

Chapter 5

EARNINGS INEQUALITY: CHANGES IN THE 1980s

A. INTRODUCTION

Trends in the inequality of earnings in the 1980s differed from those of the 1970s. While the 1970s generally saw decreasing or stable inequality, the 1980s were marked by increases in twelve of the seventeen countries for which information was available for the preparation of this chapter. These increases were generally small, except in the United Kingdom and the United States. (In the United States, inequality had also risen in the 1970s, but at a much slower pace.) In the remaining five countries, the degree of inequality was roughly stable, but often contrasted with declines in the 1970s. The only one of the seventeen countries where inequality continued to fall was Germany (this chapter will use "Germany" to refer to the area covered by the Federal Republic of Germany before reunification).

The degree of inequality in the distribution of earnings is an important part of the overall question of equity. It complements various aspects of unequal access to jobs – unemployment and long-term unemployment, involuntary part-time working, discouragement and temporary jobs – discussed in other chapters. Concern over rising inequality in the earnings distribution naturally grows in a time of stable or declining real earnings, as occurred in the United States over the late 1970s and early 1980s, because workers unable to escape from the bottom of the distribution face reductions in the purchasing power of their earnings.

However, earnings inequality is also relevant for studies of the functioning of the labour market, since it embodies the totality of wage differentials according to the range of criteria that are usually examined – age, sex, educational qualifications, occupation, and so on. It is therefore relevant to the allocative role of wages.

This chapter treats earnings inequality primarily from the viewpoint of labour market functioning. In order to emphasize this, and to avoid implicit value-judgements, the chapter refers to the level of "dispersion" rather than "inequality". The annex discusses some of the important statistical issues involved in its measurement, explaining the choice of the simple measures – ratios of deciles and

the coefficient of variation – used below. Following a presentation of the major changes in the overall distribution, succeeding sections discuss some of the correlates and possible causes of the swing to greater dispersion in the 1980s, concentrating on economic and demographic factors likely to have affected all OECD countries. The main conclusions are as follows.

First, the effects of swings in the economic cycle and international migration are likely to have played little role in the increase in dispersion. Second, on the supply side, many countries saw record numbers of young people in the workforce during the 1980s. Since young people tend to have lower-than-average wages, this would have tended to increase overall dispersion. In addition, it may have contributed to the observed decline in relative youth wages. Third, there was a general increase in the proportion of the workforce with higher levels of education, and a widespread increase in the relative earnings of highly educated workers. In the 1970s, a decline in education differentials could be attributed to the growth in the supply of such workers. In the 1980s, this explanation does not hold. However, in several countries, the rate of growth of the highly educated section of the workforce was slower than in the 1970s. Education differentials may thus have increased in the 1980s because the supply of highly educated workers, although rising, fell short of a steadily growing demand.

Fourth, demand-side effects are a key part of any explanation for the rise in dispersion in the 1980s. There is evidence of a continued strengthening in the relative demand for highly educated workers. Only a small part of this appears to have been the result of "de-industrialisation" – shifts in employment out of the manufacturing sector – because the rise in dispersion was seen within every industrial sector. A probable cause is that technological change has raised the productivity of highly skilled workers faster than that of the less-skilled. The magnitude of the effects of trade is uncertain. Fifth, institutional factors and shifts in the stance of government and enterprise policies are likely to have had a significant influence in some countries.

B. OVERALL CHANGES IN THE DISTRIBUTION OF EARNINGS

1. Basic changes in dispersion

Table 5.1 provides a summary of changes in the overall distribution of earnings in the 1980s and, where possible, the 1970s, for seventeen OECD countries. The primary source of the information is Table 5.2, showing the trends in the ratios of the upper and lower deciles of the distribution to the median.¹ Rising dispersion is indicated by a fanning out of the outer deciles relative to the median, for example by a situation where the ratio of the upper decile to the median increases and the ratio of the lower decile to the median decreases, or shows relatively little change. For some countries, information which could not be put into the format of Table 5.2 has been used as well, particularly for Finland and Spain, and for several countries in the 1970s.²

For the 1970s, information has been assembled for twelve countries. Of these twelve, only two show increases in dispersion: Spain and the United States. In Spain, the increase was slight and occurred only at the beginning of the decade. In the United States the increase occurred only among men, and was slower than in the 1980s.

By contrast, in the 1980s, increases in dispersion can be seen for twelve of the seventeen countries included in

Table 5.1; Australia, Austria, Belgium, Canada, France? Japan, the Netherlands, Portugal, Spain, Sweden, the United Kingdom and the United States. In France, the Netherlands and Sweden the increase began only in the middle of the decade, while in Spain it was apparent only in the beginning.

The remaining five countries are Denmark, Finland, Germany, Italy and Norway. Denmark, Finland, Italy and Norway saw broad stability in the 1980s. In Finland and Italy this followed a reduction in dispersion in the 1970s. Germany was the only country where a slight decline in dispersion over the 1970s continued throughout the 1980s.

Chart 5.1 illustrates the variation from country to country in the magnitude of change over the 1980s, a period which, in some cases, included years of both increases and declines in the dispersion. In general, the changes are small – except in the cases of the United Kingdom and the United States.

As indicated in the chart and in Tables 5.1 and 5.2, whenever there was an increase in dispersion, it was associated with gains by the top decile of the distribution relative to the median. These gains were not always accompanied by losses by the bottom decile – examples of this are Belgium and Portugal. In Denmark, Italy and Norway, there were gains by both top and bottom deciles, resulting in no clear change in dispersion. The decrease in inequality in Germany was due solely to gains at the bottom of the distribution.

Table 5.1. General pattern of changes in the dispersion of earnings in the 1970s and 1980s

Hourly earnings or earnings of full-time workers

	1970s	1980s	Data range in Table 5.2	Comments on extent and type of changes in dispersion
Australia	-	+	1975-1991	Increase in dispersion from 1979 onwards
Austria	-	+	1980, 87-91	Increase from 1980 to 1989
Belgium		+	1983-88, 90	Slight increase due to gains at top over 1983-88
Canada	0	+	1973, 81, 86, 88, 90	Increase mainly due to gains at top
Denmark		0	1980-1990	Slight gains at top and bottom
Finland	-	0		Slight gains at top and bottom
France	-	-/+	1967-1991	Decrease in dispersion ended in 1983
Germany	0	-	1977-1990	Decrease mainly due to gains at bottom
Italy	-	0	1978-1987	Gains at top and bottom
Japan		±	1979, 85, 90	Increase due to gains at top
Netherlands	0	-/+	1973-1991	Slight decrease to 1984, then slight increase
Norway		0	1980, 87, 91	Gains at top and bottom
Portugal		+	1985, 89	Increase between 1985 and 1990
Spain	- -/0	+		Sharp decrease in mid-1970s, rise in 1980s
Sweden	0	0/+	1972, 84-91	Increase after 1986, except for low paid women
United Kingdom	-	++	1973-1992	Increase from 1979 onwards
United States	+	++	1975-1989	Increase for men only in 1970s, strong gains at top in 1980s

Key: + increase in dispersion
 ++ strong increase
 - decrease
 -- strong decrease
 0 no clear change (perhaps changes at top and bottom working in opposite directions)
 +/- increase followed by decrease (etc.)
 Blank no information available

Sources: Data presented in Table 5.2 and other material available to the Secretariat, as discussed in the text.

Table 5.2. Trends in earnings dispersion, 1973-1991

		1973	1975	1979	1980	1981	1985	1986	1987	1988	1989	1990	1991	Average five-year change in 1980s ^a		
Australia^b																
Males	D9/D5		1.50	1.48	1.49	1.54	1.54	1.58	1.53	1.56	1.54	1.56	1.59	1980-1990	0.03	
	D1/D5		0.75	0.74	0.74	0.74	0.72	0.71	0.71	0.70	0.69	0.70	0.70	1980-1990	-0.02	
Females	D9/D5		1.37	1.40	1.43	1.44	1.48	1.48	1.47	1.48	1.48	1.47	1.49	1980-1990	0.02	
	D1/D5		0.77	0.80	0.78	0.78	0.78	0.77	0.76	0.75	0.74	0.75	0.75	1980-1990	-0.02	
Austria																
Males	D9/D5				1.62				1.65	1.67	1.65			1980-89	0.02	
	D8/D5				1.39				1.41	1.43	1.43	1.43	1.42	1980-90	0.02	
	D1/D5				0.62				0.61	0.61	0.60	0.60	0.60	1980-90	-0.01	
Females	D9/D5				1.74				1.77	1.78	1.79	1.79	1.80	1980-90	0.03	
	D8/D5				1.41				1.44	1.45	1.45	1.45	1.46	1980-90	0.02	
	D1/D5				0.52				0.51	0.51	0.52	0.51	0.50	1980-90	-0.00	
Both sexes	D9/D5				1.78				1.80	1.81	1.81	1.80	1.78	1980-90	0.01	
	D8/D5				1.46				1.46	1.47	1.47	1.48	1.47	1980-90	0.01	
	D1/D5				0.52				0.52	0.51	0.51	0.51	0.51	1980-90	-0.00	
Belgium^c																
Males	D8/D5				1.37	1.37	1.39	1.40	1.42	1.38	1.37			1983-88	0.05	
	D1/D5				0.72	0.73	0.73	0.73	0.74	0.72	0.73			1983-88	0.02	
Females	D8/D5				1.31	1.32	1.32	1.33	1.33	1.33	1.32			1983-88	0.02	
	D1/D5				0.73	0.76	0.77	0.76	0.76	0.74	0.73			1983-88	0.03	
Both sexes	D9/D5						1.71	1.73	1.75	1.63	1.61					
	D8/D5				1.35	1.37	1.38	1.39	1.40	1.39	1.38			1983-88	0.05	
	D1/D5				0.67	0.68	0.69	0.69	0.69	0.69	0.70			1983-88	0.02	
Canada																
Males	D9/D5	1.67			1.67		1.68		1.71		1.75			1981-90	0.04	
	D1/D5	0.52			0.48		0.42		0.45		0.44			1981-90	-0.02	
Females	D9/D5	1.70			1.76		1.76				1.75			1981-90	-0.01	
	D1/D5	0.55			0.47		0.41				0.44			1981-90	-0.02	
Both sexes	D9/D5	1.79			1.79		1.83				1.85			1981-90	0.03	
	D1/D5	0.48			0.45		0.41				0.42			1981-90	-0.01	
Denmark																
Both sexes	D9/D5				1.52	1.53	1.54	1.55	1.56	1.55	1.57	1.57		1981-90	0.02	
	D1/D5				0.71	0.71	0.71	0.70	0.71	0.71	0.72	0.73		1981-90	0.01	
France																
Males	Definitive data	D9/D5	2.00	2.09	2.05	2.05		2.11	2.13	2.13						
		D1/D5	0.62	0.61	0.62	0.63		0.64	0.64	0.63						
Provisional updates	D9/D5							2.08	2.09	2.09	2.11	2.12	2.11	1980-90	0.06	
	D1/D5							0.66	0.66	0.66	0.66	0.66	0.66	1980-90	0.00	
Females	Definitive data	D9/D5	1.72	1.77	1.69	1.70		1.70	1.70	1.72						
		D1/D5	0.65	0.62	0.65	0.64		0.66	0.64	0.63						
Provisional updates	D9/D5							1.66	1.67	1.67	1.68	1.68	1.69	1980-90	0.01	
	D1/D5							0.68	0.68	0.67	0.67	0.67	0.67	1980-90	-0.01	
Both sexes	Definitive data	D9/D5	1.97	1.98	1.93	1.91		1.93	1.94	1.95	1.93					
		D1/D5	0.60	0.61	0.63	0.62		0.64	0.64	0.64	0.65					
Provisional updates	D9/D5							1.93	1.94	1.95	1.94	1.96	1.96	1.96	1980-90	0.02
	D1/D5							0.66	0.66	0.66	0.65	0.65	0.65	0.65	1980-90	0.01
Germany																
Males	Social Security data	D9/D5			1.47	1.47	1.47									
		D1/D5			0.67	0.67	0.68									
GSOEP data"	D9/D5				1.63	1.66	1.66	1.63	1.65	1.65	1.65			1981-90	0.01	
	D1/D5				0.68	0.70	0.70	0.71	0.71	0.72	0.71			1981-90	0.02	
Females	GSOEP data'	D9/D5			1.56	1.58	1.62	1.58	1.58	1.59	1.58			1981-90	0.02	
		D1/D5			0.59	0.63	0.64	0.65	0.67	0.66	0.66			1981-90	0.05	
Both sexes	GSOEP data"	D9/D5			1.63	1.65	1.64	1.64	1.62	1.64	1.64			1981-90	0.01	
		D1/D5			0.61	0.63	0.63	0.65	0.65	0.67	0.65			1981-90	0.03	

Table 5.2. Trends in earnings dispersion, 1973-1991 (Cont.)

		1973	1975	1979	1980	1981	1985	1986	1987	1988	1989	1990	1991	Average five-year change in 1980s ^a	
Italy^d															
Males	D9/D5			1.37	1.46	1.50		1.51	1.56					1980-87	0.07
	D1/D5			0.67	0.69	0.70		0.73	0.75					1980-87	0.04
Females	D9/D5			1.29	1.33	1.40		1.31	1.29					1980-87	-0.03
	D1/D5			0.54	0.60	0.59		0.58	0.64					1980-87	0.03
Japan															
Males	D9/D5			1.63					1.67			1.73		1979-90	0.05
	D1/D5			0.63					0.61			0.61		1979-90	-0.01
Females	D9/D5			1.54					1.65			1.63		1979-90	0.04
	D1/D5			0.70					0.71			0.70		1979-90	0.00
Netherlands^e															
Males, 23-64															
Weekly, Ind. 1-8	D9/D5	1.54	1.53	1.54											
	D1/D5	0.77	0.78	0.76											
Weekly, Ind. 1-9	D9/D5			1.66			1.62								
	D1/D5			0.75			0.76								
Annual, Ind. 1-8	D9/D5						1.63					1.65		1979-90	-0.01
	D1/D5						0.75					0.72		1979-90	-0.01
Females, 23-64															
Weekly, Ind. 1-8	D9/D5	1.46	1.43	1.43											
	D1/D5	0.76	0.82	0.85											
Weekly, Ind. 1-9	D9/D5			1.50			1.43								
	D1/D5			0.76			0.79								
Annual, Ind. 1-8	D9/D5						1.43					1.48		1979-90	-0.01
	D1/D5						0.77					0.74		1979-90	0.00
Both sexes, 23-64															
Weekly, Ind. 1-8	D9/D5	1.53	1.53	1.54											
	D1/D5	0.76	0.77	0.76											
Weekly, Ind. 1-9	D9/D5			1.64			1.60								
	D1/D5			0.74			0.75								
Weekly, Ind. 0-9	D9/D5						1.60								
	D1/D5						0.75								
Annual, Ind. 0-9	D9/D5						1.62					1.64		1979-90	-0.01
	D1/D5						0.73					0.71		1979-90	-0.00
Norway															
Both sexes	D9/D5				1.46				1.49			1.50		1980-91	0.02
	D1/D5				0.71				0.69			0.76		1980-91	0.02
Portugal															
Both sexes	D9/D5						1.80				1.87			1985-89	0.08
	D1/D5						0.70				0.71			1985-89	0.01
Sweden^f															
Males	D9/D5	1.57				1.68	1.50	1.49		1.56			1.57	1980-91	-0.05
	D1/D5	0.76				0.78	0.76	0.76		0.76			0.73	1980-91	-0.03
Females	D9/D5	1.40				1.37	1.34	1.37		1.38			1.40	1980-91	0.01
	D1/D5	0.75				0.81	0.76	0.75		0.79			0.77	1980-91	-0.02
Both Sexes	D9/D5	1.52				1.54	1.48	1.48		1.52			1.54	1980-91	0.00
	D1/D5	0.74				0.77	0.77	0.74		0.76			0.74	1980-91	-0.02
United Kingdom															
Males	D9/D5	1.70	1.66	1.67	1.72	1.78	1.84	1.86	1.89	1.93	1.95	1.96	1.99	1980-90	0.16
	D1/D5	0.68	0.70	0.69	0.68	0.67	0.63	0.63	0.62	0.61	0.61	0.61	0.59	1980-90	-0.03
Females	D9/D5	1.75	1.72	1.65	1.68	1.78	1.77	1.82	1.80	1.87	1.93	1.90	1.93	1980-90	0.19
	D1/D5	0.68	0.68	0.71	0.70	0.68	0.67	0.66	0.65	0.64	0.64	0.63	0.62	1980-90	-0.04

Table 5.2. Trends in earnings dispersion, 1973-1991 (Cont.)

		1973	1975	1979	1980	1981	1985	1986	1987	1988	1989	1990	1991	Average five-year change in 1980s ^a	
United States															
Males	D9/D5		1.93	1.93	1.95	1.98	2.10	2.08	2.09	2.10	2.14			1980-89	0.10
	D1/D5		0.41	0.41	0.41	0.41	0.38	0.37	0.37	0.38	0.38			1980-89	-0.01
Females	D9/D5		1.97	1.96	1.96	2.01	2.09	2.12	2.10	2.11	2.15			1980-89	0.11
	D1/D5		0.47	0.49	0.50	0.50	0.47	0.45	0.44	0.44	0.44			1980-89	-0.03
Both sexes	D9/D5		2.14	2.19	2.16	2.21	2.27	2.24	2.26	2.23	2.22			1980-89	0.03
	D1/D5		0.43	0.46	0.45	0.45	0.43	0.41	0.41	0.40	0.40			1980-89	-0.03

a) Average annual arithmetic change in the ratios, over period shown, on a five-year basis.

b) Data for 1976 instead of 1975.

c) Data for 1983 instead of 1981.

d) Data for 1982 instead of 1981.

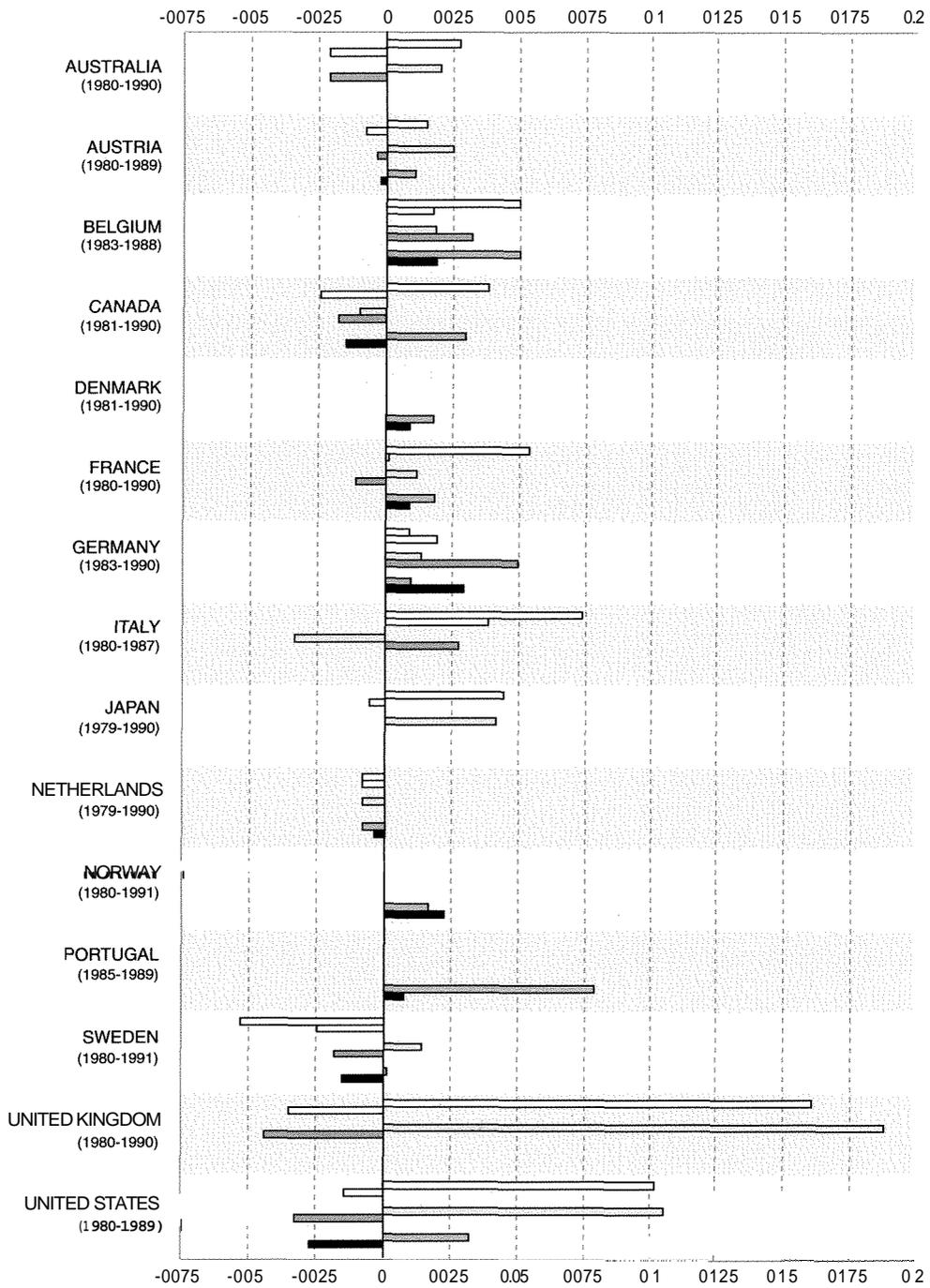
e) Data for 1974 instead of 1973.

f) Data for 1974 instead of 1973, and for 1984 instead of 1985.

- Note:** D9, D8, D5 and D1 refer to the upper limits of the ninth, eighth, fifth and first deciles, respectively. D5 is thus equal to the median of the distribution.
- Australia:** Gross weekly earnings of full-time non managerial employees who received pay for the May reference period, except the armed forces and the agricultural sector and a certain number of other categories.
- Austria:** Gross earnings per day, standardized to a monthly basis taking into account the recorded number of days of insurance contributions, referring to wage earners, salaried employees and some civil servants, excluding apprentices. The figures include special payments such as holiday and Christmas remunerations. (Current data from this source include 80 per cent of all civil servants, but the majority have been excluded from the information in the table, in order to permit comparisons with 1980.) Earnings above the maximum contribution base for social insurance are recorded at that level, precluding the calculation of D9 for certain years.
- Belgium:** Gross average income per day over a three-month period (between 1983 and 1988) or over a year (1989 and 1990) of full-time workers. The data are subject to a set of ceilings, which preclude the calculation of D9 for certain years.
- Canada:** Gross annual earnings of full-time, year-round workers.
- Denmark:** Hourly gross earnings data derived from annual wage-income (including all types of taxable wage-income) recorded in tax registers divided by actual hours worked as recorded in a supplementary pension scheme register. Persons with wage rates lower than 80 per cent of the minimum wage are excluded.
- France:** Gross annual earnings of full-time workers, adjusted for differences among individuals in annual hours worked. The "provisional" results are updated using the trends in a number of partial indicators.
- Germany:** Gross monthly earnings plus benefits calculated as 1/12 of 13th month pay plus 14th month pay plus holiday allowances plus Christmas allowances, of full-time, full-year workers.
- Italy:** Annual employment earnings net of taxes of full-time, full-year non-agricultural employees between the ages of 18 and 65.
- Japan:** Monthly scheduled earnings of regular workers, 18-59 years old, at non-governmental establishments with at least 5-10 regular workers (varies by survey year), excluding agriculture, forestry and fisheries, private household services and employees of foreign governments.
- Netherlands:** "Weekly earnings" refer to weekly wages, overtime payment excluded, for full-time, full-week workers. "Ind. 1-8" refers to Industry Major Division I to 8, according to the ISIC, etc. "Annual earnings" refers to annual earnings of full-time, full-month workers, including occasional payments (overtime, holiday, etc.). The inclusion of overtime is found to make very little difference. The age range is 23-64 years. In comparison to results for the age range 14-64 years, this restriction is found to reduce the magnitude of change at the lower end of the distribution slightly, but the direction of change remains the same.
- Norway:** Hourly wages, estimated as reported hourly/weekly or monthly wages divided by corresponding working hours. Age limits are 19 to 55 years. Observations of less than 25 kroner per hour and greater than 1 000 kroner per hour (both in 1991 kroner) are excluded.
- Portugal:** Weekly earnings for full-time workers, excluding the agricultural sector.
- Sweden:** Gross hourly earnings: earnings for those not paid on an hourly basis are calculated as the ratio between weekly (monthly) pay and corresponding reported hours worked.
- United Kingdom:** Gross hourly earnings of persons paid on adult rates, whose pay for the survey week was not affected by absence. Data prior to 1983 refer to men under 21 and women under 18.
- United States:** Gross hourly earnings, computed as annual earnings divided by annual hours worked (annual weeks worked multiplied by usual weekly hours) of wage and salary workers.
- Sources:** **Australia:** *Distribution and composition of employee earnings and hours*, Australia, ABS catalogue No. 6306.0.
Austria: Wolf and Wolf (1991), and further data supplied by the Austrian Central Statistical Office, from the *Earnings Statistics of the Austrian Association of Social Insurance Funds*.
Belgium: Secretariat calculations on the basis of data provided by the Institut national d'assurance maladie (INAMI).
Canada: Data supplied by the Analytical Studies Branch, Statistics Canada, taken from the Survey of Consumer Finances, with special adjustments to improve coverage and comparability between the years shown.
Denmark: Data supplied by Professor Niels Westergaard-Nielsen, Centre for Labour Economics, Aarhus Business School, as used in the NAUT project (The Nordic Labour Market in the 1990s).
France: Data from the yearly *Déclarations Annuelles des Données Sociales* (DADS), supplied by the Institut national de la statistique et des études Economiques, (INSEE), Paris.
Germany: *German Socio-Economic Panel*, Waves 1-8. Calculations by Viktor Steiner, Zentrum für Europäische Wirtschaftsforschung GmbH, Mannheim.
Italy: Data from the *Household Survey of the Bank of Italy*, supplied by Prof. Christopher Erickson, University of California at Los Angeles, as shown in Erickson and Ichino (forthcoming, Figures III.3A and III.3B).
Japan: Data from the *Basic Survey on Wage Structure*, taken from Katz, Loveman and Blanchflower (1992).
Netherlands: Calculations made for the Secretariat by Dr. Wiener Salverda, University of Groningen, on the basis of data supplied by the Netherlands Central Bureau of Statistics from the *Half-Yearly Survey on Earnings*, for 1972 to 1979, and from the *Yearly Survey on Earnings* for 1985 and 1990.
Norway: Calculations by Erling Barth and Halvor Mehlum, Institute for Social Research, Oslo on the basis of the Norwegian *Level of Living Surveys*, 1980, 1983, 1987 and 1991.
Portugal: Data from a sample of the *Quadros de Pessoal*, personnel records of employers with at least one employee, supplied by Professor Alberto Castro, Universidade do Porto.
Sweden: Data supplied by Dr Per-Anders Edin, University of Uppsala on the basis of the *Level of Living Survey* (LNU) for 1968, 1974 and 1981 and from the *Household Market and Nonmarket Activities Survey* (HUS) for 1984, 1986 and 1988.
United Kingdom: Data supplied by the United Kingdom Employment Department, taken from the *New Earnings Survey*.
United States: Data from the Annual Demographic Supplement to the March *Current Population Survey* as published in Karoly (1993, Table 2B.2)

Chart 5.1

Changes in ratios of earnings deciles in the 1980s
(Average five-year change)^a



Men
 Women
 Total

a) Average change over period shown calculated over five years
Source Table 5.2

Table 5.3. Trends in earnings deciles deflated by the consumer price index"

Index base 1980, 1981 or 1983 = 100

	Men			Women			Both sexes		
Australia									
1976	101	100	100	99	100	96			
1977	101	98	97	102	101	98			
1978	101	99	97	103	101	99			
1979	99	98	98	101	99	98			
1980	100	100	100	100	100	100			
1981	101	102	105	103	103	104			
1983	100	100	102	105	103	106			
1985	102	104	107	107	108	111			
1986	98	101	107	104	105	109			
1987	95	99	102	101	104	106			
1988	94	99	104	99	103	107			
1989	94	100	104	99	104	108			
1990	93	98	103	98	103	105			
1991	93	98	105	100	104	108			
Austria^b									
1980	100	100	100	100	100	100	100	100	100
1989	105	106	109	110	110	113	108	108	109
1991	108	111	114	113	117	121	111	113	114
Belgium									
1983	100	100	100	100	100	100	100	100	100
1984	107	103	105	109	107	107	105	106	106
1985	107	105	107	113	110	109	108	108	109
1986	110	107	111	117	112	114	111	110	112
1987	113	109	113	121	115	116	111	112	114
1988	113	109	116	125	118	120	115	112	116
1989	122	120	122	132	129	131	125	121	124
1990	130	126	128	140	137	139	131	130	131
Canada									
1967	66	71	72	60	69	65	69	74	73
1973	100	93	93	103	88	85	102	95	95
1981	100	100	100	100	100	100	100	100	100
1986	87	101	101	91	104	104	91	98	100
1988	94	101	102	96	102	107	93	99	103
1990	92	101	105	101	109	107	94	100	103
Denmark									
1980							100	100	100
1981							99	99	100
1982							104	104	106
1983							105	104	107
1984							103	102	106
1985							99	99	101
1986							99	100	102
1987							106	106	109
1988							109	109	112
1989							112	110	114
1990							114	112	116
France									
1973	87	88	85	82	80	81	84	87	89
1974	86	89	89	83	82	86	87	89	92
1975	87	90	92	83	86	89	88	90	94
1976	95	95	97	92	92	94	95	96	98
1977	94	96	96	92	92	94	96	97	99
1978	101	101	101	99	98	99	101	101	102
1979	98	98	98	99	98	98	99	99	100
1980	100	100	100	100	100	100	100	100	100
1982	102	101	103	103	103	103	102	101	101
1984	103	101	102	108	104	104	104	101	101
1985	103	102	105	108	105	105	105	102	103
1986	105	104	108	109	108	109	108	104	106
1987	103	103	107	105	107	108	107	103	106
1988							107	103	104

Table 5.3. Trends in earnings deciles deflated by the consumer price index^a (Cont.)

Index base 1980, 1981 or 1983 = 100

		Men			Women			Both sexes		
		D1	D5	D9	D1	D5	D9	D1	D5	D9
Germany	1983	100	100	100	100	100	100	100	100	100
	1984	103	104	105	107	105	107	101	103	105
	1985	110	107	109	119	111	112	113	108	110
	1986	114	111	113	124	115	119	117	113	114
	1987	119	115	115	134	120	121	123	116	117
	1988	123	119	120	143	125	126	128	120	119
Italy	1978	97	97	106	83	93	97			
	1979	97	101	95	87	97	94			
	1980	100	100	100	100	100	100			
	1982	101	102	104	101	103	107			
	1983	102	102	100	95	101	103			
	1984	109	104	104	111	105	100			
	1986	109	103	107	103	108	105			
	1987	114	105	113	118	111	107			
Norway	1980							100	100	100
	1983							102	99	101
	1987							102	105	108
	1991							119	111	114
Sweden	1968	60	66	71	53	60	68	57	65	71
	1974	79	83	82	75	79	81	77	80	82
	1981	100	100	100	100	100	100	100	100	100
	1984	106	106	103	104	106	105	106	105	104
	1986	110	110	106	109	111	110	110	110	108
	1988	115	115	111	115	115	114	115	114	112
	1991	121	122	117	122	122	121	122	122	119
United Kingdom	1973	93	93	92	79	81	84			
	1974	93	91	89	82	83	82			
	1975	98	96	93	91	92	94			
	1976	100	98	97	95	99	103			
	1977	95	92	90	95	94	93			
	1978	98	95	95	97	96	94			
	1979	98	97	94	97	95	93			
	1980	100	100	100	100	100	100			
	1981	101	102	106	101	102	109			
	1982	100	103	108	100	103	108			
	1983	100	106	112	105	109	115			
	1984	101	108	116	107	111	117			
	1985	101	109	117	108	113	119			
	1986	104	113	123	111	117	127			
	1987	105	116	128	113	121	129			
	1988	107	119	135	116	126	139			
	1989	108	121	138	118	128	147			
	1990	107	121	138	118	130	147			
	1991	109	125	145	122	137	157			
	1992	111	129	151	126	142	166			

Table 5.3. Trends in earnings deciles deflated by the consumer price index^a (Cont.)

Index base 1980, 1981 or 1983 = 100

	Men			Women			Both sexes		
United States									
1975	100	99	98	89	96	97	95	101	100
1976	100	101	99	93	98	99	98	101	100
1977	101	101	100	92	98	100	99	101	102
1978	104	100	101	96	100	101	101	102	102
1979	102	101	100	99	101	101	103	101	102
1980	100	100	100	100	100	100	100	100	100
1981	98	98	99	97	98	100	98	99	101
1982	95	96	101	96	100	104	97	98	103
1983	93	95	100	95	101	105	95	99	102
1984	89	96	101	93	102	107	92	99	102
1985	89	96	103	96	103	109	94	99	104
1986	91	98	105	94	105	113	94	103	107
1987	88	97	104	95	108	116	94	102	107
1988	90	97	104	95	108	116	93	103	107
1989	89	95	104	95	108	119	92	103	106

a) Gross earnings deflated by consumer price index

b) D8 shown instead of D9

Sources: Table 5.2 and OECD data base.

In the United States, the low or negative growth in average real earnings during the 1980s, combined with the increased dispersion, caused earnings at the level of the lower decile to fall in real terms during the decade (Table 5.3).⁴ This situation also occurred in Canada, at the beginning of the decade and in Australia. However, in other countries, such as the United Kingdom, any increases in dispersion were outweighed by gains in average real earnings so that the level of the lower decile increased in real terms.

2. The “disappearing middle”

Much discussion about the change in the shape of the earnings dispersion in the United States and Canada has been couched in terms of the “disappearing middle” – the proposition that, over the 1980s, these economies suffered a loss of “middle class” jobs. Such a statement cannot be tested using the data above, since the concepts of dispersion and the “disappearing middle” are not the same (see the annex).

However, other studies show that the rise in dispersion in the United States was indeed accompanied by a “hollowing out” of the middle of the distribution of earnings, especially among men [Levy and Murnane (1992, p. 1349)]. This result is also found for other countries. For Australia, Gregory (1992), defines “middle” earnings as lying in a band defined in terms of fixed ratios of the median, and points to a decline of one in three jobs in this range between 1976 and 1990. Using a similar approach, Myles *et al.* (1988) and Leckie (1988) find much smaller declines for Canada. For the United

Kingdom, Adams (1988) approaches the issue in a different way, ranking occupations according to their average earnings in 1973. Over the period 1973–86, he finds that those occupations initially in the middle of the distribution tended to suffer both a loss in earnings relative to other occupations, particularly those at the top, and a decline in their share of total employment.

3. Data and definitions

The concept of earnings used in this chapter is the standard international definition of remuneration in cash and in kind paid to employees, as a rule at regular intervals. It includes payments for holidays, but excludes employers’ contributions to social security, health insurance and pension schemes, as well as severance payments. The data in Table 5.2 are based on gross hourly earnings, to the extent that such information was available. Otherwise they represent gross earnings of full-time workers. Both types of definition avoid the bias caused by the widespread growth in part-time working, a bias which affects data on the weekly earnings of all employees, for example. Gross earnings are relevant for many aspects of labour market functioning. Net earnings would be more relevant for welfare considerations – but the latter would necessarily involve pooling net earnings and other sources of income to produce family incomes. All the data in Table 5.2 are, in fact, on a gross basis, with the exception of Italy.

The countries for which the data refer to hourly earnings include Denmark, France, Norway, Sweden, the United Kingdom and the United States. Countries with

daily, weekly, monthly or annual data restricted to full-time workers include Australia, Belgium, Canada, Germany, Italy, the Netherlands and Portugal. For Canada and Germany, a further restriction to full-year workers excludes any effect due to changing numbers of seasonal workers. The data for Japan refer only to “regular workers”, while those for Austria include part-time workers and so may be affected by changes in part-time work [Wolf and Wolf (1991)]. For Austria, Belgium (1989 and 1990), Canada, Denmark, France, Germany, Italy, the Netherlands and the United States, the data have been calculated on an annual basis and capture the effects of annual bonuses and thirteenth (or even fourteenth) month payments, an important part of earnings in some countries [Grubb (1990)]. The data for the United Kingdom include only those workers whose pay for the survey week was not affected by absence.

There seems little doubt that the general picture given by these data is accurate. However, caution is necessary in making both detailed analyses of trends in dispersion over time, and comparisons of the rate of change between countries. For example, data based on administrative records or enterprise surveys are affected by changes in the coverage of those sources – a difficulty also experienced with household surveys, owing to problems of non-response. Differences between countries in both coverage and definition warn that these data should not be used for international comparisons of the level of dispersion. An additional reason is that the level of dispersion indicated by earnings data is influenced by the length of the reference period. Data on the earnings of those who worked over the previous month will tend to indicate lower dispersion than otherwise similar data covering people who worked at any time over the previous year.⁵ Unfortunately, for comparing levels of dispersion over the 1980s, it appears that no satisfactory source is yet available.⁶

C. A REVIEW OF CORRELATES AND EXPLANATIONS

The observed consistency between the changes in dispersion in such a wide range of countries, especially with regard to the contrast between the 1970s and 1980s, suggests that pervasive economic factors are at work. This hypothesis is strengthened by another fact: those countries which did not experience an increase in dispersion over the 1980s, Denmark, Finland, Germany, Italy and Norway, are countries where national institutions have a particularly strong influence on wage setting and may have masked the effects of demographic and economic forces.

The purpose of this section is thus to examine the correlates of this swing to greater dispersion and to examine some of the economic factors which might be

responsible. Much of the evidence comes from the United States, owing to an intense national debate about the causes of the substantial increases in dispersion [Levy and Murnane (1992)]. The literature for other countries is growing, but still at an early stage of development. The major recent additions to the international literature have resulted from efforts to compare and contrast the situation in the United States with that in other countries [Freeman and Katz (forthcoming); Davis (1992)].

The section begins with a brief reference to the major changes in the institutional context and a consideration of the possible effects of the economic cycle. On the supply side, a reference to international migration is followed by an analysis of two major developments within countries: the record flows of young people into the working-age population in the 1980s, and the continuing rise in the proportion of the labour force with high-level qualifications – albeit at a slower rate than in the 1970s. On the demand side, evidence is presented for a steady increase in the relative demand for highly educated workers. Supply developments alone cannot account for the swing to greater dispersion, and a combination of supply and demand developments holds more promise. However, a continued increase in the dispersion of earnings within even quite narrowly-defined categories of workers appears particularly difficult to explain.

1. The institutional context

Many of the broad changes in wage determination in the 1980s have been summed up as a trend towards greater decentralisation of wage bargaining, a movement which was naturally associated with greater dispersion of earnings. The factors behind this included: the move away from standardized production and standard payment systems, facilitated by the technological revolution based on the microprocessor; the structural shift towards the service sector, where firms are smaller and less often unionised; the high levels of unemployment, tending to weaken the strength of trade unions; and the rightward political shift of many governments. As a result, relative to trade unions, groups of skilled workers gained considerable bargaining power within companies. In addition, for some of the same reasons, employers’ organisations lost influence in bargaining relative to individual companies [Soskice (1990)].

It is possible to point to developments in many countries which exemplify this process. For example, in Australia, the 1983 “Accord”, stipulating a highly centralised system of wage bargaining, was progressively dismantled in the following years, to the point where the Mark IV version of 1988 contained no provision for general wage increases, requiring that any increase be the outcome of bargaining between individual unions and employers over award restructuring and productivity. In Italy, the wage indexation system was substantially

changed in 1986 to allow its egalitarian effects to be compensated by wage drift. In the second half of 1983, the Netherlands government set aside the *wet aanpassingsmechanismen* (linkage mechanism) designed to maintain relative wages in the lower portion of the earnings distribution, and reduced the minimum wage and benefit levels. In Spain, the beginning of the 1980s was marked by the aftermath of the particularly sharp decrease in dispersion which followed the death of General Franco in 1975. In Sweden, the “solidarity” wage bargaining system of the 1970s, which had led to a marked compression of wage differentials, began to break down around 1983.

Another general trend was towards a reduction in minimum wages relative to average earnings, seen, for example, in Canada, France (after 1985), the Netherlands (after 1982), Portugal, Spain and the United States (until 1991). The impact of these changes on the distribution of earnings depends on the numbers of workers whose pay is affected by the standard. The changes in the United States are thought to have had a limited impact on the distribution of earnings, because by the mid-1980s the minimum wage levels were lower than those generally applying in the labour market for entry level labour [Bound and Johnson (1991, p. 92)]. In Canada and Spain, minimum wages were a similarly low proportion of average earnings; in France, Italy and Portugal, they were a significantly higher proportion. While the United Kingdom has no official minimum wage, during the 1980s about 10 per cent of the labour force worked in industries where the wages were set by Wages Councils. Their influence was eroded following the election of the Conservative government of 1979, and restricted considerably by the Wage Act of 1986 [Machin and Manning (1992)].

2. The economic cycle

The current rises in dispersion seem unrelated to the swings of the economic cycle. For different reasons, Reder (1955) and Oi (1962) have suggested that differentials between skilled and unskilled workers will tend to rise as unemployment rises, leading to an increase in the dispersion of earnings, other things being equal. Both noted that unskilled workers were more likely to be laid off in a recession, so that the excess supply of unskilled workers would increase more rapidly than that of skilled workers, especially since the latter could also compete for unskilled jobs. Oi (1962) further argued that, in a recovery, firms would tend to increase their stock of skilled workers mainly by internal training, while they would meet their requirements for unskilled workers directly from the external labour market. This would lead to a relatively greater increase in the demand for unskilled workers in a recovery.

However, the current increases in dispersion show no such cyclical pattern. The second half of the 1980s, the

period when increases in dispersion were most widespread, was one of declining unemployment in the OECD area. In addition, the strong increases in dispersion in both the United Kingdom and the United States persisted right through the economic cycles of the 1980s.⁷

3. International migration

Comparatively low-skilled migrants may compete directly with indigenous workers with low qualifications, tending to reduce the wages of low-skilled workers and so adding, both directly and indirectly, to the numbers of workers with low wages. In the United States, attention has been directed to the inflows of illegal immigrants, who are generally unskilled and inexperienced. Bound and Johnson (1991) show that the numbers of illegal migrants required to explain the whole of the relative decline in the wages of unskilled workers are far higher than plausible, though some of the decline could well be attributable to that source. In this connection, Katz (1991) points out that documented and undocumented immigration has become an increasing source of less-educated labour in the United States, particularly of high-school drop-outs.

Over the 1980s, virtually all OECD countries experienced net immigration [OECD (1991, Table 2.1)]. In many, a continued increase in the flow of migrants attributable to family reunions was accompanied by a rapid growth in the numbers of refugees and asylum-seekers and, from the middle of the decade onwards, a significant rise in the numbers of immigrant workers. However, in most countries, the flows of immigrant workers were not as large as in the United States. In specific national industries, it is possible that migrants have taken comparatively large numbers of low-paid jobs. Nevertheless, it is noticeable that Italy, Portugal and Spain, which received relatively large flows of migrants from developing countries from the middle of the decade onwards, were not countries with evidence of marked increases in overall dispersion. Outside the United States, the influence of migration on overall dispersion is thus likely to have been small.

4. Changes in the relative supply of different types of workers

This subsection refers to changes in the characteristics of the labour force in terms of such factors as age, sex, education level and work experience, and considers the role of changes in age and, particularly, education differentials (often referred to as the “return to education” or “education premiums”). Earnings differentials by sex are a large topic in their own right [OECD (1988, Chapter 5)] and are not given special attention here. In order to consider the effects of changes in these factors

on the dispersion of earnings, the following conceptual model will be used.

Given a criterion, or a set of criteria, dividing the population into a number of distinct groups, the contribution of each of the groups to the dispersion of the distribution of earnings will depend on three factors:

- i) the relative size of the group (smaller groups will tend to have less impact on the dispersion);
- ii) the differential between the group average earnings and the overall average (the larger this differential, the greater the contribution to the dispersion);
- iii) the dispersion of earnings within the group in question.

Over time, the changing contribution of each group to the overall dispersion will depend on changes in each of these factors.*

The three terms are not independent of one another. According to the widely used Mincer-type human capital model, under conditions of stable labour demand, if the relative supply of any particular age/sex/education group increases, its average relative wage level will decrease. Changes in the structure of the population by education, age and sex may thus be the cause of developments in earnings measured along these characteristics.

Changes in age structure and earnings differentials by age

Most OECD countries entered the 1980s with record numbers of people in the 15 to 24 age range (Table 5.4). Japan and Finland were two countries where the numbers had peaked earlier. For other countries the peak came during the decade itself, at the very beginning in North America and Portugal. At the same time, there were increases in the numbers of prime-age people, especially women, and declines in the numbers of older people,

Table 5.4. Trends in the numbers of young people

Index base 1981 = 100

	1971	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991
Population											
Australia	87	89	92	94	98	100	101	102	104	106	107
Canada	87	90	95	98	100	100	96	92	88	84	82
Finland	114	112	108	105	102	100	99	96	92	87	85
France	102	102	101	101	100	100	103	103	103	101	99
Germany	80	85	86	89	94	100	102	101	96	89	
Italy	90	88	91	93	97	100	102	102	102	101	106
Japan	125	116	106	101	100	100	103	106	112	117	120
Netherlands	93	91	93	95	98	100	101	101	100	97	92
Norway		96	99	99	100	100	99	102	104	105	102
Portugal			86	86	87	100	83	83	85	90	88
Spain		84	87	90	93	100	103	104	108	107	107
Sweden	107	101	98	97	97	100	102	104	105	105	103
United Kingdom	91	88	88	91	95	100	103	105	103	99	93
United States	88	91	95	98	100	100	97	93	90	87	84
Labour force											
Australia	83	85	89	93	96	100	100	101	102	106	103
Canada	70	78	88	92	98	100	94	91	90	87	81
Finland	121	115	109	106	101	100	96	96	92	88	79
France	115	112	109	107	104	100	102	98	94	84	74
Germany	95	95	93	92	97	100	101	103	101	93	
Italy	86	79	77	92	96	100	101	100	103	100	100
Japan	161	141	117	105	101	100	104	105	109	116	125
Netherlands	104	95	91	88	88	100	98	95	111	109	108
Norway		80	84	89	90	100	104	106	118	112	100
Portugal			85	83	86	100	78	74	75	72	70
Spain		92	93	96	96	100	101	98	106	102	90
Sweden	101	96	100	100	101	100	99	101	103	107	99
United Kingdom	87	83	82	90	96	100	101	106	106	105	96
United States	78	87	91	97	101	100	97	94	91	88	82

Notes: Non-institutional population:

age group 14-24: Italy;

age group 15-24: Australia, Canada, Finland, France, Germany, Japan, the Netherlands, Portugal;

age group 16-24: Norway, Spain, Sweden, United Kingdom, United States.

Source: As OECD, *Labour Force Statistics, 1971-1991*, Part III, Paris, 1993.

especially men. Only the first of these developments is discussed here.

OECD (1986, Chapter V) suggested that increases in the numbers of young people adversely affect individual economic opportunities, either by reducing their relative average earnings or increasing their relative unemployment rates. The effect appeared to persist over time. While the evidence quoted in that analysis was taken largely from North America, a more recent study by Ermisch (1988), for the United Kingdom over the period 1952-1979, suggests that young men from the larger generations tended to earn less. Youth earnings might therefore have been expected to be under pressure in the 1980s. Their numbers were high and their unemployment rates fell only slightly relative to adult rates [OECD (1991, Chapter 2)]. Since youth earnings are below average, the effect would have been to widen

overall wage dispersion, through the effect of both of the first two factors mentioned in the decomposition above.

To a large extent, this hypothesis is supported by the data in Table 5.5, which show the ratio of prime-age to youth earnings increasing – and hence relative youth earnings falling – in seven countries. While these figures refer only to men, Davis (1992, p. 261) reports similar findings for women in all the countries in the table, with the exception of the Netherlands.

These trends are generally confirmed by other studies. For Canada, evidence that the age-earnings profile shifted against the young during the 1980s is reported by Freeman and Needels (1991) and Myles *et al.* (1988); for France, the United Kingdom and the United States by Katz, Loveman and Blanchflower (1992); and for Germany by Abraham and Houseman (1992). Again for the United Kingdom, Bell *et al.* (1992) conclude that there was a considerable relative deterioration in the

Table 5.5. **Changes in earnings differentials by age among men**

Ratios of earnings of prime-age earners to young people

	Age groups used to calculate ratio	Trough year	Increase in the ratio of mean age-group earnings between trough year and 1987	
			Total change	On 5-year basis
Adjusted for changes in educational composition of age groups				
Canada	45-49/20-24	1979	0.14	0.09
	45-49/25-29	1979	0.07	0.04
Japan	40-49/20-24	1974	0.17	0.07
	40-49/25-29	1976	0.15	0.06
Sweden	21-25/10-5			-0.05 ^a
	21-25/6-10	1981	0.07	0.06
United Kingdom	40-49/21-24	1975-77	0.15	0.07
	40-49/25-29	1974	0.10	0.04
United States	45-49/20-24	1967	0.57	0.14
	45-49/25-29	1969	0.22	0.06
Not adjusted for changes in educational composition of age groups				
France	45/27	1973	0.34	0.12
	45/25	1973	0.29	0.10
			Between 1983 and 1987	
Netherlands	40-55/25-30		0.13	0.16

earnings of young workers after 1983, noting that, if the 1975 age-earnings profile had persisted, the 1990 earnings of men in their early twenties would have been 26 per cent higher than they actually were. For the Netherlands, the data in Table 5.5 apparently indicate a particularly sharp fall in the youth to prime-age earnings differential. However, this applies only to the data for the period 1983-1987, which was marked by the effects of the Netherlands government's decision to reduce the level of the minimum wage, which had previously supported earnings at the lower end of the distribution. Hartog *et al.* (1992), using econometric analyses, are unable to detect any major change for the decade as a whole.

Four of the countries where overall inequality changed little at the beginning of the 1980s also saw little change in age differentials. Table 5.5 provides evidence of only small changes for Sweden, where Asplund *et al.* (1993) suggest the pattern was one of comparative stability. These authors also find little change in Denmark and Norway, the same conclusion Erickson and Ichino (forthcoming) reach for Italy.

For Japan, while the figures in Table 5.5 indicate a relative decline in youth wages over the 1980s, detailed studies by Katz, Loveman and Blanchflower (1992) and by Katz and Revenga (1989) conclude that the wages of males entering the labour force for the first time have actually risen relative to more experienced workers. This might be expected, given the strong labour market and the fact that Japan was one of the very few countries where the peak number in the youth age group came well before the 1980s.

There is thus a close association between the onset of the baby boom, and changes in age differentials. This applies even to Germany, where the strong upswing in the numbers of young people coincided with an increase in age differentials, despite the overall decline in inequality. Italy and the Scandinavian countries were the main exceptions to the pattern. However, the strength of this result, and certainly its implications for future developments in the wage distribution, are weakened by the failure of age differentials to decline in North America during the latter part of the 1980s, when the effects of the baby boom were subsiding.

Analysis of the trends in age differentials by education group may throw further light on the issue. Davis (1992, Figure 5) and Katz, Loveman and Blanchflower (1992) point out that the relative loss in earnings in the United States was stronger for less well educated young people – age differentials actually declined after 1983 for college-educated workers. The failure of age differentials to decline in the later 1980s might thus be attributable to a weakness in the labour market for less well educated people (see below), a weakness likely to have particularly affected young people, who are frequently engaged in active job-search and are relatively unprotected by labour market institutions.

Overall, it seems likely that the baby boom effect did weaken the labour market for young people, especially those with lower educational qualifications. This tended to be reflected in a decline in their relative wages, rather than in an increase in their relative unemployment rates. This outcome corresponded to the aims of many of the labour market policies for young people introduced in countries with high unemployment in the 1980s.

Changes in educational differentials and the relative supply of highly educated workers

In the 1980s the difference between the earnings of workers with a college or university degree and those with only high school education – the so-called “college premium” – rose in most countries. The contrast between falling differentials in the 1970s and increases in the 1980s was as marked as for the overall dispersion. Particularly large rises were seen in the United Kingdom and the United States. Germany was the only country for which the 1970s decline appeared to continue.

Standardized data on trends in educational differentials are available for only a few OECD countries. There are many different ways of calculating educational differentials, ranging from the calculation of ratios of earnings for groups of workers of different education level (preferably standardized by age and/or work experience) to the estimation of complex earnings functions. Existing studies suffer from differences in the specifications of the implicit or explicit earnings functions, and from non-comparability between classifications, definitions, number of years of schooling and the like. For comparisons at a single point in time, contributions to the literature have recently been made by Lorenz and Wagner (1993) (using the Luxembourg Income Study) and OECD/CERI (1992). For the 1980s, international compilations of data on trends over time are to be found in Katz, Loveman and Blanchflower (1992) for three countries only; Gottschalk and Joyce (1992), using data from the Luxembourg Income Study and so limited to five countries and raw educational differentials (unadjusted for changes in the composition of the age groups by education); and Davis (1992), using data from the same sources as the studies just mentioned plus another two national sources, making the total of seven countries shown in Table 5.6. Owing to the disparate nature of the sources used, it should not be assumed that the figures in the table are comparable. The following assessment is based on the sources just mentioned, supplemented by a range of national studies.

For the United States in the 1970s, there was a sharp fall in the college premium, from a peak of 46 per cent in 1973 (measured as the average over all experience groups, in log differential terms), to a trough of 37 per cent in 1978. By the mid-1980s the level had risen to match previous peaks, and the 1989 value of 53 per cent was “unprecedented” [Murphy and Welch (1993, p. 105)]. Increases for younger cohorts were still more

dramatic and even older cohorts experienced large increases in the education premium.⁹

Table 5.6 indicates that Australia, Canada, Sweden and the United Kingdom saw the same general pattern of change in the college premium: a fall in the 1970s followed by a rise in the 1980s. Once again, the United Kingdom stands out (with the United States) as exhibiting a particularly strong increase in the 1980s, a pattern confirmed by Schmitt (1993). For Australia, Gregory (1992, Table 3) indicates a rise in the college premium in the second half of the 1980s, reversing a small part of the long decline that began in the 1960s. For Canada, Freeman and Needels (1991) find a strong rise, though not so marked as that in the United States. For Japan, Davis (1992) and Katz and Revenga (1989) find that the long decline in the college premium was partly reversed in the latter part of the 1980s. For Sweden and the other Nordic countries, Edin and Holmlund (1992) and Asplund *et al.* (1993) conclude that the changes in the college premium over the 1980s were small, although contrasting with a decline over the 1970s. For Italy, Erickson and Ichino (forthcoming) also find an increase in the 1980s.

In Germany there is evidence that the decline in the college premium continued, albeit at a slow pace, into the

1980s [Abraham and Houseman (1992)]. For France, data up to 1985 indicate a continual decline in the premium for a first degree, although those with higher-level qualifications – *Grande Ecole* and higher professional – were able to maintain their position [Baudelot and Glaude (1989)]. Finally, Table 5.6 indicates that the Netherlands also saw a fall in the college premium, a finding supported by Takkenberg and Walschots (1992), using data for 1985-89, although not by Hartog *et al.* (1992).

While the evidence is less complete, it appears that a less definite picture emerges with regard to the earnings differential between those with medium-level educational qualifications and those with none. In some countries, such as Australia and Italy, there was a decline in such differentials over the 1980s, and there was little change in the United States. The United Kingdom, on the other hand, saw a noticeable increase.

As with earnings differentials by age, it is natural to seek to explain the swing towards increased educational differentials by changes in the relative size of population groups at different levels of education. For the United States, the relative supply of the college-educated proportion of the workforce rose during the 1970s. Thus, a simple supply model was found to be capable of explain-

Table 5.6. Changes in earnings differentials by education among men, during the 1970s and 1980s

	Educational groups	Initial year	Ratio value	Second year	Ratio value	Five-year ^a change
1970s						
Australia	University/School leaving age 17-18	1968/69	1.89	1978/79	1.54	-0.17
Canada	University/High school	1970	1.65	1980	1.39	-0.13
Japan	College/Upper High school	1970	1.33	1979	1.26	-0.04
Sweden	University/Post-secondary	1968	1.40	1981	1.16	-0.09
United Kingdom	University/No qualification	1974	1.64	1980	1.53	-0.06
United States	College/High school	1969	1.49	1978	1.36	-0.08
1980s						
Australia	University/Trade	1982		1990		0.03
Canada	University/High school	1980	1.40	1985	1.42	0.03
Japan	College/Upper High school	1979	1.26	1987	1.26	0.00
Sweden	University/Post-secondary	1981	1.16	1986	1.19	0.03
Netherlands	University/Secondary	1983	1.50	1987	1.22	-0.35
United Kingdom	University/No qualification	1980	1.53	1988	1.65	0.08
United States	College/High school	1979	1.37	1987	1.51	0.09

a) Average annual arithmetic change in the ratios calculated on five-year basis.

Note: Notes: All figures control for changes over time in the age or experience composition of educational groups, with the exception of the Netherlands. For information on sources, earnings concepts and selection criteria, see Table 5.5 and the notes below.

Australia: Figures for the 1970s are ratios of mean earnings for 35-44 year-old men with a university degree to mean earnings for 35-44 year-old men who left school at ages 17-18, as computed from Table 2.4 of Miller (1984). The 1980s entry represents the change in the mean log wage for men with a university degree minus the change in the mean log wage for "trade qualified" men, as computed from Borland (1992, Table 3), using the *Income Distribution Survey*.

Canada: Ratio of fixed-weight averages over nine 5-year experience groups; weights equal average employment shares for the three sample years.

Japan: Based on total earnings. Ratio of fixed-weight averages over six age groups for college-educated workers and seven age groups for less educated workers; weights equal average employment shares over 1971-1987.

Netherlands: Ratios of raw education group medians from Gottschalk and Joyce (1992, Table III).

Sweden: Ratios of raw education group means.

United Kingdom: Derived from estimated log wage differential between men with a university degree and men with no advanced educational qualifications by John Schmitt, using the *General Household Survey*.

United States: Ratio of fixed-weight averages over eight 5-year experience groups, weights equal average employment shares over 1967-1989.

Sources: Davis (1992, and Addendum); Gottschalk and Joyce (1992).

ing a large part of the fall in the college premium [Levy and Murnane (1992); Freeman (1976); and Welch (1979)]. However, for the 1980s, educational differentials rose despite a continued increase in the relative supply of well educated workers so that no simple supply model can work, as confirmed by the formal test of Murphy and Welch (1992). Nevertheless, several authors, including Blackburn *et al.* (1990) and, more recently, Katz and Murphy (1992) have suggested another hypothesis which still gives a leading role to changes in supply.

More precisely, Katz and Murphy (1992) and earlier authors suggest that changes in educational differentials can be explained by changes in the rate of growth of the relative supply of different labour force groups in the context of a steady rate of growth in the demand for highly skilled labour. When the rate of growth of the relative supply of highly educated workers outstrips the demand growth, the college premium falls, and vice versa. In the 1980s, developments in the United States

were consistent with this hypothesis, and Katz, Loveman and Blanchflower (1992) have suggested it may apply to a number of other countries, including Japan and the United Kingdom.

This hypothesis is supported by the available data on supply-side trends in several countries (Table 5.7). The rapid growth in the college premium in the United Kingdom in the 1980s is indeed associated with a decline in the rate of growth of the proportion of the population with a university education, as confirmed by Schmitt (1993). In Australia and Canada, as confirmed by Borland (1992) and Freeman and Needels (1991), respectively, the directions of change are the same, and the magnitudes are less.¹⁰ For Japan, Katz, Loveman and Blanchflower (1992) identify a slight upswing in the differential in the second half of the 1980s, which they argue may correspond to the substantial reduction in the rate of growth of the share of the population with a college degree indicated by Table 5.7.

	Level			Annual average growth rate	
	Population or labour force				
France	1970	1980	1989	1970-80	1980-89
Population, males 15+ Degree holders/Total	5.3	8.3	11.8	4.6	4.0
Germany	1976	1982	1989	1976-82	1982-89
Working-age population (<i>Fachhochschule + Hochschule</i>)/Total	6.0	7.4	9.4	3.6	3.5
Sweden	1971	1980	1990	1971-80	1980-90
Total labour force, both sexes University/Total			23.1	8.3	
United Kingdom	1973	1979	1989	1973-79	1979-89
Population, both sexes, 16-60 University/Total	8.1	10.6	18.3	7.0	3.4
United States	1973	1979	1989	1969-79	1979-89
Population, both sexes, 18-64 College/Total	18.0	16.6	21.5	4.4	4.3
	Employed labour force				
Australia	1973/74	1981/82	1989/90	1973/74-81/82	1981/82-89/90
Full-time, full-year males in the workforce Degree holders/Total	4.5	9.1	13.4	9.2	5.0
Japan	1971	1979	1990	1970-79	1979-90
All employees, both sexes College/Total	12.0	17.9	22.5	5.1	2.1

Sources: Australia, Gregory and Vella (1992); France, Japan, United Kingdom and United States, Katz *et al.* (1992); Germany, Abraham and Houseman (1992); Sweden, Edin and Holmlund (1992).

Cases where the hypothesis appears to fail include Germany, France, Sweden and Italy. In the last three countries, a fall in the rate of growth of the relative supply of workers with university degrees was not matched by any rise in the university premium [for Sweden, see Table 5.7 and Edin and Holmlund (1992); for France, Table 5.7 and Katz, Loveman and Blanchflower (1992), whose data refer to occupational differentials: and, for Italy, Erickson and Ichino (forthcoming)]. However, these are all countries with strong institutional effects on wage-setting, which might be considered to have muted the influence of the changes in supply. In Germany there was little change in the rate of growth in the supply of university-educated workers and Abraham and Houseman (1992) suggest that institutional factors are well able to explain the continued decline in the premium for university education.

5. Changes in the demand for employment, by sector

This subsection presents evidence on the effect of changes in the distribution of employment within and between industries on both the overall dispersion of earn-

ings, and earnings differentials by education: and alludes to the roles of trade and technological change.

The bulk of the change in the dispersion of earnings can generally be accounted for by changes within industries, as opposed to shifts of employment from industry to industry, as illustrated by Table 5.8. The top half of this table was calculated by the Secretariat, using the general form of decomposition set out at the beginning of this section, at the most detailed level at which the industry data were available (two-digit for France and the United Kingdom, one-digit for Canada and Japan). For each of the four countries shown, the change in within-industry dispersion is the dominant cause of the overall change. The change in between-industry dispersion sometimes works in the "wrong" direction – opposite to the change in overall dispersion. The same is true of the data in the second half of the table, calculated from results published in Gottschalk and Joyce (1992).

As already noted, the explanation of changes in the college premium by means of changes in the rate of growth in the relative supply of highly educated labour requires the complementary assumption of a continued increase in the relative demand for highly educated workers. Table 5.9 confirms that this assumption is correct for all the countries covered and also indicates that the

Table 5.8. Contributions of changes in employment structure to changes in dispersion
Percentage of the square of the coefficient of variation in the initial year

	Years	Change in industry weights (1)	Change in ratio of mean earnings (2)	Change between industry dispersion (1) + (2)	Change within industry dispersion	Total change
National databases						
Canada	1981-90	0.8	-1.0	-0.2	25.4	25.2
France	1974-80	1.7	4.3	6.0	65.6	71.6
	1980-87	2.8	-1.7	1.1	-21.1	-20.0
Japan	1979-89	1.6	2.6	4.1	5.2	9.3
United Kingdom	1984-91	-6.9	8.6	1.7	52.3	54.0
LIS Database						
Australia	1981-85	1.7	2.4	4.2	11.1	15.3
Netherlands	1983-87	0.3	-2.2	-1.9	11.0	9.2
Sweden	1981-87	-0.6	-1.4	-1.9	7.5	5.6
United Kingdom	1979-86	0.1	-0.2	-0.1	37.5	37.4
United States	1979-86	1.7	1.1	2.8	28.1	31.0

Note: Data from national databases are calculations by the Secretariat using gross earnings according to the sources, concepts and selection criteria mentioned in Table 5.2. The industry classification was at the one-digit level for Canada and Japan, a 38-industry breakdown for France and at a mixed one- to two-digit disaggregation for the United Kingdom (in each case these were the finest disaggregations available). The calculations were done by changing first the industry weights, then the ratios of mean earnings and finally the within-industry dispersion measures. Those for the United Kingdom are based on a subset of industries and exclude the top earnings bracket.

Data from the Luxembourg Income Study (LIS) are calculations by the Secretariat on the basis of data published in Gottschalk and Joyce (1992, Table VIII). The calculations are performed on annual gross wages and salaries of male family heads, between 25 and 55 years old, working full-time, where this latter distinction could be made. The top 5 per cent of the distribution are excluded.

The relevant data sources from the Luxembourg Income Study data are as follows:

Australia: 1981: 1981-82 *Income and Housing Survey*. 1985: 1986 *Income Distribution Survey*.

Netherlands: 1983 and 1987 *Additional Enquiry on the Use of (Public) Services*.

Sweden: 1981 and 1987 *Income Distribution Surveys*.

United Kingdom: 1979 and 1986 *Family Expenditure Surveys*.

United States: 1980 and 1987 *March Supplements to the Current Population Surveys*.

Sources: Gottschalk and Joyce (1992, Table VIII) and calculations by the Secretariat.

Table 5.9. Proportion of the employed with higher education levels of attainment by approximate ISIC industry^a

Percentages

Approximate ISIC major division	Canada	Germany	Japan	Spain	Sweden	United Kingdom ^b	United States ^c	Unweighted average
	Proportion, 1987							
1. Agriculture	4.2	0.7	1.1	0.3	2.1	5.5	10.3	3.5
2. Mining and quarrying	10.7	2.1	10.3	2.5		5.4	23.5	9.1
3. Manufacturing	8.4	2.7	11.7	2.3	4.9 ^d	10.4	18.1	8.4
4. Electricity, gas and water		2.9	16.7	5.2		19.2		11.0
5. Construction	3.8	1.2	9.0	0.9	2.2	8.5	9.0	4.9
6. Trade, restaurants	6.6	2.2	12.7	1.8	4.8	5.6	12.9	6.7
7. Transport, communication	8.2 ^e	1.4	8.6	3.0	4.2	7.0	17.8	7.2
8. FIREB ^f	17.6	8.4	27.1	17.0	17.4	24.6	29.6	20.2
9. Other services	24.8	14.8	24.9	13.4	19.8	33.1	34.8	23.7
Other services, private	25.1		24.3				35.4	
Public administration	23.0		29.0				31.3	
All industries ^g	14.7	6.3	14.5	5.0	11.1	17.0	23.4	13.1
	Average annual change, between years shown ^h							
First date	1975	1978	1974	1977	1971	1981	1972	
Second date	1987	1987	1987	1987	1987	1987	1987	
1. Agriculture	7.0	9.9	4.0	4.1	7.2	2.4	7.5	6.0
2. Mining and quarrying	4.2	2.4	5.6	2.8		7.6	4.2	4.5
3. Manufacturing	5.1	6.9	3.7	6.0	6.7 ^d	4.7	5.8	5.6
4. Electricity, gas and water		1.7	3.6	3.6		9.4		4.6
5. Construction	4.4	6.2	3.4	-1.1	4.5	4.7	4.4	3.8
6. Trade, restaurants	5.2	5.2	3.2	5.1	6.2	2.7	4.4	4.6
7. Transport, communication	5.1 ^e	5.1	2.8	13.0	9.0	0.3	6.9	6.0
8. FIREB ^f	5.1	3.1	4.0	5.4	5.3	3.6	3.7	4.3
9. Other services	2.7	-0.3	3.4	3.8	2.9	2.0	2.4	2.4
All industries ^g	4.0	2.5	4.3	7.0	5.1	3.5	4.0	4.3

a) Statistics refer to the employed labour force only, except in Sweden where they refer to the whole labour force and include all age groups. The university level of attainment is as defined in *OECD Employment Outlook* 1989, Chapter 2, Section C.1. It is not fully comparable between countries owing to differences in nation educational systems. The industry classifications do not exactly correspond with ISIC. For Canada, restaurants and hotels are included in approximate ISIC 9; for the United Kingdom, approximate ISIC 2 refers to metal ore and mineral mining plus chemicals and man-made fibres and metal manufacturing, and ISIC 4 includes energy extraction; for the United States, business and repair services are included in approximate ISIC 9.

b) Proportions exclude individuals with educational attainment level unreported.

c) Data refer to 1988.

d) Refers to ISIC 2-4 inclusive.

e) Approximate ISIC 7 includes utilities (ISIC 4).

f) Finance, insurance, real estate and business services.

g) Statistics for All Industries may include individuals with industry attachment unreported.

h) For Japan, because data available for 1974 were aggregated, the changes shown relate not only to university but also to junior college and college of technology.

Source: As Chapter 2 of OECD, *Employment Outlook*, 1989.

growth in the proportion of the employed labour force with university-level education took place within all sectors of the economy.

Detailed studies for the United States and the United Kingdom have also concluded that shifts in employment between industries can account for only a small part of the increase in earnings differentials by education over the 1980s. For the United States, Blackburn *et al.* (1990, Table 5), using regression analysis, find that the changes in the industrial composition of employment can account for at most 30 per cent of the change in earnings differentials for men aged 25-64. In the 1980s, the United Kingdom experienced a particularly rapid relative shift of employment from manufacturing to services, coupled with a strong rise in educational differentials. However,

Schmitt (1993), using similar methods to Blackburn *et al.* (1990), finds no evidence of a strong connection between these two events. Indeed, the change in the structure of employment in the United Kingdom accounted for a negligible part of the rise in educational differentials over the 1980s. The within-industry component of the change was responsible for nearly all of the increase.

These results give no support to attempts to explain the change in the dispersion of earnings by employment shifts from the manufacturing sector to the service sector – such as the “de-industrialisation” hypothesis advanced by Bluestone and Harrison (1982). In addition, they may have implications for analyses of the short-term effects of trade.

Current evidence on the short-term effects of changes in trade patterns appears to be mixed. Some recent United States literature has suggested that the exceptionally large trade deficits in manufactured goods from 1980 to 1987 may have played a significant role in accounting for the rise in the relative wages of highly educated workers. For example, Katz and Murphy (1992) investigate shifts in the relative demand for workers between 1963 and 1987 by estimating the direct amount of labour of different educational levels embodied in U.S. exports and imports for 21 manufacturing industries. For the period 1979 to 1987, they estimate that the effect on relative labour demand was plus 7.2 per cent for male workers with a college education and minus 8.9 per cent for male workers who dropped out after 8-11 years of education. Murphy and Welch (1992) develop a model to explain the increase in dispersion in earnings and find that the demand for labour of higher education levels can be proxied satisfactorily by the net imports of durable goods as a share of gross national product. Borjas and Ramey (1992) find that the secular trend in the earnings differential between highly educated and less educated workers over the period 1963-88 is strongly correlated with (and Granger-caused by) the fluctuations in imports and exports of durable goods, particularly of automobile-related imports.

However, these analyses would not necessarily apply to other countries. For example, the United Kingdom, another country with a major increase in dispersion over the 1980s, did not experience a shift in trade patterns of the type observed in the United States. In addition, even for the United States, the studies leave unexplained the pattern of simultaneous increases in the relative demand for highly educated workers and in educational differentials observed within industries having little connection with international trade [Murphy and Welch (1993); Gottschalk and Joyce (1992)].

Nevertheless, over the longer term, the effects of trade on the dispersion of earnings may be important. For example, Wood (1991) argues that increases in trade are likely to prompt technological innovations in favour of greater labour productivity, which are then likely to shift the structure of demand in favour of the more highly skilled.

The fact that educational differentials and the relative demand for highly educated workers both rose within all major industries has suggested to some authors, including Bound and Johnson (1991), that a significant role in the increase in dispersion must be ascribed to non-neutral technological change, which has increased the productivity of more highly skilled workers relative to less highly skilled workers. This is supported by a "number of recent papers showing that the wages of highly educated workers relative to those of less educated workers and the share of highly educated workers as a percentage of total employment are highest in the most technologically progressive industries" [Levy and Murnane (1992, p. 1362)]. In particular, Krueger (1991) suggests that

one-third to two-thirds of the 1984-89 increase in wage differentials by education in the United States was directly attributable to the use of computers. This appears all the more relevant as, compared with the 1970s, the 1980s were distinguished by the effects of the micro-computer revolution.

6. The decline in unionisation

Along with the widespread increase in the dispersion of earnings, the 1980s saw a fall in unionisation rates in almost all OECD countries [OECD (1991, Chapter 4)]. As explained below, unionisation rates are strongly correlated with the dispersion of earnings – at least as regards the upper part of the distribution of earnings – and the decline in unionisation rates over the 1980s shows some correlation with the increase in dispersion. However, it is less certain whether it can be considered to be one of the causes.

The data in Table 5.2 of this chapter and those in OECD (1991, Chapter 4) allow the calculation of the correlations between the decile ratios and unionisation rates across fifteen countries for 1988. The figure for the upper decile to median ratio, D9/D5, is about two-thirds. For the lower decile ratio, D1/D5, it is lower, around 0.4. These findings corroborate that of Freeman (1993), who notes the existence of a strong correlation between union density figures for 1979 and the variance of log average wage rates by industry (his figures range between 0.6 and 0.8, depending on the source used for the earnings data).

These OECD data also show some correlation between the increase in dispersion and the decline in unionisation rates over the 1980s, again corroborating a finding of Freeman (1993). The correlation is not very strong, and France and the Netherlands are outliers – their unionisation rates declined strongly in the 1980s, but there was comparatively little increase in dispersion. However, in these two countries, the reduction in unionisation rates may overstate the decline in the influence of unions on wage developments. Owing to the regulations in force for the extension of collective agreements to non-unionised establishments, there was little change in the proportion of employees covered by collective bargaining agreements. Removing France and the Netherlands produces a relatively strong correlation between the change in unionisation rate and the change in the upper decile to median ratio: around two-thirds (in place of 0.2 using all fifteen countries). On the other hand, there is very little correlation between the change in unionisation rates and the change in the ratio of the lower decile to the median, even if these two (or indeed any other two) countries are excluded.

Other studies have tried to establish the relationship between unionisation rates and wage differentials within countries. Blanchflower and Freeman (1990), using the International Social Survey Programme (ISSP) six-country data set, concluded that union/non-union wage differ-

entials were particularly pronounced in the United States. The fifteen-point differential they found was “nearly three times as great as the unweighted average difference for the other five countries”. However, even for the United States, recent studies suggest that the decline in unionisation rates had a relatively small effect on the dispersion of earnings. Katz and Revenga (1989) estimate that de-unionisation might have increased the earnings of college graduates relative to less educated workers by only 0.5 to 2 per cent over the period 1979-87. Blackburn *et al.* (1990) arrive at the higher figure of 15 per cent. The estimates of Bound and Johnson (1991) vary according to the number of years of work experience and the type of differential, but are generally around 15 per cent or below. The last authors note that although the change in educational differentials in the United States over the 1980s was similar for the two sexes, unions have never played a strong role in the determination of women’s wages.

While the decline of unionisation was a correlate of the increase in dispersion over the 1980s, it is striking that the factors which are advanced to explain the decline in unionisation are all factors which might well also affect the dispersion of earnings – including decentralisation of wage-bargaining, the growth in the small firm sector, the trend towards “non-standard” forms of work, changes in the occupational structure and shifts in the stance of government and employer policies [OECD (1991, Chapter 4)]. Rather than declining unionisation rates being the cause of the increase in dispersion, it is more likely that both changes were driven by other factors.

7. Changes in within-group inequality

The discussion above has referred only to the increase in dispersion between groups of workers, defined in terms of age, education and industry. However, inequality within such groups also tended to grow in the 1980s in at least some countries. Davis (1992) finds an increase in dispersion within groups defined in terms of age and occupation for the United Kingdom, and work experience and education for Canada and the United States. For the United States, these results are confirmed by Levy and Murnane (1992). For Canada, Freeman and Needels (1991) note that within-group dispersion increased markedly for men in the 1980s, but not in the 1970s.

Factors mentioned as possible causes for increased within-group dispersion include an increased importance of skills not well measured by educational qualifications, such as the ability to work with other people, changes in plant-specific earnings differentials [Davis and Haltiwanger (1991)]; and changes in wage-setting arrangements, including the shift to greater individualisation of salaries.

D. CONCLUSIONS

Statistics brought together in this chapter indicate that the trends in the dispersion of earnings in the 1980s were different from those in the 1970s. While the earlier decade saw generally decreasing dispersion, the 1980s were marked by increases in twelve of the seventeen countries for which data are available: Australia, Austria, Belgium, Canada, France, Japan, the Netherlands, Portugal, Spain, Sweden, the United Kingdom and the United States. The rises were generally small, except in the last two countries. In France, the Netherlands and Sweden, increases began only in the middle of the decade, while in Spain they were apparent only in the beginning. Levels were roughly stable in Denmark, Finland, Italy and Norway. Germany was the only country where the dispersion continued to fall. Relative to the median, the increases in dispersion were due more to gains by the top of the distribution of earnings than to losses by the bottom. Australia, Canada and the United States were the only countries which saw falls in the real value of the bottom earnings decile.

The chapter has surveyed a number of economic and demographic factors which might underlie this swing towards greater dispersion of earnings. It is recognised that the 1980s were also marked by several institutional changes likely to widen wage differentials, including a greater decentralisation of wage bargaining, the rightward shift in government policies and the trend towards greater individualisation of salaries. It is unlikely that such institutional factors were solely responsible for the widespread changes in dispersion – for example it hardly seems possible to explain developments in the United States in those terms. Nevertheless, differences in national wage-setting institutions and in the speed of change of those institutions may well be one reason why dispersion increased more strongly in some countries than in others.

Several factors are likely to have been relatively unimportant. They include the effects of the economic cycle and international migration (except for particular industries and regions). In addition, rather than the decline in unionisation rates being the primary cause of the trend towards greater dispersion, it seems more plausible that both trends were the result of a common set of other factors.

During the 1980s, youth earnings fell relative to average earnings, tending to increase overall dispersion. It is not clear to what extent this was due to the “crowding” effects of the record numbers of young people seen in many countries during the decade; crowding fails to explain the fact that relative youth wages continued to fall in the United States even after the effects of the baby boom had begun to subside. Complementary explanations for the relative fall in youth earnings include the special labour market problems of less well educated labour market entrants and the spread of labour market

programmes offering relatively low wages to young workers and trainees. In addition, there may have been an increase in the relative demand for more experienced workers.

The 1980s also saw an increase in the relative earnings of highly educated workers, contrasting strongly with the declines of the 1970s. This occurred despite a continued increase in the supply of highly educated workers. However, it has been suggested that part of the cause of the reversal in trend was that the rate of growth in the relative supply of highly qualified workers was slower in the 1980s than in the 1970s. The hypothesis is that during the 1970s the supply outstripped the demand, but that the reverse was the case in the later decade. The statistics available indicate that the increase in dispersion did indeed coincide with a slowing down of the rate of growth in the proportion of highly educated workers in a number of countries, including Australia, Canada, Japan, Sweden, the United Kingdom and the United States. However, there is no sign of any such relationship in a number of others.

While the evidence on the supply side is mixed, there is no doubt that demand factors played an important role in the increase in the earnings premium associated with university-level education. The relative demand for university educated workers can be seen to have increased in all sectors – “The idea is spreading that those who have ‘only’ a qualification at post-compulsory level no longer have much chance of obtaining a really skilled job” [OECD (1993, p. 18)]. Shifts of employment from sector to sector appear to account for little of the changes in either overall dispersion or educational differentials, contrary to the “de-industrialisation” theories advanced at the beginning of the 1980s. The main effects are seen within each sector.

Technological change has been advanced by many authors as a possible explanation for the increase in the

university education premium within sectors. The most technologically advanced industries have been found to be those with the strongest increases in both the relative employment of highly educated workers and in their relative earnings. The increasing use of micro-computers – which became widespread in the 1980s – may have been important. Over the longer term, increased competition through trade may well have played a significant role in prompting gains in labour productivity by means of technological developments and recourse to more highly educated workers.

The conclusions above have been concerned with increases in the dispersion of earnings between groups of workers, defined particularly by age and education. However, one of the features of the 1980s was that, in a number of countries, the dispersion of earnings increased even within narrowly defined categories of workers, for reasons that are still unclear. In principle, the explanation must lie in factors which are not well captured by the statistical definitions used to define the categories. This has invited consideration of a wide range of possible factors, such as a greater differentiation of pay according to skills other than educational or vocational qualifications, and the movements towards the individualisation of pay-setting mechanisms.

Taken together, the evidence suggests that an important cause of the swing to increased dispersion of earnings in the 1980s was an increase in the relative demand for highly educated workers. While its causes are not fully understood, this increase appears to be associated with technological developments linked to shifts in the demand for products and services and to changes in trade and investment patterns. To the extent that the rise in the demand for highly educated workers continues, there will be pressure for increased earnings dispersion.

NOTES

1. The upper decile of the distribution is defined as the lower limit of the earnings of the top tenth of earners, and the bottom decile as the upper limit of the earnings of the bottom tenth of earners.
2. The other information used is to be found in the following sources:
Australia: Borland (1992); Gregory (1992).
Austria: Communication from the Austrian Central Statistical Office.
Denmark and Norway: Asplund *et al.* (1993).
Finland: Data supplied by Professor Tor Eriksson from the Population Censuses of 1971, 1975, 1980 and 1985 and by Dr. Rita Asplund concerning employees of companies belonging to the Finnish Employers' Confederation.

France: CERC (1989).

Germany: Abraham and Houseman (1992); Marsden and Silvestre (1992).

Italy: Erickson and Ichino (forthcoming); Marsden and Silvestre (1992).

Portugal: Information supplied by the Portuguese Ministry of Employment and Social Affairs, concerning a widening of the dispersion according to industry, qualifications, sex and region, and a sharply-rising differential between the pay of senior managers and other workers.

Spain: Revenga (1991); Garcia Perea (1991).

Sweden: Edin and Holmlund (1992).

United States: Katz, Loveman and Blanchflower (1992); Davis (1992); Karoly (1993).

3. Based on provisional data.
4. This does not imply that the real earnings of individual workers necessarily fell, because some will have moved out of the bottom decile. However, Sawhill and Condon (1992) show that the increase in dispersion of family income in the United States was not matched by an increase in this type of mobility, implying that the situation of many families in the bottom income decile deteriorated.
5. Out of the spells of employment occurring over the year, a monthly survey is more likely to pick up the longer spells than the shorter ones and earnings in short spells tend to be relatively low.
6. Progress has been made in harmonizing income surveys in the Luxembourg Income Study, but the selection of data was not made with labour market analysis as a priority and the range of sources included are rather disparate.
7. The United Kingdom and the United States were the only two countries where OECD (1987, Chapter 3) found that occupational wage differentials reacted noticeably to the cycle over the period of the 1970s and early 1980s.
8. These factors can normally be measured separately only if an additively-decomposable measure of dispersion is being used. The square of the coefficient of variation is one such measure. The variance of logs is another [Cowell (1977)].
9. Presumably, educational differentials increase faster for younger people because they have a longer time to reap the benefits from their extra human capital. Lollivier and Payen (1990) have noted that, for France, in times of overall rises in real earnings, the pay of those less qualified rises comparatively little, but in a fashion which is not dependent on age. The pay of those with higher levels of qualifications increases faster, but the effect is strongly dependent on age.
10. The finding by King *et al.* (1992, p. 407) that the pattern of change in the relative supply of highly educated workers “contributes nothing” to the explanation of changes in educational differentials appears to be based on data for the 1980s alone.

Annex 5.A

THE MEASUREMENT OF INEQUALITY¹

This annex discusses the appropriate choice of inequality measures. It explains the reasons for the approach taken in this chapter, distinguishes between the concepts of “inequality” and “polarisation” (the “disappearing middle”), and discusses ways of accounting for change in inequality over time.

Scalar inequality indices

Studies of changes in inequality rely heavily on appropriate measures. Single figures, or “scalar measures”, are a succinct way of summarising trends and are especially valuable, as in the case of this chapter, when the survey concerns many countries over a period of time. There are two serious, potential shortcomings, however. Not only can different indices produce different, and potentially conflicting, descriptions of inequality trends, but single figures can conceal information on the structure of inequality and the way in which it is changing.²

Different indices tend to “disagree” about magnitudes and even directions of change in inequality largely because they place different weights on changes at particular parts of the distribution; for example, the variance of logs measure and the Atkinson indices (with high inequality aversion) are especially sensitive to changes at the lower end of the distribution, while the Gini coefficient is most sensitive to transfers in the neighbourhood of the mode. Nevertheless, many common indices of inequality give the same ranking of two different earnings distributions whenever the Lorenz curves do not cross. These indices include the Gini, Theil, Theil-Bernouilli, Atkinson, and exponential measures, and the coefficient of variation. When the Lorenz ordering is ambiguous – *i.e.* when neither of the Lorenz curves lies consistently above or “dominates” the other – these measures may yield different rankings.

Karoly (1992) and Green *et al.* (1990) illustrate this potential shortcoming of scalar measures. Karoly applies ten inequality measures to United States Current Population Survey earnings data from 1967 to 1986.³ The results show that the magnitude of the change in inequality varies according to the measure used; moreover, in certain cases, there are differences in the measured direction of the change. Green *et al.* apply a similar range of measures to data from the Luxembourg Income Study to a number of countries, and find that the ranking depends on the choice of indicator. Nevertheless, Karoly finds that the general United States pattern of trends in inequality is robust with respect to the choice of the inequality index.

Percentile ratios

Disaggregated approaches are required to reveal more about the structure of inequality and how it is changing. A first step is to provide a more complete statistical description of the way in

which inequality has been changing over time by focusing on selected parts of the earnings distribution. A common approach, used in this chapter, is to tabulate the ratios of earnings at the top and bottom deciles (or upper and lower quartiles) relative to median earnings? Growing inequality is indicated by a “fanning out” of the ratios over time. These changes must be interpreted with some caution since there is no simple relationship between changes in percentile ratios and structural changes in the earnings distribution. A given change in percentile ratios may be the result of one of a number of different types of change in the underlying distribution; in particular, small movements around the chosen percentile points can produce similar changes in the percentile ratios to changes throughout the distribution.⁵

The “disappearing middle”

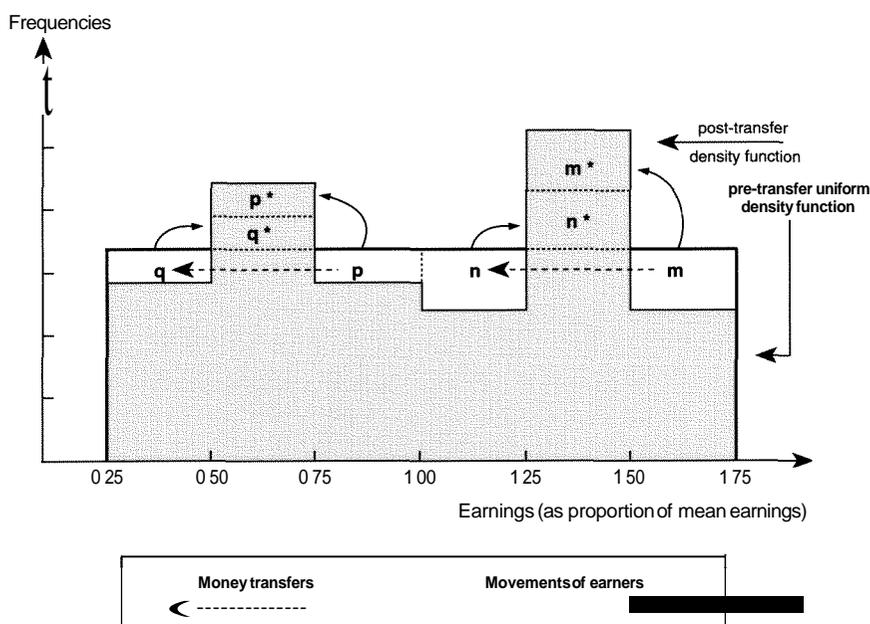
Much of the U.S. literature on growing inequality in the 1980s claimed to show that what had been occurring was the impoverishment of the “middle class”. Empirical examination of these ideas requires some definition of the “middle” – and many different definitions were used, resulting in some confusion. In a recent proposal, Foster and Wolfson (1992) carefully distinguish between the concepts of inequality and “polarisation”, a term they use in preference to “the disappearing middle”, and give their concept of polarisation a precise statistical meaning.

Chart 5.A.1 illustrates the difference between the concepts of inequality and “polarisation”. It shows two simple hypothetical earnings distributions. The first, a uniform density, is shown by a dashed line. The second, shown by a solid line, is bi-modal, with a depleted middle. Wolfson (1992) argues that, according to any sensible definition of polarisation, this latter density is the more polarised. However, it is less, rather than more unequal, according to any inequality measure consistent with the Lorenz criterion. This follows from the fact that the bi-modal distribution can be derived from the uniform distribution by two sets of “progressive mean-preserving redistributive transfers” in the sense of Atkinson (1970), in the way illustrated in the chart. By construction, the bi-modal distribution is at the same time more polarised and less unequal than the uniform distribution from which it was derived.

In the literature on the “disappearing middle”, some authors have used scalar inequality measures. However, it is clear from the above that these measures are inappropriate. Other authors, on the other hand, have used quintile earnings shares, or the fraction of the population in various income ranges defined in terms of the mean or median earnings. However, neither of these latter alternatives are necessarily improvements, as Chart 5.A.1 shows. While the share of the middle

Chart 5.A.1

Illustration of the distinction between polarisation and inequality



Source: Wolfson (1992)

quintile is lower in the bi-modal distribution, indicating a higher level of polarisation, the share of the middle three quintiles is higher. Similarly, while the share of the population with earnings within 25 per cent of the median (or mean) is lower in the bi-modal distribution, that of the population within 50 per cent of the centre is higher. Thus, statistics that count the share of the population with “near middle” incomes may fail to capture changes in polarisation. Experimentation with different ranges is required.

Decompositions of grouped data

When the necessary data are available, it is possible to consider the contribution made to inequality by variations in earnings between and within population groups, defined by characteristics such as type of worker, type of job, industry, region, etc.⁶ Decomposing measured inequality in this way enables us to distinguish the effects on the earnings distribution of changes in the number of earners in different groups, and of changes in earnings themselves.

At the crudest level, it is possible to measure between-group earnings differentials simply by using the raw data to compare over time the average earnings for groups defined by, for example, sex, education or age. Less crude is the use of data standardized for the effect of other factors, for example by means of regression analysis. By estimating separate regressions for each of a number of years, it is possible to observe how the coefficients representing the effects of sex, education and work expe-

rience change over time. Using this approach, within-group inequality can be measured by the distribution of residuals. Changes in within-group inequality can then be examined by inequality indicators such as the decile ratios of this distribution.

A related approach to analysing the impact of structural changes in the earnings distribution is “shift-share” analysis. This approach, used in this chapter, examines how the earnings distribution would have changed over time on the assumption that one structural characteristic had not changed from what it was in a chosen base year. If, for example, the structural characteristic of interest is the age distribution, then – assuming other distributional characteristics retain their end-year values – it is possible to compute what the end-year earnings distribution would have looked like if the age structure had not changed from the base year. Comparing this hypothetical distribution with the actual one provides an estimate of the effect of changing age structure on the earnings distribution.

While this approach has proved enlightening in a number of studies, it does have some disadvantages. It is not particularly useful in a situation where a number of structural changes have occurred simultaneously, because identifying and assessing the relative importance of different changes is difficult. It also ignores relationships between the components.

Shift-share analysis is most easily applied using additively decomposable inequality indices, providing a decomposition in which the contributions to inequality of the separate factors sum

to the overall change in inequality. Changes in inequality may then be partitioned into “between-group” and “within-group” changes, the former in turn reflecting both changes in the numbers in the different groups and changes in the earnings they receive? This approach can decompose both the level of inequality in a given year and the trend in inequality over time. In the latter case, there are the following three components; the first two sum to the changes in inequality due to changes between groups:

- i) changes in subgroup population shares;
- ii) changes in the relative mean earnings of the different subgroups;
- iii) changes in within-group inequality.

Choice of population earnings variable and unit of analysis

A particular difficulty in drawing together results from different studies is that the populations under examination are likely to differ from study to study. Narrowly defined, relatively homogeneous populations – e.g. males working full-time and year-round (as opposed, for example, to the population of all workers with earnings during the year) – enable concentration on a particular set of structural changes in the labour market, abstracting from seasonal changes and some demographic shifts. However, this concentration may mean that certain earn-

ings trends of central policy concern – changes over time in the earnings of part-time versus full-time workers, for example – are ignored.

Inequality and welfare

Information on changes in inequality does not, by itself, reveal whether countries are better or worse off, because the changes may be accompanied by increases in overall living standards. Assumptions about the terms of society’s trade-off between inequality and average living standards are needed in order to decide whether the overall change improves welfare or not. Many of the commonly used summary measures (relative mean deviation, variance of logarithms, Gini coefficient, Theil’s measure) have the property of being invariant to equal increases in earnings throughout the distribution; they do not allow for the differences between inequality in a wealthier society and in a poorer one. New methods for tackling that question have recently been proposed by Jenkins (1993).

Finally, no standard measure of inequality takes account of earnings mobility; the welfare assessment of a given degree of inequality (or inequality change) is likely to differ if it is considered that individuals have a reasonable chance of moving out of the lower deciles, or dead-end jobs. Evaluation of earnings mobility requires panel data, to follow the fortunes of individuals over time.

NOTES

1. This annex is based on a report commissioned by the Secretariat from Donald Verry of University College, London, supplemented by material supplied by Michael Wolfson of Statistics Canada. Since the word “inequality” is the term preferred in the technical literature, it is also employed here.
2. For a discussion of the welfare interpretations of different scalar indices, see Sen (1973).
3. The measures are: **i)** the coefficient of variation; **ii)** the relative mean deviation; **iii)** the Gini coefficient; **iv)** the variance of logs; **v)** Theil’s entropy measure; **vi)** the mean logarithmic deviation; and **vii)-x)** the Atkinson index with four values (0.5, 1.0, 1.5, 2.0) of the inequality aversion parameter, e .
4. Sometimes, and more correctly, the term “first decile” is taken to refer to all earnings lying in the bottom tenth of the distribution of earnings. In that case, the statement would refer to the ratios of the upper limit of the bottom decile and the lower limit of the top decile to the median, and similarly for the quartiles.
5. A striking example is provided by Adams (1988). In a hypothetical earnings distribution of 100 earners, the worst paid receives £1, the next worst paid £2 and so on up to the highest earner who receives £100. Changes in inequality are measured by the ratio of the highest to lowest deciles. The initial ratio is 9. Now, this ratio cannot distinguish between the case where the lowest paid 50 individuals suffer a loss of earnings of £1 and the 50 best paid individuals receive an extra £1 of earnings, and that in which only the tenth lowest paid worker loses £1 of earnings and the tenth highest paid receives an increase of the same amount. In both cases the decile ratio increases from 9 to 10.1. A similar problem applies to the ratios of the upper and lower deciles to the median.
6. In econometrically estimated earnings functions allowing wages to vary by sex, the joint effect of education and work experience (or age) tends to account for only about one-third of the variation in earnings between individuals. This suggests that growth in the variability of earnings within such groups has the potential to make a large contribution to the overall increase in the inequality of earnings.
7. Jenkins (1993) provides a decomposition of the mean logarithmic deviation inequality measure and its changes. Gottschalk and Joyce (1992) use a decomposition of the square of the coefficient of variation.

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