1}$ where $\kappa = (1 - 1/\varepsilon)$. Then Eq. (3) becomes

$$\phi(1 - u^*, s, c) = 1 - \frac{\beta(1 - \alpha\kappa)}{(\gamma\beta + \alpha\kappa)(1 - b)},$$

so

$$u^* = f(s, c, b, \beta, \alpha\kappa, \gamma). \tag{4}$$

So equilibrium unemployment is decreasing in any factor which reduces the exogenous separation rate out of employment (s), increases the search effectiveness of the unemployed (c), lowers the benefit replacement ratio (benefits relative to *post-tax* earnings) (b), lowers the strength of workers in the wage bargain (β) or raises the elasticity of product demand facing the firm (ε, where $\kappa = 1 - 1/\varepsilon$). It is also worth noting that equilibrium unemployment is decreasing in the extent to which workers take account of the employment effects of their actions when bargaining about wages (γ).

Most of our subsequent discussion of the impact of labor market institutions on unemployment comes under these headings but there are two notable absentees. The first is the payroll plus income tax rate, τ. Why does this not come in? Essentially because if benefits are indexed to post-tax earnings, b is unaffected by τ and hence the outside alternative A has the form $\bar{A}(1 - \tau)$ where $\bar{A}$ is independent of τ. So an increase in τ affects the

opportunities both inside and outside the firm in exactly the same way and, so long as utility is isoelastic,[5] τ will not influence the labor cost outcome, w_i. Those who believe that taxes have an important impact on labor costs in wage bargains must rely on utility not being isoelastic (a weak reed) or on benefits being indexed to something other than post-tax earnings or on important non-labor income effects (see, e.g., Phelps, 1994; Pissarides, 1996). These latter arise because while labor costs are subject to both payroll and income taxes, non-labor income is subject only to the second of these. So in the case where utility is not linear, the relevant term in the objective now has the form

$$v(w_i(1 - t_1 - t_2) + y_n(1 - t_2))$$

$$-[\phi v(w(1 - t_1 - t_2) + y_n(1 - t_2)) + (1 - \phi)v(bw(1 - t_1 - t_2) + y_n(1 - t_2))],$$

where v is the utility function, t_1 is the payroll tax rate, t_2 is the income tax rate and y_n is non-labor income. Now the taxes do not factor out even if u is isoelastic (so long as it is not linear). So an increase in the payroll tax rate, t_1, will influence the bargained labor cost, w_i, so long as v is not linear and y_n is not zero.

The second major area involving labor market institutions which is not covered by the simple model discussed above concerns the role of coordination by unions and employers *across firms*, and the related issue of centralization. In a unionized economy, coordination across firms makes a difference for a variety of reasons, generally concerned with the externality arising from the fact that bigger wage rises for one group makes other groups worse off (via consumer price increases, for example). See Calmfors (1993) for an extensive discussion. This externality is not internalized under decentralized, uncoordinated bargaining. However, if bargaining is completely coordinated, those who benefit from higher nominal wage increases are the same as those who are harmed by the consequent nominal price increases. This tends to reduce wage pressure and hence equilibrium unemployment (see Bertola's chapter in this volume, Section 3.1, for an elegant formal model of this process).

A countervailing tendency, noted in Calmfors and Driffill (1988), is that bargaining at a higher level of centralization (industry versus firm, for example) tends to reduce the product demand elasticity facing the wage bargainers which will tend to raise wages and hence equilibrium unemployment (as in Eq. (4)). This effect tends to be of lesser importance in more open economies but Calmfors and Driffil suggest this elasticity effect, when combined with the externality effect discussed above, leads to a "hump-shaped" relationship between centralization and unemployment in unionized economies.

4.2. *Unemployment and growth*

There are many possible ways in which growth and unemployment may be related

[5] The general objective for non-linear utility has the form $[v(w_i(1 - \tau)) - v(\bar{A}(1 - \tau))]^{\beta} N_i^{\gamma\beta} \pi_i$. So long as $(1 - \tau)$ can be factored out, as it can if v is isoelastic, it will not influence the outcome.

although generally speaking they are, of course, jointly determined endogenous variables. Consider first the ways in which *exogenous* increases in the rate of productivity growth may impact on unemployment. A typical mechanism where growth reduces unemployment operates via the so-called capitalization effect (see Pissarides, 1990, Chapter 2). Here an increase in growth raises the present value returns from creating a new job slot (at a given level of employment) leading firms to open more vacancies. This, in the context of a matching model (see the chapter by Pissarides and Mortensen) will lead to reduced equilibrium unemployment.

A representative alternative, where growth raises unemployment, is based on the idea that higher growth is associated with more innovation and greater turbulence. Thus Aghion and Howitt (1991) present a model of growth via "creative destruction" which leads to a higher rate of labor reallocation and higher unemployment. Overall, therefore, this relationship can go either way (see Saint-Paul, 1991 for some other mechanisms) and there is no evidence that it is either important or robust (see, e.g., Bean and Pissarides, 1993).

Next, let us consider mechanisms which operate in precisely the opposite direction, that is ways in which exogenous increases in the equilibrium unemployment rate directly influence the rate of growth. Both Bean and Pissarides (1993) and Daveri and Tabellini (1997) present standard overlapping generations endogenous growth models of the "AK" type in which only the young work. Both these models have an equilibrium unemployment rate which is not directly influenced by exogenous shifts in the growth rate. However, because only the young work, a rise in equilibrium unemployment lowers the income of the young, lowers savings and hence reduces the equilibrium growth rate. This mechanism is, however, not robust, since it relies on the old not working. A more uniform (and more realistic) spread of work through the lifecycle would tend to eliminate this effect.

Daveri and Tabellini (1997) have another mechanism. A rise in equilibrium unemployment lowers the marginal product of capital (because of the rise in the capital/labor ratio) which reduces returns and hence the savings of the young. This result depends critically on the positive impact of the interest rate on savings. While this may be theoretically robust, empirically it is quite the opposite. Liebfritz et al. (1997) present a summary of 14 recent single country studies of this relationship. There are four with a positive effect, four with a negative effect, two with some positive and some negative effects and four with no effect. Bosworth (1993) and Masson et al. (1995) have undertaken panel data investigations using a number of countries with the former finding a negative relationship and the latter a positive one. So, overall, there appears to be no very strong reason why factors which raise equilibrium unemployment should, of necessity, lower long-run growth rates.

4.3. Labor market institutions and growth

While the two models we have just discussed do not provide strong backing for the view that factors which directly raises equilibrium unemployment will automatically reduce

growth rates, they do both indicate that higher income taxes will reduce growth rates simply because they reduce savings. Of course, this depends on the taxes being spent on consumption. If they are spent by the government on productive investment, this particular result will no longer apply.

Turning to other factors, the endogenous growth literature (for a good survey, see Barro and Sala-i-Martin, 1995) indicates that the most important mechanisms by which labor market institutions could affect productivity growth are via their impact on human and physical capital accumulation, on innovation (both technological and managerial) and on the rates at which low productivity companies close down and high productivity companies start up.

To summarize, therefore, it is theoretically plausible for any labor market institutions which influence equilibrium unemployment, consequently to influence the long-run labor productivity growth rate. Furthermore, the opposite also applies. Any labor market institutions which influence long run growth may, as a consequence, affect equilibrium unemployment. However, our analysis of the evidence suggests that neither of these two possibilities is likely to be of any great significance. This leaves us to consider the direct impact of labor market institutions on equilibrium unemployment and on long-run growth, treated separately.

With regard to lowering equilibrium unemployment, we expect this to be associated with any institution which reduces exogenous job separations, increases search effectiveness, reduces the level of benefits, lowers the strength of workers in the wage bargain or raises the elasticity of product demand facing firms (i.e., raises the level of product market competition). Turning to raising equilibrium growth rates, this we expect to be associated with institutions which raises savings, raise human or physical capital accumulation, increase technological and managerial innovation, and raise the start-up rate of new companies.

5. Some summary regressions explaining growth and labor supply

Before we go into a detailed investigation of the relationship between labor market institutions, long-run growth and unemployment, we set the empirical scene by presenting a few simple cross-country regressions. In Tables 15 and 16, we report some estimated equations explaining various aspects of unemployment and aggregate labor input. The idea here is to relate unemployment or labor input to the important labor market institutions set out in Tables 5–7, 10 and 14. The only variables we do not consider are those which are highly specialized such as those covering annual and parental leave in Table 6. Because these institutions influence *equilibrium* unemployment rates but we have *actual* rates for the dependent variable, we capture the difference between them by including the rate of change of inflation. This is consistent with a standard NAIRU framework. The variables which are reported in the main body of the table were those which are reasonably significant. In footnote a to the table, we report the coefficients on a further sequence of

Table 15
Regressions to explain log unemployment rate (%) (20 OECD countries, 1983–1988 and 1989–1994)[a]

	Total unemployment (1)	Longterm unemployment (2)	Shortterm unemployment (3)
Total tax wedge (%)	0.027 (4.0)	0.023 (1.6)	0.028 (3.5)
Employment protection (1–20)		0.052 (1.4)	−0.061 (2.8)
Union density (%)	0.010 (2.3)	0.010 (1.0)	0.0031 (0.5)
Union coverage index (1–3)	0.38 (2.7)	0.83 (2.3)	0.45 (2.1)
Coordination (union + employer) (2–6)	−0.43 (6.1)	−0.54 (3.6)	−0.34 (3.8)
Replacement rate (%)	0.013 (3.4)	0.011 (1.3)	0.013 (2.6)
Benefit duration (years)	0.10 (2.2)	0.25 (2.7)	0.045 (0.8)
Active labor market policies[b]	−0.023 (3.3)	−0.039 (2.8)	−0.097 (1.2)
Owner occupation rate (%)	0.013 (2.6)	−0.0007 (0.1)	0.01 (2.7)
Change in inflation (% pts. p.a.)	−0.21 (2.2)	−0.30 (1.6)	−0.29 (2.7)
Dummy for 1989–1994	0.15 (1.5)	0.30 (1.8)	0.092 (1.0)
R^2	0.82	0.84	0.73
N (countries, time)	40 (20, 2)	38 (19, 2)	38 (19, 2)
Hausman test of the random effects of restriction (χ^2_{10})	6.35	4.52	6.86

[a] Estimation is by GLS random effects (Balestra–Nerlove) using two time periods (1983–1988, 1989–1994). *t* ratios in parentheses. If we add the following variables, one at a time, to column (1), their coefficients are: payroll tax rate (%), 0.014 (0.5); employment protection, 0.011 (0.6); labor standards, 0.0011 (0.02); real interest rate (%), 0.040 (1.0); centralization, (centralization)^2, 0.048 (0.5), 0.0005(0.1). For the 1989–1994 values of the independent variables, see Tables 5–7, 10 and 14. The 1983–1988 values are available from the author on request. The dependent variables are in Table 1.

[b] The variable is instrumented. Because the active labor market policies variable refers to percent of GDP normalized on *current* unemployment, this variable is highly endogenous. So we renormalized the current percent of GDP spent on active labor market measures on the average unemployment rate in 1977–1979 to create the instrument. Insofar as measurement errors in unemployment are serially uncorrelated, this will help with the endogeneity problem.

variables when they are added individually to the basic model in column (1). These are generally completely insignificant.

The regressions are based on two cross-sections dated 1983–1988 and 1989–1994. The dependent variables are some of the unemployment rates reported in Table 1 or the labor input variables in Table 2.[6] The independent variables may be found in Tables 5–7, 10 and 14 where we report their values for 1989–1994. The 1983–1988 values, many of which are different, are available from the authors. We choose to use 6-year averages in order to smooth out both the cycle and year-on-year noise. Finally, note that in the unemployment equations we use the log of unemployment as the dependent variable. This we do because there are good theoretical and empirical reasons for believing that wages are related to log u rather than u (see Lipsey, 1960; Nickell, 1987; Blanchflower and Oswald, 1994).

[6] The 1980s values of the labor input variables are not reported in Table 2 but are available from the authors on request.

Table 16
Regressions to explain labor input measures (Table 2) (20 OECD countries, 1983–1988 and 1989–1994)[a]

	Employment/population ratio (%)		Total hours/ population (index)
	Whole working age population (1)	Males aged 25–54 (2)	(3)
Total tax wedge (%)	−0.24 (2.0)	−0.15 (2.0)	−0.26 (1.6)
Employment protection (1–20)	−0.79 (2.7)	0.037(0.2)	−0.64 (1.6)
Union density (%)	−0.012 (0.1)	−0.058 (1.0)	−0.15 (1.3)
Union coverage index (1–3)	−2.40 (1.0)	−2.00 (1.2)	−2.97 (1.0)
Coordination (union + employer) (2–6)	4.75 (4.0)	2.39 (3.2)	4.08 (2.5)
Replacement rate (%)	−0.067 (1.0)	−0.065 (1.5)	−0.057 (0.6)
Benefit duration (years)	−1.06 (1.8)	−0.57 (1.4)	−0.23 (0.3)
Active labor market policies[b]	0.10 (1.0)	0.036 (0.5)	−0.036 (0.3)
Owner occupation rate (%)	−0.19 (2.7)	−0.11 (2.3)	−0.066 (0.8)
Change in inflation (% pts. p.a.)	−1.21 (1.3)	−0.50 (0.7)	−1.69 (1.6)
Dummy for 1990–1994	3.16 (3.7)	−1.29 (1.9)	0.48 (0.5)
R^2	0.80	0.64	0.51
N (countries, time)	(20, 2)	(20, 2)	(20, 2)

[a] Variables and definitions are in Tables 2 (Cols. 5–7), 5–7 and 10. Estimation is by GLS random effects using two time periods (1983–1988, 1990–1994). *t* ratios in parentheses.
[b] Active labor market policies are instrumented as in Table 15.

The independent variables have all been described in Section 2 and their impact on unemployment or labor input arises from the mechanisms described in the previous section (i.e., they impact on job separations, search effectiveness, benefits, bargaining strength or the product demand elasticity). However it should be recognized that variations across country in labor input are going to be harder for our variables to explain than variations in unemployment, because labor input is also influenced by the disability system, the early retirement system and factors influencing the participation rates of married women. Cross-country variables which capture all these factors are not included in the regressions (because they are not readily available) and, as a consequence, the labor input equations will tend to contain a lot more unexplained noise. Summarizing the results briefly, the overall tax burden on labor has a clear negative impact on both unemployment and labor input. Payroll taxes alone, however, have no additional effect (see footnote a, Table 15).

Looking at rigidities, there is no evidence that employment protection or labor standards (see footnote a, Table 15) influence overall unemployment although the former raises longterm and reduces shortterm unemployment. Employment protection does, however, appear to reduce the employment population ratio although this result is driven by high employment protection and low married women's participation in southern Europe (OECD, 1994a, Table 6.9).

On the wage determination front, unions raise unemployment and reduce labor input. These effects are, however, offset if unions and employers can coordinate their wage bargaining activities. In the presence of the coordination variable, there is no role for centralization (see footnote a, Table 15). Turning to benefits, both higher replacement ratios and longer durations of eligibility mean higher unemployment although there is no effect on labor supply, probably because higher benefits mean higher unemployment *and* higher participation. These effects can, however, be offset by active labor market policy. Finally, there is some evidence that owner occupation tends to raise unemployment, although whether this is a mobility barrier effect, as proposed by Oswald (1996), is another question. For example, there is no correlation across the twelve countries between the mobility numbers in Table 13 and the owner occupation numbers in Table 14.

For purposes of comparison, it is worth reporting on a similar exercise undertaken by Scarpetta (1996), extended in Elemskov et al. (1998). The main differences are that Scarpetta uses two fewer countries, uses an annual panel from 1983–1993 and captures the difference between actual and equilibrium unemployment by the deviation of output from trend generated by the HP filter. This last is a little bit risky since it is easy to over- or under-correct for the cycle using the HP filter, depending on how the arbitrary parameter is set. In terms of outcomes, the Scarpetta results are similar for the tax wedge, unionization, coordination and benefits. The impact of active labor market policies is weaker. Employment protection has a significant effect on unemployment although it disappears when an index of centralization is included, so it is not totally robust.

We repeat the exercise for productivity growth in Table 17. Here we use a single cross-section, taking the average productivity growth over the period 1976–1992 as the dependent variable.[7] We omit union effects, because they are never remotely significant. The only clear-cut results are the positive impact of employment protection and the negative effect of the total labor tax rate. Both of these are completely wiped out once we control for convergence, using the initial productivity gap between the country concerned and the United States. We date this convergence variable prior to the start of the sample period to try and minimize measurement error bias. Nevertheless, if measurement error has some persistence at the country level, these convergence effects could be spurious. It is probably best to interpret these results as saying that employment protection and low total taxes are associated with high productivity growth but they happen to occur in countries which start off further behind.

To summarize, labor market institutions appear to have a strong association with unemployment, some association with labor input and a weak association with productivity growth. We are now in a position to go more deeply into the various types of institution.

[7] Underlying this regression is a robust cross-country growth regression of the type described by Levine and Renelt (1992). The base regression is essentially one in which per capita output growth is explained by per capita input growth (i.e., investment, minus population growth, human capital growth) plus one or two other variables. The idea here is to investigate the extent to which labor market institutions influence per capita output growth either directly or *via per capita input growth*. So we replace these latter variables by the labor market institutions in order to allow them to have the maximum possible impact.

Table 17
OECD productivity growth and labor market institutions 1976–1992[a]

	Growth rates (%)					
	Labor productivity	Labor productivity	TFP	Labor productivity	Labor productivity	TFP
		With hours correction			With hours correction	
	(1)	(2)	(3)	(4)	(5)	(6)
Total tax rate (%)	−0.034 (2.2)	−0.031 (1.8)	−0.015 (1.2)	0.000 (0.1)	0.000 (0.0)	−0.006 (0.3)
Employment protection (1–20)	0.081 (2.8)	0.092 (2.8)	0.093 (3.4)	0.004 (0.1)	0.021 (0.6)	0.073 (1.9)
Replacement rate (%)	0.005 (0.5)	0.008 (0.8)	0.008 (0.9)	−0.004 (0.6)	−0.000 (0.0)	0.006 (0.6)
Benefit duration (years)	−0.21 (2.0)	−0.13 (1.1)	0.087 (0.9)	−0.12 (1.6)	−0.046 (0.4)	0.11 (1.1)
Owner occupation rate (%)	0.014 (1.1)	0.011 (0.8)	0.014 (1.2)	0.001 (0.1)	0.000 (0.1)	0.010 (0.8)
Initial productivity gap				2.32 (3.9)	2.12 (2.7)	0.61 (0.8)
R^2	0.48	0.41	0.53	0.76	0.61	0.55
N	20	20	20	20	20	20

[a] Estimation is by OLS. If we add any of the union variables (density, coverage, coordination) they are jointly and severally totally insignificant in all the regressions as are labor standards and the payroll tax rate. The dependent variables are columns (1)–(3) of Table 12. The independent variables are the averages over the two time periods used in the unemployment regressions (Table 15). The initial productivity gap is measured by ln(US labor productivity, average 1973–1975) − ln(country labor productivity, average 1973–1975). The use of the average prior to the start of the productivity growth in 1976 is to reduce the usual measurement error bias problem which besets this variable.

6. Labor taxes

As we have already noted in Section 3, we expect the major impact of labor taxes to operate via the total tax wedge between product and consumption wages, namely the sum of payroll, income and consumption tax rates. Some exceptions to this rule are first, for individuals earning the minimum wage, a switch from income tax to payroll tax will raise labor costs and reduce the demand for their services because the wage cannot adjust. Second, a switch from income tax to payroll tax will reduce the tax rate on non-labor income which will tend to reduce labor supply. Furthermore, on the growth front, since income taxes typically serve as direct taxes on capital income, they are more likely to have a more negative impact on productivity growth than payroll taxes. Third, a switch from income tax to consumption tax makes little odds to an individual who spends all her income. And since individuals most likely to become unemployed save little,[8] such a switch is unlikely to have much impact on labor costs and hence employment. However, this switch could obviously have a significant effect on savings behavior and hence influence growth.

There is also the possibility that marginal tax rates could have an effect independently of average tax rates. For example, a high level of tax progressivity ensures that wage increases become less valuable and so, in standard union models, wages are reduced (see Lockwood and Manning, 1993). On the growth front, high tax progressivity reduces both effort incentives (Newell and Symons, 1993) and education incentives, thereby reducing growth rates.

Finally, before turning to the empirical evidence it is worth noting that in steady state growth, even with unemployment, the growth rate of output per capita will be the same as the growth rate of labor productivity. So when we refer to evidence on "growth", this, in theory, implies the growth rate of both output per capita and productivity. In practice, it is not quite so straightforward because of the secular shifts in labor input per population member in many OECD countries over the post-war period. So when we refer to evidence on growth more generally, this typically means the growth of output per capita and the above caveat applies.

6.1. Differential taxes

6.1.1. Unemployment

The key issue here is whether different taxes exhibit differential rates of shifting onto labor. There are a large number of time series wage equations for various countries which show

[8] In 1987, over 50% of entrants into unemployment in Britain had no savings and only 15% had savings of more than £1000. This would generate an annual non-labor income of only a small proportion of the unemployment benefit.

[9] The problem in time series investigations is discriminating between permanent effects and temporary effects which persist for a long time.

different degrees of shifting onto labor for different taxes. There is no pattern to these numbers,[9] many of which are summarized in Layard et al. (1991, p. 210) and OECD (1994a, p. 247). Some intensive cross-country investigations may be found in the work of Tyrväinen reported in OECD (1994a, Table 9.5) and in that of Robertson and Symons in OECD (1990, Annex 6A). In both these wide-ranging studies, there is no significant evidence that payroll, income or consumption taxes have a differential impact on labor costs and hence on unemployment. As the OECD Jobs Study (1994a) remarks, "Changes in the mix of taxes by which governments raise revenues can be expected, at most, to have a limited effect on unemployment" (p. 275).

6.1.2. Productivity growth

The main result here seems to be the existence of some evidence that personal income tax rates have a higher negative effect on growth rates in the OECD than other taxes (see, e.g., Dowrick, 1993; Mendoza et al., 1996; Widmalm, 1996).

6.2. Total tax rates

6.2.1. Unemployment

In OECD (1990, Annex 6), a simple test of the impact of tax rates on labor costs is carried out as follows. We have labor demand and labor supply equations of the form

$$N^D = f^1(w)K, \qquad N^S = f^2(w - T, z)L,$$

where N is employment, w = ln(real labor cost), K is the capital stock, $T = (t_1 + t_2 + t_3)$, the total tax rate, L is the labor force, z is an exogenous factor. Then the reduced form wage equation is

$$w = g(T, K/L, z).$$

If w is independent of T in the long run, the labor market *behaves as if* labor supply is inelastic and taxes are all shifted onto labor. Employment, and hence unemployment is then unaffected by T in the long run. The following equation represents the average coefficients and t statistics for individual time series regressions on 16 OECD countries (1955–1986).

$$w = \underset{(8.7)}{0.79}w_{-1} + \underset{(2.0)}{0.18}\ln(K/L) - \underset{(0.6)}{0.08}T + \underset{(2.6)}{0.52}\Delta T.$$

Thus total taxes, T, have no long-run effects on labor costs although they have a substantial and long-lasting short-run effect via ΔT (and the high level of persistence in wages). Consistent with this result is the work discussed in Gruber (1997) on the incidence of payroll taxation. Gruber studies the impact on wages and employment at the micro level of the sharp exogenous reduction in payroll tax rates (of around 25 percentage points!) which took place in Chile over the period 1979–1986. His analysis of a large number of individual firms indicates that wages adjust completely to this payroll tax shift and there is no employment

effect whatever. This is, without question, one of the most reliable studies of labor tax incidence yet undertaken.

In contrast to this result the tax wedge effect appears significantly in the work of Scarpetta (1996) and in every unemployment and labor input equation in the previous section (Tables 15 and 16), although the overall effect on unemployment is not that great. For example, a reduction in the total tax rate of 5 percentage points, which is substantial, would reduce unemployment by around 13% (e.g., from 8 to 7%). Bigger effects on unemployment are found by Daveri and Tabellini (1997), who undertake a multi-country panel study of OECD countries and allow the coefficients on taxes to differ between three groups for countries. For two groups of countries (Scandinavia and Canada, US, Japan, UK (post-1980)), taxes have no significant impact but for one group (Australia, Belgium, France, Germany, Italy, The Netherlands, Spain and UK (pre-1980)), the effects are substantial with an x percentage point rise in the overall labor tax rate leading to around an $x/2$ percentage point rise in the unemployment rate. This is enough to explain more or less all of the post-war rise in unemployment in most of these countries. Many others have found significant tax wedge effects on labor costs, and some have argued that the size of these tax wedge effects depends significantly on those labor market institutions connected with flexibility (see Daveri and Tabellini, 1997; Liebfritz et al., 1997). In order to pursue this, we set out some results on the impact of the tax wedge on labor costs in Table 18. The first point to note is how wildly the numbers and the rankings fluctuate across the columns. This is basically due to variations in the other variables included in the labor cost equations and emphasizes the fragility of most of the results in this area. Second, in order to see if there is any relationship between tax wedge effects and labor market flexibility we regressed the average tax wedge effect on some institutional variables to obtain:

$$\begin{aligned}\text{Tax wedge effect} = {} & \text{Constant} + \underset{(0.9)}{0.030}\ \text{employment protection} \\ & \underset{(0.1)}{-0.005}\ \text{labor standards} \\ & \underset{(1.7)}{-0.16}\ \text{coordination (union + employer)} \\ & \underset{(0.6)}{+0.004}\ \text{union density (average)}\end{aligned}$$

$$N = 20, \quad R^2 = 0.23.$$

The independent variables are the same as those in the previous regressions (Tables 15–17) and while most of the signs are consistent with the hypothesis, the negative impact of wage bargaining coordination is the only one which is significant (at the 10% level). So the

Table 18
Percentage increase in real labor cost in response to a one percentage point rise in the tax wedge[a]

	BLN (1)	T (2)	AP (3)	PSK (4)	Kvd W (5)	Average (6)
Austria	0			0		0
Belgium	3.4		0.37	0.95		1.57
Denmark	0		0.28	0		0.09
Finland	0.2	0.5	0.28			0.33
France	0.5	0.4	0.37	0	0.56	0.37
Germany (W)	0	1.0	0.37	0	0.72	0.42
Ireland	1.4					1.4
Italy	0.3	0.4	0	0	1.03	0.35
Netherlands	0.4		0.37	0	1.15	0.48
Norway	0.2		0.28			0.24
Spain	1.0					1.0
Sweden	0.5	0.6	0.28	0.73	0.70	0.56
Switzerland	1.4					1.4
UK	1.3	0.25	0	0	0.58	0.43
Japan	0	0.5	0		1.19	0.42
Australia		0.5	0.37		1.64	0.84
New Zealand	0					0
Canada	1.5	0.8	0		0.59	0.72
US	0.1		0		0.43	0.18

[a] BLN, Bean et al. (1986, Tables 3 and 5) (except the number for Spain which is taken from Dolado et al., 1986); T, Tyrväinen (1995) as reported in OECD, Jobs Study (1994a, Table 9.5) (except Sweden's number which is from Helmlund and Kolm, 1995); AP, Alesina and Perotti (1994, Table 7, column 4); PSK, Padoa Schioppa-Kostoris (1992); Kvd W, Knoester and Van der Windt, 1987. Some of these numbers were taken directly from Leibfritz et al. (1997, Table A1.5). The tax wedge definitions differ somewhat between columns: 1, 2, 4 use the sum of payroll, income and consumption tax rates; 3, 5 omit the consumption tax rate.

evidence in favor of the hypothesis that flexibility reduces tax wedge effects is not strong. Overall, however, the balance of the evidence suggests that there is probably some overall adverse tax effect on unemployment and labor input. Its precise scale, however, remains elusive.

6.2.2. Productivity growth

The general conclusion in the quite extensive literature on taxation and growth is that there may be a negative relationship but it is not robust (see, e.g., Levine and Renelt, 1992; Easterly and Rebelo, 1993; Agell et al., 1997). Indeed, Easterly and Rebelo (1993) argue that the reason why positive results sometimes show up is because of the positive correlation between the initial level of GDP per capita and total tax rates. So once convergence effects are controlled for, tax effects disappear, exactly as in our regressions in Table 17. However, the latest OECD estimates (Liebfritz et al., 1997, p. 10) indicate that a reduction of the total tax rate by 10 percentage points could have raised growth rates by as much as

0.5 percentage point. Furthermore, the reading of the evidence by Engen and Skinner (1996) reaches the same conclusion. Finally, it is worth noting that the really large estimates of the impact of taxation tend to come from simulated endogenous growth models (e.g., King and Rebelo, 1990). The closer the investigation gets to the data, the smaller and more fragile are the estimated effects.

6.3. Marginal tax rates and progressivity

6.3.1. Unemployment

The main argument here is that increased progressivity leads to lower wage demands (because wage increases are less valuable), lower inflationary pressure and lower unemployment. Some evidence in favor of this hypothesis is reported in Tyrväinen (1994), Holmlund and Kolm (1995), and Lockwood and Manning (1993). However, Newell and Symons (1993) find that the change in unemployment between the 1970s and 1980s is a significantly *increasing* function of the change in marginal tax rates over the same period. They argue that this is essentially a labor supply effect.

6.3.2. Growth

Widmalm (1996) finds a significantly negative impact of progressivity on growth which is robust (in the sense of Levine and Renelt, 1992). This is interpreted as an education effect. Newell and Symons (1993) also find that changes in marginal tax rates are negatively related to changes in growth rates from the 1970s to the 1980s. They interpret this as an effort effect.

6.4. Summary

There appear to be no important differential tax effects on unemployment but there is evidence that overall labor tax rates do influence labor costs in the long run and hence raise unemployment. There is a great deal of uncertainty about the size of this effect but a typical order of magnitude is where a 5 percentage point reduction in the aggregate tax wedge reduces unemployment by about 13% (e.g., from 8 to 7%). On the growth front, the results are not very robust. There is some indication that personal income taxes reduce growth rates but there is no strong and consistent evidence that total labor tax rates have any significant impact.

7. Labor standards and employment protection

When studying labor market regulation, it is important to distinguish between rules which simply add to labor costs, such as mandatory sick pay, and rules which raise the cost of employment adjustment, such as employment protection legislation. In the former case, if wages adjust appropriately, the impact on the labor market is very limited. In the latter

case, even if wages adjust fully to compensate for the legislation, the intertemporal pattern of labor demand may be very different.

First, we consider factors which add directly to labor costs but which do not affect hiring and firing costs. These include parental leave mandates, employee representation rights, rules on working time, health and safety regulations, mandatory sick pay. The key issue for unemployment is whether or not wages adjust to offset the extra labor costs. For productivity growth, it may be argued that too many rules and regulations inhibit innovative activity. On the other hand, employee rights to representation, for example, may induce a higher degree of management/worker co-operation which will enhance productivity performance. These are all empirical questions, so let us turn to the evidence.

7.1. Labor standards

7.1.1. Unemployment

There are a small number of studies on the impact of various mandates and regulations on wages and employment. Thus Gruber and Krueger (1991) find that the costs of mandated workers compensation insurance in the United States are fully compensated by wage adjustments. Again Gruber (1994) indicates that the cost of laws mandating the inclusion of maternity coverage in company health insurance policies were fully compensated by reductions in the wages of married women aged 20–40. Ruhm (1996) studies parental leave entitlement across European countries (see Table 6) and finds again that there are wage adjustments when entitlements are substantial (>6 months) with no adverse employment effects. However, Bartel and Thomas (1987) find that environmental protection and health and safety regulation have reduced employment in small firms.

So there are some bits and pieces of evidence, mostly pointing in the direction that labor legislation of this type has little impact on unemployment. And this is consistent with the fact that our labor standards index (Table 2) has no impact on unemployment in our cross-country regression (footnote a, Table 15). However, there is not really enough evidence here to be decisive.

7.1.2. Growth

Evidence here is also very thin. There seems no evidence of negative effects on productivity growth. Indeed the only germane evidence at all is that presented by Levine and Tyson (1990), where in a survey of studies, they find that what they call "representative" participation, where employees have representation on workers councils, consultative committees or even boards of directors, has no significant impact on productivity performance.

7.2. Employment protection

7.2.1. Unemployment

We turn now to the effects of job security regulations and laws concerning the use of fixed

term contracts. It is obvious that employment protection will tend to reduce the separation rate from employment into unemployment, and reduce the exit rate from unemployment into work as firms become more cautious about hiring. This will tend to reduce shortterm unemployment and raise longterm unemployment, exactly the pattern we see in Table 15. As for the overall impact of these offsetting effects, there appears to be very little on unemployment (see footnote a, Table 15) confirming the results of Bentolila and Bertola (1990). As we have already noted in Section 5, there is a significant negative impact of employment protection on the employment population ratio, a fact reported in Lazear (1990). However, this correlation does not apply to prime age men (see Table 16, column (2)) and is basically driven by low female participation and high levels of employment protection in southern Europe (OECD, 1994a, Table 6.9). Whether there is any particular causation running from the latter to the former remains an open question.[10]

7.2.2. Growth

One basic argument here is that employment protection laws slow down the reallocation from old and declining sectors to new and dynamic sectors, thereby reducing the growth rate (see Hopenhayn and Rogerson, 1993; Bertola, 1994). A related argument, due to Saint-Paul (1997), is that the demand for new goods is more volatile than the demand for old goods. So more flexibility is required to produce new goods and countries with low levels of employment protection will specialize in their production.

However, these kinds of arguments carry less weight than they might, when it is recognized that firms can reduce employment by 10% per year or more, simply by relying on workers leaving. This is quite a rapid rate of adjustment although this applies only to continuing firms. A considerable proportion of the overall adjustment operates via the closure of old plants and the opening of new ones. If employment protection hinders this process, then it will still be damaging. However, there is no evidence that rates of job destruction and job creation are lower in central and southern Europe than anywhere else. Indeed, as we can see from Table 19, they are much the same in many European countries with high levels of employment protection as they are in the United States. This is explained by Bertola and Rogerson (1997) by the fact that while employment protection slows down the rate of job turnover, wage inflexibility *at the firm level* speeds it up. As Layard et al. (1991, Chapter 4), notes, firm wages are more responsive to firm level shocks in the United States than they are in Europe, and this makes for increased job stability at the firm level. Nevertheless, this fact still indicates that despite the existence of employment protection, unprofitable jobs are closed down and profitable ones started up at a reasonable rate. On the other hand worker turnover is noticeably higher in North America

[10] A speculative hypothesis is that low participation rates among wives and strong employment protection for adult men are natural consequences of a culture which places a great deal of weight on the position of the (male) head of household. It comes as no great surprise that the unemployment rate among husbands in Italy is a mere 2% (see OECD Jobs Study (1994a, Vol. I, Table 1.19)).

Table 19
Job and worker turnover (% p.a.)

	Job turnover[b]						Worker turnover[c]			
	Total				Continuing establishments					
	Years	Creation	Destruction	Turnover	Creation	Destruction	Turnover	Years	Accessions	Separations	Turnover
Austria	1991–1993				5.7	6.2	11.9				
Belgium	1983–1985	7.7	7.5	15.2				1985	21.9	19.9	41.8
Denmark	1983–1989	16.0	13.8	29.8	9.9	8.8	18.7	1984–1991[e]	29.0	29.0	58.0
Finland	1986–1991	10.4	12.0	22.4	6.5	8.7	15.2	1984	40.0	37.0	77.0
France	1984–1991	12.7	11.8	24.4	6.6	6.3	12.9	1987	28.9	30.7	59.6
Germany (W)	1983–1990	9.0	7.5	16.5	6.5	5.6	12.1	1984–1990	31.6	30.4	62.0
Ireland (manu.)	1984–1985	8.8	12.7	21.4	6.1	8.1	14.1				
Italy	1987–1992	11.0	10.0	21.0	7.3	6.2	13.5	1985–1991	34.5	33.6	68.1
Netherlands (manu.)	1984–1991	8.2	7.2	15.4			7.0	1990[f]	11.9	10.1	22.0
Norway (manu.)	1985–1992	8.1	10.6	18.7	6.0	7.5	13.5				
Spain[d]	1993–1994				5.2	7.6	12.8	1993–1994	26.6	28.5	55.1
Sweden	1985–1992	14.5	14.6	29.1	8.0	9.6	17.6	1977–1981[e]	16.8	17.8	34.6
UK	1985–1991	8.7	6.6	15.3	6.0	2.7	8.7	1967–1985	37.2	37.6	74.8
Japan	1985–1992				8.6	5.3	13.9	1988–1992[f]	20.2	18.9	39.1
Australia (manu.)	1984–1985	16.1	13.2	29.3	7.1	4.6	11.7				
New Zealand	1987–1992	15.7	19.8	35.5	8.3	11.3	19.7				
Canada	1983–1991	14.5	11.9	26.4	11.2	8.8	20.0	1988	48.2	44.4	92.6
US	1984–1991	13.0	10.4	23.4	4.6	3.1	7.7	1985–1993			96.0
US (manu.)	1984–1988	8.2	10.4	18.6	6.7	7.7	14.4	1977–1981	45.2	46.0	91.2

[a] Job turnover (% of total employment, yearly average) = job creation + job destruction. Worker turnover (% of total employment, yearly average) = accessions + separations.

[b] OECD Employment Outlook (1996, Table 5.1).

[c] OECD Employment Outlook (1996, Table 5.2); Contini et al. (1995, Tables 7.1, 7.2).

[e] Manufacturing.

[f] Continuing firms.

[d] Garcia Serrano (1998).

than elsewhere which means that workers must rotate round existing jobs more rapidly. Whether or not this is particularly advantageous is not clear.

While rapid adjustment away from declining sectors is obviously good for growth, it is also true that job security may itself help to enhance productivity performance. There is a great deal of evidence that, in many sectors, substantive employee participation, where employees have some degree of autonomy in decision taking,[11] is associated with high productivity growth (see Levine and Tyson, 1990, for a survey). Furthermore, the results reported in Levine and Tyson (1990) and Ichniowski et al. (1995) make it very clear that the role of participation is much enhanced by a number of complementary factors, notably incentive pay and employment security.

Employment security is important for two reasons. First, productivity improvements often depend crucially on the co-operation of workers, or even directly upon their ideas and suggestions. These will be withheld if individuals feel their jobs are at risk as a consequence. Second, substantive participation requires more training, and this is only worth providing if the employment relation is longterm. So there is no reason to be surprised that employment protection shows up with a positive coefficient in our simple productivity regressions (Table 17).

However, if the provision of employment security is good for productivity, why are most firms in the United States neither providing it nor agitating in favor of the introduction of "just-cause" legislation? The obvious argument here is based on adverse selection (see Levine, 1991). If a single firm introduces employment security, it will attract dud workers and it then becomes too expensive to screen them out. If there are employment protection laws, this problem goes away. Furthermore, as the number of legal cases associated with employment separation in the US continues to increase, maybe this will change (see Flanagan, 1987; Dertouzos and Karoly, 1993). For, as Spulber (1989) remarks "Rather than resorting to costly litigation in each instance of breach [of contract], it may be preferable to have standard penalties for breach which are established and enforced by a regulatory agency" (p. 60).

7.3. Summary

There is no evidence that stricter labor standards lead to higher unemployment, mainly because it appears that wages adjust to compensate. Employment protection slows down the flows through the labor market, raising longterm unemployment and reducing short-term unemployment with little evidence of any overall effect. As far as growth is concerned, there seems to be no evidence that either stricter labor standards or employment protection lowers productivity growth rates. If anything, employment protection can lead to higher productivity growth if it is associated with other measures taken by firms to enhance the substantive participation of the workforce.

[11] This must be distinguished from merely "representative" participation where, as we have already seen, there is no association with higher productivity growth.

8. Unions and wage setting

One of the main differences between continental Europe and the United States is the fact that in continental Europe, most workers have their wages set as a result of collective agreements negotiated between trade unions and employers. This does not necessarily mean that most of these workers are union members. As we can see in Table 7, the two countries in the OECD with the lowest union membership are France (9.8%) and Spain (11%). The key point here is that within firms, unions or union dominated works councils will negotiate pay even though many or even most of the employees are not members. Furthermore, in a number of continental European countries, union wage agreements in unionized firms are extended (by law) to non-union firms in the same locality (e.g., in Belgium and Germany).

The consequence of this is to make measured union membership wage effects particularly hard to interpret in some countries. In Table 20, we present a series of coefficients on union membership in individual wage regressions generated from International Social Survey Programme (ISSP) data by Blanchflower (1996). Several points are worth noting about these numbers. First, some important controls are missing, notably firm size, which helps explain the extraordinary Japan coefficient. Second, the numbers cannot, in most cases, be interpreted as the gap between union and non-union rates of pay (or the union mark-up). This is because, in many of the countries, the majority of non-union members are paid at union rates. This can be seen clearly from the fact that in Spain, Germany and the Netherlands, for example, the estimated membership coefficients are very low despite the fact that unions are very powerful in all three countries. Nevertheless, the numbers in Table 20 are consistent with the view that unions raise wages, something which has been confirmed from numerous other data sources (see, e.g., Lewis, 1986).

Table 20
Coefficients on union membership in individual ln wage regressions: 1985–1993 (%)[a]

Austria	14.6
Germany	3.4
Ireland	30.5
Italy	7.2
Netherlands	3.7
Norway	7.7
Spain	0.3
Switzerland	0.8
UK	14.7
Japan	47.8
Australia	9.2
New Zealand	8.4
Canada	4.8
US	23.3

The extent to which unions can succeed in raising wages does not simply depend on the power of the union. It also depends on the extent of the firm's product market power. As the work of Stewart (1990), Abowd and Lemieux (1993) and Nickell et al. (1994) makes clear, union wage mark-ups are higher in firms with greater market power. Increased competition in the product market reduces the ability of unions to raise wages.

8.1. Unemployment

There is no question that because unions increase wage pressure, their existence will, ceteris paribus, raise unemployment. And the more workers they cover, the higher their impact (see Table 15). Our results indicate that if the proportion of workers covered by collective agreements rises from less than 25% to over 70%, unemployment is more than doubled. This, of course, is just based on a crude cross-section regression, but it gives some idea of the importance of union pay bargaining.

However, there is also no question that if unions and firms can coordinate their wage bargaining activities, they can overcome some of the externalities generated by decentralized collective bargaining, moderate wage pressure and, thereby, reduce the unemployment consequences of trade union wage bargaining. Thus, using again the coefficients in Table 15, a move from no coordination to complete coordination will completely offset the unemployment impact of a move from zero union density and no union coverage to 100% union density and full coverage. Supporting evidence along the same lines may be found in OECD (1997, Chapter 3).

The problem for the fully unionized, fully coordinated economy is the potential fragility of the coordination element. Coordination has elements of instability for all the usual reasons displayed in standard oligopoly models. Individuals have an incentive to break away and this can only be prevented by the threat of social or economic punishment. Maintaining widespread union strength in individual firms while reducing coordination is a recipe for increased wage pressure and unemployment. This has been part of the problem in Sweden in the 1990s, the comparison with Norway being very instructive.

To summarize, therefore, unions generate wage pressure and cause unemployment although their overall impact is lower the greater the degree of product market competition faced by the firms. This positive effect of unions on unemployment can also be offset by coordination among both unions and employers. Such coordination is subject to a degree of fragility leading to the ever present danger of its breaking down.

8.2. Growth

Unions may influence productivity growth for a number of reasons. First, by the standard hold-up mechanism, they may capture quasi-rents associated with firms' investments of various kinds. This reduces the level of such investments. Second, they may slow down the introduction of new technology and new working practices because they are wedded to restrictive working practices, which reduce the level of effort and enable the union to exercise control in the work place. This, of course, cuts both ways. A union which co-

operates in the introduction of new technology or new work practices may actually enhance their impact by increasing the level of co-operative endeavor among the workforce.

The evidence on this issue is quite voluminous. On the hold-up mechanism, Van Reenen (1986) demonstrates that technological innovations by firms boost subsequent pay by more when unions are stronger. Furthermore the evidence reported in Nickell and Denny (1992) and the balance of the evidence surveyed in Addison and Hirsch (1989) suggests a negative impact of unions on investment. The evidence on R&D expenditure also appears fairly clear cut. Of the nine studies surveyed in Menezes-Filho et al. (1995), seven exhibit a significant negative impact of unions on R&D expenditure. However, it is worth noting that when firm effects or industry effects are controlled, the negative relationship is much weakened.

On the overall impact of unions on productivity and productivity growth, the balance of the evidence for Britain and the United States suggests that this impact is negative (see Addison and Hirsch, 1989; Fernie and Metcalf, 1995). In particular, Bean and Crafts (1995) find that UK firms which have to deal with a multiplicity of unions are very badly affected. However, there is no evidence of union effects in cross-country growth regressions and in Englander and Gurney's (1994a) survey of the determinants of OECD productivity, there is not a single mention of trade unions.

Looking at more detailed micro studies of productivity, the impression given is one where, in many union plants, productivity is reduced by the activities of the union but it does not have to be so. It all depends on the response of management. For example, Cooke (1992) explains how participation programs generate significant productivity improvements in non-union firms or in union firms where the program is jointly administered by the firm and the union. If the management of a union firm pushes through a participation program on its own, it has no impact on productivity. Ichniowski and Shaw (1995) and Ichniowski et al. (1995) indicates how more non-union than union firms make use of participatory practices but those union firms which do introduce them do as well as non-union firms. Underlying this is the fact that workers and supervisors are typically strongly resistant to the introduction of new human resource management (HRM) practices in plants with a long history of adversarial industrial relations. Switching is then only induced by the threat of closure which suggests that unions are more likely to co-operate in productivity enhancing practices in bad times or when the firm faces a higher degree of product market competition. This story is wholly consistent with the surge in productivity in union plants in Britain after the very deep recession of 1981 (see Nickell et al., 1992).

8.3. Summary

Unions are important players in the economies of continental Europe. They generate wage pressure and hence unemployment although this effect can be, and in many countries is, offset by effective coordination in wage bargaining between different unions or between different employers. Effective coordination does, however, have a tendency to fragility.

On the productivity front, unions, at least in the United States and Britain are, on average, negatively associated with productivity growth. But if management and unions can operate in a more co-operative fashion, then this negative association disappears. There is no evidence of negative union effects on growth in cross-country regressions which suggests, that in the countries of continental Europe, unions and management, on average, operate in a more co-operative fashion and thereby avoid serious negative effects on productivity growth.

9. Minimum wages

As we have already noted in Section 2, minimum wages of one form or another are widespread in the OECD where only the United Kingdom currently does without them completely. Their potential for influencing unemployment is obvious, their impact on productivity less so. Indeed, the only two serious arguments in this regard seem to be first, that minimum wages tend to raise overall productivity by eliminating low pay, low productivity jobs and, presumably, raising unemployment among the workers who would otherwise fill them. Second, that minimum wages reduce skill differentials and hence the incentive to accumulate human capital.

9.1. Unemployment

This is a much debated topic (see the chapter by Brown in this Handbook) upon which there is little consensus as a reading of Card and Krueger (1995) and its various reviews in the July 1995 issue of *Industrial and Labour Relations Review* readily indicates. Our reading of the evidence is that minimum wages are typically set low enough not to have a significant impact on adult male unemployment. However, in countries where the minimum is not seriously adjusted for the under 25s (e.g., France and Spain) or which have very high payroll taxes (e.g., France and Italy), there is some evidence that youth unemployment rates are increased. Some suggest that wage floors, including the minimum wage, have had a significant impact on the unemployment rate of low skill workers more generally. This is not clear, but we shall return to it when we discuss skills and training.

9.2. Growth

There are no serious hypotheses here except those noted above about minimum wages eliminating low productivity jobs and reducing training incentives. There is no solid evidence on the second of these and, as for the first, the problem is that low productivity jobs also tend to be eliminated if there is a shortage of low productivity people. For example, McKinsey Global Institute (1997) notes that in France, Toys 'R' Us stores employ 30% fewer people than in identical stores in the United States. This is put down to

the minimum wage. However, even if there were no minimum wage in France, whether Toys 'R' Us would be able to find a large number of extra employees in France who would be prepared to work at very low wages is a moot point.

10. Social security systems and active labor market policies

The impact of the social security system on economic performance operates mainly via labor supply. Higher unemployment benefits are obviously liable to raise unemployment, and other elements of the social security system will influence the extent of disability and early retirement. To minimize these effects, it is clear that the system should be operated so that its main aim is to get people working. Systems which allow individuals who are able to work to collect benefit over long periods without serious pressure being applied to take up a job, will eventually have large numbers of customers. As for the impact of social security systems on productivity growth, we know of no evidence or hypotheses other than the vague notion that a social security system which is too generous will undermine entrepreneurial instincts or the equally vague notion that more generous social security encourages greater risk-taking and so enhances entrepreneurial instincts. So we shall have nothing further to say on this question.

10.1. Unemployment

The impact of a high benefit replacement ratio on unemployment is well documented (Layard et al., 1991, p. 255/6; OECD, 1994a, Chapter 8) and is confirmed by the coefficient on the replacement ratio in Table 15. Another important feature of the benefit system is duration of entitlement. Longterm benefits generate longterm unemployment (see Table 15, column (2) or OECD, 1990, Chart 7.1B). Of course, it can be argued that countries might introduce more generous benefit systems when unemployment is a serious problem, so that in cross-country correlations, the causality runs from unemployment to benefits rather than the other way round. However, the microeconometric evidence on the positive impact of benefit levels and entitlement duration on the duration of individual unemployment spells (Narendranathan et al., 1985; Meyer, 1990) suggests that at least part of the observed cross-country correlation can be taken at face value.

The impact of a relatively generous benefit system might be offset by suitable active measures to push the unemployed back to work. Such policies seem to work particularly well when allied to a relatively short duration of benefit entitlement, reducing longterm unemployment while alleviating the social distress that might be caused by simply discontinuing benefits without offering active assistance towards a job. Their effects are well summarized in OECD (1993, chapter 2), and their significant impact in reducing longterm unemployment is illustrated in column (2) of Table 15.

While benefits affect unemployment, our evidence suggests that the benefit system seems to have little impact on overall labor input as shown in Table 16. There is a

suggestion here that while high benefits lead to high unemployment, they also lead to high participation because they make participation in the labor market more attractive, participation being necessary to be eligible for the high benefits. This is consistent with a weak impact of benefits on employment/population ratios, because the higher unemployment effect and the higher labor market participation effect tend to cancel out.

10.2. Summary

Generous and long-lasting unemployment benefits will tend to raise unemployment. The effect can be offset by active labor market policies and strictly operated systems.

11. Skills and education

While human capital accumulation is obviously important for productivity growth, the main purpose of this section is to explore the role of labor market institutions in the responses of different countries to the universal increase in the relative demand for skilled workers which has taken place in recent decades. It has been suggested that this shift has been responsible for the significant aggregate unemployment increases in Europe essentially because of the important rigidities generated by European labor market institutions, particularly unions and minimum wages (see, e.g., Krugman, 1994). Just to see what we might expect to happen, consider the following basic model.

Suppose the production function has the form

$$Y = F(K, [\delta N_1^{-\rho} + (1 - \delta)N_2^{-\rho}]^{-1/\rho}), \tag{5}$$

where Y is output, K is capital, N_1 is skilled labor, N_2 is unskilled labor. Then the labor demand equations will imply

$$\frac{W_1}{W_2} = \frac{\delta}{1 - \delta}\left(\frac{N_2}{N_1}\right)^{1/\sigma} \tag{6}$$

even under imperfect competition in the product market. W_1 is the skilled wage, W_2 the unskilled wage and $\sigma = (1 + \rho)^{-1}$ is the elasticity of substitution. So if s is the share of skilled workers in the labor force and u_i is the unemployment rate of group i, (6) can be rewritten as

$$\frac{W_1}{W_2}\left(\frac{1 - u_1}{1 - u_2}\right)^{1/\sigma} = \frac{\delta}{1 - \delta}\left(\frac{s}{1 - s}\right)^{-1/\sigma}. \tag{7}$$

In log changes, we thus have

$$\sigma\Delta\ln(W_1/W_2) + \Delta\ln[(1 - u_1)/(1 - u_2)] = \sigma\Delta\ln(\delta/(1 - \delta)) - \Delta\ln(s/(1 - s)), \tag{8}$$

where the right-hand side can be interpreted as the shift in the relative demand for skilled workers less the shift in the relative supply. If demand shifts outstrip supply shifts, this will translate into some combination of a relative wage movement and a relative unemploy-

ment movement pinned down by (8). Precisely how much will go into wages and how much into unemployment will depend on the wage setting mechanism for each skill group, i.e., how wages respond to excess demand/supply in each of the labor markets. For example, if there is complete relative wage rigidity, all the shift in relative excess demand will go into unemployment changes. The nice feature of this simple framework is that we can estimate δ by the adjusted share of skilled labor in total labor cost, namely, $\delta = W_1 N_1^{1/\sigma}[W_1 N_1^{1/\sigma} + W_2 N_2^{1/\sigma}]^{-1}$, so we can easily measure the demand and supply shifts in (8) for given values of σ.

Before looking at these shifts, let us first investigate the wage and unemployment outcomes for the OECD countries. First, in Table 21, we report the unemployment rates for men which correspond to the educational attainment levels in Table 11. We restrict ourselves to men because they will be our main focus when we look at wage and unemployment changes. The results for women have exactly the same implications. The main feature of Table 21 is that for every country except Italy and Switzerland, the unemployment rates among the least educated are far higher than those for the most educated.

How have educational unemployment rates changed in recent years? In Table 22, we present some data which cover the last two decades for the top and bottom educational

Table 21
Male unemployment rates by education, 1991 (age 25–64)[a]

	ISCED2 Minimal compulsory	ISCED3 Higher secondary	ISCED5 Non-degree tertiary	ISCED6/7 Degree	All
Austria	4.7	3.0	–	1.3	3.2
Belgium	3.5	2.0	1.6	1.4	4.7
Denmark	13.0	7.9	5.2	4.6	8.8
Finland	10.2	9.0	4.1	2.8	8.2
France	8.9	4.9	2.6	2.8	6.0
Germany (W)	10.0	5.0	3.3	3.4	5.0
Ireland	16.9	8.5	5.4	3.0	15.9
Italy	3.3	4.0	–	3.4	3.4
Netherlands	4.0	2.5	–	–	3.4
Norway	7.6	4.8	2.9	1.8	4.6
Portugal	2.4	1.7	2.0	1.2	2.3
Spain	10.5	7.3	–	5.8	9.6
Sweden	2.6	2.7	1.3	1.1	2.3
Switzerland	0.4	0.8	0.8	2.3	0.9
UK	13.4	6.8	4.3	2.5	7.8
Australia	10.6	6.0	6.6	3.1	7.0
New Zealand	8.0	7.7	6.7	4.8	8.9
Canada	13.9	9.7	8.2	4.6	9.3
US	14.6	8.9	6.4	4.4	8.0

[a] Source: OECD Jobs Study, Part II (1994a, Table 7.B.1). ISCED 0/1 is omitted. For full definitions, see Table 11.

Table 22
Male unemployment rates by education (%)[a]

	1971–1974	1975–1978	1979–1982	1983–1986	1987–1990	1991–1993
France						
Total			5.2[b]	6.7[c]	7.2	8.1
High ed.			2.1	2.5	2.6	4.2
Low ed.			6.5	9.0	10.8	12.1
Ratio			3.1	3.6	4.1	2.9
Germany (W)						
Total		2.8	3.4	6.3	4.9	4.1[d]
High ed.		1.5	2.0	3.3	2.9	2.2
Low ed.		5.2	7.6	13.9	12.1	10.7
Ratio		3.5	3.8	4.2	4.2	4.9
Italy						
Total (M + F)		7.2	8.2	10.5	11.8	11.2[d]
High ed.		12.3	12.2	13.1	13.1	12.5
Low ed.		4.4	4.8	6.4	8.1	7.5
Ratio		0.4	0.4	0.5	0.6	0.6
Netherlands						
Total (M + F)		5.5[e]	7.1[f]	13.1[g]	6.9[h]	6.8
High ed.		2.9	3.4	6.2	5.2	5.0
Low ed.		5.7	8.3	18.0	9.9	9.9
Ratio		2.0	2.4	2.9	1.9	2.0
Norway						
Total (M + F)	1.2[g]	1.9	2.1	2.7	3.9	5.7
High ed.	1.0	0.8	0.9	0.8	1.5	2.6
Low ed.	1.9	2.2	2.9	3.8	6.0	8.8
Ratio	1.9	2.8	3.2	4.8	4.0	3.4
Spain						
Total		6.1	11.7	18.5	15.3	15.1
High ed.		4.5	7.9	11.0	8.8	9.0
Low ed.		7.7	13.5	21.4	17.7	20.0
Ratio		1.7	1.7	1.9	2.0	2.2
Sweden						
Total	2.8	1.9	2.4	3.1	1.8	5.8
High ed.	1.3	0.8	0.9	1.1	1.0	2.8
Low ed.	3.2	2.4	3.1	4.1	2.4	6.9
Ratio	2.5	4.0	3.4	3.7	2.4	2.5
UK						
Total	2.9[k]	4.4	7.7	10.5	7.5	10.8[d]
High ed.	1.4	2.0	3.9	4.7	4.0	6.2
Low ed.	4.0	6.4	12.2	18.2	13.5	17.1
Ratio	2.9	3.2	3.1	3.9	3.4	2.8

Table 22 (*continued*)

	1971–1974	1975–1978	1979–1982	1983–1986	1987–1990	1991–1993
Canada						
Total	6.9	6.6[l]	10.3[n]	7.8	11.6	
High ed.	2.6	2.4	4.3	3.4	5.1	
Low ed.	8.2	8.3	12.5	11.3	16.1	
Ratio	3.2	3.5	2.9	3.3	3.2	
US						
Total	3.6	5.5	5.7	7.3	5.1	6.0
High ed.	1.7	2.2	2.1	2.7	2.1	3.0
Low ed.	5.3	8.6	9.4	12.8	9.8	11.0
Ratio	3.1	3.9	4.5	4.7	4.7	3.7

[a] Notes: *France*: Low ed., no certification or only primary school certificate. High ed., 2 years university education or further education college degree or university degree (5.1% of labor force in 1968, 15.8% in 1990). Source: Enquête sur L'Emploi, INSEE. Data refer to males, age 15+. *(West) Germany*: Low ed., no formal qualification (39% of working age population 1976, 28% in 1989). High ed., degree (11.3% of working age population in 1976, 15.9% in 1989). Source: Buttler and Tessaring (1993), adjusted to be compatible with OECD standardized rate. *Italy*: Low ed., lower secondary or less (56% of labor force in 1977, 23.1% in 1992). High ed., upper secondary or higher (18% of labor force in 1977, 35.2% in 1992). Source: Annuario Statistico Italiano, ISTAT. M + F refers to males and females, age 25–64. *Netherlands*: Low ed., basic education or completed junior secondary school or junior vocational education (72.8% of labor force in 1975, 33.1% in 1993). High ed., completed vocational college or university (10.2% of labor force in 1975, 23.9% in 1993). Source: Dutch Central Bureau of Statistics. M + F refers to males and females, age 15–64. *Norway*: Low ed., primary level (64.5% of labor force in 1972, 16.3% in 1993). High ed., university level (9.9% of labor force in 1972, 26.3% in 1993). Source: Labour Market Statistics, Statistik Sentrallyra. Data refer to men and women, age 16–74. *Spain*: Low ed., illiterate or primary (75.8% of labor force in 1976, 40% in 1993). High ed., superior (university) 2.6% of labor force in 1976, 5.5% in 1993). Source: Spanish Labour Force Survey. Refers to males, age 16–64. *Sweden*: Low ed., pre-upper secondary school up to 10 years (59.7% of labor force in 1971, 30.6% in 1990). High ed., post-upper secondary education (7.9% of labor force in 1971, 21.7% in 1990). Source: Swedish Labour Force Surveys. Refers to males, age 16–64. *UK*: Low ed., no qualifications (55.7% of labor force in 1973, 28.2% in 1991). High ed., Passed A levels (18+ exam) or professional qualification or degree (16.4% of labor force in 1973, 36.8% in 1991). Source: General Household Survey. Refers to males, age 16–64. *Canada*: Low ed., up to level 8 (23.3% of labor force in 1975, 7.3% in 1993). High ed., university degree (10.4% of labor force in 1975, 16.8% in 1993). Source: The Labour Force, Statistics Canada. Refers to males, age 15+. *US*: Low ed., less than 4 years of high school (37.5% of labor force in 1970, 14.5% in 1991). High ed., 4 or more years of college (15.7% of labor force in 1970, 28.2% in 1991). Source: Handbook of Labor Statistics, BLS, 1989 (Table 67). Statistical Abstract of the US (1993, Table 654). Refers to males, age 25–64. Ratio = low ed. unemployment / high ed. unemployment.

[b] 1982 only.

[c] 1983, 1986.

[d] 1991–1992.

[e] 1975, 1977.

[f] 1979, 1981.

[g] 1983, 1985.

[h] 1990.

[i] 1972–1974.

[j] 1973–1974.

[k] 1979.

[l] 1984–1986.

Table 23
Education earnings ratios for men (top level/bottom level)[a]

	Early 1970s	Late 1970s	Early 1980s	Mid/late 1980s	Early 1990s	% Annual Rate of Change 1970s	% Annual Rate of Change 1980–1990s
Austria					1.74		
Denmark			1.58	1.59	1.61		0.4
France	3.85	4.23		3.81		5.4	−5.2
Germany (W)			2.00	1.94			−1.2
Netherlands			1.96	1.86			−2.0
Norway			1.43	1.32	1.35		−1.0
Sweden	1.68		1.37	1.57	1.55	−4.4	1.8
UK	1.83	1.69		1.87	2.04	−2.8	3.4
Canada	2.09	1.69		1.90	2.08	−6.6	3.2
US	1.92	1.94		2.33	2.47	0.4	4.0
Japan	1.32	1.30		1.36	1.36	−0.4	0.4
Australia	2.03	1.87	1.74	1.70	1.79	−3.2	0.4

[a] Source: OECD Jobs Study (1994a, part II, Table 7.A.1). The education ratios are level E/level A ≈ ISCED6/7/ISCED2 = degree level/minimal compulsory education level. See Table 11 for details. France is a complete outlier partly because level E appears to refer only to graduates of a Grande Ecole, which is a tiny elite subgroup of those with first degrees.

groups. In all countries we see a large rise in unskilled unemployment from the 1970s to the 1990s. In many countries we have a substantial rise in skilled unemployment. However, in Germany, Norway, Sweden and the United States, the increase in skilled unemployment is relatively slight as is the percentage point increase in unemployment as a whole. Overall, the pattern of the rise in US unemployment from the early 1970s to the early 1990s is very similar to that in Germany from the mid-1970s to the early 1990s. Of course, in the last couple of years there has been considerable divergence, although that is mainly cyclical.[12]

Turning now to the wage changes, in Table 23 we see that while most countries except France saw a narrowing of educational wage differentials in the 1970s, the United Kingdom, the United States and, to some extent Canada, saw a substantial widening of differentials in the 1980s and 1990s. In the case of Canada, however, this simply offset the dramatic narrowing that took place in the 1970s. So only in the case of the United Kingdom and the United States are educational wage differentials substantially wider now than they were in the early 1970s. These patterns reflect the changes in the overall earnings distribution over the same period.

Three interesting questions emerge from these facts. First, why have the educational wage differentials widened so much more in Britain and the United States than in other

[12] Plus the fact that the "unification tax" of around 5% of West German GDP per annum has had a big impact on unemployment, mainly because the unions have been trying to offset the tax in their wage bargaining.

Table 24
Changes in the demand and supply of skilled workers (Eq. (8))[a]

	$\sigma\Delta\ln(\delta/(1-\delta))$ change in relative demand	$\Delta\ln(s/(1-s))$ change in relative supply	Annual change (× 100) in $\sigma\ln(\delta/(1-\delta)) - \ln(s/(1-s))$ (relative demand − relative supply)		
	$\sigma = 1$ (1)	$\sigma = 1$ (2)	$\sigma = 1$ (3)	$\sigma = 2$ (4)	$\sigma = 1/2$ (5)
France 1984–1993	0.559	0.544	0.17	0.19	0.17
Germany (W) 1984–1993	0.175	0.241	−0.73	−1.51	−1.34
Italy 1977–1993	1.199	1.117	0.51	0.60	0.47
Netherlands	0.267	0.336	−1.36	−1.38	−1.36
Norway 1979–1993	0.875	0.862	0.09	−0.06	0.17
UK 1979–1991	1.126	0.984	1.29	2.24	0.65
Australia 1979–1990	0.429	0.443	−0.12	−0.32	−0.04
Canada 1979–1991	0.929	0.896	0.28	0.48	0.18
US 1980–1989	0.414	0.289	1.34	2.82	0.67

[a] Source: Jackman et al. (1997, Annex 2 and Table 5) except for UK, Labour Force Survey and New Earnings Survey, and Germany, Clark (1997, Tables 5.1, 5.3). Definition of skilled workers (unskilled are the remainder). France: baccalaureat general or above. Germany: all except those with basic/middle levels of schooling and no formal vocational training. Italy: upper secondary qualification or above. Netherlands: senior secondary qualification or above. Norway: secondary school level II or above. UK: O levels (GCE) or above. Canada: some postsecondary education or above. US: some college or above. Australia: attended highest available secondary school or above.

countries, particularly in recent years? Second, has the demand shift against the unskilled contributed substantially to the large increase in unemployment in some European countries over the last 20 years? Third, leaving aside France (see notes to Table 23), why are there such big cross-country variations in the wage differentials corresponding to similar education differentials? Note that these variations in educational pay differentials correspond quite closely to variations in the overall earnings distribution (see, OECD, 1993, Chapter 5).

The obvious place to start with these questions is the pattern of supply and demand. In Table 24, we present information on the recent changes in relative demand less changes in relative supply, corresponding precisely to Eq. (8). In the first two columns we present changes in relative demand and supply under the assumption of a unit elasticity of substitution (see Jackman et al., 1997 for evidence in favor of this hypothesis). Then in the next three columns we have the average annual change in relative demand less relative supply for three different values of the elasticity of substitution. The numbers reveal immediately that the relative demand for skilled workers has outstripped the relative supply by far more in the United Kingdom and the United States than in any other country for which data are available. These numbers are consistent with those presented by Manacorda and Manning (1997). This seems quite enough to answer the first question without recourse to any special arguments about unions, minimum wages and relative wage inflexibility.

All the available evidence suggests that the answer to the second question is no. While it has often been suggested that wage inflexibility has generated unemployment in Europe in response to relative demand shifts in favor of the skilled (see, e.g., Krugman, 1994), there is no convincing evidence in favor of this view. As we might expect from the numbers in Tables 22 and 23, particularly the substantial rises in skilled unemployment in many countries, the evidence suggests that skill shifts account for only a tiny proportion of the rise in unemployment since the 1970s. Furthermore, there is no evidence that this proportion is lower is "flexible" Britain than anywhere else (see Card et al., 1995; Nickell and Bell, 1995, 1996; Jackman et al., 1997).

The last question is, perhaps, the most interesting, asking why earnings are so much more compressed in some countries than others. The standard answer to this question, set out persuasively in Blau and Kahn (1996), is that institutional factors in many countries (unions, minimum wages etc.) serve to raise pay at the bottom end and generate pay compression. However, the analysis which produces this kind of conclusion typically uses schooling as the international currency of skill, then shows that pay differentials across certain schooling levels are much higher in the United States than in Sweden, say, and concludes that the only explanation for this is that institutions generate pay compression (thereby raising unemployment).

As we have seen in Table 12, the use of schooling as a common currency may be a problem. An alternative hypothesis to explain why earnings differentials corresponding to apparently comparable schooling differentials differ so much, is that the schooling differentials are not comparable. Furthermore if a truly comparable measure of skill is used, the earnings differentials can readily be explained by the skill differentials. An investigation of this alternative hypothesis is presented in Table 25 and Fig. 1, where we use the scores in

Table 25
Average test scores and earnings (labor force), 1990s[a]

	ISCED3/ISCED2		ISCED6–7/ISCED2	
	Test score ratio (1)	Earnings ratio (2)	Test score ratio (3)	Earnings ratio (4)
Germany (W)	1.054	1.133	1.40	1.94
Netherlands	1.092	1.188	1.30	1.86
Sweden	1.018	1.132	1.20	1.55
Switzerland	1.128	1.313	–	–
Canada	1.110	1.232	1.61	2.08
US	1.167	1.511	1.72	2.47

[a] ISCED2, first stage secondary–end of compulsory schooling; ISCED3, second stage or higher secondary. ISCED6–7, first degree or above. Columns (1) and (2) were provided by Per-Anders Edin (Uppsala) from data supplied by OECD. Column (3) is derived from Table 12. Column (4) is taken from Table 23. Test scores refer to scores in the OECD quantitative literacy test, reported in Literacy, Economy and Society (OECD, 1995). The tests and the marking system were identical across all countries.

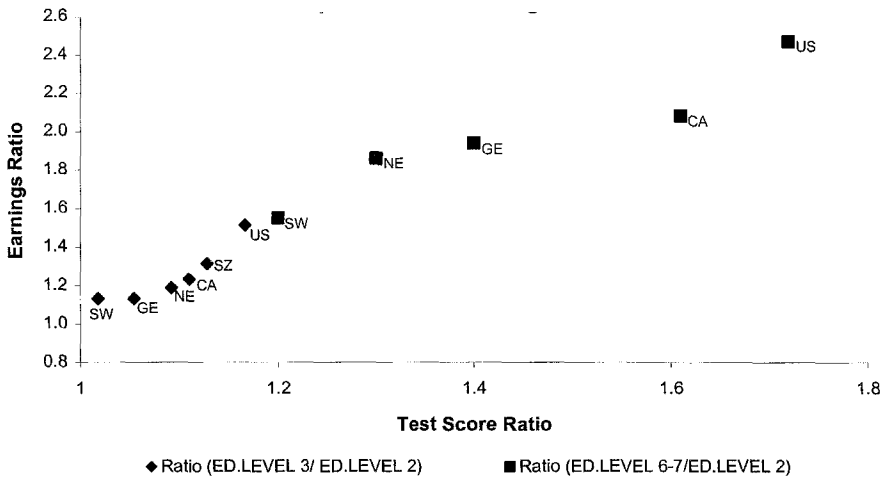

Fig. 1. The relationship between earnings and test scores.

an OECD quantitative literacy test administered to a random sample of the working age population in a variety of countries. The test and the marking scheme were identical for each country. In Table 25 and Fig. 1, we see that the earnings ratios associated with "comparable" education levels relate very closely to the test score ratios corresponding to these same "comparable" education levels. These results provide quite strong evidence in favor of the very simple hypothesis that variations in earnings distributions across countries correspond rather closely to variations in true skill distributions. Thus, Sweden has a very compressed earnings distribution relative to the United States, because it has a very compressed skill distribution. There is no need to wheel on the all-purpose "European institutions" to explain the differences – supply and demand does fine (see Leuven et al., 1997 for further evidence).

11.1. Summary

The increase in the relative demand for skilled workers has been substantial in the last two decades across the OECD. The fact that relative demand has outstripped relative supply by much more in Britain and the United States than elsewhere helps to explain why relative skilled wages have risen by far more in those two countries. There is no evidence that relative demand shifts have played an important role in the overall rise in unemployment in many OECD countries. Finally, there is quite strong evidence that the compressed earnings distributions in some OECD countries relative to the United States are a consequence of equally compressed skill distributions. Most of the gross features of unemployment and wage distributions across the OECD in recent years seem explicable by supply

and demand shifts and the role required of special institutional features such as unions and minimum wages is correspondingly minimal.

12. Conclusions

Consider each of the labor market features in turn.

Labor taxes. There is some evidence that overall labor tax rates have a short-run, and possibly a long-run, impact on unemployment rates. On the growth front the evidence is not robust and there is no strong reason for believing that total labor tax rates have any significant effect. Since major cuts in the tax burden are hard to achieve without significant social upheavals, such as moving health or pension provision into the private sector, an alternative strategy is to restructure the tax system so that things like health or pensions are paid for by a mechanism which largely mimics a private insurance system. This will add to the likelihood that such taxes are shifted wholly onto labor, thereby minimizing any negative effects on employment.

Labor standards and employment protection. There is no evidence that stricter labor standards or employment protection lead to higher unemployment. Employment protection does, however, raise longterm unemployment and lower shortterm unemployment, by reducing the rate of flow out of and into unemployment. As far as growth is concerned, there is no reason to believe that stricter labor standards or employment protection lower productivity growth rates – indeed maybe the reverse.

Unions, wage setting and minimum wages. The existence of strong trade unions can be expected to raise unemployment and lower growth rates except under certain circumstances. First, their harmful impact on unemployment can be offset if unions and firms can coordinate centrally over wage setting. Second, their harmful effect on growth rates can be offset if management and unions adopt a more co-operative and less adversarial stance. The difficulty here is the tendency for coordinating or co-operative endeavors to be unstable unless there are supporting institutions (such as local employers' federations in Germany).

A key factor forcing management and unions to adopt a co-operative stance is external competitive pressure. This suggests that encouraging high levels of product market competition is an important way of eliminating the negative effects of trade unions. This can be done both by standard competition policy and by removing anti-competitive product market regulation, which is a commonplace in much of the service sector in many OECD countries (see McKinsey Global Institute, 1992, 1997; Baily, 1993, for example). Finally, the effects of minimum wages, at current levels, are minimal except perhaps in France.

Social security systems. Generous and long-lasting unemployment benefit entitlements remain commonplace in Europe and these generate higher unemployment. Strikingly, the only big difference between US unemployment and European unemployment is in long-term unemployment (see Table 1), and this is largely explained by the long period for

which benefits are available in Europe with few strings attached. The impact of generous benefits can be offset by active labor market policies *and* a strictly operated system (e.g., a strict work test).

Skills and education. Institutional differences have not been very important in determining the unemployment and wage responses of different OECD countries to the recent substantial shifts in demand in favor of skilled workers. Different movement of supply and demand seem to explain most of the relevant features.

To conclude, the key labor market institutions on which policy should be focussed are unions and social security systems. Encouraging product market competition is a key policy to eliminate the negative effects of unions. For social security the key policies are benefit reform linked to active labor market policies to move people from welfare to work. By comparison, time spent worrying about strict labor market regulations, employment protection and minimum wages is probably time largely wasted.

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