

The Employment of Nations—A Primer

by Richard Rogerson

Richard Rogerson is the Rondthaler Professor of Economics at Arizona State University and a research associate at the Federal Reserve Bank of Cleveland. He thanks Nathan Porter and Yasuo Terajima for research assistance and the National Science Foundation for financial support.

Introduction

One of the striking macroeconomic developments of the last 30 years has been the marked rise in European unemployment in comparison to that in the United States. As of 2000, U.S. unemployment was basically unchanged from 1970 at around 4 percent, whereas over the same period, the unemployment rate in the European Union almost tripled, increasing from around 3 percent to almost 9 percent. Not surprisingly, a relatively large literature has emerged that both documents various aspects of this differential evolution of unemployment rates and tries to account for it.¹

The premise of this paper is that our understanding of this and other related phenomena will likely be facilitated by placing them in a broader context. In particular, since economics is often defined as the study of how scarce resources are allocated, I follow the standard economic approach of approaching the labor market from the perspective of documenting differences in resource allocations. Because labor is a key input in the market production of goods and services, it follows that how much time is allocated to the market production of goods and services is likely to be an

important feature of the resource allocation achieved by an economy. While economists have long recognized variation in labor input as a (if not *the*) central element in business cycle fluctuations, in contexts other than business cycles, variation in labor input has received much less attention. The objective of this paper, then, is to document the empirical properties of the low-frequency component of labor input in a cross section of industrialized countries over the period 1960–95. This is done using both aggregate data as well as data that are disaggregated by age and sex.

While the larger issue of interest is that of the allocation of time, this study will concern itself almost exclusively with employment patterns. As such, it abstracts from differences in such things as workweeks and vacation days. Obviously, it would be of interest to

■ 1 The literature is too large to reference exhaustively. See, however, Bertola and Ichino (1995), Millard and Mortensen (1997), Ljungqvist and Sargent (1998), Blanchard and Wolfers (2000), and Blanchard (2000).

supplement the analysis provided here with information on these additional aspects of time allocation, but due to data limitations, I do not undertake it in any great detail here. I also restrict attention to a study of industrialized countries, since there are reasons to believe that countries at very different stages of development face considerations which make their time-allocation problems less comparable. Specifically, countries with large rural or agricultural populations may behave quite differently.

The paper presents its findings in the form of nine stylized facts. I will not present them all in this introduction, but a few are worth emphasizing. First, large and persistent differences in employment-to-population ratios are common throughout the period. While differences have become larger since 1970, persistent differences exist throughout the entire sample and are in no way a novel feature of the post-1970 world. Second, countries move about considerably in the distribution of employment-to-population ratios. Some countries move up, and some countries move down. Third, and perhaps most important, a comparison of aggregate and disaggregate data shows that there is substantial variation in disaggregated labor input that is obscured when examining aggregate data. When employment-to-population ratios change in a persistent fashion, the changes are distributed across groups disaggregated by sex and age in a very disproportionate fashion. Because changes across demographic groups display so much variation, it seems natural to think that they contain a great deal of information that will be helpful in sorting out the causes of the aggregate changes.

The paper is unapologetically atheoretical. There is no attempt to discuss what the facts uncovered have to say about various models of the labor market or various explanations for differences in labor market outcomes. Rather, the objective here is to simply lay out the facts that a general theory of low-frequency movements in employment should be able to account for.

An outline of the paper follows. The next section gives a brief description of data sources. Section II examines the aggregate data and presents the main stylized facts that follow from them, while section III does the same for the data disaggregated by age and sex. Section IV discusses some additional measures of labor input, and section V concludes.

I. Data

The measure of labor input that I use in this study is employment to population. For the aggregate analysis, I use the ratio of total employment to the population of individuals between the ages of 15 and 64.²

All of the data used in this analysis come from Organisation for Economic Co-operation and Development (OECD) sources, which in turn are based on surveys carried out by individual member countries. Aggregate data on employment relative to the population of individuals aged 15–64 are taken from various issues of the OECD publication *Historical Statistics*. Data on employment rates disaggregated by sex and age are taken from various issues of the OECD publication *Labor Force Statistics*. This publication actually provides information on participation rates and unemployment rates, from which I have computed the employment-to-population ratios. The disaggregated data are not available for as many countries or for as long a time, so the time period and countries analyzed differ for the two exercises. Section IV of the paper, which considers some additional measures of labor input, relies on data that appear in various issues of the OECD publication *Employment Outlook*.

As is true for any study that relies on cross-country data from country-level sources, an important caveat that must be mentioned is the possibility that the data are not strictly comparable. Survey procedures may differ from country to country, as may classification procedures. Additionally, there are occasional changes in the accounting methods for some countries.³ For examining cross-country differences in employment, these accounting issues do not appear to be very significant. The OECD publications listed above provide documentation of the various country surveys and definitions used to determine employment,

■ **2** Note that this measure includes employed individuals above 65 in the numerator but not in the denominator. It is obviously debatable whether this measure is preferable to the employment-to-population ratio for all individuals or the employment-to-population ratio for all individuals above the age of 15. Since much of the analysis is also carried out with data that are disaggregated by age and the basic findings there are similar, this is probably not an important issue for the purposes of this paper.

■ **3** For the most part, these did not appear to be too serious.

and there is a high degree of uniformity of the criteria. Basically, in order to be counted as employed, an individual has to have either worked at least one hour for pay during the reference period, had a job from which he or she was absent (due to sickness, vacation, strike, weather, and so on), been self-employed, or been an unpaid employee in a family business.⁴ Having said this, I will take the employment data at face value, and no additional space will be devoted to this potentially important measurement issue. However, in section IV, when data are presented on hours of work and part-time versus full-time employment, measurement issues are likely to be substantial, and the appropriate caveats will again be raised.

II. Facts about Employment Rates I: The Aggregate Data

This section focuses on patterns found in the aggregate data. I examine 18 countries over the period 1960–95.⁵ Because we are interested in low-frequency rather than high-frequency movements, I present five-year averages at five-year intervals.⁶ In each case, the indicated year is the center of the five-year period used to construct the average; that is, data for 1985 represent the average for the period 1983–87.⁷ Table 1 presents the data on aggregate employment relative to the total population for individuals between the ages of 15 and 64 for 18 countries plus some summary statistics: the mean, standard deviation, and the 85:15 ratio for the cross-sectional distribution in each year. The 85:15 ratio is the ratio of the highest to the lowest value for the employment ratio after having excluded the top two and bottom two values.⁸ I report this rather than the ratio of maximum to minimum values in order to downplay the possible role of extreme values. Note also that the mean value reported is the simple mean of the cross-country observations and does not weight countries by their size.

Some of the important features of these data are described next.

Fact 1. The average employment rate remained roughly constant over this period.

As table 1 indicates, there is no evidence of a secular trend in the average employment rate across countries. The average values from 1980 onward are slightly lower than the average values before 1975, but by less than one-half of a percentage point. The average value does fluctuate somewhat over time, and the fluctuations seem larger in the post-1975 period.

Fact 2. Differences in employment rates across countries are large.

No matter which of the cross sections we look at, the variation in employment rates is strikingly large. For the sample as a whole, the maximum values exceed 80 percent, whereas the lowest values are less than 50 percent. The standard deviations are also large, though it can be difficult to gauge what constitutes large in this context. The 85:15 ratio is perhaps more informative in this regard. Note that this ratio exceeds 1.20 for each cross section. To understand the significance of this value, note that in the largest postwar recession in the United States (1982), the ratio of employment to population at the peak was only about 1.03 times larger than it was at the trough. It is particularly significant that the large difference in employment rates across countries is not a phenomenon that emerged after the early 1970s. Cross-country differences were large even in the 1960–70 period.

■ 4 We note that cross-country studies of unemployment are potentially more problematic because of differences in criteria across countries, particularly in what constitutes searching for employment. However, the OECD does publish a series of “standardized” unemployment rates that attempts to correct for cross-country differences in measurement.

■ 5 See Blanchard and Wolfers (2000) for a presentation of the low-frequency movements in unemployment rates over this period.

■ 6 An alternative procedure to isolate the low-frequency component would be to use the trend component generated by applying the Hodrick–Prescott filter to the data. The results of using this alternative procedure are very similar and hence are not reported.

■ 7 The exception to this is 1960. Due to data limitations, 1960 simply refers to the average for 1960–62.

■ 8 More accurately, this is really the 83:17 ratio.

TABLE 1

Aggregate Employment/Total
Population, Ages 15–64

	1960	1965	1970	1975	1980	1985	1990	1995
Canada	58.9	60.9	61.3	63.4	65.5	66.1	68.9	67.3
United States	62.2	62.9	64.5	64.4	66.8	68.5	72.4	73.4
Japan	74.3	71.5	71.1	69.7	70.3	70.6	72.5	74.4
Australia	64.6	66.6	68.8	67.5	65.5	64.7	67.6	67.4
New Zealand	62.9	63.7	64.1	64.8	64.2	62.3	66.8	69.2
Belgium	59.5	60.5	61.3	61.1	58.4	54.5	56.6	56.3
Denmark	70.0	72.2	74.3	73.3	73.1	75.3	76.8	74.1
France	68.6	66.4	65.8	65.4	63.5	59.4	60.1	58.9
Germany	70.1	69.6	68.6	65.7	63.6	62.5	65.8	65.2
Ireland	64.4	64.3	62.0	58.0	57.0	51.7	52.7	55.2
Italy	62.6	58.8	56.3	55.6	55.7	54.0	55.0	52.5
Netherlands	61.1	59.9	57.3	54.5	53.6	53.3	61.5	65.3
Norway	63.6	63.0	64.1	68.9	73.8	76.0	74.3	74.2
Portugal	59.2	59.8	62.2	64.5	63.8	64.6	68.9	67.3
Spain	59.9	59.8	60.1	58.1	50.2	45.4	48.9	46.4
Sweden	73.0	71.9	72.7	76.3	78.7	79.3	79.8	70.4
Switzerland	78.2	78.7	77.5	75.3	73.7	74.6	81.7	79.9
United Kingdom	70.8	71.4	70.4	70.8	68.7	65.7	70.7	68.6
Mean	65.7	65.7	65.7	65.4	64.8	63.8	66.7	65.9
Standard deviation	5.81	5.71	5.91	6.38	7.67	9.45	9.30	8.82
85:15 ratio	1.23	1.20	1.21	1.26	1.32	1.41	1.40	1.34

SOURCES: Organisation for Economic Co-operation and Development, *Historical Statistics*, various issues; and author's calculations.

Fact 3. The spread of employment rates across countries changes substantially across time.

Whether one looks at the standard deviation or the 85:15 ratio, the spread of employment rates across countries has exhibited substantial change over time. The distribution became significantly more spread out during the first part of the sample period, and though

it subsequently became more compressed, there has still been a significant spreading out over the period as a whole.

Fact 4. Differences in employment rates across countries are persistent.

To see this, I report the correlation matrix for the country-level observations across time in table 2.

TABLE 2

Correlation Matrix for County-Level
Observations across Time

	1960	1965	1970	1975	1980	1985	1990	1995
1960	1							
1965	.95	1						
1970	.88	.96	1					
1975	.76	.84	.93	1				
1980	.66	.72	.81	.94	1			
1985	.59	.65	.75	.89	.98	1		
1990	.60	.68	.77	.87	.93	.97	1	
1995	.53	.62	.69	.76	.84	.89	.95	1

SOURCES: Organisation for Economic Co-operation and Development, *Historical Statistics*, various issues; and author's calculations.

Note that at one lag (five years), the average correlation coefficient exceeds 0.95. Obviously, this indicates a great deal of persistence.⁹ Note also, however, that the average persistence decreases as the number of lags increases. At four periods (20 years) the average correlation drops to 0.70. It is also interesting to note that these correlations are not driven by changes that occurred before and after the oil shock of the mid-1970s. For example, the correlation between 1980 and subsequent years looks very similar to the pattern of correlations between 1960 and subsequent years. The fact that at longer horizons the correlations decrease considerably suggests our next fact.

Fact 5. There is considerable mobility within the distribution.

There are several ways to motivate this fact. One is to simply look at the changes in individual countries over the entire sample. Table 3 reports changes over three horizons—1960 to 1995, 1960 to 1970, and 1985 to 1995. This split is of interest because the latter two lie on either side of the 1970s' oil shocks.

From the perspective of mobility, the key is dispersion in changes. The dispersion of changes over each period in table 3 is large. Over the 1960–95 period, some countries see their employment rates climb by more than 10 percentage points, while others see their employment rates fall by more than the same amount. Moreover, there is very little correlation between a country's starting value in 1960 and the subsequent change; the correlation is only -0.18 . It is important to emphasize that the situation is not characterized as one in which countries simply differ in the extent to which their employment rates decrease—almost half of the countries experience an increase in their employment rates over this period, and as we know from above, there is virtually no secular trend in the average employment rate across these countries.

■ 9 Keep in mind that our observations are themselves five-year averages, which obviously induces some persistence relative to what would be found using annual data.

TABLE 3

Changes in Employment Rates

	Δ (1960–95)	Δ (1960–70)	Δ (1985–95)
Canada	+8.4	+2.4	+1.2
United States	+11.2	+2.3	+4.9
Japan	+0.1	-3.2	+3.8
Australia	+2.8	+4.2	+2.7
New Zealand	+6.3	+1.2	+6.9
Belgium	-3.2	+1.8	+1.8
Denmark	+4.1	+4.3	-1.2
France	-9.7	-2.8	-0.5
Germany	-4.9	-1.5	+2.7
Ireland	-9.2	-2.4	+3.5
Italy	-10.1	-6.3	-1.5
Netherlands	+4.2	-3.8	+12.0
Norway	+10.6	+0.5	-1.8
Portugal	+8.1	+3.0	+2.7
Spain	-13.5	+0.2	+1.0
Sweden	-2.6	-0.3	-8.9
Switzerland	+1.7	-0.7	+5.3
United Kingdom	-2.2	-0.4	+2.9

SOURCES: Organisation for Economic Co-operation and Development, *Historical Statistics*, various issues; and author's calculations.

As suggested earlier, it is significant that there is substantial mobility even abstracting from the 1970–85 period. In the period 1960–70, the range of changes exceeds 10 percentage points, and the same holds true for the period 1985–95 as well. It is also of interest to note the heterogeneity of experiences for countries that experience similar changes over the full sample. Specifically, France, Italy, and Spain all experience drops in their employment rates of around 10 percent. However, Italy experiences over half of this drop in the first 10 years, while France experiences roughly a third in the first decade, and Spain experiences virtually no decline in this period. It should also be noted that there is virtually zero correlation between changes in the first decade and changes in the final decade.

Lastly, to highlight the range of mobility experiences found in the data, consider the evolutions of the Netherlands and Sweden. Consider first the Netherlands. Beginning in 1965, the employment rate in the Netherlands begins a steady decline, losing almost 8 percentage points and bottoming out in 1985. Subsequently, however, the rate increases by more than 10 percentage points, and the Netherlands climbs significantly in the distribution. Next consider Sweden. Between 1960 and 1970, Sweden's employment rate is relatively constant, after which it increases substantially, raising Sweden to the top of the distribution between 1980 and 1990. Subsequently, however, the employment rate falls back to a value very near its level in the 1960–70 period.

TABLE 4

**Correlation between Employment
and Unemployment Rates**

	Trend components	Cyclical components
Canada	.96	-.92
United States	.53	-.92
Japan	-.30	-.60
Australia	-.42	-.90
New Zealand	-.97	-.90
Belgium	-.89	-.76
Denmark	.73	-.88
France	-.99	-.77
Germany	-.87	-.77
Ireland	-.98	-.85
Italy	-.88	-.72
Netherlands	-.32	-.52
Norway	.79	-.81
Portugal	.86	-.77
Spain	-.98	-.89
Sweden	.10	-.93
Switzerland	-.36	-.57
United Kingdom	-.94	-.97

SOURCES: Organisation for Economic Co-operation and Development, *Historical Statistics*, various issues; and author's calculations.

**A Digression on
Unemployment
versus Employment**

The previous analysis has focused on employment-to-population ratios as the measure of labor input. As noted earlier, many studies focus instead on unemployment rates. I have argued that from the perspective of understanding differences in resource allocations, it is differences in labor input that are of primary interest. But is the choice really substantive, or is it the case that movements in employment and unemployment are close to mirror images of each other, in which case the issue is largely irrelevant? In this section I present some evidence on the matter. It turns out that while movements in employment and unemployment are highly negatively correlated at cyclical frequencies, this is not necessarily true at lower

frequencies. To investigate this I examined the series for employment-to-population ratios used earlier and the standardized unemployment rate series produced by the OECD for the period 1960–95. For each country I apply the Hodrick–Prescott filter to each series and compute the trend and cyclical components. For each country I compare the behavior of the two trend series and the two cyclical series, in each case computing the correlation between the two series. Table 4 displays the correlations.

The two columns of table 4 tell quite a different story. The first column shows that there is really no tendency for trend increases in the employment rate to be associated with either trend increases or decreases in the unemployment rate; while there are many values that are close to negative one, there are also several that are close to positive one, as

well as several that are not close to either of the extreme values. Reflecting this, the average of the values in the first column is -0.27 . On the other hand, the values in the second column are all negative, are all greater than 0.5 in absolute value, and all have an average value of -0.80 .

The message from this is that when studying low-frequency movements in the labor market, one may get a very different picture depending upon the measure one uses. Having said this, it would appear that in at least one context—that of the “European unemployment problem” mentioned in the introduction—the differences are likely to be quantitative rather than qualitative in nature, at least in terms of changes over this period. The main reason for this is that many of the European countries that experienced large decreases in employment over the sample period, including Belgium, France, Germany, Italy, Ireland, and Spain, are countries for which the correlation between employment and unemployment is close to negative one.

III. Facts about Employment Rates II: The Disaggregated Data

This section examines employment rates from the perspective of data that are disaggregated by age and sex. As mentioned earlier, data availability limits the scope of the analysis in terms of time period and the set of countries that can be examined. I note first that using the available data, one can establish the equivalent to facts 2, 4, and 5 for the disaggregated data as well: there are large differences in the rates across countries, and they are persistent, but there is also substantial mobility. Hence, in this section I focus on additional findings that the disaggregated data present us with. A basic issue to explore here is the extent to which the aggregate data capture the differences that exist across countries at a point in time and the changes that take place across countries over time.

We begin by examining the cross sections for 1995 for a set of 15 countries. For the time-series analysis we are restricted to a much smaller set of countries, but it is of interest to examine one cross section for a much larger set. In this case, the data represent a three-year average, taken over the period 1994–96. Table 5 presents the data and several summary statistics. The 80:20 ratio represents the ratio of

highest to lowest values after removing the two highest and lowest values for each category.

Several features of the data in table 5 are worth remarking on. First, the basic shape of the life-cycle employment rate profile is the same across all countries for both men and women. The basic shape is that of an inverted U. The peak in most cases occurs for the 35–44 age group, though in some cases it occurs for the 45–54 age group. However, although the basic shape is the same across countries, there are important quantitative differences in the profiles across countries. In particular, the disaggregated data show that the large differences in aggregate data do not reflect an aggregation phenomenon; that is, it is not the case that aggregate differences are accounted for by different age distributions across countries that have very similar life-cycle profiles. Examination of tables 5(a) and 5(b) lead to the following conclusions.

Fact 6.1. Differences in employment rates are much larger for women than for men.

Fact 6.2. Differences in employment rates are much larger for young and old individuals than for prime-aged individuals.

These are pretty much self-evident from table 5. For example, the 80:20 ratios are U-shaped for both men and women, and the values are much higher for women than for men with the lone exception of the over-65 group. It follows that many of the differences in aggregate data are driven by differences among women and men who are not of prime age. Specifically, the tables show that the highest correlation between disaggregate and aggregate values occurs for prime-aged women—the correlation of employment rates for women in the two age groups 35–44 and 45–54 is 0.86 . In contrast, the correlation coefficient between aggregate employment rates and those for men aged 35–44 is only 0.33 and 0.41 for those aged 45–54. In fact, excluding workers over the age of 65, the lowest value of this correlation occurs for males aged 35–44. However, even though differences are smallest for prime-aged males, it is worth noting that the data still support the following conclusion.

T A B L E 5

**Employment Rates over the
Life Cycle, 1995**

A. Men	15-24	25-34	35-44	45-54	55-64	65+
Canada	52.2	81.7	84.6	82.8	54.4	10.1
United States	58.0	88.0	88.6	85.7	63.7	16.2
Japan	44.9	94.3	96.1	95.7	80.9	36.4
Korea	27.6	90.5	95.2	92.3	78.8	41.6
New Zealand	61.3	86.2	87.7	87.1	62.9	9.9
Belgium	29.3	86.9	89.0	82.5	34.8	2.3
Denmark	68.5	87.0	88.5	86.1	60.5	4.3
France	22.0	83.7	88.7	86.3	38.7	2.6
Germany	51.4	83.6	90.4	87.4	47.4	4.2
Ireland	37.7	81.1	81.7	77.2	59.0	15.0
Italy	26.4	71.1	88.6	90.2	55.5	6.0
Portugal	42.7	86.4	91.9	86.6	58.9	21.8
Spain	26.6	72.2	83.2	80.3	48.8	2.8
Sweden	41.3	79.0	85.0	86.4	65.0	13.2
United Kingdom	61.2	84.2	86.0	85.8	56.6	7.5
Mean	43.4	83.7	88.3	86.2	57.7	12.9
Standard deviation	15.0	6.2	4.0	4.5	12.5	12.1
Coefficient of variation	.35	.07	.05	.05	.22	.93
80:20 ratio	2.30	1.11	1.09	1.09	1.37	7.79
Correlation with aggregate aged 15-64	.66	.59	.33	.41	.45	.30
Correlation with men aged 35-44	-.06	.68	1	.86	.44	.65

B. Women

	15–24	25–34	35–44	45–54	55–64	65+
Canada	51.6	69.4	71.8	66.4	33.9	3.3
United States	55.2	70.4	73.8	72.2	47.5	8.5
Japan	44.5	57.6	63.9	68.1	47.5	15.5
Korea	39.3	47.6	61.6	59.6	49.9	20.5
New Zealand	55.4	62.0	70.0	73.6	38.3	3.1
Belgium	24.0	69.9	63.1	45.5	12.5	0.9
Denmark	60.7	72.6	80.9	73.7	37.8	1.2
France	18.3	65.2	69.3	67.3	28.6	1.3
Germany	48.6	65.8	67.7	62.2	24.5	1.5
Ireland	34.0	62.1	45.7	36.2	20.3	2.7
Italy	21.6	46.9	51.8	47.4	20.2	1.7
Portugal	33.5	73.0	74.5	61.0	34.1	9.7
Spain	21.4	44.9	43.1	32.0	17.6	1.3
Sweden	41.9	73.9	83.0	85.3	59.9	4.6
United Kingdom	57.5	66.2	71.9	71.7	38.9	3.1
Mean	40.5	63.2	66.1	61.5	34.1	5.3
Standard deviation	14.4	9.8	11.7	15.0	13.6	5.9
Coefficient of variation	.36	.15	.18	.24	.40	1.11
80:20 ratio	2.56	1.53	1.44	1.62	2.35	7.46
Correlation with aggregate aged 15–64	.75	.63	.86	.86	.78	.32
Correlation with females aged 35–44	.60	.79	1	.92	.64	.06

SOURCES: Organisation for Economic Co-operation and Development, *Labor Force Statistics*, various issues; and author's calculations.

Fact 7. Differences in employment rates across countries, even for prime-aged males, are large.

To see this, simply recall the comment made earlier to put the 80:20 ratios in perspective. In postwar time series data for the United States, a value of 1.03 is big. Hence, values of 1.1 must also be viewed as large.

Fact 8. Differences in disaggregated employment rates are not proportional to differences in aggregate data.

Another way to phrase this is to say that when two countries have very different aggregate employment rates, the corresponding life-cycle profiles of employment rates are not simply shifted up or down in a parallel fashion, even controlling for sex. The relatively low correlations between prime-aged employment rates and the rates for other age groups (controlling for sex) indicate this. A few examples serve to illustrate the significance of this

point. The three largest economies of continental Europe, Germany, Italy, and France, all have employment rates at the aggregate level (or even for males) that are substantially lower than that of the United States in 1995. However, each of these countries has prime-aged employment rates for men that actually exceed the corresponding value for the United States! Yet, in sharp contrast, for the 55–64 age group the employment rate in the United States is roughly double that in these other countries. Spain has the lowest employment rates in the aggregate level, and this continues to hold when the data are disaggregated by sex. Canada, on the other hand, has a relatively high aggregate employment rate. Yet the employment rates for prime-aged males are roughly similar in these two countries. On the other hand, male youths in Canada are almost twice as likely to be employed as their Spanish counterparts, as is roughly true for females of all age groups in the two countries.

TABLE 6

Changes in Employment Rates:
1972 to 1995

A. Men	15–24	25–34	35–44	45–54	55–64	65+
Canada	-4.7	-9.9	-8.2	-7.7	-23.3	-7.4
United States	-8.6	-3.1	-4.5	-3.6	-12.1	-5.5
Japan	-10.3	-2.4	-0.9	-0.1	-4.1	-9.7
France	-33.7	-12.4	-9.6	-7.7	-32.4	-16.3
Germany	-18.5	-10.8	-7.1	-6.8	-26.6	-10.2
Italy	-16.0	-23.6	—	-5.0	-13.2	-1.4
Spain	-43.2	-21.1	-13.0	-14.0	-32.3	-22.5
Sweden	-22.8	-12.5	-8.6	-6.6	-16.3	-10.8

A. Women	15–24	25–34	35–44	45–54	55–64	65+
Canada	6.2	27.2	30.4	25.7	4.4	1.0
United States	7.5	24.4	23.8	18.7	7.3	0.2
Japan	-4.8	13.4	5.6	7.9	3.6	-0.6
France	-25.0	10.0	19.6	16.6	-8.1	-5.6
Germany	-13.3	15.0	17.9	13.3	-1.3	-4.3
Italy	-7.6	15.6	—	17.5	11.3	0.3
Spain	-29.4	16.9	18.5	5.5	-5.7	-6.5
Sweden	-14.9	11.3	12.9	16.5	15.4	-2.9

SOURCES: Organisation for Economic Co-operation and Development, *Labor Force Statistics*, various issues; and author's calculations.

Having examined the differences in life-cycle employment rates from a single cross section, I next turn to a look at the evolution of life-cycle profiles over time and across countries. For this exercise, data availability limits us to a set of eight countries—Canada, the United States, Japan, France, Germany, Italy, Spain, and Sweden, and the period 1972–95. The appendix contains a complete set of tables for the evolution of these life cycles over time. For the sake of illustration I focus on changes between 1972 and 1995. The data for 1995 are a three-year average centered on 1995, whereas the data for 1972 are simply an average of 1972 and 1973.¹⁰ Table 6 presents changes in life-cycle employment profiles, disaggregated by age and sex for eight countries.¹¹

A look at table 6 indicates a striking pattern for this period—in all countries there was a huge reallocation of employment away from males and toward females. In the table for males, every entry is negative. In the table for women, the entries are all positive for ages 25–54. A closer look reveals the following fact.

■ **10** Data for 1971 are not available for all countries, so the two-year average is used rather than further reducing the number of countries in the sample. It also seemed preferable to not use 1974 since this marks the beginning of the oil price shocks.

■ **11** Note that there are two missing values for Italy.

TABLE 7

Changes in Normalized Life-Cycle Profiles, 1972–1973 to 1994–1996

A. Men	15–24	25–34	45–54	55–64	Scale	Absolute deviations
Canada	1.00	.97	1.00	.77	.91	.26
United States	.91	1.01	1.01	.88	.95	.23
Japan	.82	.98	1.01	.96	.99	.26
France	.43	.95	1.01	.60	.91	1.03
Germany	.79	.96	1.00	.69	.93	.56
Italy	.69	.83	1.05	.82	.91	.71
Spain	.44	.89	.98	.69	.86	1.00
Sweden	.71	.95	1.02	.88	.91	.48
Standard deviation	.21	.06	.02	.12	.04	

B. Women	15–24	25–34	45–54	55–64	Scale	Absolute deviations
Canada	.66	.95	.94	.66	1.73	.79
United States	.78	1.04	.95	.80	1.48	.51
Japan	.82	1.19	1.03	.99	1.10	.41
France	.30	.85	.95	.56	1.39	1.34
Germany	.58	.95	.94	.70	1.36	.83
Italy	.44	.90	.95	1.36	1.67	1.07
Spain	.24	.92	.69	.43	1.75	1.72
Sweden	.62	1.00	1.05	1.14	1.18	.57
Standard deviation	.21	.11	.11	.31	.24	

SOURCES: Organisation for Economic Co-operation and Development, *Labor Force Statistics*, various issues; and author's calculations.

Fact 9. Changes in aggregate employment rates are associated with large changes in the shape of life-cycle employment-rate profiles.

This fact is really a time-series equivalent to fact 8. There we saw that if two countries have very different aggregate employment rates, the life-cycle profiles of employment rates are not simply parallel transformations of each other. What table 6 shows is that when the employment rate changes in a country, the life-cycle employment-rate profiles do not shift in a parallel fashion. Consider a few examples. Aggregate employment and male employment rates fall significantly over this period in France, Germany, Italy, and Spain. Yet the change is disproportionately accounted for by changes in the employment rates of young and old

workers. The changes would look even more skewed if we considered them relative to the starting values—in some countries, youth employment rates are falling by more than half. Similarly, female employment rates are actually increasing over this period in France, Germany, and Spain, yet despite this, there are massive decreases in the employment rates for female youths.

I next present this same information in a manner that can better highlight the relative contribution of parallel movements of the life-cycle profile against changes in the shape of the profile. I adopt the following procedure to normalize the shape of the life-cycle profile. Normalize the employment rate for the 35–44 age group to one, and then express all other values relative to this value. This profile of

relative values plus the actual employment rate for the 35–44 group completely describes the whole profile. This procedure is carried out for both the 1972 and 1995 data. Then, to summarize the changes in life-cycle profiles over time, I compute the ratio of the relative values and the ratio of the actual values for the 35–44 age group. I do this for both sexes for each of the countries in our sample, and table 7 presents the results. The column labeled scale indicates the ratio of the employment rate for the 35–44 group in 1995 relative to its value in 1972–73. The columns with age ranges show the ratios of the relative life-cycle employment profiles. The column labeled absolute deviations gives the sum of the absolute deviations of the four life-cycle points from one. Note that if the shape of the profile stayed the same but was shifted up or down proportionately, each of the first four columns would have a value of one, and the sum of absolute deviations would be zero. Hence, the last column is a measure of how much the shape of the profile is changing. Table 7 does not report data for the over-65 age group since its relatively low employment rates make it relatively unimportant from our perspective.

Consider the results for men first. It is striking that the values in the third column (ages 45–54) are so close to one. This implies that the shape of the life-cycle employment profile changes very little for prime-aged males. For the other age groups, the changes are much larger. Note that the scale factor is less than one for each country. Note also that the vast majority of the values in the table are less than one as well. Comparing the standard deviations of the various columns gives us a way to ascertain the extent to which the changes in scale dominate the changes in shape. For three of the four age groups, the standard deviation of the shape ratios exceeds the standard deviation of the scale factors.

Now consider the case of women. First note the magnitude of the scale factors—they are all much larger than one, indicating that in all countries the employment rate for women aged 35–44 increased. However, the rest of the entries are typically less than one, indicating that although the employment rates were increasing for most age groups in most countries, the increase was less than proportionate to the increase for prime-aged women. Once again, however, with the exception of Spain, the entries for the 45–54 age group are fairly close to one. Interestingly, however, for women the standard deviation in scale factors exceeds that of three of the four changes in

shape. This is the opposite of what was found for men.

Note the asymmetry of the changes for men and women. For men, the changes for prime-aged workers are much smaller proportionately than are the changes for other age groups. For women, the opposite is true. Changes are proportionately largest for prime-aged women. An important development is that in 1994–96, women’s life-cycle profiles increasingly resemble those of their male counterparts, whereas in the 1972–73 period, women’s profiles tended to be relatively flat.

A Closer Look at Sweden and the Netherlands

To illustrate the range of experiences that exists across countries, we now take a closer look at Sweden and the Netherlands for the period 1972–96. Recall from the analysis of aggregate data that these two countries follow quite different paths over this period. Sweden experiences a significant increase in its employment rate over the first part of the period and then witnesses a decline at the end that brings it back roughly to where it began. In contrast, the Netherlands experiences a large decrease in its employment rate over the first part but subsequently experiences a large increase and ultimately ends the period with a higher employment rate. What happened to the life-cycle employment profiles for these countries over this period? That is the issue I turn to next. I examine the profiles at the dates 1972, 1980, 1985, 1990, and 1995. In each case, the data represent a three-year average with the given year as the midpoint of the period, except for the initial point, which is a two-year average based on 1972–73. Data limitations require that we focus on three age groups: 15–24, 25–54, and 55–64. For each year, I present normalized profiles that give the relative employment rates for the two extreme age groups relative to the 25–54 age group. I also report a scale factor that gives the employment rate of the 25–54 group relative to its value in 1972. Table 8 gives the results. These data are aggregated for men and women.

T A B L E 8

Changing Profiles in Sweden and the Netherlands

A. Sweden

	$\frac{ER15-24}{ER25-54}$	$\frac{ER55-64}{ER25-54}$	Scale
1972	.76	.79	1.00
1980	.75	.75	1.10
1985	.68	.72	1.13
1990	.71	.76	1.14
1995	.50	.76	1.03

B. Netherlands

	$\frac{ER15-24}{ER25-54}$	$\frac{ER55-64}{ER25-54}$	Scale
1972	.93	.77	1.00
1980	.71	.56	1.06
1985	.64	.44	1.04
1990	.76	.41	1.21
1995	.75	.40	1.28

SOURCES: Organisation for Economic Co-operation and Development, *Labor Force Statistics*, various issues; and author's calculations.

The differences across the two countries are rather striking. First consider the case of Sweden. As the scale column indicates, the employment rate for prime-aged workers mimics the behavior of the aggregate employment rate: a substantial increase between 1972 and 1980, relative constancy over the 1980s, and then a decline back to its earlier value. Moreover, until the final year, the relative life-cycle profile of employment rates changes little. However, when the aggregate employment rate falls in 1995, the shape of the profile changes a good deal, as the employment rate for young workers falls disproportionately. Next, consider the case of the Netherlands. What is most striking in the Netherlands is that the behavior of the prime-aged employment rate does not really mimic at all the behavior of the aggregate employment rate. Whereas the aggregate employment rate drops continuously between 1970 and 1985, the prime-aged-employment rate experiences a mild increase between 1972 and 1985. Subsequently, it does mirror the large increase between 1985 and 1995 found in the aggregate rate. In contrast to the case of Sweden, however, the shape of the life-cycle employment

profile changes substantially. Over the period 1972–85, there are massive relative downward shifts for both young and old workers. Employment rates for these groups fall relative to those for prime-aged individuals by roughly a third. Moreover, over the period 1985–95, although the employment rate for young individuals partially recovers, the relative rate for older individuals falls slightly.

A Closer Look at Prime-Aged Males

Prime-aged males are a group that attracts considerable attention in cross-country comparisons of labor market outcomes. One reason for this interest is that they correspond to a group whose main activity is presumed to be market work. They are too old to be in school, too young to be retired, and, even though social norms are changing, they typically do not have primary responsibility for child care or other family situations. Although fact 7 explicitly deals with differences among prime-aged males in the 1995 cross section (noting

TABLE 9

Changes in Employment Rates:
1972 to 1995

Males 35–44	1972	1980	1985	1990	1995
Canada	93.0	91.9	88.2	88.0	84.6
United States	93.1	91.8	90.3	90.2	88.6
Japan	97.0	96.5	95.7	96.6	96.1
France	97.3	95.2	92.9	92.1	88.7
Germany	97.5	95.9	92.6	91.4	90.4
Italy	—	97.1	95.0	93.1	88.6
Spain	96.2	90.6	85.0	88.9	83.2
Sweden	93.6	95.6	95.1	94.7	85.0
Mean	95.4	94.3	91.9	91.9	88.2
90:10 ratio	1.05	1.05	1.08	1.07	1.07

SOURCES: Organisation for Economic Co-operation and Development, *Labor Force Statistics*, various issues; and author's calculations.

that differences across countries are large), it is of interest to look at the evolution of this group in our panel of eight countries. Table 9, which also appears in the appendix, shows the employment-to-population ratios for males aged 35–44 over the period 1972–95.

Three points are worth making about the data in table 9. First, as already mentioned, one of the striking facts for this age group is the negative secular trend in all countries, even for those in which aggregate employment rose during the period. Second, while it is true that cross-country differences among other demographic groups tend to be much larger, the differences for this group are still substantial. Third, the patterns found for this demographic group do not reflect the patterns in aggregate data. For example, in table 9, Germany appears to be a high-employment country and Canada appears to be a country with low employment, but aggregate data suggest just the opposite.

IV. Other Measures of Labor Input

This paper began by arguing that it is of interest to understand differences in labor input, both across time within a given economy and at a given point in time across different economies.

Until now, however, all of the data analysis has pertained to employment ratios. In fact, employment is but one, albeit important, component of labor input. Other components include hours of actual work per employed person and work effort. Differences in actual hours of work per employed person can be further subdivided by differences in normal weekly hours of work, overtime hours, the extent of multiple job holding, or paid vacation and sick days. While there seem to be no attempts to officially document work effort by national statistical agencies, most countries do attempt to measure hours of work.

Unfortunately, strictly comparable cross-country time-series data on hours of work per employed person do not exist. Differences in procedures across countries with regard to such matters as whether the category “hours of work” refers to hours paid versus hours actually worked limit the appropriateness of cross-country comparisons. Having made this qualification, I present in table 10 data reported by

T A B L E 10

Annual Hours of Work Per
Employed Worker

	1970	1975	1979	1983	1990	1996	<i>b</i> 1970 <i>b</i> 1996
Canada	1890	1837	1832	1780	1788	1784	1.06
United States	1889	1832	1845	1808	1819	1839	1.03
Japan	2201	2112	2126	2095	2031	1892	1.16
France	1962	1865	1806	1712	1657	1608	1.22
Germany	1949	1801	1696	1657	1598	1511	1.29
Italy	1969	1841	1722	1699	1674	1636	1.20
Norway	1766	1653	1514	1485	1432	1407	1.25
Spain	—	—	2022	1912	1824	1810	—
Sweden	1641	1516	1516	1518	1546	1623	1.01
Mean	1908	1807	1757	1719	1693	1663	1.15
Standard deviation	163.1	172.2	197.8	189.9	185.0	165.6	.108
90:10 ratio	1.11	1.13	1.22	1.19	1.18	1.22	1.22

SOURCES: Organisation for Co-operation and Economic Development; *Employment Outlook*, various issues; and author's calculations.

the OECD for annual hours of work for a set of nine countries over the period 1970–96.¹² All of the summary statistics are for the set of eight countries not including Spain, since values for Spain are not available before 1979. I chose to include the available data for Spain because in our earlier comparisons Spain was typically the country with the lowest labor input as measured by employment. However, in table 10 we see that as of 1996, annual hours per employed worker in Spain were some 10–15 percent higher than their corresponding values in France, Germany, and Italy. Assuming that this comparison is appropriate, it indicates the care that one must take in extrapolating from cross-country differences in employment (and hence unemployment) to differences in labor input.

There are several patterns worth noting in table 10. First, in all countries the tendency since 1970 has been for annual hours of work per employed person to decrease, though the range of decreases is very large. Second, as already discussed, comparisons at a point in time across countries may be misleading due to differences in how the data are collected. However, assuming that the effects of these differences are roughly constant over time, the

data suggest very large relative movements in labor input across countries. As the last column in the table indicates, annual hours per worker fell in Germany by more than 25 percent relative to the United States.¹³ One issue to keep in mind when interpreting these differences is the fact that in all countries there is a tendency for the workweek in manufacturing to decrease as a country becomes richer. While this decrease for the United States occurred prior to the 1970s, in many other countries it occurred after 1970.

■ **12** These data are taken from various issues of the OECD *Employment Outlook*. The OECD reports these measures with a strong warning that they should not be used for cross-country comparisons at a point in time. The value for Sweden in 1996 is not directly comparable to the earlier values because of survey changes. It seems that the effect of the change is to increase the value of hours worked in 1996 by around 3 percent.

■ **13** Although cross-country, point-in-time comparisons are not recommended with these data, there are some indications that such comparisons may be meaningful in some cases. In their study of the auto industry, Fuss and Waverman (1992) document differences in annual hours of work per auto-industry employee in Canada, the United States, Japan, and Germany between 1961 and 1981. In 1961, the values were Canada 1970, United States 2042, Japan 2495, and Germany 2007. In 1981 the values were Canada 1857, United States 1923, Japan 2200, and Germany 1602.

TABLE 11

Full- and Part-Time Employment Ratios (1970 and 1995)

	Full-time		Part-time	
	1970	1995	1970	1995
Canada	55.4	54.4	6.0	12.9
United States	54.4	59.4	10.1	13.0
Japan	61.2	53.3	9.9	16.2
Australia	60.6	49.0	8.2	17.2
New Zealand	56.9	45.3	7.2	13.1
Belgium	59.0	47.2	2.3	9.1
France	61.9	50.1	3.9	8.8
Germany	61.7	54.4	6.9	10.2
Italy	52.7	45.1	3.6	5.8
United Kingdom	59.1	53.5	11.3	15.9
Mean	58.3	51.2	6.9	12.2
90:10 ratio	1.13	1.20	2.81	1.84

SOURCES: Organisation for Co-operation and Economic Development; *Employment Outlook*, various issues; and author's calculations.

How do these changes in hours correlate with the changes in employment ratios documented earlier? The correlation between the change in hours between 1970 and 1996 and the change in aggregate employment-to-population ratios between 1970 and 1995 for this set of eight countries is 0.36. Norway is somewhat of an outlier in this regard, and if Norway is excluded, the correlation increases to 0.77. This suggests that the relative changes in aggregate labor input are probably substantially larger than are the relative changes in employment-to-population ratios.

A closely related issue that often comes up in this context is cross-country differences in the extent of part-time employment.¹⁴ The measures of hours presented above do include part-time employment, and hence do control for these differences. However, it may also be of interest to directly examine data on full-versus part-time employment. Here again, however, a major caveat is necessary since cross-country measures are not directly comparable due to differences in definitions of part-time employment.

As a crude attempt to decompose the previously examined employment-to-population ratios into full-time and part-time components so that I can compare relative changes in the proportion of the population employed full- and part-time, I compute full- and part-time employment-to-population ratios for 1970 and 1995. I use the data on the fraction of employment that is part-time in 1973 and 1997 in conjunction with the earlier data on employment-to-population ratios for individuals aged 15–64 for the years 1970 and 1995. Although the years do not match exactly, to the extent that changes in part-time versus full-time employment patterns have been occurring gradually through time, this comparison should give a good idea of the changes over the 1970–1995 period.

The values are in table 11.¹⁵

■ 14 In particular, some researchers have argued that the dramatic improvement in employment in the Netherlands is entirely due to increases in part-time employment. See, for example, Nickel and van Ours (2000) and its discussion.

■ 15 The 90:10 ratio in this table refers to the ratio of the second-highest value to the second-lowest value.

A few patterns emerge. First, note that in all countries the employment-to-population ratio has increased for part-time workers, and in every country except the United States the employment-to-population ratio for full-time employment has decreased. Second, it is in no way true that differences across countries in aggregate employment-to-population ratios are dominated by differences in the extent of part-time work. The 90:10 ratio for full-time employment exceeds 1.10 for both years. Moreover, the value increases over time, suggesting that differences in full-time-employment ratios have become larger. In contrast, differences in part-time-employment ratios have actually narrowed slightly, though based on the 90:10 measure, differences in part-time-employment ratios still exceed those for full-time-employment ratios. Third, from the perspective of the “European unemployment problem,” the full-time-employment ratios suggest even larger relative changes than do the aggregate numbers, since in 1970, part-time work was much less prevalent in Europe but has since become increasingly common there relative to the United States.

V. Conclusion

This paper has studied the empirical properties of aggregate and disaggregate employment in a cross section of developed countries over the period 1960–95. It has documented several facts that a successful theory of employment should be able to account for. Though much information is presented here, there is much additional information that would give a richer picture of differences in time allocations across countries. First, we need better cross-country measures of hours of actual work, especially at a disaggregated level. Second, additional disaggregations would be useful, especially by family structure. Third, it is important to understand how people spend their time when not working in the market—are they taking care of other family members, in school, or what?

Three conclusions seem to bear repeating. First, large and persistent differences in employment ratios across countries seem to be pervasive. In particular, although the relative changes in unemployment between the United States and Europe over the last 30 years have been dramatic, one should not be misled into thinking that in this regard the world is dramatically different after 1970 than before.

From the perspective of employment-to-population ratios, there are large cross-country differences before 1970 as well as after, and there were substantial changes in cross-country relative employment ratios in the period before 1970 as well as after. Second, the changes found in data disaggregated by sex and age do not at all mirror the changes found in aggregate data. Changes tend to be concentrated among the young and the old and among women. Any successful theory of cross-country changes in employment must successfully account for this concentration. Third, the patterns found in aggregate data for a cross section of countries do not carry over to all demographic groups within those countries.

Appendix— Disaggregated Changes in Employment Rates

This appendix presents the complete set of tables for disaggregated changes in employment rates between 1972 and 1995 for a set of

eight countries. The data for 1972 represent an average for 1972 and 1973, whereas for every other year, the data represent a three-year average centered on the given year; for example, for 1980 the data are an average of 1979–81. The 90:10 ratio is the ratio of the second-highest to the second-lowest value.

T A B L E 12

Disaggregated Changes in Employment Rates

A. Males 15–24

	1972	1980	1985	1990	1995
Canada	56.9	62.5	58.3	60.7	52.9
United States	66.8	64.0	62.7	62.8	60.9
Japan	55.2	41.6	40.7	41.6	45.3
France	55.7	46.3	38.0	33.6	25.5
Germany	69.9	59.4	57.0	59.5	54.0
Italy	42.2	38.7	34.3	33.8	31.3
Spain	69.8	54.0	40.4	42.5	31.4
Sweden	64.1	66.8	61.4	64.4	40.8
Mean	60.1	54.2	49.1	49.9	42.8
90:10 ratio	1.26	1.54	1.62	1.86	1.73

B. Males 25–34

	1972	1980	1985	1990	1995
Canada	91.6	89.7	83.9	84.8	81.6
United States	91.6	89.5	88.1	88.6	88.0
Japan	96.7	95.2	94.4	95.4	94.3
France	96.1	93.2	88.6	88.4	83.7
Germany	94.4	88.8	82.0	85.0	83.6
Italy	94.7	87.6	82.5	79.2	71.1
Spain	94.3	85.8	76.3	81.4	72.2
Sweden	91.5	92.8	91.1	90.5	79.0
Mean	93.9	90.3	85.7	86.7	81.7
90:10 ratio	1.05	1.06	1.11	1.11	1.22

C. Males 35–44

	1972	1980	1985	1990	1995
Canada	93.0	91.9	88.2	88.0	84.6
United States	93.1	91.8	90.3	90.2	88.6
Japan	97.0	96.5	95.7	96.6	96.1
France	97.3	95.2	92.9	92.1	88.7
Germany	97.5	95.9	92.6	91.4	90.4
Italy	—	97.1	95.0	93.1	88.6
Spain	96.2	90.6	85.0	88.9	83.2
Sweden	93.6	95.6	95.1	94.7	85.0
Mean	95.4	94.3	91.9	91.9	88.2
90:10 ratio	1.05	1.05	1.08	1.07	1.07

D. Males 45–54

	1972	1980	1985	1990	1995
Canada	90.5	88.8	85.2	85.8	82.8
United States	89.3	88.2	86.9	87.2	85.7
Japan	95.9	95.0	94.5	95.7	95.7
France	94.0	91.6	88.7	88.2	86.3
Germany	94.2	92.4	90.7	88.7	87.4
Italy	95.2	96.3	94.9	94.2	90.2
Spain	94.3	87.3	80.6	84.9	80.3
Sweden	93.0	93.5	93.4	93.3	86.4
Mean	93.3	91.6	89.4	89.8	86.9
90:10 ratio	1.05	1.07	1.11	1.10	1.09

E. Males 54–64

	1972	1980	1985	1990	1995
Canada	77.7	72.5	64.5	60.0	54.4
United States	75.8	69.5	64.9	64.7	63.7
Japan	85.0	81.7	79.0	80.5	80.9
France	71.1	64.5	46.5	42.9	38.7
Germany	74.0	63.4	54.4	51.3	47.4
Italy	—	72.0	65.6	63.1	55.5
Spain	82.1	71.6	59.2	56.7	48.8
Sweden	81.3	77.2	73.2	73.8	65.0
Mean	78.2	71.6	63.4	61.6	56.8
90:10 ratio	1.11	1.20	1.35	1.44	1.37

F. Males 65+

	1972	1980	1985	1990	1995
Canada	17.5	14.5	12.1	11.0	10.1
United States	21.7	18.5	15.5	15.7	16.2
Japan	46.1	40.1	36.2	36.3	36.4
France	16.3	8.2	5.3	3.8	2.6
Germany	14.4	6.8	5.0	4.4	4.2
Italy	7.4	7.9	5.3	5.2	6.0
Spain	25.3	12.3	6.1	3.9	2.8
Sweden	24.0	13.7	11.6	13.5	13.2
Mean	21.6	15.3	12.1	11.7	11.4
90:10 ratio	1.76	2.32	2.92	4.03	5.79

G. Females 15–24

	1972	1980	1985	1990	1995
Canada	45.4	55.2	55.9	59.1	51.2
United States	47.7	54.0	55.3	56.0	55.2
Japan	49.3	42.5	41.6	43.0	44.5
France	43.3	33.9	28.0	25.1	18.3
Germany	61.9	53.2	50.6	54.2	48.6
Italy	29.3	28.1	24.1	25.1	21.6
Spain	50.8	34.2	22.4	28.3	21.4
Sweden	56.8	65.2	61.8	64.8	41.9
Mean	48.1	45.8	42.5	44.5	37.8
90:10 ratio	1.31	1.63	2.32	2.35	2.39

H. Females 25–34

	1972	1980	1985	1990	1995
Canada	42.2	58.8	64.1	70.2	69.4
United States	46.0	60.7	65.6	69.0	70.4
Japan	44.2	47.2	50.2	54.8	57.6
France	55.2	63.5	64.4	65.7	65.2
Germany	50.8	57.5	56.3	62.5	65.8
Italy	31.3	47.1	47.3	50.0	46.9
Spain	28.0	32.2	36.3	44.3	44.9
Sweden	62.3	79.4	85.4	86.3	73.9
Mean	45.0	55.8	58.7	62.9	61.8
90:10 ratio	1.76	1.34	1.39	1.40	1.50

I. Females 35–44

	1972	1980	1985	1990	1995
Canada	41.4	58.1	64.5	72.2	71.8
United States	50.0	61.9	67.8	73.0	73.8
Japan	58.3	60.1	62.5	65.1	63.9
France	49.7	60.4	64.7	67.4	69.3
Germany	49.8	55.3	57.6	64.3	67.7
Italy	—	43.1	48.8	52.8	51.8
Spain	24.6	27.5	28.3	37.1	43.1
Sweden	70.1	83.5	88.9	91.4	83.0
Mean	49.1	56.2	60.4	65.4	65.6
90:10 ratio	1.41	1.44	1.39	1.38	1.42

J. Females 45–54

	1972	1980	1985	1990	1995
Canada	40.7	50.7	55.6	64.1	66.4
United States	51.5	57.2	61.3	68.6	72.2
Japan	60.2	61.0	63.4	67.6	68.1
France	50.7	54.5	58.0	60.9	67.3
Germany	48.9	49.6	50.3	57.6	62.2
Italy	29.9	36.8	40.5	45.6	47.4
Spain	26.5	26.5	24.4	28.1	32.0
Sweden	68.8	82.2	87.0	89.4	85.3
Mean	47.2	52.3	55.1	60.2	62.6
90:10 ratio	2.01	1.66	1.57	1.50	1.52

K. Females 55–64

	1972	1980	1985	1990	1995
Canada	29.5	32.2	31.1	32.9	33.9
United States	40.2	40.0	40.3	43.8	47.5
Japan	43.9	44.6	43.5	46.5	47.5
France	36.7	36.8	28.6	28.5	28.6
Germany	25.8	26.9	21.7	22.2	24.5
Italy	8.9	22.0	20.7	21.3	20.2
Spain	23.3	20.9	18.5	18.1	17.6
Sweden	44.5	54.7	57.6	64.3	60.0
Mean	34.8	34.8	32.8	34.7	35.0
90:10 ratio	1.70	2.03	2.10	2.18	2.35

L. Females 65+

	1972	1980	1985	1990	1995
Canada	4.3	4.3	4.0	3.7	3.3
United States	8.3	7.9	7.2	8.2	8.5
Japan	16.1	15.5	15.4	16.2	15.5
France	6.9	3.6	2.2	1.6	1.3
Germany	5.8	3.2	2.3	1.9	1.5
Italy	1.5	2.7	2.2	2.1	1.7
Spain	7.7	4.1	2.4	1.6	1.3
Sweden	7.5	3.9	3.3	5.3	4.6
Mean	7.3	5.7	4.9	5.1	4.7
90:10 ratio	1.93	2.47	3.27	5.12	6.53

SOURCES: Organisation for Economic Co-operation and Development, *Labor Force Statistics*, various issues; and author's calculations.

References

Bertola, Giuseppe, and Andrea Ichino.

“Wage Inequality and Unemployment: The United States versus Europe,” *NBER Macroeconomics Annual*, Cambridge: MIT Press, 1995, pp. 13–54.

Blanchard, Olivier. *The Lionel Robbins*

Lectures. Presented at the London School of Economics, 2000.

Blanchard, Olivier, and Justin Wolfers.

“The Role of Shocks and Institutions in the Rise of European Unemployment,” *Economic Journal*, vol. 110, no. 462 (March 2000), pp. 1–33.

Ljungqvist, Lars, and Thomas J. Sargent.

“The European Unemployment Dilemma,” *Journal of Political Economy*, vol.106, no. 3 (June 1998), pp. 514–550.

Millard, Stephen P., and Dale T. Mortensen.

“The Unemployment and Welfare Effects of Labour Market Policy: A Comparison of the USA and the UK,” in *Unemployment Policy: How Should Governments Respond to Unemployment*, edited by Dennis Snower and Guillermo de la Dehesa, Oxford: Oxford University Press, 1997.

Mortensen, Dale T., and Chris A. Pissarides.

“Unemployment Responses to ‘Skill Biased’ Technology Shocks: The Role of Labour Market Policy,” *Economic Journal*, vol. 109, no. 455 (April 1999), pp. 242–65.

Nickell, Steve, and Jan van Ours. “The

Netherlands and the United Kingdom: a European Unemployment Miracle?” *Economic Policy*, vol. 0, no. 30 (April 2000), pp. 135–80.

OECD Employment Outlook, various issues,

Organisation for Economic Co-operation and Development.

OECD Historical Statistics, various issues,

Organisation for Economic Co-operation and Development.

OECD Labor Force Statistics, various issues,

Organisation for Economic Co-operation and Development.