CHAPTER 2

Making the most of the minimum: statutory minimum wages, employment and poverty

A. INTRODUCTION AND MAIN FINDINGS

1. Introduction

Several OECD countries have experienced a rise in earnings inequality and/or a widening of the gap in income between rich and poor over the past decade or so. This has led to a resurgence of interest in the links between employment growth, low pay and poverty. In particular, the impact of statutory minimum wages on employment and the distribution of earnings and income has been subject to intense scrutiny.

Analysis of minimum wages inevitably raises contentious theoretical, empirical and policy issues. On the one hand, statutory minimum wages are seen as playing an important role in ensuring that "fair" wages are paid and in bolstering the incomes of families with low-wage workers. On the other hand, it is argued that high minimum wages can destroy jobs and have a limited impact on poverty because many poor families have no working members. New life has been injected into this debate by the findings of Card and Krueger (1995, 1998) that minimum wage increases can, in some circumstances, result in net job gains rather than the losses predicted by conventional wisdom. However, while many reassessments of minimum wages have been carried out on a national basis, there have been few from an international perspective [for one of the few, see Dolado *et al.* (1996)]. The need for a reconsideration of the costs and benefits of statutory minimum wages is further reinforced by the fact that two Member countries, Ireland and the United Kingdom, are committed to introducing a national minimum wage for the first time in their histories.

Accordingly, this chapter covers the following issues: *i)* the setting and operation of statutory or national minimum wages (Section B); *ii)* their impact on employment (Section C); *iii)* their impact on the earnings of low-paid workers and household incomes (Section D); and *iv)* their interaction with tax/benefit systems (Section E). Statutory minimum wages are defined fairly broadly to include countries such as Belgium and Greece where the minimum wage, while determined through collective negotiation, is fairly universal in coverage.[1] Minimum wages are also effectively set through collective agreements in a number of other countries and, in some cases, such agreements are administratively extended to cover whole sectors of activities. However, these minima can vary substantially across sectors and according to a worker's age, experience and qualifications. Their impact on employment and the distribution of earnings and income is likely to be quite different than in the case of a uniform national minimum wage. For this reason, such collectively-set minima are excluded from the scope of this chapter.

2. Main findings

National or statutory minimum wages exist in 17 OECD countries, but there are substantial differences in the way they are set and operate. The main differences concern the level of the minimum relative to average wages; the extent of differentiation by age or region; mechanisms for indexation; and the roles of governments and the social partners in setting them.

There is little agreement, at either the theoretical or empirical level, about the precise employment effects of minimum wages, at least over moderate levels relative to average wages. However, there is general agreement that a statutory minimum wage is likely to reduce employment if set above a certain, usually unspecified, level. While sometimes conflicting, the weight of evidence suggests that young workers may be most vulnerable to job losses at a high level of the minimum wage. There is less evidence available on the employment effects, if any, for other groups such as women and part-time workers, who represent a large and growing proportion of the workforce.

Standard economic theory predicts that the imposition of a minimum wage will simply truncate the earnings distribution at that wage, but the empirical evidence points to much more complicated effects. Spikes tend to appear at the new minimum wage, indicating that many of those previously

earning below the new minimum now earn exactly that amount. This suggests that minimum wages can be effective in achieving one of its equity goals of ensuring that "fair" wages are paid to workers. There is also some evidence of spillover effects that lead to an increase in wages for those previously at or just above the new minimum. Partly as a result of these effects, those countries with higher minimum wage rates relative to the median have less earnings dispersion and a lower incidence of low pay. In addition, minimum wages narrow earnings differentials across demographic groups, particularly between the young and old and between men and women.

Minimum wages can reduce poverty rates and income inequality among working families. However, their impact on family (household) poverty and income distribution is limited, because many poor families have no one working and many minimum-wage workers live in households with above-average incomes.

Minimum wages are not as well targeted at reducing in-work poverty as other measures such as in-work benefits which are means tested. However, means-tested benefits face other drawbacks: they may give rise to poverty traps; they may lead to a fall in the wages of low-paid workers; and they can be very expensive. This suggests that there may be some scope to complement in-work benefits with a national minimum wage. The overall net benefit of such a policy mix will depend upon the specific economic and institutional context of the labour market in each country.

B. MINIMUM-WAGE SYSTEMS IN OECD COUNTRIES

1. Coverage, operation and setting of minimum wages

Nearly all OECD countries have some form of minimum wage-setting arrangements in place in accordance with one or several of the relevant ILO conventions [ILO (1992)]. Currently, 17 countries have a statutory or national minimum wage which cuts across almost all sectors of the economy. An overview of their coverage, operation and setting is provided in Table 2.1.

Most countries opt to set a single national minimum rate, although there may be a reduced or "sub-minimum" rate for some groups such as youth and apprentices. Minimum wages are set at both the federal and regional levels in Canada and the United States, and at the regional level only in Japan and Mexico.[2] In the United States, just seven states and the District of Columbia set minimum wages above the Federal rate, the lowest rate that can be set. In Canada, each province and territory sets its own hourly minimum. In 1997, it ranged from C$ 5 in Alberta to C$ 7 in British Columbia, compared with a national average of just under C$ 6.50. This range is wider than in Japan, where the spread of prefectural rates in 1997 around the national average of ¥ 635 per hour ranged from ¥ 578 in a number of prefectures to ¥ 671 for Tokyo.[3] In Mexico, basic rates are set for three broad regions as well as higher rates for 88 specific occupations in each region.[4] Premia also exist related to a worker's experience (Belgium and Greece), qualifications (Czech Republic), and marital and family status (Greece and Luxembourg).

There is substantial variation across countries in terms of coverage. Disabled workers are often excluded or come under separate regulations. Apprentices and trainees are often exempted or only qualify for a reduced rate. In some cases, public servants are also not covered (France, Greece and Luxembourg). In Canada and the United States, supervisory and managerial employees are typically excluded.

Sub-minimum rates for young workers are very common: over one-half of the countries in Table 2.1 apply a reduced rate for them, though the differential varies a lot. In the Netherlands, Belgium and Luxembourg, the adult rate is reduced successively for each year below 23, 21 and 18 years of age, respectively. Reduced rates for 17-year-olds and those under 17 are also set in France, but they are incorporated into relatively few collective agreements. In the other countries with a youth minimum, there is only a single rate. In some countries, such as France, there are also *de facto* sub-minimum wages for youths as a result of special employment programmes which allow employers either to pay lower wages than the SMIC or lower their social security charges.

The setting of statutory minima wages for younger workers has changed over recent years in several countries. In Spain, the separate rate for under 17-years-olds was abolished in 1990 with the rate for 17-year-olds applying to all workers less than 18. A further change in Spain was introduced at the beginning of 1998 when a single statutory minimum wage was established with no distinction by age. In 1994, New Zealand introduced a separate youth rate (60 per cent of the adult minimum) for workers aged less than 20. In Canada, while youth rates still exist in some provinces, there has been a marked tendency over recent years for these rates to be repealed. In contrast, a youth rate was introduced in the United States at the Federal level as recently as 1996, but it only applies to the first 90 consecutive calendar days of employment.

Table 2.1. **Summary of minimum wage systems in OECD countries with a national minimum**

Country and year of introduction[a]	Name and type of determination	Employees excluded	Rates for younger employees (age and % of adult rate)	Indexation or "uprating" procedures	Other remarks
Belgium (1975)	The minimum monthly wage – *Revenu minimum mensuel moyen garanti* (RMMMG) – is set by a national collective agreement.	Public sector workers, apprentices, trainees and workers in sheltered workshops.	20, 94%; 19, 88%; 18, 82%; 17, 76%; and under 17, 70%.	RMMMG is indexed to consumer prices on a branch-by-branch basis. The RMMMG is also increased when the central agreement is renegotiated, usually every two years.	Since 1991, additional steps to the RMMMG have been added for adult workers with more than 6 or 12 months tenure.
Canada (Women: 1918-1930; Men: 1930s-1950s)	Minimum hourly wages are set by statute at the Federal and Provincial levels.	Apprentices, farm workers, and supervisory and managerial workers are often excluded under provincial regulations.	Reduced rates for youth have generally been abolished.	No automatic indexation for general price or wage inflation.	Since July 1996, the Federal rate has been aligned with the rate in each province and territory.
Czech Republic (1991)	A basic minimum wage and Minimum Wage Tariffs (MWTs), on an hourly and monthly basis, are set by statute.	MWTs only apply to employees not covered by collective agreements. Public sector pay is set separately.	No reduced rates for young adults, but lower rates for minors.	No automatic indexation for general price or wage inflation.	Lower rates for disabled employees. MWTs vary according to complexity, responsibility and physical difficulty of job performed.
France (1950; 1970 in current form)	The minimum hourly wage – *Salaire minimum interprofessionnel de croissance* (SMIC) – is set by statute.	General government workers and disabled workers (who are covered by separate rules).	For workers with less than 6 months of tenure: 17, 90%; and under 17, 80%.	The SMIC is indexed to consumer prices (for rises of 2% or more) and must rise by at least half the increase in the hourly wage rate of workers. The SMIC can be raised by more than these prescribed increases by decree.	Apprentices and trainees entitled to 25% to 78% of the SMIC, depending on age and stage of training.
Greece (1953; 1990 in current form)	Minimum wages are set as a daily (manual workers) and monthly (non-manual workers) rate by the National General Employment Collective Agreement.	Applies to employees in the private sector only. Public sector pay levels are set separately by the government.	No reduced rates.	While there is no automatic indexation, the rate has been adjusted twice to three times a year.	Higher rates apply according to job tenure and marital status.
Hungary (1977; 1992 in current form)	The minimum (hourly and monthly) wage is set by statute.	All employees covered. Apprentices must receive at least 10% of the minimum wage.	No reduced rates.	There is no automatic indexation but the rate is normally adjusted annually with the agreement of the tripartite Interest Reconciliation Council.	Lower minimum wages can be granted in certain cases but this has not occurred in practice.

Table 2.1. **Summary of minimum wage systems in OECD countries with a national minimum** *(cont.)*

Country and year of introduction[a]	Name and type of determination	Employees excluded	Rates for younger employees (age and % of adult rate)	Indexation or "uprating" procedures	Other remarks
Japan (1959; 1968 in current form)	A statutory minimum (hourly and daily) wage is set for each of the 47 prefectures.	Some civil servants; apprentices and trainees; disabled and intermittent workers; newly hired workers on probation; and workers with very short working hours.	No reduced rates.	In consultation with local tripartite Minimum Wages Councils, minimum wages are revised every year, taking into account increases in wages and the cost of living.	Minimum wages are also set by prefecture for selected industries and at the national level for the coal and metal mining industries.
Korea (1988; 1990 in current form)	The minimum (hourly and daily) wage is set by statute.	Only business with more than 10 workers must observe the minimum wage. Exceptions also apply to: apprentices and trainees; newly hired workers on probation; and disabled and intermittent workers.	For workers with less than 6 months of job experience: under 18, 90%.	While there is no automatic indexation, the minimum wage is adjusted annually by the Minister of Labour after consulting the tripartite Minimum Wage Council.	Minimum wages were initially fixed for manufacturing only and then extended to all businesses in 1990.
Luxembourg (1944)	The minimum monthly wage – *Salaire social minimum* (SSM) – is set by statute.	Only covers private sector employees.	17, 80%; 16, 70%; and 15, 60%.	The SSM is indexed to consumer prices. Also reviewed biennially in line with economic and pay growth.	Rates are 20% higher for skilled and experienced workers. The minimum rate also varies according to marital and family status.
Mexico (1917; 1962 in current form)	Statutory daily minimum wages for three broad geographical zones are fixed by the tripartite National Minimum Wage Commission.	No exemptions.	No reduced rates.	While there is no automatic indexation, the minimum wage has been adjusted regularly.	Higher minimum rates are also set for 88 occupations in each region.
Netherlands (1968)	The minimum (daily, weekly and monthly) wage – *Minimumloon* – is set by statute.	Covers all employees with a labour contract. In 1992, coverage was extended to employees working less than 13 hours a week.	22, 85%; 21, 72.5%; 20, 61.5%; 19, 52.5%; 18, 45.5%; 17, 39.5%; 16, 34.5%; and 15, 30%.	Since 1992, the minimum wage is linked to average wage growth but indexation can be suspended if the ratio of welfare recipients to employment (in benefit and work years, respectively) rises above a given level.	The minimum wage was cut by 3% in 1984 and frozen in nominal terms until 1990 when indexation was restored.
New Zealand (1945; 1983 in current form)	The minimum (hourly, daily and weekly) wage is set by statute.	Apprentices and trainees; and disabled workers.	16 to 19, 60%.	No automatic indexation, but the Minister of Labour must undertake an annual review of the level.	

Table 2.1. **Summary of minimum wage systems in OECD countries with a national minimum** *(cont.)*

Country and year of introduction[a]	Name and type of determination	Employees excluded	Rates for younger employees (age and % of adult rate)	Indexation or "uprating" procedures	Other remarks
Poland (1990)	The minimum monthly wage is set by statute.	No exemptions.	No reduced rates.	Updated 3 to 4 times each year according to a formula, taking into account expenditures of low-income "working" households, price inflation and other economic factors.	
Portugal (1974)	The national minimum monthly wage – *Remuneracao minima nacional* (RMN) – is set by statute.	Armed forces.	Under 18, 75%.	Updated annually by law after tripartite consultation, taking into account inflation and economic performance.	Lower rates are set for apprentices, trainees, domestic staff and disabled workers.
Spain (1963; 1976 in current form)	The minimum monthly wage – *Salario minimo interprofesional* (SMI) – is set by statute.	No exemptions.	Under 18, 89%.	Updated annually by law after tripartite consultation, taking into account inflation and economic performance.	As of 1 January 1998, there is no longer a reduced rate for younger workers.
Turkey (1971)	The minimum daily wage is set by statute.	Apprentices.	Under 16, 85%.	Usually updated annually through a tripartite Minimum Wage Board, taking account of the cost of purchasing a minimum basket of food and non-food items, as well as other economic developments.	Separate regional minima were discontinued in 1974. Prior to August 1989, a separate (lower) rate was set for agricultural workers.
United States (1938)	Federal and State minimum hourly wages are set by statute.	Executive, administrative and professional employees and other specific, but small, groups of workers.	From October 1996, a reduced Federal rate of $4.25 per hour may be paid to workers under 20 during their first 90 consecutive calendar days on the job.	No automatic indexation for price or wage inflation.	Subject to certain conditions, employers may pay trainees 85% of the Federal rate as well as lower rates for full-time students and disabled workers.

a) For many countries, there have been a substantial number of changes in the laws and regulations governing minimum wages. The year of introduction is simply meant to indicate when the central features of the current system were put into place.

Sources: National submissions to the Secretariat.

Countries also differ in how the minimum is initially set, its subsequent "uprating" and in whether it is automatically indexed for inflation. In most cases, minimum wages are set by the government unilaterally or following consultations with, or recommendations by, a tripartite body (France, Japan, Korea, Portugal and Spain). Belgium and Greece have hybrid systems: the minimum is set through a national agreement between the social partners, but is legally binding in all sectors (the private sector only in Greece). Only Belgium and Luxembourg appear to automatically index for price inflation, while in France, Greece, Japan, Portugal and Spain, both price and wage movements are either explicitly or implicitly taken into consideration in annual reviews of the minimum rate. In the Netherlands, minimum wages are linked to the average, collectively bargained, wage increase, but this link is conditional: indexing can be suspended if the ratio of the inactive to active population (expressed in benefit and work years, respectively) rises above a certain specified level.[5] In a few countries, criteria, such as the "expected" impact on employment, unemployment and competitiveness, are explicitly taken into account in annual or biennial reviews of the minimum wage (Luxembourg, New Zealand, Portugal and Spain).

Table 2.2. **Minimum wage per hour, end-1997**[a]

	In national currency[b]		In US$, using[c]	
			Exchange rates	PPPs
Belgium	250	(43 343/month)	6.77	6.40
Canada	6.47		4.53	5.33
Czech Republic	13.50		0.39	0.92
France	39.43		6.58	5.56
Greece	774	(6 195/day)	2.74	3.06
Hungary	98		0.48	1.05
Japan	635		4.88	3.38
Korea	1 485		1.05	2.15
Luxembourg	267	(46 275/month)	7.23	6.91
Mexico	3.04	(24.30/day)	0.38	0.59
Netherlands	12.95	(517.8/week)	6.42	6.00
New Zealand	7.00		4.07	4.46
Poland	2.60	(450/month)	0.74	1.57
Portugal	327	(56 700/month)	1.78	2.32
Spain	384	(66 630/month)	2.53	2.94
Turkey[d]	147.66	(1 181/month)	0.72	1.38
United States	5.15		5.15	5.15

a) In all cases, the minimum wage refers to the basic rate for adults.
b) For countries where the minimum wage is not usually expressed as an hourly rate, the given rate (shown in parentheses) has been converted to an hourly basis assuming a working time of 8 hours per day, 40 hours per week and 173.3 hours per month.
c) Exchange rates refer to the end of December 1997. The PPPs refer to provisional estimates of Purchasing Power Parities for final private consumption expenditure for December 1997.
d) The minimum wage rates in national currency refer to thousands of Turkish Lira.
Sources: OECD Minimum Wage Database; and for exchange rates and PPPs, OECD, *Main Economic Indicators.*

2. Minimum-wage levels

Minimum wages can be set on either an hourly, daily, weekly or monthly basis which complicates cross-country comparisons of their levels. Therefore, the hourly equivalent of the adult minimum wage in each country at the end of 1997 is provided in Table 2.2, both in national currencies and in US$. In terms of US$ measured at current exchange rates, minimum hourly wages range from under 50 cents per hour in the Czech Republic, Hungary and Mexico to over $7 in Luxembourg. When converted into US$ using purchasing power parities (PPPs), the dispersion in rates is reduced somewhat, but remains substantial.

Another way to compare minimum wages across countries is to measure their value relative to some measure of average wages. In addition to taking cross-country productivity differences into account, such a ratio also provides an indication of how many workers are likely to be affected by the minimum. However, this ratio can vary substantially depending on how both the numerator (minimum wage) and denominator (average wage) are measured. As discussed in Box 1, using median rather than mean wages in the denominator provides a better basis for international comparisons because of differences across countries in the dispersion of earnings. Ideally, minimum wages should also be measured relative to the median value of basic earnings, *i.e.* excluding overtime and bonus payments, but such data are only available for a few countries. Finally, the gap between minimum and average wages varies considerably for different groups of workers and this may affect international comparisons of the overall ratio because of differences in the age, gender and skill composition of each country's workforce. For these reasons, the ratio of minimum to average wages is presented in Table 2.3 according to a range of earnings measures and for different groups of workers.

The ratio of minimum to average wages is higher when the denominator refers to median rather than mean earnings because earnings distributions are typically left-skewed. Similarly, the ratio is higher when measured in terms of basic rather than total earnings. Country rankings, however, are fairly stable whichever ratio is compared. In relative terms, minimum wages appear to be highest in Belgium and France, and lowest in the Czech Republic and Korea. On the basis of more partial information, they also appear to be quite low in Mexico and Turkey.

Table 2.3. **Adult minimum wage relative to a range of average earnings measures, mid-1997**[a]

Percentages

	Full-time median earnings						Full-time mean earnings			Mean hourly pay in manufacturing[d]
	Basic	Including overtime pay and bonuses					Basic	Including overtime pay and bonuses		
	All	All	Men	Women	Youth[b]	Low paid[c]	All	All	Youth[b]	
Belgium	61.1	50.4	49.2	55.2	65.5	71.6	52.6	43.4	63.3	59.9
Canada	..	39.6	35.1	46.8	..	90.1	..	35.7	58.4	38.2
Czech Republic	..	21.2	19.4	24.6	..	34.6	..	18.7	23.0	..
France	68.5	57.4	55.2	63.3	..	86.2	55.3	46.3	71.7	68.7
Greece	..	..	..	..	..	..	..	..	..	51.4
Hungary	..	37.4	..	..	..	71.9	..	32.6	..	40.7
Japan	39.7	30.8	26.5	42.1	44.9	64.7	34.9	27.1	43.9	46.8
Korea	30.6	24.4	21.2	36.0	35.0	47.4	27.4	21.5	33.5	30.7
Luxembourg	..	..	..	..	..	..	..	..	..	53.9
Mexico	..	..	..	..	..	..	..	..	..	27.6
Netherlands	55.9	49.4	47.2	61.0	..	77.6	51.1	45.2	76.1	58.1
New Zealand	47.4	45.6	41.9	51.4	59.2	81.4	41.0	39.4	..	52.8
Poland	..	44.6	39.6	49.6	..	78.3	..	40.8	..	..
Portugal	..	..	..	..	..	..	49.6	41.9	..	64.1
Spain	36.4	32.4	30.1	42.3	..	66.6	28.8	25.6	..	40.6
Turkey	..	..	..	..	..	..	..	..	..	27.7
United States	43.3	38.1	33.2	44.4	59.7	79.5	34.9	30.6	52.5	36.1

.. Data not available.

a) In all cases, the minimum wage refers to the basic rate for adults. The average earnings data for 1997 for the different groups of full-time workers and for manual workers in manufacturing are estimates based on extrapolating data for earlier years in line with other indicators of average earnings growth. All earnings data are gross of employee social security contributions.

b) Youth are defined as employees aged 20-24. For the Netherlands, the mean ratio is around 65 per cent in terms of the average minimum rate for youths (weighted by the youth labour force by single year of age). In other countries with reduced rates for youths, these generally apply below the age of 20.

c) The low paid are defined as employees in the bottom 20 per cent of the earnings distribution. By construction, median earnings for this group correspond to the upper earnings limit for the bottom decile of employees.

d) Hourly pay for manual workers for time worked, *i.e.* excluding sick pay, holiday pay and other annual or non-regular bonuses and supplements. For Korea, Mexico, Portugal and Spain, hourly pay for time worked has been partly estimated based on data on total direct pay.

Sources: Minimum wages: OECD Minimum Wage Database; Mean and median earnings for full-time workers: OECD estimates and OECD Earnings Database (for more details, see OECD, *Employment Outlook,* July 1996, Chapter 3); Mean hourly pay in manufacturing: US Bureau of Labor Statistics, *International Comparisons of Hourly Compensation Costs for Production Workers in Manufacturing, 1975-1996.*

Box 1. **International comparisons of the ratio of minimum to average wages**

Minimum wages are often reported relative to mean earnings, but, for the purpose of international comparisons, it may be better to report them relative to median earnings. For example, a large rise in the earnings of a few highly-paid workers may be sufficient to raise the mean relative to the minimum wage, but it would be mistaken to regard this as a sign of a decline in the potential number of workers affected by the minimum. Moreover, countries with the lowest relative value of minimum wages also tend to have the greatest dispersion of earnings. This implies that the variation across countries in their minimum wages will be somewhat overstated when measured relative to mean rather than median earnings.

Across countries, the composition of total earnings varies substantially. For example, in 1995, overtime payments and annual bonuses boosted basic rates of pay by almost 30 per cent in Japan, but by less than 13 per cent in Spain. International comparisons may be sensitive to whether these supplementary payments are included. Given that it is not generally possible with available data to establish the average amount of these supplementary payments for minimum-wage workers, the denominator should, ideally, refer to average earnings measured on a consistent basis, *i.e.* in terms of basic rates of pay.* However, for many countries, it is difficult to obtain this type of measure and the available earnings data include some or all supplementary payments received by workers. In these cases, the relative importance of the minimum wage will be understated.

For workers, the value of the minimum relative to average wages in *net* terms is probably the most relevant measure. Given that overall income taxes on earnings are typically progressive, the minimum wage ratio on a gross basis will understate the ratio on a net basis. This understatement will vary across countries according to the degree of progressivity of each country's tax system. Similarly, for employers, the value of minimum wages relative to the average in terms of total labour costs is probably a more relevant measure. Employers' social security contributions, which make up the bulk of non-wage labour costs, are generally levied at a flat rate (at least up until mean or median earnings), so that the ratio of minimum to average wages is unlikely to be very different, whether measured in terms of gross earnings or labour costs. In Belgium, France and the Netherlands, however, there have been a number of reductions over recent years in employer social security contributions for low-wage workers and their minimum-wage ratio is now lower in terms of labour costs than in terms of gross earnings.

Finally, comparisons across countries may also be affected by differences in the composition of the workforce. For example, the aggregate ratio of minimum to average wages may be similar across countries, but differ greatly across groups. Thus, when possible, it is important to also look at these ratios for different groups of workers.** It is also important to take account of differences in the universe of workers covered by their earnings statistics. For example, in some countries the average wage received by all workers may be understated because government workers are excluded while, in others, it may be somewhat overstated because workers in small establishments are excluded.

* In all cases in Table 2.3, the minimum wage has been calculated assuming a standard number of working hours and no supplementary payments.

** Earnings statistics for many countries are not readily available for part-time workers. Therefore, most of the comparisons in Table 2.3 refer to full-time workers.

Women and youth have lower average wages than men and older workers and are, thus, more likely to be affected by the minimum wage. The gap between men and women's wages is particularly large in Korea: whereas the minimum wage amounts to 21 per cent of median earnings for men, it is 36 per cent for women. In all countries, the ratio is much higher still for low-paid workers. In Canada, in particular, whereas the weighted average of the provincial minima is quite modest in terms of median earnings for all workers, it amounts to some 90 per cent of median earnings of low-paid workers.

3. Incidence and distribution of employment at statutory minima

Relatively few countries are able to provide information on the incidence and distribution of employment at minimum wages (Table 2.4). It is also difficult to make direct international comparisons because of differences in the way the incidence of minimum-wage work is measured and in the groups of workers covered by the statutory minimum. Nevertheless, it appears to be the case that the lower value of the minimum relative to average wages in

Table 2.4. **Minimum-wage employment according to various worker characteristics**[a]

Percentages

	France[b] 1996	Hungary 1997	Mexico 1996	Netherlands 1994	Poland 1996	Portugal[c] 1997	United States 1996	France[b] 1996	Hungary 1997	Mexico 1996	Netherlands 1994	Poland 1996	Portugal[c] 1997	United States 1996
	A. Incidence[d]							B. Distribution[e]						
Total	**11.0**	**3.8**	**17.6**	**3.7**	**4.5**	**4.7**	**5.1**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Sex														
Men	7.5	4.0	15.2	2.6	3.9	3.7	3.8	..	52.9	56.6	41.4	45.4	47.7	39.3
Women	16.5	3.6	22.1	5.5	5.1	6.3	6.5	..	47.1	43.4	58.6	54.6	52.3	60.7
Age														
Under 25	31.6	7.7	..	11.1	..	..	13.7	33.5	22.2	..	46.5	..	..	44.5
Under 20	..	11.9	..	14.0	..	..	22.5	..	3.7	..	14.1	..	12.6	26.6
20-24	..	7.2	..	10.2	..	..	8.7	..	18.5	..	32.4	..	..	17.9
25-54	..	3.4	..	2.4	..	..	3.1	..	75.4	..	53.5	..	..	44.0
55 and over	..	1.9	..		..	..	5.5	..	2.4	..		..	..	11.5
Education														
Basic education	..	5.1	..	..	..	..	14.7	..	68.8	..	..	..	..	38.7
Upper secondary	..	3.3	..	..	..	..	4.4	..	26.3	..	..	..	..	28.1
Higher education	..	1.0	..	..	..	..	3.1	..	4.9	..	..	..	..	33.2
Part-time/full-time status														
Full-time	..	3.8	..	2.1	..	..	2.8	..	..	..	37.9	..	..	45.0
Part-time	..	..	..	7.0	..	..	14.9	..	..	..	62.1	..	..	55.0
Selected industries														
Manufacturing	7.3	2.5	..	1.7	..	4.6	2.0	..	17.6	..	7.5	..	..	6.9
Wholesale/Retail trade	15.3	11.7	..	7.7	..	6.8	10.6	..	29.1	..	39.8	..	..	44.6
Public administration	..	0.3	..	1.6	..	..	1.8	..	0.7	..	13.6	..	..	1.8
Personal services	..	1.2	..		..	5.3	5.1	..	7.2	..		..	..	34.9
Selected occupations														
Sales workers	..	11.3	..	..	..	..	5.9	..	27.0	..	..	..	..	13.2
Service workers	..		..	..	..	..	16.5	..		..	..	..	..	46.6
Labourers	..	4.0	..	..	..	..	4.5	..	23.9	..	..	..	..	13.9

.. Data not available.

a) Data refer to all employees for France, Mexico, the Netherlands and the United States and to full-time employees only for Hungary, Poland and Portugal.

b) Data exclude employees in general government sector, domestic workers and workers on temporary contracts.

c) Data exclude employees in the general government sector. The age group "under 20" refers to persons under 18 years of age.

d) Percentage of all workers in each category who are paid minimum wages or less.

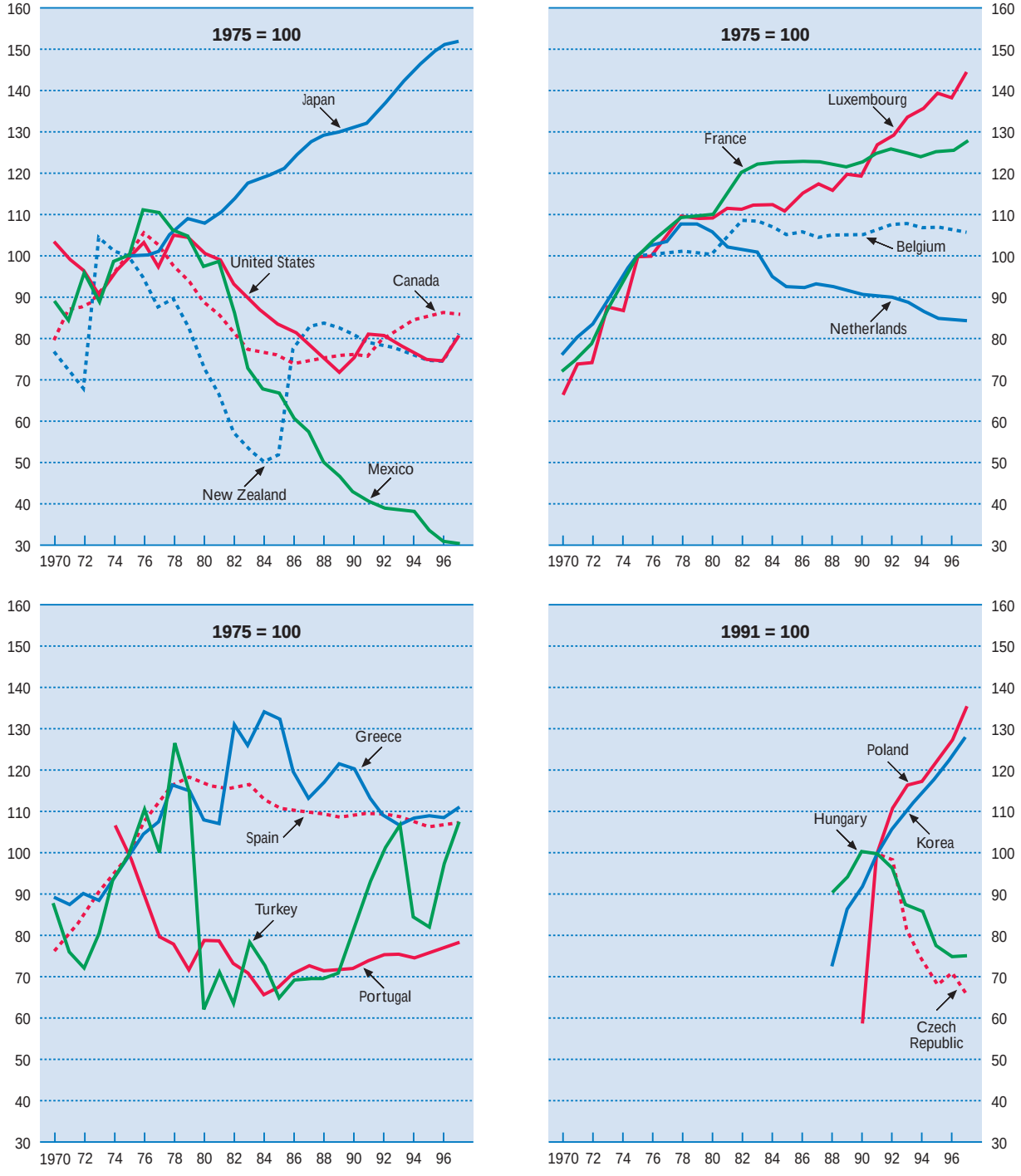
e) Percentage share of all minimum-wage workers in each category. The sub-categories may not cover all workers and hence may not add up to 100.

Sources: For Poland and the United States, Secretariat estimates derived from, respectively, the Survey of Earnings Distribution in the National Economy conducted by the Polish Central Statistical Office, and the Current Population Survey, by the US Bureau of Labor Statistics. The Polish data were derived from published tabulations of the monthly earnings distribution for full-time employees. The US data were derived from microdata on usual hourly earnings which were constructed by taking reported hourly earnings for workers paid by the hour and computing hourly earnings for other workers by dividing their usual weekly earnings by usual weekly hours of work. For all other countries, the data were provided by the national statistical authorities.

Chart 2.1.

Real minimum wages, 1970-1997[a]

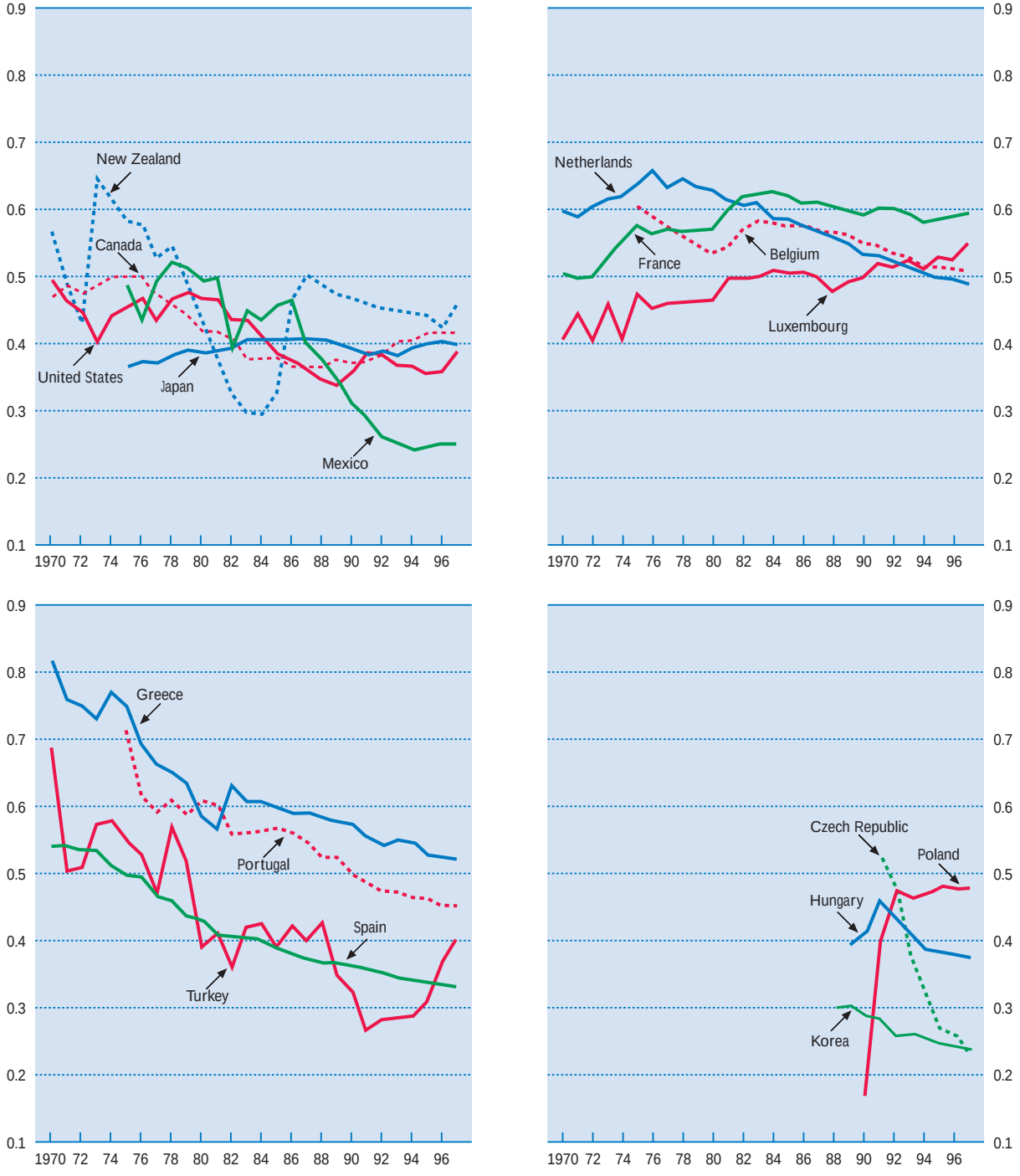
Indices: 1975 or 1991 = 100



a) For each country, annual average of the nominal value of the minimum wage deflated by the Consumer Price Index.
Source: OECD Minimum Wage Database.

Chart 2.2.

Ratio of minimum wages to average wages, 1970-1997[a]



a) Average wages refer to median earnings for full-time workers except as follows: for Greece, Luxembourg, Mexico and Turkey, they refer to mean earnings of manufacturing workers; and, for Portugal, they refer to mean earnings in the business sector. See Annex 2.A for more details.

Source: OECD Minimum Wage Database.

the United States than in France is also reflected in a much lower proportion of all employees paid at the minimum or less. In the United States, just over 5 per cent of all employees received hourly earnings at, or less than, the Federal minimum in 1996, whereas in France more than 10 per cent of all employees are currently paid the SMIC or less. At around 17 per cent, Mexico stands out for its high incidence of minimum-wage work. This reflects both a high degree of earnings inequality and extensive employment in the informal sector.

The profile of minimum-wage workers corresponds closely to that for low-paid workers reported in the 1996 *Employment Outlook* (Chapter 3, Table 3.5). The incidence of minimum-wage work tends to be highest amongst youth, women and part-time workers. It also tends to be much higher than average in retailing, hotels and restaurants, and in smaller firms. In terms of the distribution of minimum-wage workers, Table 2.4 suggests that, while younger workers are disproportionately affected, there are substantial numbers of older workers who are also affected.

4. Developments over time

In several countries, there has been a substantial erosion of the real value of the minimum wage since the mid to late-1970s (Chart 2.1). This is particularly apparent in the case of Mexico. Since their introduction, minimum wages have also fallen in real terms in the Czech Republic and Hungary, but have risen substantially in Poland. France and Luxembourg are the only other European countries to have recorded almost continuous rises, although the most substantial increases have occurred in Japan and Korea.

These trends could merely reflect developments in overall wage growth. However, as shown in Chart 2.2, minimum wages have also fallen relative to average wages in many countries over the past 25 years. The decline has been most pronounced in Mexico. The ratio has risen somewhat from a low level in Canada in recent years, but is still well below the level of the mid-1970s. In the United States, the trend decline reflects the fact that the Federal minimum is fixed in nominal terms and adjusted irregularly.

Among the European countries, there has been a trend decline in minimum wages in relative terms everywhere except France, Luxembourg and, more recently, Poland. In France, where the SMIC has been boosted by the occasional 'coup de pouce' over and above the rise in inflation, the ratio has remained stable since the early 1980s. However, in terms of labour costs, there has been a significant fall over the past five years. Since 1992, employer social security contributions for low-wage workers have been reduced substantially and the cost of hiring a minimum-wage worker relative to one at median earnings has declined from nearly 60 per cent in 1992 to just over 50 per cent in 1996. Similarly, in Belgium and the Netherlands, there have also been reductions over recent years in employer social security charges for low-paid workers and the decline in the relative value of minimum wages in terms of labour costs is more pronounced than shown in Chart 2.2.

Information on how these changes in the relative value of minimum wages have affected the number of minimum-wage workers is very scanty. In both the Netherlands and the United States, the fall in the relative and real value of the minimum has been accompanied by a decline in the incidence of minimum-wage employment from over 10 per cent in the mid to late 1970s to around 5 per cent or less in 1996 and 1997. In France, the opposite has occurred: a higher proportion of workers is currently working at the level of the SMIC than at any time over the past 25 years.

C. EMPLOYMENT EFFECTS OF THE MINIMUM WAGE

One argument against a statutory minimum wage is that, if set above the market-clearing level, it will result in job losses and so the very workers that it is intended to benefit may lose out. However, some recent studies have questioned both the earlier empirical work as well as the theoretical basis for predicting job losses. There has been a resurgence of interest in alternative models of the labour market, and this section begins with a brief survey of them. The recent empirical literature is then reviewed, followed by an international analysis of minimum-wage effects on employment.

1. Theoretical considerations

Under the assumption of a perfectly competitive labour market, a minimum wage which is set above the market clearing-wage will result in a decline in labour demand and a lower equilibrium level of employment. Alternative economic models have been put forward that predict insignificant or positive employment effects of minimum wages. The simplest such model is a labour market with a monopsonistic employer. Others include efficiency-wage, human-capital models and search-theoretic models (see Box 2).

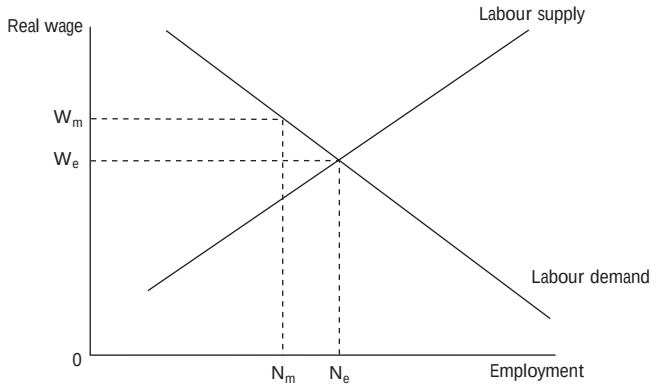
There has been much debate about which model best represents the way labour markets operate.[6] Generally, negative employment effects are more likely the higher the level of the minimum

Box 2. **Theoretical models of the employment effects of minimum wages**

As shown in Figure A, according to standard *neo-classical theory*, a minimum wage, W*m*, which is fixed above the market-clearing wage, W*e*, will lower labour demand to N*m* and lead to employment losses of N*e*–N*m*. This unambiguous prediction stems from a number of restrictive assumptions such as homogenous labour, perfectly competitive labour markets and perfect information. In practice, labour markets are characterised by heterogeneous firms and workers, and wage differentials for seemingly similar workers.

Figure A

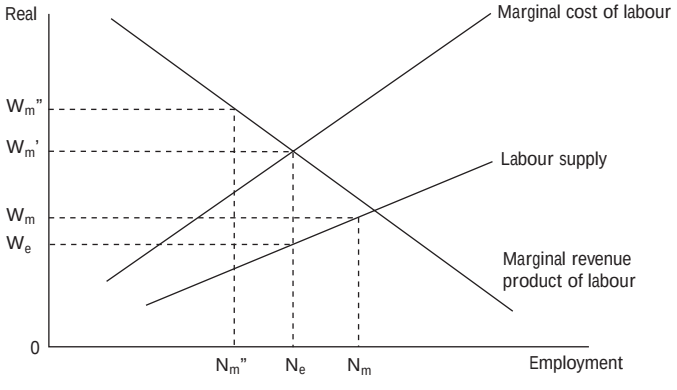
Minimum wages and employment in a competitive labour market



The simplest model where positive employment effects of the minimum wage may arise is a labour market with a *monopsonistic employer* or, more broadly, where firms have some discretion in wage-setting (see Figure B). In such a model, workers are assumed to have little negotiating power since they cannot easily obtain employment

Figure B

Minimum wages and employment in a monopsonistic labour market



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(continued)

with other employers. A monopsonistic labour market may arise because workers are not very mobile geographically. In this case, the employer is able to set wages, W*e*, below the marginal product of labour. Imposing a minimum wage, say at W*m*, may raise employment. The positive employment effect of the minimum wage will be maximised at the wage level corresponding to the market-clearing wage in a competitive labour market. For levels of the minimum wage above the competitive labour market wage, these job gains will be reversed with employment falling below its original level, N*e*, for wages above W*m*', say at W*m*''. A higher elasticity of labour supply and/or a lower elasticity of labour demand imply a larger range in which minimum wages can be increased without generating job losses.

In *eciency-wage* models, employers are assumed to set wages for their employees above the market equilibrium level in order to increase workers' productivity and reduce shirking and job turnover. In this context, higher minimum wages may result in increased employment. As in the monopsony case, beyond a certain level, a rise in the minimum wage will produce negative employment effects. Rebitzer and Taylor (1995) show that, within an efficiency-wage framework, minimum wages will increase employment in the short-run. However, in the long-run, the gains may be lost, depending on the position of firms along the profit curve and on subsequent changes in product prices and the number of firms operating in the market.

Other models that allow for the possibility of positive employment effects of the minimum wage build on endogenous-growth considerations linked to *human capital investment* decisions. The key assumption is that minimum wages provide incentives for low-productivity workers to invest in more training or education in order to raise their productivity. The resulting increase in human capital has a positive impact on growth and, consequently, employment. Cahuc and Michel (1996) show that a decrease in the minimum wage may even reduce growth. Cubitt and Hargreaves-Heap (1996) argue that the net employment loss of minimum wages may be zero for a given range of values of the minimum wage since they will increase investment by firms in physical capital and by individuals in human capital. Acemoglou and Pischke (1998) also show that minimum wages may increase firm-provided training to low-skilled employees.

Minimum wages have also been analysed using a *job-search framework*. Within this framework, the sign of the employment effects depends on the level of minimum wage and its impact on the intensity of job search, the level of acceptance wages and the job offer probability. Swinnerton (1996) presents an equilibrium search model where firms have downward-sloping labour demand curves, labour productivity varies from firm to firm, and the unemployed have imperfect information and search randomly and sequentially for jobs. The author shows that, because of a rise in average labour productivity, positive welfare effects may still arise even in those cases where negative employment effects occur.

wage relative to workers' productivity, the more elastic the demand for labour, the less elastic the supply of labour, and the smaller the investment responses of firms and individuals. The larger the elasticity of substitution between skilled and unskilled labour, the larger the negative employment effects for the less skilled are likely to be. Consequently, the size and the sign of any employment effects may differ across firms, individuals (by age and skill levels) and geographical areas, and according to the level of the minimum wage.

One final issue concerns the short-run and long-run impacts of changes in the minimum wage. Many of the theoretical models compare the new equilibrium level of employment with the old. However, given adjustment costs, the short-run effects may be much more muted than predicted by theory. Moreover, as some of the human capital models suggest, dynamic responses, such as increased investment in education and training, may alter the simple predictions of long-run responses based on more static models.

These theoretical considerations have several implications for the empirical study of the employment effects of minimum wages. First, it is important to allow for the possibility of both positive and negative employment responses. Second, there may be a certain degree of non-linearity in employment responses, with positive effects occurring for minimum wages below a certain level, but job losses occurring thereafter. Third, disemployment effects may vary according to a worker's age, skills, industry and region of employment. In particular, the possibilities of substitution between workers of different skill levels imply that aggregate job losses may be more muted than for specific groups of workers. Finally, it is important to distinguish between short-run and long-run employment effects.

2. Recent empirical studies on minimum wages and employment

An overview of recent empirical studies is provided in Annex 2.B (Table 2.B.1). Earlier studies, based predominantly on time-series data for the United States, were summarised by Brown *et al.* (1982). They concluded that a 10 per cent increase in the level of the minimum wage reduced teenage employment by a range of 1 to 3 per cent. These and other results have been challenged by the work of Card and Krueger (1995) on the basis of both methodological considerations and their own empirical findings of insignificant or small positive employment effects.

The work of Card and Krueger has, in turn, been subject to intensive scrutiny and launched a raft of further empirical work on the impact of minimum wages on employment. A range of new data sources has been tapped, and various methodological approaches have been adopted, each with its own strengths and weaknesses (see Box 3). While differences in methodology and data sources may account for some of the widely differing results which have emerged, it is more difficult to reconcile the contradictory results which have arisen even when similar data and estimation techniques have been used.

Most empirical studies focus on the employment effects for youth. This is partly because youth generally have fewer skills and less labour market experience than other workers and, hence, their labour demand is likely to be more sensitive to hikes in the minimum wage. On the basis of the available evidence, however, it is not clear that a rise in minimum wages has unambiguously led to job losses for youth in all circumstances. The results of the time-series and pooled, cross-sectional studies are especially contradictory, with some authors finding negative, but generally small, employment effects and others finding either statistically insignificant or small positive effects. Apart from the econometric issues of differences in specification and estimation techniques, it may be the case that in all of these studies the net, aggregate, employment response for youth masks more substantial job losses for the least skilled among them as a result of substitution of more skilled for less-skilled youth.

These substitution effects can be potentially identified or controlled for in the studies based on longitudinal data. In these studies, there appears to be greater agreement that individuals affected by a minimum-wage rise are less likely to be subsequently employed than other workers who are not affected by the rise.

For other groups of workers, there is much less empirical evidence. The scant evidence available indicates that employment of part-time workers has risen in the United States following increases in minimum wages [Ressler *et al.* (1996)]. Manning (1996) suggests that monopsony is likely to occur with respect to the employment of women. However, the evidence available to date on the employment effects of minimum wages for women does not permit one to draw clear conclusions [Nakosteen and Zimmer (1989); Myatt and Murrel (1990); Williams and Mills (1998)].

3. International evidence on employment effects

One of the main difficulties facing national studies based on aggregate time-series data is the lack of variation in minimum wages relative to other factors affecting employment outcomes. This makes it difficult to identify the employment effects with any precision using standard econometric techniques. A potential source of much greater variation is provided by the large differences *across* OECD countries in minimum relative to average wages.

Therefore, a number of pooled, cross-country, time-series regressions were carried out using annual data in which employment-population ratios for different demographic groups were regressed against the ratio of minimum to average wages and other explanatory variables to control for various cyclical and institutional factors believed to influence employment outcomes (see Annex 2.C for details of the specification used and estimation procedures).[7] The corresponding estimates of the elasticity of employment with respect to minimum wages are presented in Table 2.5. The analysis covers the period 1975 to 1996 for nine countries: Belgium, Canada, France, Greece, Japan, the Netherlands, Portugal, Spain and the United States. Separate regressions were carried out by gender (except for Portugal and Spain) for teenagers, young adults and prime-age adults. The minimum-wage ratio was calculated separately for men, women and all persons using the corresponding average wage for each group. For Portugal and Spain, however, long time series of average wages by gender were not readily available and so two sets of regressions were carried out according to whether these two countries were included or excluded.

The specifications follow the approach adopted in much of the time-series literature, but adapted to a cross-country context. While the methodology underlying this approach has been subject to criticism (see Box 3), its use permits greater comparability of the results with those of earlier studies. However, even within the standard approach, there has been considerable debate about the most appropriate specification and the estimated elasticities are very sensitive to differences in these specifications.

Box 3. **Estimating employment effects of minimum wages**

Much empirical work has adopted a *time-series* approach in which a measure of employment for a demographic group thought most likely to be affected by the minimum (*e.g.*, the employment/population ratio for youth) is regressed against the ratio of minimum to average wages and a set of other control variables. One advantage of the time-series approach is that, in theory, both short-run and long-run responses can be distinguished. However, the empirical findings from time-series models tend to be sensitive to the exact estimation methodology used and to the inclusion/exclusion of different explanatory variables, *e.g.* time trends and controls for the business cycle. An additional drawback is the possible endogeneity of the minimum/average wage ratio. In particular, this ratio may capture, not only variation in the level of the minimum wage, but also the impact of labour demand or supply shocks on the level of the average wage. More generally, the model specified does not normally bear a direct relation to the theory. Some studies have tried to avoid these latter problems by adopting a more structural approach that relies on estimating both wage and labour demand equations, and then extrapolating the employment effects of minimum wages [for example, Bazen and Martin (1991)].

Studies based on *pooled cross-section* or *longitudinal data* would appear to provide generally more reliable estimates in that they can allow for greater variation in relative minimum wages across individuals, industries, firms or regions. However, in many cases the endogeneity problem also applies because the estimating model involves regressing employment-population ratios on the minimum-wage ratio. Moreover, these studies often capture only short-term effects.

Some studies using pooled cross-section or longitudinal data adopt the so-called *natural-experiment* approach. This compares employment changes for specific regions, individuals or firms that experience a change in the minimum wage with that of similar regions, individuals or firms which are unaffected by the change, *i.e.* the control group. These studies have been carried out most often in the US, where changes in the level of the minimum wage in each State have frequently taken place at different times. In Europe, studies of this type have compared changes in employment for workers earning just below or just above the minimum, and across regions, industries or firms with a different incidence of low-paid workers. The main criticism of these studies is that it is difficult to control fully for factors other than the change in minimum wages which might explain different employment responses between the groups of workers affected and the "control" group. Furthermore, some of these studies have been criticised for covering too short a time span, which may not permit them to detect longer-run employment responses.

Finally, a few studies have used the so-called *Meyer-Wise* approach. Meyer and Wise (1983) estimated what the earnings distribution would look like in the absence of the minimum wage based on the actual distribution of earnings above the legal minimum. The employment effects of the minimum can then be inferred by taking the difference between the estimated number of workers with below minimum-wage earnings according to this counterfactual distribution and the actual number at or below the minimum. However, this method has been shown to be very sensitive to the functional form of the counterfactual distribution and the extent to which the minimum wage has spillover effects on wages higher up in the distribution [Dickens *et al.* (1994*b*)].

Therefore, no attempt was made to obtain a single "best estimate". Instead, the results in Table 2.5 are reported according to a range of specifications. For each specification, elasticities are reported with either the prime-age male unemployment rate (Columns 1 and 3) or the output gap (Columns 2 and 4) as controls for cyclical factors. For several countries, the prime-age male unemployment rate has also trended upwards over time and so may capture factors other that just cyclical ones. In addition, some of the results are adjusted for autocorrelation and heteroscedasticity (Columns 3 and 4). In all cases, the specifications include country-specific time trends and a range of variables to control for institutional factors. Country dummy terms have also been included in each regression to control for all other factors which vary across countries but are constant over time.

The results suggest that minimum-wage rises have a negative impact on teenage employment, although the magnitude of the reported elasticities varies significantly, from –0.3 to –0.6 when Spain and Portugal are excluded, and from 0 to –0.2 when they are included in the regression. In some of the specifications, negative employment effects are also found for groups of workers other than teenagers.

Tests on the equations for individual countries (not reported) point to serially correlated error terms. Correcting for autocorrelation and heteroscedasticity results in elasticities for prime-age adults that are close to zero (Columns 3 and 4 in

Table 2.5. **Estimated employment elasticities with respect to the minimum wage, based on cross-country regressions**[a]

	Linear specification				Log specification			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Elasticities								
Excluding Spain and Portugal								
Teenagers, aged 15-19[b]	–0.58**	–0.37**	–0.41**	–0.27*	–0.42**	–0.32*	–0.40**	–0.31**
Men	–0.43**	–0.22	–0.31**	–0.19	–0.38**	–0.26*	–0.38**	–0.28**
Women	–0.70**	–0.49**	–0.48**	–0.30*	–0.40**	–0.33*	–0.40**	–0.33**
Youth, aged 20-24	–0.14**	–0.04	–0.10*	–0.05	–0.12	–0.03	–0.07	–0.05
Men	–0.10	0.01	–0.10*	–0.06	–0.12	–0.02	–0.11	–0.05
Women	–0.20**	–0.11	–0.08	–0.04	–0.11	–0.05	–0.03	–0.04
Adults, aged 25-54	–0.09**	–0.04	0.00	0.01	–0.09**	–0.05*	0.00	0.00
Men	–0.01	0.05**	–0.01	0.05**	–0.02	0.03	0.00	0.04*
Women	–0.22**	–0.19**	–0.03	0.00	–0.18**	–0.17**	0.02	0.02
Including Spain and Portugal								
Teenagers, aged 15-19[b]	–0.11	0.10	–0.20*	–0.07	–0.01	0.01	–0.19**	–0.15*
Youth, aged 20-24	–0.08	0.06	–0.06	–0.03	–0.04	0.07	–0.03	–0.04
Adults, aged 25-54	–0.07**	–0.01	0.01	0.02	–0.06*	–0.01	0.01	0.01
Controls for								
Prime-age male unemployment rate	Yes	No	Yes	No	Yes	No	Yes	No
Output gap[c]	No	Yes	No	Yes	No	Yes	No	Yes
Institutional factors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed country effects and country-specific time trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Autocorrelation and heteroscedasticity	No	No	Yes	Yes	No	No	Yes	Yes
Number of observations								
Excluding Spain and Portugal	154	154	154	154	154	154	154	154
Including Spain and Portugal	198	198	198	198	198	198	198	198

** and * indicate significance at the 1 per cent and 5 per cent levels, respectively.

a) The regressions were carried out using data for 1975 to 1996 pooled across nine countries: Belgium, Canada, France, Greece, Japan, the Netherlands, Portugal, Spain and the United States. Portugal and Spain could not be included in the separate regressions for men and women as sufficiently long time series of average earnings by sex were not available for constructing the relevant minimum-wage ratios. In the case of the linear specification, the elasticities have been calculated with reference to the means of the minimum-wage and employment/population ratios. A value for teenagers of –0.58 in Column 1 (excluding Portugal and Spain) of the linear specification, for example, indicates that a 10 per cent rise in the minimum wage will, all else equal, result in a 5.8 per cent fall in their employment. See Annex 2.C for further details on specification and estimation.

b) 16-19 in Spain and the United States.

c) Ratio of actual to smoothed real GDP, using the Hoderick-Prescott filter with a smoothing factor of 1 000.

Sources: Secretariat estimates. See Annex 2.C for further details and for the sources of the data used in the regressions.

both the log and linear specifications). In the case of young adults, the elasticities are also lower and for men and women separately are either close to or not statistically different from zero. However, making these adjustments does not change the conclusion that negative and significant employment elasticities are estimated for teenagers for both sexes. The results in Columns 3 and 4 of the linear and log specifications suggest that a 10 per cent rise in the minimum wage, all else equal, is associated with a fall in employment for teenagers of between 2 and 4 per cent.

The results are generally quite robust to a number of changes in the basic specification (see the discussion in Annex 2.C). For instance, the estimated elasticities are little changed if the minimum and average wage are entered as separate variables rather than as a ratio. There is also little evidence that negative employment effects are larger in relatively high minimum-wage countries as compared with relatively low minimum-wage countries. The results are more sensitive to whether the time trends are omitted or not and so in future work it would be of some interest to explicitly include other variables such as enrolment rates which may also be closely related to employment rates for teenagers and youth.

Bearing in mind the possible "fragility" of the results in Table 2.5, a number of tentative conclusions can be drawn. Firstly, the results suggest that a rise in the minimum wage has a negative effect on teenage employment. Secondly, negative employ-

ment effects for young adults are generally close to or insignificantly different from zero. Thirdly, for prime-age adults, the most plausible specifications suggest that minimum wages have no impact on their employment outcomes. Overall, these findings, especially for younger workers, are very similar to the results found by Brown *et al.* (1982).

At the same time, it is important to note that these estimated effects are relatively insignificant in terms of explaining the large decline that has occurred in the teenage employment-population ratio in some countries. In Table 2.6, the estimated contribution of minimum wages has been calculated on the basis of the regression results underlying the elasticities reported in Column 3 of the linear specification. In France, for example, the teenage employment-population ratio declined by over 18 percentage points between 1975 and 1996, but the rise in the minimum wage relative to average wages accounts for less than half a percentage point of this decline. An even more dramatic decline in teenage employment occurred in Spain, despite a fall in the relative value of minimum wages. Thus, the substantial difference across countries in teenage employment trends can only be marginally attributed to differences in the evolution of minimum wages and must be explained by other factors.

D. IMPACT OF MINIMUM WAGES ON EARNINGS AND INCOME DISTRIBUTION

1. Introduction

While considerable research has been devoted to the employment effects of statutory minimum wages, there are fewer studies of their impact on the distribution of earnings and income. Yet, historically, two important – though certainly not exclusive – goals of minimum-wage legislation have been to pay workers a "fair" compensation for their work effort and to raise the standard of living of low-paid workers and their families. Therefore, this Section examines the distributional impacts of minimum wages, first on individual earnings and then on household incomes.

2. Impact on the earnings distribution

How does the minimum wage affect the earnings distribution? Simple neo-classical models predict that if a statutory minimum wage is binding, the imposition of a minimum will lead to those workers whose productivity levels are below the minimum wage being laid off [Stigler (1946)]. This truncation of the earnings distribution leads directly to a measured reduction of the dispersion of the earnings of those in jobs.[8]

There are many nuances to this prediction. One example is the model of Teulings (1996), which takes into account workers of different skill types. An increase in the minimum wage leads to layoffs for workers at or near the old minimum wage. The increase, however, lowers the relative price of more skilled labour. Shifting demand toward more skilled labour implies that some workers with wages originally between the two minima will be able to find employment at or above the new minimum. Some workers initially earning above the new minimum wage will also be affected. Their wages increase as well, with such spillover effects weakening the further up the distribution one goes. The net effect is also a truncation of the earnings distribution below the minimum wage, but with some increase in the portion of the workforce earning above the new minimum wage.

Empirical work has, however, pointed to an impact of minimum wages on the earnings distribution that is not explained by either the simple or complex versions of the neo-classical model: the

Table 2.6. **Estimated impact of the minimum wage on teenage employment**[a]

Percentage point changes in teenage employment/population ratios

	Belgium	Canada	France	Greece	Japan	Netherlands	Portugal	Spain	United States
Actual change, 1975-1996	–14.5	–5.6	–18.5	–15.2	–4.7	0.5	–40.4	–34.5	0.3
Change explained by									
Minimum wage	1.1	1.1	–0.3	2.9	–0.5	2.1	–1.4	1.6	1.2
Other factors	–16.9	–4.7	–17.7	–17.4	–3.3	2.1	–34.3	–35.7	–1.7
Residual	1.2	–2.1	–0.5	–0.7	–0.9	–3.7	–4.6	–0.4	0.7

a) The estimated contribution of changes in the minimum-wage ratio to changes in the teenage employment/population ratio is based on the regression results reported for the linear specification in Column 3 of Table 2.5. Teenagers refer to persons aged 16 to 19 in Spain and the United States, and 15 to 19 in the other countries.

Sources: Secretariat estimates. See Table 2.5 and Annex 2.C for further details on estimation methodology and data sources.

presence of a spike at the minimum wage, indicating a high proportion of workers earning exactly that wage [Card and Krueger (1995); DiNardo *et al.* (1996)]. As the minimum wage increases, the spike moves to the new minimum, indicating that many of those previously earning a wage below the new minimum wage are now earning exactly the minimum wage. Though the theories explaining this shift are not easily summarised, the existence of a spike is a well established empirical regularity [Card and Krueger (1995)].[9]

Minimum wages can also affect earnings differentials among demographic groups. Groups with higher proportions of low-wage workers are likely to see their earnings increase relative to those of other groups when minimum wages are increased. They will receive a disproportionate share of the "pay increase" as well as a disproportionate loss of low-paying jobs if there are disemployment effects.

In sum, a minimum wage affects the earnings distribution in at least three ways: *i)* by reducing the proportion of the workforce earning below the minimum; *ii)* by increasing the proportion of workers earning exactly the minimum; and *iii)* through spillover effects that affect workers initially earning above the new minimum. The magnitude of these impacts is an empirical question.

The recent empirical literature on these issues is summarised in Annex 2.D (Table 2.D.1). Several approaches have been adopted. Meyer and Wise (1983) sought to measure the impact of minimum wages by examining the difference between the actual earnings distribution and that which would have existed in its absence. This method is very sensitive to the assumed functional form of the counterfactual distribution and other parametric assumptions and recent work has sought to minimise the use of such assumptions [Green and Paarsch (1996)]. Another approach is to simulate the effect of increases in minimum wages on the earnings distribution (sometimes including disemployment effects, sometimes not), and then to use this simulated distribution to calculate measures of dispersion and of differentials across different demographic groups. A third method relies on multivariate analysis to uncover correlations between the levels of, or changes in, the minimum wage and measures of earnings dispersion.

Taken as a whole, several key findings emerge from this literature. First, almost all studies find that minimum wages do lead to a compression of the earnings distribution. Second, how much earnings dispersion is reduced depends on how high the minimum wage is set relative to the rest of the distribution. One indication of this is shown in Chart 2.3. Countries with higher minima relative to median earnings have both a lower dispersion of earnings and incidence of low pay. Third, minimum wages have tended to narrow the earnings differentials across demographic groups. These effects have been strongest in the cases of gender and age differentials, because the incidence of employment at low wages is greater for women than for men and for younger workers relative to older ones.

3. Impact on poverty and income distribution

The links between minimum wages and income at the family or household level are more complex than the relationship between wage minima and the earnings distribution. As Neumark and Wascher (1997) discuss, a prerequisite for an increase in the minimum wage to raise the incomes of poor families and to reduce family income inequality is that minimum wages redistribute earnings toward low-wage workers. This will be the case if the increase in earnings accruing to those at a rate of pay between the old and new minima exceeds the loss in earnings among any low-wage workers who lose jobs or find their hours reduced as the result of the minimum-wage hike.

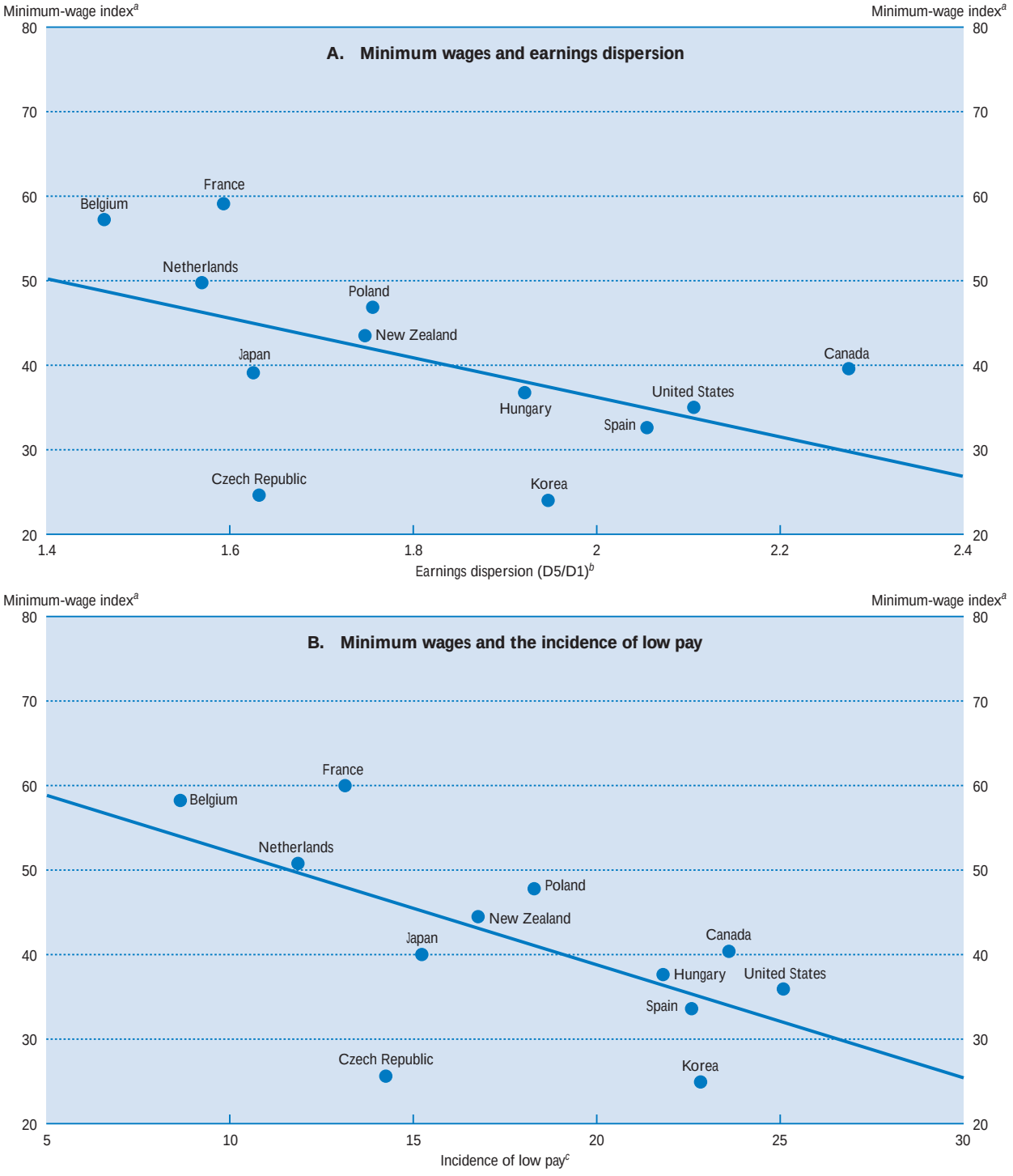
The absolute size of the elasticity of employment with respect to wages provides an indication as to whether this prerequisite is usually met.[10] But many other factors must also be considered. First, a minimum wage increase could affect the labour supply of other family members and, as a result, the family's total income, although in what direction and to what extent is not clear. Second, these economic changes may induce changes in family living arrangements, with resulting impacts on measured poverty. Third, changes in labour income may affect government transfers received by the family. In general, those families experiencing job loss as a result of a minimum wage hike may receive an increase in government assistance, though they may also lose in-work benefits.

Perhaps more importantly, how much of the minimum wage increase will flow to those in poverty and whether or not it reduces family income inequality depends on two additional factors. First, the higher the concentration of low-wage workers in the bottom of the family income distribution the more likely that low-income families will benefit disproportionately from minimum-wage increases. Second, the proportion of low-income families that have low-wage workers is also of considerable importance, as families without labour income do not benefit directly from increases in the return to labour.

Recent studies focusing on one or more of these issues are summarised in Annex 2.D (second part of Table 2.D.1). As with the earnings distribution literature, a range of methods and data have

Chart 2.3.

Minimum wages, low pay and earnings dispersion, mid-1990s



a) Minimum wages as a percentage of median full-time earnings.
b) Ratio of median earnings to the upper limit of earnings received by the bottom 10 per cent of full-time workers.
c) Percentage of full-time workers receiving less than two-thirds of median earnings.
Sources: OECD Minimum Wage and Earnings Databases.

been used to attempt to answer different questions. Some view the minimum wage as one, among many, potential tools for improving the standard of living of those families where at least one individual is working. Thus, the focus is restricted to working families. For this group, minimum wages can have a visible impact on reducing poverty among families with low earnings, as well as on reducing the dispersion of family earnings. Others consider the impact of a minimum wage on poverty and income inequality among *all* families. Here, the impact will be smaller, as many families in the lower tail of the distribution have no earners present and, hence, cannot by definition benefit from a hike in the minimum wage.

Tables 2.7 and 2.8 show data on the overlap between those who are low paid and those who are in low-income households and, thus, provide an indication of where minimum wage hikes may have their greatest impact on poverty and the household income distribution when all households, not just working ones, are included. Because legal minimum wages do not exist across all the countries shown in the tables and to enhance comparability, the tables rely on a definition of low pay that is set equal to two-thirds of the median earnings of full-time, year-round workers. Poverty is also defined in a way that is consistent across countries, as those individuals with household incomes below one-half the median household income, adjusted for family size. Further details on these calculations are contained in Annex 2.E.

The first four columns of Table 2.7 show the proportion of all individuals aged 16 or older in each part of the household income distribution who are low paid. For instance, the first row shows that in Belgium 1.9 per cent of adults that are members of poor households are low paid, with 2.7 per cent of

Table 2.8. **Distribution of low-paid workers[a] by household income, 1993**

	Level of adjusted household income[b]		
	Below poverty	Low	Moderate to high
Belgium	7.3	9.9	82.8
Denmark	3.1	15.0	81.9
Germany	9.7	10.9	79.4
Greece	11.5	9.7	78.8
Spain	10.6	11.2	78.2
France	7.7	14.9	77.4
Ireland	3.3	3.8	92.9
Italy	18.4	10.4	71.2
Luxembourg	9.2	23.5	67.3
Netherlands	11.2	9.8	79.0
Portugal	13.7	9.5	76.8
United Kingdom	9.1	10.8	80.0
United States[c]	22.1	16.3	61.7

Notes and source: See Table 2.7.

Table 2.7. **Incidence of low-paid employment[a] by household income, 1993**

Percentages

	A. Among all persons aged 16 and over				B. Among all full-time, year-round employees			
	Level of adjusted household income[b]				Level of adjusted household income[b]			
	Below poverty	Low	Moderate to high	Total	Below poverty	Low	Moderate to high	Total
Belgium	1.9	2.1	2.9	2.7	64.9	30.8	7.8	9.1
Denmark	2.0	4.8	4.0	3.9	54.3	53.1	8.1	9.6
Germany	7.6	8.5	6.9	7.1	85.0	47.1	15.5	18.3
Greece	1.6	2.1	2.5	2.3	86.7	33.2	9.9	11.9
Spain	3.3	3.5	3.9	3.8	88.0	39.7	14.1	16.8
France	3.2	6.0	4.2	4.3	65.5	42.3	11.6	14.0
Ireland	1.7	1.3	5.8	4.8	89.9	30.9	18.1	18.9
Italy	3.8	2.8	2.7	2.9	73.4	20.3	9.2	11.7
Luxembourg	9.5	14.9	6.1	7.3	68.9	46.5	14.7	19.2
Netherlands	6.3	4.9	5.0	5.1	90.3	30.7	12.1	14.3
Portugal	4.0	4.9	5.7	5.3	61.6	28.7	13.0	15.4
United Kingdom	5.2	6.4	7.8	7.3	92.5	58.0	17.9	21.0
United States[c]	13.3	19.2	9.8	11.3	87.2	63.1	18.8	26.3

a) Low-paid employment refers to all employees working full-time, year-round and earning less than two-thirds of median earnings for this group.
b) Adjusted household income is calculated over all individuals. "Below poverty" refers to income of less than one-half the median adjusted household income; "Low" refers to income between one-half and two-thirds of the median; "Moderate to high" refers to income above two-thirds of the median.
c) 1995.
Source: See Annex 2.E.

all adults being low paid. Higher numbers imply a greater overlap between the working poor and the poverty population as a whole, suggesting a greater potential for minimum wages to improve the well-being of poor families. The incidence rate for adults in poverty ranges from under 2 per cent in Belgium, Greece and Ireland to over 13 per cent in the United States. Only Germany and Luxembourg have proportions exceeding one-half of that for the United States.

These numbers are low in part because low pay has only been measured for full-time, year-round workers and thus excludes those who work on a part-time or part-year basis or who are self-employed. The biggest reason, however, is the large number of individuals who do not work at all. The low incidence rates make it apparent why minimum wages cannot be considered – and are not designed to be – a tool to reduce poverty across all families: unless workers are present in a household, higher wages cannot affect that household's income.

The picture changes dramatically, however, when incidence rates of low pay are calculated among a group of workers, those employed full-time, year-round. The incidence of low pay among full-time, year-round workers in poverty – ranging from 54.3 per cent in Denmark to 92.5 per cent in the United Kingdom – indicates that the majority of low-income households with a worker present could potentially receive additional income from measures that boost the pay of low-wage workers.

Another interesting aspect of Table 2.7 is how the incidence rates of low-paid employment vary across the household income distribution. When the denominator is all adults, the incidence rate is usually higher for low-income individuals than for individuals in poverty. When the denominator is individuals working full-time, year-round, the incidence of low-paid employment falls with income, in some countries sharply so. The difference in the way the two incidence rates change with household income suggests that those without full-time, year-round work are a greater share of those individuals in poverty than of those with low incomes (also see Chapter 1).

The distribution of low-paid workers according to their household income is shown in Table 2.8 and provides an indication of the extent to which wage increases to the low paid will be concentrated among low-income households. Ireland stands out as having a particularly weak connection between low pay and low household income, with more than 90 per cent of low-wage workers living in households with moderate-to-high incomes. This result stems in large part from the fact that the incidence rate for low-paid employment for all individuals in moderate-to-high income families is more than four times the comparable rate for low-income families. The data suggest that the labour force participation rate in Ireland's moderate-to-high income families relative to that in other families must be high in comparison to other countries. At the other end of the spectrum is the United States, which has more than one-fifth of its low-paid workers in poverty. Even here, the majority of any increases in wages paid to low-paid workers will accrue to individuals not living in poverty, as confirmed by many of the studies summarised in Table 2.D.1. The overlap between the low-paid and the poor increases, however, when attention is restricted to households with at least one worker.

In sum, in countries where there are large numbers of full-time/full-year "working poor," there is a greater potential for increases in the minimum wage to alleviate poverty and reduce the inequality of household income. A related question is the extent to which the level of the minimum wage contributes to cross-country differences in the overlap between those who are low-paid and those with low household incomes. As shown in Chart 2.3, those countries with higher minimum wages have narrower earnings distributions, which reduces the incidence of low pay. Similarly, countries with relatively high minimum wages have a lower incidence of low pay. Other factors – such as collective bargaining arrangements and differences in industrial structure – also affect the degree of earnings dispersion. Moreover, countries with similar levels of earnings inequality can be very dissimilar in terms of how the low paid are distributed across the household income spectrum, particularly if the rates of employment among individuals in low-income households are disparate. Though minimum wages undoubtedly influence cross-country differences in the extent to which those in poverty are working, other factors are clearly more important, including macroeconomic conditions, cultural norms and the generosity of public assistance.

4. The overlap of low pay and low incomes over the longer term

Tables 2.7 and 2.8 show the extent to which low-paid individuals reside in low-income households in a given year. This snapshot is incomplete. Over time, some workers will exit the ranks of the low paid, as either their pay increases or they lose jobs, while other workers will join these ranks. In addition, the composition of households changes frequently as well, as a result of children leaving the home, marriage, divorce and other such events. Therefore, to more fully assess the overlap between low pay and low household income, it is informative to fol-

low individuals over longer periods of time. To do this, longitudinal data are required.[11]

Table 2.9 shows how the incidence of low-paid employment in different parts of the household income distribution (family income distribution in the case of the United States) varies as the time period expands. Because the composition of households often changes, it is necessary to follow the individual rather than the household. For each individual, an inflation-adjusted equivalent household income is calculated for each year and these incomes are summed over the period to form the household income distribution.

For each year, it is also determined whether an individual was among the low paid, defined as earnings below the low-pay threshold in any of the years under consideration. As the rates of low-pay incidence are calculated over all adults rather than just adults in working families, they understate the extent to which working families are affected by low pay. For all countries, results are shown where the incidence of low pay was calculated using full-time, year-round workers. In addition, for the Netherlands, United Kingdom and the United States, calculations have also been made using all employees (see Annex 2.E for more details).

The first number in Table 2.9 indicates that for (west) Germany in 1993, low-paid (full-time, year-round) workers accounted for 3.6 per cent of all adults in poverty. The first number in the second row shows what happens to this incidence rate when the calculations are made over a two-year period. Thus, in Germany in 1992-1993, 5.5 per cent of those in poverty (measured by aggregate income over two

Table 2.9. **Incidence of low-paid employment by household income over one, two and five years[a], for all individuals aged 16 and over**

Percentages

	Period	Level of adjusted household income			
		Below poverty	Low	Moderate to high	Total
Low pay defined over full-time, year-round workers only					
Germany[b]	1993	3.6	3.8	2.8	3.0
	1992-1993	5.5	4.9	5.1	5.1
	1989-1993	11.6	10.3	9.3	9.5
Netherlands	1994	4.1	3.7	4.0	4.0
	1993-1994	5.0	5.0	6.2	6.0
	1990-1994	8.0	9.3	9.9	9.7
United Kingdom[c]	1995	1.7	7.0	9.2	8.4
	1994-1995	3.4	9.4	13.4	11.2
	1991-1995	6.0	12.1	20.3	17.1
United States[d]	1991	14.2	23.0	9.3	11.5
	1990-1991	20.5	34.0	13.0	16.4
	1987-1991	31.7	43.4	20.4	24.5
Low pay defined over all workers					
Netherlands	1994	12.5	6.6	7.7	8.0
	1993-1994	15.9	12.1	8.5	11.9
	1991-1994	20.5	17.8	17.7	17.9
United Kingdom[c]	1995	5.4	12.8	10.8	10.0
	1994-1995	8.4	17.4	15.4	14.4
	1991-1995	12.7	22.0	23.4	21.4
United States[d]	1991	33.3	32.6	13.4	18.9
	1990-1991	42.0	45.0	18.5	25.3
	1987-1991	52.9	56.3	28.1	35.0

a) Adjusted household income is summed over the relevant period and calculated over all individuals. The level of adjusted household income is classified as follows: "Below poverty" refers to income of less than one-half the median adjusted household income; "Low" refers to income between one-half and two-thirds of the median; and "Moderate to high" refers to income above two-thirds of the median. Low-paid employment is defined either among all employees or all employees working full-time, year-round (as indicated) and refers to all those earning less than two-thirds of the median earnings for the corresponding group. Low-paid employment can have occured in any year of the period. The results in this table are not directly comparable with those in Table 2.7 because of differences in data sources, definitions and reference years.

b) Western Germany only.

c) Low pay and full-time status are defined over the month rather than the year.

d) Adjusted family income is used instead of adjusted household income.

Source: See Annex 2.E.

years) were low paid in at least one of the two years. Given mobility into and out of low-paid employment, these incidence rates increase as the time period expands, for some countries dramatically so. This finding suggests that incidence rates for a single cross-section understate the portion of the population that is affected by policies designed to boost the earnings of low-paid workers.

The results in Table 2.8 suggested that for all countries the majority of low paid workers resided in households with moderate-to-high incomes. The results in Table 2.10 suggest that this finding holds even when the time period expands. In fact, there is evidence that low-paid workers are less concentrated among low-income households when the time period is lengthened. This result is driven by the fact that some individuals who are low paid in one year will find higher-wage employment in a later year, moving them up the income spectrum.

The second set of results for the Netherlands, the United Kingdom and the United States in Tables 2.9 and 2.10 suggests how the results would change if the definition of low paid is expanded to include employees working either part-time or part-year. The incidence of low pay is, not surprisingly, much higher using the broader definition. For instance, 4.1 per cent of adults in poverty in the Netherlands in 1994 were low paid using the narrower definition, versus 12.5 per cent for the broader definition. Low-paid workers are also more concentrated in poverty with the broader definition, although a majority of such workers resides in families with moderate- to high-incomes.

E. INTERACTIONS OF MINIMUM WAGES WITH THE TAX/BENEFIT SYSTEM

The impact of statutory minimum wages on employment and the earnings and income distribution will also depend on their interactions with the tax/benefit system. Several countries have accompanied a minimum-wage policy with either in-work benefits (*e.g.* Canada, New Zealand and the United States) or with payroll-tax reductions on low wages (*e.g.* Belgium, France and the Netherlands) in the hope of increasing labour demand for the low skilled, raising work incentives and alleviating in-work poverty.

Table 2.10. **Distribution of low-paid employment by household income over one, two and five years**[a]

Percentages

	Period	Level of adjusted household income		
		Below poverty	Low	Moderate to high
Low pay defined over full-time, year-round workers only				
Germany[b]	1993	13.4	13.4	73.1
	1992-1993	10.0	11.6	78.3
	1989-1993	7.7	11.9	80.4
Netherlands	1994	9.9	11.7	78.3
	1993-1994	6.7	10.6	82.8
	1990-1994	4.8	12.2	83.0
United Kingdom[c]	1995	3.9	10.0	86.1
	1994-1995	5.4	9.1	85.5
	1991-1995	5.8	8.2	86.1
United States[d]	1991	23.2	18.3	58.5
	1990-1991	22.5	19.8	57.7
	1987-1991	21.3	17.5	61.3
Low pay defined over all workers				
Netherlands	1994	15.0	10.4	74.6
	1993-1994	10.6	12.8	76.6
	1991-1994	6.7	12.6	80.3
United Kingdom[c]	1995	9.7	14.0	76.2
	1994-1995	10.5	13.3	76.2
	1991-1995	10.0	11.9	78.1
United States[d]	1991	33.0	15.8	51.2
	1990-1991	30.0	17.0	53.2
	1987-1991	24.9	15.9	59.2

Notes and source: See Table 2.9.

Which of the two, subsidies for the low paid as opposed to employer subsidies, is the more suitable policy instrument to complement minimum wages will depend on the level of the minimum wage and the degree of earnings inequality. Countries with relatively low minimum wages, such as the United States, complement them with subsidies for the low paid in the form of in-work benefits. On the other hand, countries with higher levels of minimum wages, such as the Netherlands, have opted to subsidise the hiring of low-paid workers by reducing employers' payroll taxes on the low paid.[12] Countries with very compressed earnings distribution have tended not to implement in-work benefits since this has been seen as too costly because of the relatively large number of workers that would be entitled to the subsidy.

Both minimum wages and in-work benefits aim to ease the unemployment trap, *i.e.* the disincentives to work that arise from high, out-of-work, welfare payments relative to income from work.[13] Statutory minimum wages achieve this directly by raising gross earnings from low-paid jobs, whereas in-work benefits aim to " top up" net incomes from low-paid work either in the form of benefits or as a tax credit. At the same time, the two schemes have rather different implications in terms of financial costs for the public purse and the economic incentives they create for workers and firms. This has led some to argue that the two schemes may complement each other.

As discussed in the previous Section, minimum wages or in-work benefits cannot be expected to greatly reduce household poverty as many poorer households have nobody in work. However, their effectiveness in reducing income inequality among households with at least one person in work is greater. Even here, a rise in minimum wages may lead to substantial spillover to the non-poor, given the spread of minimum-wage workers throughout the income distribution. On the other hand, by raising incentives to work, minimum wages and in-work benefits could, in principle, shift some poorer, formerly, "workless" households out of poverty.

An advantage of in-work benefits is that they can be more closely targeted at the working poor [OECD (1997); Whitehouse (1996); Scholz (1996); Burkhauser *et al.* (1997)]. Nevertheless, they too face a number of drawbacks. High marginal effective tax rates associated with the phase-out range of the benefit give rise to disincentives to increase earned income beyond a certain limit. Moreover, since the benefits are usually means-tested on total family income, the spouses of the (potential) recipients may have an incentive to work a smaller number of hours or to drop out of the labour market in order for the family not to lose entitlement to the benefits. An extensive system of in-work benefits might also provide an incentive for employers to lower wages for low-paid workers (sometimes termed "moral hazard"). This may occur directly or indirectly as a result of any increase in the labour supply stimulated by in-work benefits. An enforceable legal minimum wage could shift the benefits to workers, though possible disemployment effects would have to be considered. Take-up of in-work benefits may also be low because of stigma effects or lack of knowledge of the programme.[14]

Depending on the way they are implemented and the overall earnings distribution, in-work benefits can be very costly for the public purse and can involve administrative costs to avoid error and fraud. Minimum wages are instead paid by employers. It has been argued that the fiscal revenue from (higher) minimum wages could be used to cover part of the costs of in-work benefits schemes. However, if minimum wages also result in job losses, some of these gains may be offset by higher welfare expenditures. Moreover, the redistributive effects of relative price changes as a result of minimum wages would also need to be considered [Freeman (1996)].

It should also be remarked that minimum wages are paid to individuals, independently of the total family or household income, while in-work benefits are means-tested on total household income. In this respect, given the notable increase in household dissolution rates in all OECD countries in the past decades, means tests may be costly in the long-run because of larger scope for fraud and error and also because they may reinforce (married) women's dependency patterns with large costs for society in terms of lower participation rates, loss of human capital, lower earnings capacity and consequent dependency on social welfare benefits.

The advantages and disadvantages of each are summarised in Table 2.11. At first sight, it would appear that they may complement each other. In order to accurately assess the scope for complementarities, it is also important to take account of the "potential" beneficiaries of the two schemes. The incidence of minimum-wage work is greatest among teenagers, young adults, (married) women, and part-time workers though prime-age adults also account for a considerable proportion. Recipients of in-work benefits tend to be lone parents (60 per cent of recipients in the United States and 44 per cent in the United Kingdom) and one-earner couples with children (39 per cent in the United Kingdom). Although this distribution will tend to vary with different levels of minimum wages and different entitlement rules to in-work benefits, there seems to be a degree of complementarity in coverage between the two schemes. However, the two may be substitutes if, for example, the spouses (and the

Table 2.11. **Advantages and disadvantages of a statutory minimum wage and in-work benefits**

Positive effects and drawbacks	Minimum wage	In-work benefits
Positive effects		
Reduce in-work poverty	Limited	Yes
Ease the unemployment trap	Yes	Yes
Potential drawbacks		
Spillover to richer families	Yes	Limited
Reduce labour demand/employment	Yes (if set at a high rate)	No
Disincentives to increase earned income	No	Yes
Disincentives for spouses to work	No	Yes
May lower wages of low paid	No	Yes
Public budget/fiscal costs	No (if job losses small)	Yes
Scope for abuse and error	Limited	Yes
Stigma effects, low-take up	No	Yes (if implemented as a benefit rather than as a tax credit)

children) of low-wage workers have a disincentive to take-up or remain in work at the minimum wage, in order to allow their husbands to claim means-tested, in-work benefits.

The extent to which minimum wages and in-work benefits may complement each other will depend ultimately on the level at which they are set. The higher the level of the minimum wage and the lower the earnings thresholds that regulate entitlement to in-work benefits, the more likely they are to be substitutes rather than complements. However, it is extremely difficult to evaluate the overall net effects of such a policy mix given the complex interactions with other parts of the tax/benefit system and the resulting labour demand and supply responses. Microsimulations may provide some information on first-run effects of implementing various combinations of minimum wages and in-work benefits. However, they usually ignore longer-term behavioural responses.

In the United States, minimum wages and in-work benefits have co-existed for quite sometime, but little work on their possible interactions has been done. Burkhauser *et al.* (1997) simulate, separately, the effect of different levels of minimum wages and in-work benefits on the income distribution of households in the United States, using CPS data. They conclude that for the United States the Earned Income Tax Credit (EITC) is more effective than minimum wages in reducing household poverty. Bluestone and Ghilarducci (1996) simulate the impact of different levels of minimum wages and in-work benefits, implemented simultaneously, on the level of household income and hours of work for different household types. Negative employment effects are allowed for. The authors conclude that when considered in conjunction there are strong complementary effects between the minimum wage and the EITC.

In the United Kingdom, Family Credit has been in force since 1971 (originally under the name of Family Income Supplement). In the recent debate over the introduction of a national minimum wage, possible interactions between the two schemes have attracted considerable attention. Sutherland (1997) simulates changes in household incomes and hours of work for different levels of the minimum wage, and given the existing in-work and housing benefits schemes. She concludes that, unless minimum wages are set at a very high level, the benefit system must continue to subsidise low-income households to bring them out of poverty. Therefore, there is scope for complementarities. However, the author points out that means-tested benefits may create poverty traps and are very expensive to administer. Therefore, she argues, other policy tools, such as a higher non-means-tested child benefit or increased progressivity in the tax and national insurance systems, may be more effective in alleviating poverty, especially in the long-run.

The effectiveness of a combined policy of in-work benefits and minimum wages will depend on a number of other factors. The wider the earnings distribution, the greater the likelihood that in-work benefits will increase aggregate labour supply and at a lower cost [OECD (1997)]. Good access to child-care facilities and the provision of universal child allowances may cancel out or reduce the disincentives to work or to work longer hours for lone parents and for women married to low-paid men who are entitled to means-tested, in-work benefits. Finally, training courses may need to be made available to low-productivity workers to improve their skills and, thus, their chances of obtaining a job at the minimum wage and climbing the earnings ladder.

F. CONCLUSIONS

As with most policy measures, statutory minimum wages imply both benefits and costs. They can play a role in preventing wages from falling below socially unacceptable levels. They can also serve to improve incentives to take up work. However, if they give rise to large disemployment effects, their costs may outweigh the benefits. Their effectiveness in bolstering incomes of low-paid workers will also depend on their interactions with other policies designed to support low-income households.

Both theory and empirical evidence are inconclusive about the precise employment effects of minimum wages over some range relative to average wages. However, at high levels, there is general agreement that a statutory minimum wage will reduce employment. While sometimes conflicting, there is evidence that young workers may be most vulnerable to job losses.

The considerable diversity in the way in which minimum wages are set and operated in OECD countries suggests that there is some scope to limit the detrimental effect of minimum wages on employment. For example, reduced minimum rates exist for youths and apprentices in many countries, and special employment programmes may also allow employers to pay younger workers less than the statutory minimum.

There is also flexibility in the overall setting of minimum wages. While it may be politically difficult to cut minimum wages in nominal terms – if seen as too high – this has often occurred in real terms over time as a result of price inflation. In most countries, minimum wages have also fallen relative to average wages. Thus, it may be prudent for governments not to be locked into a rigid formula for regular adjustments of the minimum wage either in terms of price or wage inflation. This would need to be balanced against the possibility of a greater level of social conflict in the absence of a concrete commitment to adjust the minimum for changes in the cost of living or in line with productivity growth. In the Netherlands, for instance, this balance is struck by linking minimum wages to average wage increases, but subject to the inactivity rate remaining below a specified level. Some countries have also used reductions in employers' social security contributions to lower the cost of hiring low-paid workers while maintaining the real take-home value of the minimum wage.

Even if detrimental effects of minimum wages on employment can be mitigated, how effective are minimum wages as a policy instrument for raising the living standards of poorer workers? Countries with relatively high minimum wages have less earnings inequality and a lower incidence of low pay. In addition, minimum wages have been shown to narrow earnings differentials across demographic groups, particularly between young and older workers and male and female workers. There is also some evidence that minimum wages can help in reducing poverty among working families, as well as reduce income inequality for this group. Their impact on the income distribution for all families are less substantial, however, owing to the fact that many poor families do not have any workers present. The impact of minimum wages on the family income distribution depends importantly on whether those who are low paid also tend to be in families with low overall incomes. There is substantial variation across the OECD countries in this overlap.

The effectiveness of a statutory minimum wage in tackling low pay and poverty will also depend on its interactions with the tax/benefit system and should be assessed in the context of a policy package for tackling social inequities. In-work benefits, in particular, have received considerable attention as an alternative tool for alleviating working poverty. Both minimum wages and in-work benefits aim to increase work incentives by raising the rewards from work relative to unemployment income. At the same time, the two schemes have rather different implications in terms of financial costs for the public purse and the economic incentives they create for workers and firms, and they do not necessarily affect the same groups of people. This has led some to argue that the two schemes may possibly complement each other and, thus, achieve greater benefits than for any one measure in isolation. However, the interactions between minimum wages and tax/benefit systems are complex and designing the appropriate policy mix will depend on individual country circumstances.

In sum, there is considerably more flexibility across OECD countries than is often recognised in the setting of minimum wages and, hence, they can be tailored to limit some of their negative features. There is also scope to judiciously combine them with other policies to more effectively tackle growing social inequities.

Notes

1. It is not always easy to make a clear cut distinction between those countries with a statutory or national minimum wage and those without. For example, the Australian Industrial Relations Commission introduced a new Federal Minimum Wage in its April 1997 Safety Net Review Wages decision which applies to employees who work under Federal awards (around 40 per cent of all employees). Moreover, subsequent wage case decisions in all States except for Tasmania have applied the Federal Minimum Wage to workers under State awards. Nevertheless, there is no automatic link between the Federal Minimum Wage and wages set under State awards and so it was decided not to include Australia in this study as having a national minimum wage.
2. To a more limited extent than in Canada, Japan, Mexico and the United States, regional minima exist or existed in a few other countries. In Portugal, a separate rate was set for the Azores and continues to be set for Madeira. Separate minimum wage rates were also set for the French overseas departments and territories prior to 1996. Finally, for Turkey, regional minima were discontinued after 1973.
3. Japan is somewhat exceptional in that legal minimum wages are also set for certain industries in each prefecture in addition to the overall rate set for the prefecture. For 1997, the average of these industrial rates was almost 14 per cent higher than the average prefectural rate.
4. To a much more limited degree, separate occupational rates are also set in some Canadian provinces.
5. Indexation of the minimum wage in the Netherlands based on average wage growth was suspended from 1984 until 1990. The minimum wage was cut by 3 per cent at the beginning of 1984 and then frozen in nominal terms until 1990.
6. For example, the plausibility of monopsony has been questioned. Recent studies suggest that a certain degree of monopsony may exist in any case where individual firms face an upward-sloping labour supply curve [Boal and Ransom (1997)]. This may occur, for example, if information about job vacancies is imperfect and/or if job search and labour mobility are costly. Within the framework of imperfect information, some studies [*e.g.* Burdett and Mortensen (1989)] have put forward the idea of a dynamic monopsony, where employers who offer higher wages face lower quit rates and lower hiring costs. These elements lead to an elastic supply curve faced by these employers. Dolado *et al.* (1996) point out that "the important features of monopsony will be reproduced in any situation where firms have some discretion over the wages they pay". Dickens *et al.* (1994) develop a theoretical model where it is "labour market frictions" – meaning that labour supply to an individual firm will not be perfectly elastic – that give firms some monopsony power. The authors conclude that the "optimal" minimum wage that maximises employment should vary from firm to firm and, in particular, it should differ for different types of workers. However, low-pay sectors are often characterised by high degrees of competition or high geographical density (*i.e.* retail trade outlets), offering highly substitutable products and employing similar workers. On the other hand, at the aggregate level, the empirical evidence suggests a steeply sloped or simply vertical (*i.e.* perfectly inelastic) labour supply curve and, thus, increases in the minimum wage may show up in higher wages with either little or negative effects on overall employment.
7. The institutional variables are: trade union density, *i.e.* the proportion of employees that belong to a trade union; the unemployment benefit replacement rate, *i.e.* the level of unemployment benefit entitlements relative to gross earnings, averaged across different family situations, durations of unemployment and earnings levels [for more details, see OECD (1994), Chapter 8, and OECD (1996), Chapter 2]; and the payroll tax rate, *i.e.* employer social security contributions as a proportion of total labour costs.
8. In the presence of disemployment effects, the two distributions will have different numbers of earners. It is, however, extremely difficult to calculate measures of earnings dispersion that include jobless individuals, as this would involve imputing wages to those without a job.
9. Card and Krueger (1995) discuss theories that are consistent with this feature of the wage distribution. Of course, if the minimum wage is so low as to be irrelevant, this spike is not likely to occur.
10. Neumark and Wascher (1997) point out that knowing whether an aggregate elasticity of employment with respect to wages is above –1 is not sufficient to determine whether labour earnings will be redistributed toward low-wage workers when the minimum wage is increased. That is because employment losses are likely to be concentrated among the low-wage group and because those workers earning between the old and new minimum wages may experience an increase in wages that is less than the rise in minimum wages.
11. Owing to differences in the underlying data sources, the estimates in Table 2.9 and 2.10 should not be regarded as directly comparable to those in Tables 2.7 and 2.8. Similarly, cross-country comparisons of incidence rates within Tables 2.9 and 2.10 should not be attempted, given important differences across surveys. Calculations using the British Household Panel Survey (BHPS) are particularly at variance with those from the other surveys, as the use of monthly data rather than annual data can lead to a very

different sample of workers being studied, with unpredictable effects on measures of low pay. See Annex 2.E for a description of the data sources and methods underlying the analysis in this sub-section. The Secretariat is particularly grateful to Richard Dickens (Centre for Economic Performance, London School of Economics and Political Science) for providing the estimates based on the BHPS.

12. Interestingly, in the Netherlands, there is currently a debate on introducing tax credits to the low-paid in order to create more incentives to work for the long-term unemployed [see the debate in *Economisch-Statistische Berichten*, 1998, 3-4].

13. In the Netherlands, however, the level of social benefits is linked to the statutory minimum wage and so increases in the minimum wage will be automatically reflected in increases in benefits. Thus, in proportionate terms, incentives to take up a minimum-wage job will not be increased.

14. A distinction should be made between benefits administered through the social security system or tax credits operated by the tax office. The latter seem to be associated with less stigma, have higher take-up rates and leave less scope for fraud or error [Scholz, (1996)].

ANNEX 2.A

Sources and definitions for minimum and average wage series in Charts 2.1-2.3

Table 2.A.1 gives the sources and definitions for the minimum and average wage series in Charts 2.1-2.3. Details are provided on adjustments to the average wage series in order to convert them to the same basis as the minimum wage in terms of a rate per hour, week, month, etc. The table also provides details on any splicing or interpolation that has been carried out in order to obtain a longer time series for the median or average wage.

Table 2.A.1. **Definitions and sources for minimum and median wage series**

	Minimum wage	Median wage	Adjustments to median wage	Supplementary wage series (W1 and W2)
Belgium	Minimum monthly wage – *Revenu minimum mensuel moyen garantie* (RMMMG) – for workers aged 21 and over. *Source:* Data provided by national authorities.	Median monthly earnings of full-time workers. *Source:* Institut National de Statistique, *Enquête sur la structure des salaires*, 1995.	Spliced with W1 prior to 1994 and with W2 for 1994 and for 1996 onwards.	W1: mean hourly wages of manual workers in industry. W2: hourly wage rate index for adult male manual workers in industry. *Sources:* ministère de l'Emploi et du Travail, "Le marché du travail en Belgique : salaires et durée du travail"; Institut national de statistique, *Bulletin de Statistique*.
Canada	Weighted average of provincial hourly minimum wages (weighted by labour force). *Source:* Data provided by national authorities.	Median annual earnings of full-year, full-time workers. *Source:* Data provided by Statistics Canada based on their *Survey of Consumer Finances*.	Divided by 2 184 potential hours of paid work per year (*i.e.* 52 weeks of 42 hours). Spliced with W1 prior to 1980 and for 1996.	W1: mean hourly earnings in manufacturing. *Source:* OECD, *Main Economic Indicators*.
Czech Republic	Minimum gross monthly wage. *Source:* Provided by national authorities.	Median monthly earnings of employees who worked at least 1 700 hours during the year. *Source:* Secretariat calculations based on Czech Statistical Office, *Earnings Survey, 1996*.	Spliced with W1 prior to 1996.	W1: mean gross monthly wage of all employees. *Source:* Provided by national authorities.
France	Net annual equivalent of the hourly minimum wage – *Salaire minimum interprofessionnel de croissance* (SMIC). *Source:* Provided by national authorities.	Median net annual earnings of full-time workers in the private and semi-private sector. *Source:* INSEE, *Séries longues sur les salaires,*1996, as revised by INSEE.	No adjustment.	Not required.
Greece	Minimum daily wage for an unqualified, single, worker with no work experience. *Source:* Provided by national authorities.	Mean hourly wages in manufacturing. *Source:* Bank of Greece, *Bulletin of Conjunctural Indicators*.	Daily equivalent, assuming 8-hour work day.	Not required.
Hungary	Minimum gross monthly wage. *Source:* Provided by national authorities.	Median monthly earnings of full-time employees in May of each year. *Source:* Data provided by Ministry of Labour and National Labour Centre.	Interpolated using W1 as a guide for years where data not available.	W1: mean monthly earnings of full-time employees. *Source:* KSH, *Statistical Yearbook of Hungary*.
Japan	Weighted average of prefectural hourly minimum wages (weighted by employment). *Source:* Data provided by national authorities.	Median scheduled wage for June of each year (according to *Basic Survey on Wage Structure*). *Source:* Ministry of Labour, *Yearbook of Labour Statistics*.	Hourly equivalent, obtained by dividing by scheduled hours worked (taken from same source as for W1). Spliced with W1 prior to 1976.	W1: mean scheduled wage for June of each year (according to *Basic Survey on Wage Structure*). *Source:* Ministry of Labour, *Yearbook of Labour Statistics*.

Table 2.A.1. **Definitions and sources for minimum and median wage series** *(cont.)*

	Minimum wage	Median wage	Adjustments to median wage	Supplementary wage series (W1 and W2)
Korea	Minimum hourly wage. *Source:* Data provided by national authorities.	Median gross monthly wage, including overtime and all special payments (as reported in the *Wage Structure Survey*). *Source:* Ministry of Labour, *Yearbook of Labour Statistics*.	Hourly equivalent, obtained by dividing by hours worked (taken from same source as for W1). Spliced with W1 for 1996.	W1: mean monthly wage, including overtime payment but excluding special payments (according to *Monthly Labour Survey*). *Source:* Ministry of Labour, *Yearbook of Labour Statistics*.
Luxembourg	Minimum monthly wage – *Salaire social minimum* (SSM) – for single workers aged 18 and over. *Source:* Statec, *Annuaire Statistique*.	Mean hourly wages of manual workers in manufacturing.*Source:* Statec, *Annuaire statistique*.	No adjustment.	Not required.
Mexico	Weighted average of regional daily minimum wages (weighted by employment). *Source:* Data provided by national authorities.	Mean hourly wages of manual workers in manufacturing. *Source:* INEGI, *Encuesta Industrial Mensual*.	Daily equivalent assuming 8-hour work day. Spliced with W1 prior to 1994 and with W2 prior to 1985.	W1: mean hourly wages of manual workers in manufacturing. W2: mean hourly earnings in industry. *Sources:* INEGI, *Encuesta Industrial Mensual*; INEGI, *Estadísticas Históricas de México*.
Netherlands	Minimum weekly earnings – *Minimumloon* – for persons aged 23 to 64. *Source:* CBS, *Sociaal-Economische Maand statistiek*.	Median gross annual earnings of full-time employees (including overtime payments). *Source:* CBS, *Sociaal-Economische Maand statistiek*.	Weekly equivalent (*i.e.* dividing annual wage by 52). Spliced with W1 prior to 1984 and with W2 prior to 1972.	W1: mean gross monthly earnings of full-time workers in industry and services. W2: mean gross weekly earnings of adult male workers in industry. *Sources:* CBS, *Vijfennegentig Jaren Statistiek in Tijdreeksen, 1899-1994*; CBS, *Negentig Jaren Statistiek in Tijdreeksen, 1899-1989*.
New Zealand	Minimum weekly wage for workers aged 20 and over. *Source:* Data provided by national authorities.	Median usual weekly earnings of full-time employees. *Source:* Data provided by the Department of Labour based on Statistics New Zealand, *Household Economic Survey*.	Spliced with W1 prior to 1984 and interpolated, also using W1, for missing observations for the odd years in the period 1984 to 1994.	W1: mean weekly earnings of employees excluding overtime payments. *Source:* Statistics New Zealand, *Monthly Statistics*.
Poland	Minimum monthly wage. *Source:* Data provided by national authorities.	Median gross monthly earnings of full-time workers. *Source:* Polish Central Statistical Office, *Statistical Yearbook*.	No adjustment.	Not required.
Portugal	Minimum monthly wage – *Salário Mínimo Nacional* (SMN) – for non-agricultural workers aged 20 and over. *Source:* Data provided by national authorities.	Mean monthly earnings in the business sector. *Source:* Ministério para a Qualificação e o Emprego.	Spliced with W2 prior to 1981 and with W1 after 1995.	W1: mean gross monthly earnings of full-time workers. W2: mean hourly earnings in manufacturing. *Sources:* Ministério para a Qualificação e o Emprego, *Inquérito aos Ganhos*; ILO, *Year Book of Labour Statistics*.

Table 2.A.1. **Definitions and sources for minimum and median wage series** *(cont.)*

	Minimum wage	Median wage	Adjustments to median wage	Supplementary wage series (W1 and W2)
Spain	Minimum monthly wage – *Salario Minimo Interprofesional* (SMI) – for workers aged 18 and over. *Source:* Ministerio de Trabajo y Asuntos Sociales, *Boletin de Estadisticas Laborales.*	Median gross hourly earnings of full-time workers. *Source:* INE, *Encuesta Estructura Salarial, 1995.*	Monthly equivalent (*i.e.* dividing by 147.2 hours per month). Spliced with W1 both before and after 1995.	W1: mean gross monthly earnings. *Source:* Ministerio de Trabajo y Asuntos Sociales, *Boletin de Estadisticas Laborales.*
Turkey	Minimum daily wage for workers aged 16 and over. *Source:* Data provided by national authorities.	Mean daily earnings of manufacturing workers. *Source:* State Planning Organisation.	Spliced with W1 prior to 1988.	W1: mean monthly earnings of private sector manufacturing workers. *Source:* Bulutay (1995).
United States	Federal minimum hourly wage. *Source:* Data provided by national authorities.	Median usual weekly earnings of full-time employees. *Source:* US Bureau of Labor Statistics, *Employment and Earnings.*	Hourly equivalent assuming a 40-hour work week.	Not required.

ANNEX 2.B

Recent empirical studies of the impact of minimum wages on employment

An overview of recent empirical studies of the impact of minimum wages on employment is provided in Table 2.B.1.

Table 2.B.1. **Recent empirical studies of the impact of minimum wages on employment**

	Country/Data sources	Outcome measures/Method	Main results	Comments
Time-series studies				
Bazen and Martin (1991)	France: Annual time series data, 1963/68-1986.	Structural time-series model with labour demand and wage equations and derived employment elasticities.	Employment elasticities are negative, but not robust for youths and zero for adults.	Assumption of a competitive labour market is imposed on the data.
Benhayoun (1994)	France: Time-series data, 1975-1991.	Time-series regressions.	No significant evidence of negative youth employment effects.	The minimum wage may be endogenous to the model. Results are sensitive to the specification adopted.
Koutsogeorgopoulou (1994)	Greece: Labour Force Survey, 1962-1987.	Applied the Bazen-Martin specification.	Employment elasticities of the minimum wage are negative for men and positive for women.	Assumption of a competitive labour market is imposed on the data.
Maloney (1995)	New Zealand: Labour Force Survey, 1985-1994. Minimum wages did not apply to youth (15-19) before 1994.	Regression of employment/population ratio for youth and young adults (20-24) on Kaitz index. School enrolment rate included among the regressors.	An increase in (adult) minimum wages raises youth employment rates and reduces young adult employment.	Possible endogeneity of the Kaitz index. School enrolment rates may be endogenous.
Mare (1995)	New Zealand: Labour Force Survey, 1985-1994.	Same regressions as Maloney.	Youth employment rates kept growing after youth minimum wage was introduced in 1993-1994. Maloney's results were explained by the cycle not by minimum wages.	Same critique that applied to Maloney's results.
Bell (1995)	Mexico and Columbia: monthly wages from Annual Industrial Survey of manufacturing firms, 1984-1990. Mexican Household Survey 1988.	Time series regression of employment/population ratio on Kaitz index. Panel data estimation of factor demand equations for unskilled and skilled labour. Fixed effects are assumed.	Significant negative employment elasticity for Columbia but insignificant for Mexico. Negative employment effects for the low skilled.	Robustness of the results not tested.
Card and Krueger (1995)	US: Time series data 1954-1993.	Time-series regressions.	No statistically significant teenage employment effects.	The minimum-wage ratio may be endogenous to the model. Results are sensitive to the specification adopted.
Deere *et al.* (1995)	US: Current Population Survey, 1985-93.	Regression of employment-population ratios on minimum wages.	Teenage employment falls as minimum wage rises.	The minimum wage may be endogenous to the model. Results are sensitive to the specification adopted.
Bazen and Marimoutou (1997)	US: Time-series data, 1954-1993.	Time-series regression. Re-estimated the Card-Krueger (1995) equations using several controls for seasonality and the cycle.	Significant negative employment elasticities for teenagers.	The estimates are sensitive to the method adopted.

Table 2.B.1. **Recent empirical studies of the impact of minimum wages on employment** *(cont.)*

	Country/Data sources	Outcome measures/Method	Main results	Comments
Pooled, cross-sectional studies				
Card (1992); Card and Krueger (1995)	US: Current Population Survey, 1987-1989. State data on employment and wages.	Employment of teenagers, low-paid workers and retail employees is compared across States with higher and lower fractions of workers earning between the old and new Federal minimum wage. Regressions of changes in employment.	In all cases, there is no significant reduction of employment in response to the rise in the Federal minimum.	Only short-term employment changes are captured.
Neumark and Wascher (1992)	US: 50 States and District of Columbia, 1973/77-1989. Information on State minimum-wage legislation; subminimum provisions.	Regressions of employment/population ratios on coverage-adjusted minimum wage. Year and state fixed effects.	Significant negative employment effects for teenagers and young adults employment – larger for teenagers. Subminimum wages imply more moderate effects.	School enrolment rate, included among the regressors, may be endogenous. If dropped, employment effects are positive (but insignificant) for teenagers and negative (significant) for young adults.
Machin and Manning (1994)	UK*:* New Earnings Survey, minimum wages levels in Wages Councils, 1979-1990.	Regressions of employment changes on Kaitz index. First differences and instrumental variables.	Positive relationship between minimum wages and employment.	There may be other (uncontrolled) factors explaining these results. Wage Councils were modified substantially before their abolition.
Bazen and Skourias (1997)	France: Cross-section time series data from Labour Force Survey, 38 industrial sectors, 1980-1984.	Investigate changes in proportions employed at minimum and subminimum wages.	Significant negative youth employment effects.	Other factors explaining youth employment levels are not taken into account such as, for example, sectoral labour demand, output growth, prices.
Dolado *et al.* (1996)	France: Labour Force Survey data grouped by education, age and gender. 1981-1985 minimum wage increase compared with 1985-1989. Regional data also used.	Regressions of employment/ unemployment rate on proportion paid at or below the minimum wage for each cell. Regression of employment growth on initial wages, regional data.	The increase in minimum wages in the 1980s has no substantial effects on employment.	The authors find some econometric evidence that youth unemployment increased in the eighties, but attribute this mainly to the recession rather than to higher minimum wages.
	Netherlands: Labour Force Survey, 1981 and 1983, when youth minimum wages were reduced.	Descriptive analysis of youth employment changes in low-wage sectors.	Youth employment rose in low-wage sectors, which are assumed to be more affected by the fall in youth minimum wages.	No attempt is made to control for other factors that may explain employment changes.
	Spain: Panel of industrial sectors. Data on employment and wages, 1967-1994.	Regression of change in employment on Kaitz index with sector fixed effects. Estimated by Instrumental Variables.	The Kaitz index has a significantly negative impact on youth employment but a positive impact on adult employment. Total employment rises with higher minimum wages.	Year fixed effects are not controlled for.

Table 2.B.1. **Recent empirical studies of the impact of minimum wages on employment** *(cont.)*

	Country/Data sources	Outcome measures/Method	Main results	Comments
Burkhauser *et al.* (1997)	US: Current Population Survey and Survey of Income and Program Participation, 1990-1992. Monthly data, pooled cross-sections.	Regressions of employment/population ratios on minimum wage.	Significant negative effects on employment of teenagers, young high-school dropouts and young blacks, but insignificant effects for prime-age workers.	Short period of time covered. Possible endogeneity of the minimum wage.
Baker *et al.* (1997)	Canada: Data from Labor Canada and Statistics Canada, 1975-1993.	Regression of teenagers employment/population ratio on Kaitz index. Fixed effects assumed for provinces and years.	Significant negative employment elasticities for teenagers.	The estimated effect varies in sign and significance depending on which specification is used.
Longitudinal studies				
Card and Krueger (1995, 1997)	US: Authors' own *ad hoc* survey and BLS ES-02 datafile for data on wages and employment in fast food restaurants in New Jersey and Pennsylvania, before and after minimum-wage increases in New Jersey in 1992; before and after minimum wage increase in Pennsylvania in 1996.	Regressions of changes in employment on New Jersey dummy and/or wage gap (from initial wages to new minimum wage level).	Employment increased (insignificantly) in New Jersey, relative to Pennsylvania in 1992. No evidence of employment losses in Pennsylvania in 1996.	Timing of surveys too close to legislated changes to observe possible long-run adjustments in labour demand.
Neumark and Wascher (1995)	US: Current Population Survey data 1979-1992. Matched surveys to construct longitudinal data for individuals.	Estimate effect of minimum wages on transitions of teenagers in and out of education and work. Multinomial logit models.	Employers substitute less-skilled teenagers with more skilled teenagers. Employment of the low-skilled is reduced and enrolment rates fall.	Unobserved individual characteristics may be difficult to control for.
Currie and Fallick (1996)	US: National Longitudinal Survey of Youth, 1979-1987. Pooled cross-sections.	Panel data model of the impact of minimum wages on the transitions between employment and unemployment.	Individuals affected by the minimum wage in 1979-80 were less likely to be employed a year later.	Missing employment data may affect estimation results (wage data are valid for only 30% of the sample in 1979 and 46% in 1980).
Abowd *et al.* (1997)	US: Current Population Survey, 1981-1987. France: Labour Force Survey, 1981-1989. Longitudinal, individual data.	Multinomial logits of transitions into and out of employment for workers paid below and above the minimum wage.	Youth paid at minimum wages have significantly lower employment probabilities then those paid marginally above in both countries.	Unobserved individual characteristics may be difficult to control for.
Chapple (1997)	New Zealand: Quarterly time series data 1985-1997; panel of industries 1980-1997.	Time-series model. Panel data model.	Negative employment effects for 20-24 years-old, but results are not robust.	There might have been a structural break in the nineties; time series data cover a relatively short period.

Table 2.B.1. **Recent empirical studies of the impact of minimum wages on employment** *(cont.)*

	Country/Data sources	Outcome measures/Method	Main results	Comments
Other studies				
Van Soest (1994)	Netherlands: Macro time series and Dutch Socio-Economic Panel, 1984 and 1987.	Multinomial choice model: employment, unemployment, education. Potential wages are also estimated and wages allowed to be endogenous.	There is a significantly negative impact of minimum wages on youth employment.	The negative outcome is built into the structural model.
Dickens *et al.* (1994)	UK: Cross-sectional data on the distribution of wages.	Estimate employment losses by comparing the actual wage distribution with the hypothetical wage distribution in the absence of the minimum wage.	Negative employment effects of minimum wages, but not robust.	Estimates are sensitive to the functional form of the distribution of wages. The method relies on the assumption that workers earnings above the minimum are not affected by the minimum wage.

ANNEX 2.C

Cross-country regressions: specification and sensitivity of the results

1. Specification and data sources

In Table 2.5, employment-population rates for different groups were regressed against the ratio of minimum to median wages, with controls for the business cycle (prime-age male unemployment rate and/or output gap), different institutional features (trade union density, the gross unemployment benefit replacement rate and payroll taxes), trend effects (time and time interacted with country dummies), and fixed country effects. The minimum-wage ratio was calculated separately for men, women and all persons using the corresponding average wage for each group. Minimum wages were also calculated separately for each age-group taking into account reduced rates for youth rates in some countries. The regressions were carried out using data for 1975 to 1996 pooled across nine countries: Belgium, Canada, France, Greece, Japan, the Netherlands, Portugal, Spain and the United States. Portugal and Spain could not be included in the separate regressions for men and women as sufficiently long time series of average earnings by sex were not available for constructing the relevant minimum-wage ratio. In the linear specifications, the regressions have been run with respect to the levels of each variable. In the log specifications, the log of each variable has been used, except for time trends and country dummies. In the case of the linear specification, the elasticities have been calculated with reference to the means of the minimum-wage and employment-population ratios. The corrections for autocorrelation and heteroscedasticity were carried out using Generalised Least Squares (GLS) estimates and assuming country-specific, first-order, autocorrelation for the error terms and heteroscedasticity across countries, but not over time. Otherwise, Ordinary Least Squares (OLS) estimation was used.

The general specification underlying the cross-country regressions results reported in Table 2.5 is:

$$EP_{it} = \alpha + \beta\, MIN_{it} + \delta\, CY_{it} + \phi\, BEN_{it} + \lambda\, UNION_{it} + \gamma TAX_{it} + \sum_i \tau_i DUM_i TIME + \nu\, TIME + \sum_i \omega_i DUM_i + \varepsilon_{it}$$

where:

- EP_{it} = employment-population ratio for country i at time t;
- MIN_{it} = ratio of minimum to average wages for country i at time t;
- CY_{it} = business-cycle indicator for country i at time t (either the prime-age male unemployment rate or the output gap);
- BEN_{it} = gross unemployment benefit replacement ratio for country i at time t;
- $UNION_{it}$ = trade union density for country i at time t;
- TAX_{it} = non-wage labour costs as a proportion of total labour costs for country i at time t;
- DUM_i = dummy for country i (except for Belgium which was chosen as the reference country);
- TIME = time trend; and
- ε_{it} = error term.

The data sources are as follows:

- EP: OECD, *Labour Force Statistics*, Part III; EUROSTAT, *Labour Force Survey Results*. Data for Greece was provided by the Greek national authorities. Some adjustments were made by the Secretariat to the data for Belgium, Greece, the Netherlands and Spain to take account of various breaks in the series;
- MIN: OECD Minimum Wage Database;
- CY: The prime-age male unemployment rate is taken from the same sources as for *EP*. The output gap refers to the ratio of actual to smoothed real GDP, using the Hoderick-Prescott filter with a smoothing factor of 1000. Real GDP is taken from the OECD Economic Outlook Database;
- BEN: OECD database on tax and benefit entitlements;
- UNION: Visser (1996) with revisions and updates by the Secretariat; and
- TAX: OECD, *The Tax/Benefit Position of Production Workers*, various editions.

2. Sensitivity of the results

A number of supplementary regressions were carried out in order to check the sensitivity of the results presented in Table 2.5 to alternative specifications.

Card and Krueger (1995) have suggested that, if minimum wages and average wages are not entered as separate variables, equations of the type presented above may be misspecified. Therefore, the regressions were re-run with the denominator and numerator of the ratio of minimum to average wages entered separately. This resulted in very little difference in any of the estimated elasticities in Table 2.5.

A second concern is the possibility that there may be some non-linearity in the relationship between minimum wages and employment. As discussed in Section C, a relatively low minimum wage may have little effect on employment, but the effect could be greater if it is set at a relatively high level. This possibility was investigated by dividing the countries included in the regression results reported in Table 2.5 into two groups: a "high" minimum-wage group comprising Belgium, France and Greece; and a "low" minimum-wage group comprising the remaining six countries. An additional variable was then added to the basic specification as presented above in the regressions for teenagers and youth, consisting of the minimum-wage ratio interacted with a dummy variable for whether each country was in the "high"or "low" group. The coefficient on this variable was not statistically significant indicating that employment effects do not appear to be significantly greater in the "high" minimum-wage group of countries than in the "low" minimum-wage group.

The regressions were also re-run without the institutional variables with very little change with respect to the reported elasticities in Table 2.5. The results were also little changed when the total tax wedge was substituted for the payroll tax rate in the regressions. The results were more sensitive, however, to whether time trends are included or not. The elasticities are much higher without time trends for adult women and, in the log specification, for youth. The fact that the elasticities decline substantially when time trends are added suggests there may be omitted variables which are required to explain overall country trends in employment-population ratios. In many countries, the employment-population ratio for teenagers and youth has declined substantially while their participation in education has been rising and so an obvious "missing" variable to add to the regressions would be the school enrolment rate. However, these data are not readily available and problems of possible endogeneity between enrolment rates and employment prospects would have to be dealt with. It would also be useful to control for youth participation in active labour market programmes which, in countries such as France, have increased significantly over time, but unfortunately long time-series on a consistent international basis are not available. In the case of women, factors such as the timing and average number of births, availability of child-care facilities and educational levels may all be important factors which, ideally, should be included.

ANNEX 2.D

Recent empirical studies of the impact of minimum wages on the distribution of earnings and income

An overview of recent empirical studies of the impact of minimum wages on the distribution of earnings and income is provided in Table 2.D.1.

Table 2.D.1. **Recent empirical studies of the impact of minimum wages on the distribution of earnings and income**

	Country/Data sources	Outcome measures/Method	Main results	Comments
Earnings Distribution				
Green and Paarsch (1996)	Canada: Survey of Work History 1981; Survey of Union Membership, 1984; Labour Market Activity Survey, 1986-1987, 1988-1990.	Effect of the minimum wage on the distribution of teenage wages.	For male teenagers, it is estimated that the probability of observing wages between the minimum and one dollar above the minimum is decreased and the probability of observing wages higher than that level is increased. They find no such effects for female teenagers.	Econometric method used seeks to minimise functional form restrictions imposed by Meyer and Wise (1983).
Shannon (1996)	Canada: Labour Market Activity Survey, 1986.	Changes in the gender gap in hourly wages resulting from the existence of a minimum wage are estimated using Meyer and Wise (1983) method.	For 16-24 year-olds, the log wage gap would be nearly double, while for adults the wage gap would be about 10% higher in the absence of a minimum wage.	The method, which estimates what the wage distribution would have looked like in the absence of a minimum wage, has been criticised because of its sensitivity to functional form assumptions.
Dickens, Machin and Manning (1994)	UK: New Earnings Survey, 1975-1990, focusing on a panel of industries covered by Wages Councils.	Changes in the wage distribution resulting from the existence of a minimum wage using the method of Meyer and Wise (1983).	Find some compression of the wage distribution.	The authors argue that estimates of the impact of minimum wages are very sensitive to parametric assumptions about the form of the wage distribution.
Machin and Manning (1994)	UK: New Earnings Survey used to create a panel of industries covered by Wages Councils between 1979 and 1990.	Partial correlation between wage dispersion and "toughness" of minimum wage is estimated using regression analysis.	Decline in the "toughness" of minimum wages has contributed to an increase in wage dispersion.	
Card and Krueger (1995)	US: Current Population Survey, annual demographic and outgoing rotation group files, various years.	Partial correlation between the proportion affected by 1990-1991 minimum wage increase, on the one hand, and the inequality of the wage and family earnings distributions, on the other.	Greatest compression of wage and family earnings inequality tended to occur in states with higher proportions of workers affected by minimum wage.	Difficult to control for all factors leading to changes in wage distribution across states.
DiNardo, Fortin and Lemieux (1996)	US: Current Population Survey, hourly wage data from May and outgoing rotation group files, various years.	Semi-parametric methods used to assess what wage distribution would have looked like in the absence of a decline in the value of the minimum wage.	The authors estimate that between 1979 and 1988, the decline in the real value of the minimum wage accounts for up 25% of the change in the standard deviation of men's log wages and up to 30% for women's wages.	Assume no spillover effects, nor any disemployment effects.

Table 2.D.1. **Recent empirical studies of the impact of minimum wages on the distribution of earnings and income** *(cont.)*

	Country/Data sources	Outcome measures/Method	Main results	Comments
Horrigan and Mincy (1993)	US: Current Population Survey, March 1981 and 1988.	Comparison of actual change in the share of earnings held by each quintile between 1987 and 1980 and that which would have occurred if minimum wage had been indexed by inflation is made via simulation. The analysis is done separately for men and women.	Small impact on both the male and female earnings distribution. Small reduction in age- and occupation-differentials, and almost no impact on education differentials.	Labour demand elasticities are used to estimate disemployment effects of minimum wage increases. Spillover effects are not incorporated.
Mishel, Bernstein, and Rassell (1995)	US: Current Population Survey, outgoing rotation group file, 1993.	Changes in indicators of hourly-wage inequality, such as quantile ratios and education-earnings differentials are simulated.	Boosts in the minimum wage would narrow the gap between those in the 10th percentile and those higher paid, for both men and women. Minimum wages have very little impact on the college-high school wage differential, but have a greater impact on the college-high school dropout differential, particularly for women.	Spillover effects are incorporated, to reflect the impact of minimum wage boosts on portions of the distribution above the minimum wage. Employment effects are ignored.
Income Distribution				
Gosling (1996)	UK: Family Expenditure Survey, 1994-95.	Impact of various minimum wages on the distribution of net disposable equivalent income for all "benefit units" and for "benefit units" with at least one worker are simulated using Institute for Fiscal Studies (IFS) tax and benefit model.	A minimum wage that would affect 30 per cent of the workforce would only reduce the proportion of benefit units with less than two-thirds of mean income by 1.4 percentage points. Much of the gains accrue to the middle of the income distribution.	Possible employment effects and spillover effects are ignored.
Sutherland (1995)	UK: Family Expenditure Survey, 1991.	Percentage of gains from national minimum wage that would accrue to each decile of the distribution of equivalent disposable household income are simulated using the tax-benefit model POLIMOD.	The higher the level of minimum wage simulated, the more the gains are spread across household income levels, with the bulk going to middle-income households.	No behavioural changes taken into account.
Addison and Blackburn (1996)	US: Current Population Survey, annual demographic files, 1984-1992.	Calculated (partial) correlations between measured poverty rates and minimum wages, making use of variation in such wages over time and across states.	Do not find evidence that minimum wages have significant impacts on poverty rates, even amongst those groups most likely to be affected by minimum wage changes.	Use a reduced-form approach, which while avoiding some of the assumptions used in simulation exercises, does not allow an examination of individual channels by which minimum wages may affect poverty.

Table 2.D.1. **Recent empirical studies of the impact of minimum wages on the distribution of earnings and income** *(cont.)*

	Country/Data sources	Outcome measures/Method	Main results	Comments
Burkhauser, Couch and Wittenburg (1996)	US: Current Population Survey, outgoing rotation group file for March 1990.	Effect of increase in minimum wage on individuals classified on the basis of equivalent family income.	Workers who live in poor families are 3.6 times more likely to be helped by the minimum wage hike than is the average worker, but the majority of the working poor not helped by the increase. Roughly two-fifths of the benefits of a minimum-wage hike accrue to workers in poor families.	Employment and spillover effects not incorporated.
Card and Krueger (1995)	US: Current Population Survey, annual demographic and outgoing rotation group files, various years.	Partial correlations between the proportion affected the 1990-1991 minimum wage increases and changes in poverty, by state.	Find that reductions in poverty were faster in states where more workers affected by minimum wage increase, but estimates are imprecise.	
Horrigan and Mincy (1993)	US: Current Population Survey, March 1981 and 1988.	Comparison of actual change in percentage of family income held by each quintile between 1987 and 1980 and that which would have occurred if minimum wage had been indexed by inflation is made via simulation.	Higher minimum wage would have had almost no impact on family income inequality.	Labour demand elasticities are used to estimate disemployment effects of minimum wage increases. Spillover effects are not incorporated.
Mishel, Bernstein, and Rassell (1995)	US: Current Population Survey, outgoing rotation group file for March 1994.	Share of wage gains from proposed minimum wages increases accruing to each quintile of the income distribution of those families with at least one earner is simulated.	Some 60% of the gains would accrue to the bottom 40% of families with at least one worker, with the remaining gains persisting across the entire distribution of families with at least one worker.	Employment effects not incorporated, though spillover effects are. No account taken of families with no earner present.
Neumark and Wascher (1997)	US: Matched March Current Population Survey annual demographic files, 1986-1995.	The authors use logit analysis to see if, *ceteris paribus,* the level of the minimum wage (both current and lagged) affect the probabilities of transitions into and out of poverty.	Over a one-to-two year period, higher minimum wages increase both the probability that poor families escape poverty and the probability that previously non-poor families become poor. On net, no significant effects on the proportion of families that are poor.	The authors make use of variation in the minimum wages across states and over time. Some have argued that this variation is insufficient to estimate impacts with confidence.

ANNEX 2.E

Sources, definitions and methods for Tables 2.7-2.10

1. Data sources, definitions and methods for Tables 2.7 and 2.8

European Union: *European Community Household Panel* (ECHP), 1994 wave.

The ECHP is an annual survey of a representative panel of households and individuals in each country. The survey is based on a harmonised questionnaire, the Community version of which was drawn up by EUROSTAT, and subsequently adapted by "national data collection units" depending on the institutional peculiarities of each country. For the purposes of the ECHP, a *household* is defined in terms of two criteria: sharing the same dwelling; and common living arrangements. These can include meals taken together or a shared room, and/or a joint budget, and/or the use of common equipment.

Calculations involving household income make use of *total net monetary income*. This concept covers all market incomes plus social transfers received, including all types of pensions plus private transfers received, minus social insurance contributions and income taxes deducted at source. For France, all income taxes, including those remitted by households and individuals, are taken out.

Since income data refer to receipts during the year preceding the interview (1993) the labour force characteristics of households also refer to that year, except for the Netherlands. In this country, information on the labour force situation of households during the year preceding the interview was not asked and the employment profile characteristics of persons and households refer to a reference week in the year of the survey (1994).

Earnings refer to annual net earnings (net of social security contributions and income taxes deducted at source) including all overtime payments, paid leave, monthly and annual bonuses, etc. For France, annual earnings are net of social security contributions deducted at source, but not of income taxes.

United States: *Current Population Survey* (CPS), March 1996.

The CPS is a monthly survey of about 50 000 households conducted by the US Bureau of the Census for the Bureau of Labor Statistics. The sample is representative of the civilian non-institutional population. For the purposes of the CPS, a *household* consists of all the persons who occupy a house, an apartment, or other group of rooms, or a room which constitutes a housing unit. The measure of *household income* used in the CPS includes all forms of money income and government transfers, but does not exclude taxes that are paid.

Earnings refer to money received for work performed as an employee during the previous year. This includes wages, salary, Armed Forces pay, commissions, tips, piece-rate payments, and cash bonuses earned, before deductions are made for taxes, bonds, pensions, union dues, etc.

For all individuals in each survey (including children), adjusted household income (W_j), is calculated, using total income (TI_j), size of the household (S_j), and the following formula:

$$W_j = TI_j / S_j^{0.5} \qquad [1]$$

The exponent for S_j, 0.5, is the equivalence elasticity, which adjusts for the presence of economies of scale at the household level.

All adults are classified in terms of their employment status, with those individuals working as a full-time wage and salary employee for at least 10 months in the year (40 weeks in the case of the United States) counted as full-time, year-round workers. For this group, the average gross monthly salary income (including overtime, paid leave, bonuses, etc.) is calculated.

In Tables 2.7 and 2.8, all individuals aged 16 and over with incomes that are one-half or less than the median are classified as below poverty. "Low income" encompasses individuals with incomes above one-half, but below two-thirds of the median, with the remaining individuals put in the group for "moderate to high income". Full-time, year-round workers whose earnings are no more than two-thirds of the median earnings for this group are classified as low paid.

2. Data sources, definitions and methods for Tables 2.9 and 2.10

Germany: *German Socio-Economic Panel* (GSOEP).

The GSOEP is a representative longitudinal study of private households in Germany. The income variable used is total household income after taxes and transfers. This variable has been computed by researchers at Syracuse University and is the sum of labour earnings, asset flows, private transfers, public transfers, imputed rental value of owner-occupied housing and other income of all individuals within a given household minus federal income and payroll taxes [see Burkhauser, Butrica and Daly (1995)]. Low pay is defined over all employees working full-time for 10 or more months during the year.

Netherlands: *Socio-Economic Panel* (SEP).

The SEP is a representative random sample of Dutch households. Household disposable income is constructed on the basis of detailed questions on incomes. The household disposable income information used here was constructed by the SZW group at Tilburg University. Ruud Muffels, Rob Alessie and B. Mikulic provided valuable information on these calculations. Each wave of the SEP asks for information on gross annual earnings and months of work in the previous year. Data on hours worked, however, relate to contractual weekly hours in the job held at the time of the survey. As a result, when computing hourly earnings, it is necessary to combine data from successive waves of the SEP. Low pay is defined over two universes: all employees usually working 30 hours or more for 10 or more months during the year; and all employees.

United Kingdom: *British Household Panel Survey* (BHPS).

The BHPS is an annual survey of a nationally representative sample of households. The BHPS provides earnings data from the month preceding the survey. Household income, which is measured on a gross basis, is income for the month. Low pay, measured on the basis of monthly earnings, is defined over two groups: all employees who are working full-time during the month; and all employees. Richard Dickens of the Centre for Economic Performance, London School of Economics and Political Science, provided the results of calculations using the BHPS.

United States: *Panel Survey of Income Dynamics* (PSID).

The PSID is a longitudinal survey of a representative sample of individuals and the families in which they reside. Because most of the questions are based on a family concept, the income for a family is used instead of that for a household. The PSID defines a family as a group of individuals living together who are related by blood, marriage or adoption. In addition, cohabitors are considered to be part of the family if the couple is living together for more than one interview. Income refers to total money income, including government transfers, but not taking account of taxes. The survey asks about income and labour force information for the year preceding the time of the survey. Low pay is defined over two universes: all who worked 40 or more weeks and who usually worked 35 or more hours; and all employees.

To as great extent as possible, the same methodology for these tables was followed as for Tables 2.7 and 2.8, but extended to apply to periods longer than one year. In each case, adjusted household income for each individual was summed over the relevant period. Cut-offs for inclusion in various income categories were then made using this aggregate income. Aggregate adjusted household incomes that are one-half or less than the median are classified as below poverty. "Low income" encompasses individuals with incomes above one-half, but below two-thirds of the median, with the remaining individuals put in the group for "moderate to high income". Individuals had to be over 16 years of age for each year of the period and also have valid data for all years.

Bibliography

ABOWD, J.M., KRAMARZ, F., LEMIEUX, T. and MARGOLIS, D.N. (1997), "Minimum Wages and Youth Employment in France and the United States", National Bureau of Economic Research, Working Paper No. 6111.

ACEMOGLU, D. and PISCHKE, J.S. (1998), "The Structure of Wages and Investment in General Training", National Bureau of Economic Research, Working Paper No. 6357.

ADDISON, J. T. and BLACKBURN, M. L. (1996), "Minimum Wages and Poverty", mimeo, September.

BAILY, M.C., HULTEN, C. and CAMPBELL, D. (1992), "Productivity Dynamics in Manufacturing Plants", *Brookings Papers on Economic Activity: Microeconomics*, No. 1, pp. 187-267.

BAKER, M., DWAYNE, B. and STANGER, S. (1997), "The Highs and Lows of the Minimum Wage Effect: A Time Series-Cross Section Study of the Canadian Law", mimeo, Toronto University.

BALDWIN, J.R. (1995), *The Dynamics of Industrial Competition: A North American Perspective*, Cambridge University Press, New York.

BAZEN, S. and MARTIN, J.P. (1991), "The Impact of the Minimum Wage on Earnings and Employment in France", *OECD Economic Studies*, No. 16, pp. 199-221.

BAZEN, S. and BENHAYOUN, G. (1994), "Low Pay and Minimum Wages", *International Journal of Manpower*, No. 2/3, pp. 62-73.

BAZEN, S. and MARIMOTOU, V. (1997), "Looking for a Needle in a Haystack? A Re-examination of the Time Series Relationship Between Teenage Employment and Minimum Wages in the United States", mimeo, Université Montesquieu Bordeaux IV, France.

BAZEN, S. and SKOURIAS, N. (1997), "Is There a Negative Effect of Minimum Wages in France?", *European Economic Review*, No. 41, pp. 723-732.

BELL, L. A. (1995), "The Impact of Minimum Wages in Mexico and Columbia", The World Bank Policy Research Working Paper, No. 1514, Washington D.C.

BENHAYOUN, G. (1994), "The Impact of Minimum Wages on Youth Employment in France Revisited: A Note on the Robustness of the Relationship", *International Journal of Manpower*, No. 15, pp. 82-85.

BERNSTEIN, J. and SCHMITT, J. (1997), "The Sky Hasn't Fallen: An Evaluation of the Minimum Wage Increase", Economic Policy Institute Briefing Paper, Washington, D.C., July.

BINGLEY, P. and WALKER, I. (1997*a*), "Labour Supply with In-Work and In-Kind Transfers", Centre for Labour Market and Social Research, Working Paper No. 97-02, Äarhus, Denmark.

BINGLEY, P. and WALKER, I. (1997*b*), "The Labour Supply, Unemployment and Participation of Lone Mothers in In-Work Transfers Programmes", *The Economic Journal*, No. 107, pp. 1375-1390.

BLUESTONE, B. and GHILARDUCCI, T. (1996), "Making Work Pay: Wage Insurance for the Working Poor", *Public Policy Brief*, The Jerome Levy Economics Institute of Bard College, No. 28.

BOAL, W.M. and RANSOM, M.R. (1997), "Monopsony in the Labor Market", *Journal of Economic Literature*, March, pp. 86-112.

BROWN, C. (1988), "Minimum Wage Laws: Are They Overrated?", *Journal of Economic Perspectives*, No. 3, Summer, pp. 133-47.

BROWN, C., GILROY, C. and COHEN, A. (1982), "The Effect of the Minimum Wage on Employment and Unemployment", *Journal of Economic Literature*, June, pp. 487-528.

BURDETT, K. and MORTENSEN, D. (1989), "Equilibrium Wage Differentials and Employer Size", mimeo, University of Sussex.

BURKHAUSER, R. V., BUTRICA, B. A. and DALY, M. C. (1995), "The Syracuse University PSID-GSOEP Equivalent Data File: A Product of Cross-National Research", All-University Gerontology Center, Syracuse University, Cross-National Studies in Aging Program Project Paper No. 25, New York, July.

BURKHAUSER, R. V., COUCH, K. A. and GLENN, J. A. (1996), "Public Policies for the Working Poor: The Earned Income Tax Credit versus Minimum Wage Legislation", *Research in Labour Economics*, Vol. 15, pp. 65-109.

BURKHAUSER, R. V., COUCH, K. A. and WITTENBURG, D. C. (1996), "Who Gets What" from Minimum Wage Hikes: A Re-Estimation of Card and Krueger's Distributional Analysis in *Myth and Measurement: The New Economics of the Minimum Wage*", *Industrial and Labor Relations Review*, April, pp. 547-553.

BURKHAUSER, R. V., COUCH, K. A. and WITTENBURG, D. C. (1997), "Who Minimum Wage Increases Bite: An Analysis Using Monthly Data from the SIPP and the CPS", mimeo, Center for Policy Research, Syracuse University, New York.

CAHUC, P. and MICHEL, P. (1996), "Minimum Wage Unemployment and Growth", *European Economic Review*, August, pp. 1463-1482.

CALLENDER, C., COURT, G., THOMPSON, M. and PATCH, A. (1994), "Employees and Family Credit", Research Report No. 32, Department of Social Security, HMSO, London.

CARD, D. (1992), "Using Regional Variation in Wages to Measure the Effects of the Federal Minimum Wage", *Industrial and Labor Relations Review*, October, pp. 38-54.

CARD, D. and KRUEGER, A. (1994), "Minimum Wages and Employment: A Case Study of the Fast Food Industry in New Jersey and Pennsylvania", *American Economic Review*, September, pp. 772-793.

CARD, D. and KRUEGER, A.B. (1995), *Myth and Measurement: The New Economics of the Minimum Wage*, Princeton University Press, Princeton, N.J.

CARD, D. and KRUEGER, A.B. (1998), "A Reanalysis of the Effect of the New Jersey Minimum Wage Increase on the Fast-Food Industry with *Representative* Payroll Data", Industrial Relations Section, Princeton University, Working Paper No. 293.

CARD, D., KATZ, L.F. and KRUEGER, A. (1994), "Comment on David Neumark and William Wascher – Employment Effects of Minimum and Subminimum Wages: Panel Data on State Minimum Wage Laws", *Industrial and Labour Relations Review*, April, pp. 487-497.

CHAPPLE, S. (1997), "Do Minimum Wages Have an Adverse Impact on Employment? Evidence from New Zealand", *Labour Market Bulletin*, No. 2, pp. 25-50.

COHEN, D., LEFRANC, A. and SAINT-PAUL, G. (1997), "French Unemployment: A Transatlantic Perspective", *Economic Policy*, No. 25, pp. 265-293.

CUBITT, R. P. and HARGREAVES-HEAP, S. P. (1996), "Minimum Wage Legislation, Investment and Human Capital", mimeo, Economics Research Centre, University of East Anglia, Norwich, UK.

CURRIE, J. and FALLICK, B. C. (1996), "The Minimum Wage and the Employment of Youth: Evidence from the NLSY", *Journal of Human Resources*, Spring, pp. 404-428.

DEERE, D., MURPHY, K. M. and WELCH, F. (1995), "Reexamining Methods of Estimating Minimum Wage Effects: Employment and the 1990-91 Minimum Wage Hike", *American Economic Review Papers and Proceedings*, May, pp. 232-237.

DICKENS, R., MACHIN, S. and MANNING, A. (1994*a*), "The Effect of Minimum Wages on Employment: Theory and Evidence from Britain", Centre for Economic Performance, Discussion Paper No. 183.

DICKENS, R., MACHIN, S. and MANNING, A. (1994*b*), "Estimating the Effect of Minimum Wages on Employment from the Distribution of Wages: A Critical Review", Centre for Economic Performance, Discussion Paper No. 203.

DICKERT, S., HOUSER, S. and SCHOLZ, J.K. (1995), "The Earned Income Tax Credit Transfer Programs: A Study of Labor Market and Program Participation", in Poterba, J.M. (ed.) *Tax Policy and the Economy*, MIT Press, Cambridge, Mass.

DINARDO, J., FORTIN, N. and LEMIEUX, T. (1996), "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semi-parametric Approach", *Econometrica*, September, pp. 1001-1044.

DOLADO J., KRAMARZ, F., MACHIN, S., MANNING, A., MARGOLIS, D. and TEULINGS, C. (1996), "The Economic Impact of Minimum Wages in Europe", *Economic Policy*, October, pp. 319-370.

FREEMAN, R.B. (1995), "Comment: What will a 10% ... 50% ... 100% Increase in the Minimum Wage DO?", *Industrial and Labor Relations Review*, July, pp. 842-849.

FREEMAN, R.B. (1996), "The Minimum Wage as a Redistributive Tool", *The Economic Journal*, May, pp. 639-649.

FRY, V. and STARK, G. (1993), "The Take-Up of Means-Tested Benefits 1984-90", mimeo, Institute for Fiscal Studies, London.

GOSLING, A. (1996), "Minimum Wages: Possible Effects on the Distribution of Income", *Fiscal Studies*, November, pp. 31-48.

GREEN, D. A. and PAARSCH, H .J. (1996), "The Effect of the Minimum Wage on the Distribution of Teenage Wages", University of British Columbia, Department of Economics, Discussion Paper No. 97-02.

GRILICHES, Z. and REGEV, H. (1995), "Firm Productivity in Israeli Industry, 1979-1988", *Journal of Econometrics*, January, pp. 175-203.

HORRIGAN, M. W. and MINCY, R. B. (1993), "The Minimum Wage and Earnings and Income Inequality", in Danziger, S. and Gottschalk, P. (eds.) *Uneven Tides: Rising Inequality in America*, Russell Sage Foundation, New York, pp. 251-75.

ILO (1992), *General Survey of the Reports on the Minimum Wage-Fixing Machinery Convention (No. 26) and Recommendation (No. 30), 1928; the Minimum Wage Fixing Machinery (Agriculture) Convention (No. 99) and Recommendation (No. 89), 1951; and the Minimum Wage Fixing Machinery Convention (No. 131) and Recommendation (No. 135), 1970*, Report III (Part 4 B), International Labour Conference 79th Session, Geneva.

JACKMAN, R. and LEROY, C. (1996), "Estimating the NAIRU: The Case of France", mimeo.

THE JOSEPH ROWNTREE FOUNDATION (1997), "Evidence to the Low Pay Commission", mimeo, London.

KENNAN, J. (1995), "The Elusive Effects of Minimum Wages", *Journal of Economic Literature*, December, pp. 1949-1965.

KOUTSOGEORGOPOULOU, V. (1994), "The Impact of Minimum Wages on Industrial Wages and Employment in Greece", *International Journal of Manpower*, No. 2/3, pp. 86-99.

MACHIN, S. and MANNING, A. (1994), "The Effects of Minimum Wages on Wage Dispersion and Employment: Evidence from the U.K. Wage Councils", *Industrial and Labor Relations Review*, January, pp. 319-329.

MACHIN, S. and MANNING, A. (1996), "Employment and the Introduction of a Minimum Wage in Britain", *The Economic Journal*, May, pp. 667-676.

MALONEY, T. (1995), "Does the Adult Minimum Wage Affect Employment and Unemployment in New Zealand?", *New Zealand Economic Papers*, No. 1, pp. 1-19.

MANNING, A. (1996), "The Equal Pay Act as an Experiment to Test Theories of the Labour Market", *Economica*, No. 63, pp. 191-212.

MARCEAU, N. and BOADWAY, R. (1994), "Minimum Wage Legislation and Unemployment Insurance as Instruments for Redistribution", *Scandinavian Journal of Economics*, No. 1, pp. 67-81.

MARE, D. (1995), Comments on Maloney, T., 'Does the Adult Minimum Wage Affect Employment and Unemployment in New Zealand', New Zealand Department of Labour, mimeo.

MEYER, R.H. and WISE, D.A. (1983), ''Discontinuous Distributions and Missing Persons: The Minimum Wage and Unemployed Youth'', *Econometrica*, November, pp. 1677-1698.

MISHEL, L., BERNSTEIN, J. and RASSELL, E. (1995), ''Who Wins with a Higher Minimum Wage'', Economic Policy Institute Briefing Paper, Washington D.C., February.

MYATT, A. and MURREL, D. (1990), ''The Female/Male Unemployment Rate Differential'', *Canadian Journal of Economics*, XXIII (2), pp. 312-322.

NAKOSTEEN, R.A. and ZIMMER, M. A. (1989), ''Minimum Wages and Labour Market Prospects of Women'', *Southern Economic Journal*, 56 (2), pp. 302-314.

NEUMARK, D. and WASCHER, W. (1992), ''Employment Effects of Minimum and Sub-minimum Wages: Panel Data in State Minimum Wage Laws'', *Industrial and Labor Relations Review*, October, pp. 55-81.

NEUMARK, D. and WASCHER, W. (1995), ''Minimum Wage Effects on Employment and Enrolment: Evidence from Matched CPS Surveys'', National Bureau of Economic Research, Working Paper No. 5092.

NEUMARK, D. and WASCHER, W. (1997), ''Do Minimum Wages Fight Poverty?'', National Bureau of Economic Research, Working Paper No. 6127.

OECD (1994), *The OECD Jobs Study: Facts, Analysis, Strategies*, Paris.

OECD (1996), *Employment Outlook*, Paris, July.

OECD (1997), *The OECD Jobs Strategy. Making Work Pay: Taxation, Benefits, Employment and Unemployment*, Paris.

O'RAVN, M. and SORENSEN, J. R. (1995), ''Minimum Wages: Curse or Blessing'', Center for Economic Policy Research, Discussion Paper No. 1212.

PALLEY, I. T. (1997), ''The Positive Employment and Distributional Effects of the Minimum Wage'', mimeo, Public Policy Department, AFL-CIO, Washington D.C.

RESSLER, R. W., WATSON, J. K. and MIXON, F. G. Jr. (1996), ''Full Wages, Part-Time Employment and the Minimum Wage'', *Applied Economics*, November, pp. 1415-1419.

REBITZER, J. and TAYLOR, L. (1995), ''The Consequences of Minimum Wage Laws: Some New Theoretical Ideas'', *Journal of Public Economics*, February, pp. 245-255.

ROORDA, W.B. and VOGELS, E. (1998),''Werknemerstoeslagen versus loonkostensubsidies'', *ESB*, 13 February 1998.

SCHOLZ, J. K. (1996), ''In-Work Benefits in the United States: The Earned Income Tax Credit'', *The Economic Journal*, January, pp. 130-141.

SHANNON, M. (1996), ''Minimum Wages and the Gender Wage Gap'', *Applied Economics*, December, pp. 1567-76.

SKOURIAS, N. (1992), ''Un réexamen des incidences du SMIC sur l'emploi, la participation et le chômage des jeunes'', Centre d'Economie Régionale, Groupe de Recherches sur l'Internationalisation, la Formation et l'Emploi, No. 7, September.

SKOURIAS, N. (1993), ''Salaire minimum et emploi des jeunes : l'expérience française'', Centre d'Economie Régionale.

SLOANE, P. J. and THEODOSSIOU, I. (1996), ''Earnings Mobility, Family Income and Low Pay'', *The Economic Journal*, May, pp. 657-666.

SMITH, R. E. and VAVRICHEK, B. (1992), ''The Wage Mobility of Minimum Wage Workers'', *Industrial and Labor Relations Review*, October, pp. 82-88.

SORENSEN, P. B. (1997), ''Public Finance Solutions to the European Unemployment Problem?'', *Economic Policy*, No 25, pp. 223-264.

STEWART, M. B. and SWAFfIELD, J. K. (1997), ''Low Pay Dynamics and Transition Probabilities'', mimeo, Warwick University, UK.

STIGLER, G. (1946), ''The Economics of Minimum Wage Legislation'', *American Economic Review*, Vol. 36, pp. 358-365.

SUTHERLAND, H. (1995), ''Minimum Wage Benefits'', *New Economy*, Winter, pp. 214-219.

SUTHERLAND, H. (1997), ''A National Minimum Wage and In-Work Benefits'', Employment Policy Institute, *Economic Report*, April.

SWINNERTON, K. A. (1996), ''Minimum Wages in an Equilibrium Search Model with Diminishing Returns to Labor in Production'', *Journal of Labor Economics*, No. 2, pp. 340-355.

TEULINGS, C.N. (1996), ''A Generalized Assignment Model of Workers to Jobs for the US Economy'', Department of Microeconomics, University of Amsterdam, mimeo, January.

VAN SOEST, A. (1994), ''Youth Minimum Wage Rates: the Dutch Experience'', *International Journal of Manpower*, No. 2/3, pp. 100-117.

VISSER, J. (1996), ''Unionisation Trends Revisited'', University of Amsterdam, mimeo.

WILLIAMS, N. and MILLS, J. A. (1998), ''Minimum Wages Effects by Gender'', *Journal of Labor Research*, XIX, pp. 397-412.

WHITEHOUSE, E. (1996), ''Designing and Implementing In-Work Benefits'', *The Economic Journal*, January, pp. 130-141.