

# INTERPRETING UNEMPLOYMENT: THE ROLE OF LABOUR-FORCE PARTICIPATION

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## INTRODUCTION

Unemployment is an important social and economic problem in the majority of OECD countries. Getting a precise and internationally comparable assessment of its magnitude is therefore of interest in its own right. The appropriate measure of unemployment is, however, likely to depend on the purpose at hand. Unemployment may be used as an indicator of inflationary pressures in the labour market, as a gauge of social hardship or as a measure of under-utilisation of labour. It is, however, not necessarily the same set or the same number of persons that are of interest in each of these cases.

A key issue in the measurement of unemployment is the absence of a clear dividing line between unemployment and non-participation in the labour force, and the important role it plays in accounting for the differing unemployment experience across countries. Labour-force participation seems to be sensitive to cyclical conditions in the labour market and this has given rise to the hypothesis of a causal link running from unemployment to participation. The strength of this interaction is likely to vary across countries depending *inter alia* on the demographic composition of the work-force, coverage and generosity of alternative income-support systems and a variety of other incentives affecting the decision to join or leave the labour force. Low unemployment – or small increases in unemployment – in some countries could simply reflect the channelling of excess supply in the labour market into non-participation rather than into measured unemployment.

In this note, the interaction of unemployment and labour-force participation is discussed and some implications for the reliability of measured unemployment as a social and economic indicator are considered. Descriptive evidence on the link between levels and trends of unemployment and participation is presented in Section I. The varying degree of cyclicity in unemployment across OECD countries is reviewed in Section II by looking at the links between production, employment and labour-force participation. The appropriateness of measured unemployment as a social and economic indicator is discussed in Section III. The note closes with some tentative conclusions and a few remaining puzzles concerning the interaction between trends and cycles of unemployment and participation rates.

## I. UNEMPLOYMENT TRENDS: THE ROLE OF LABOUR-FORCE PARTICIPATION

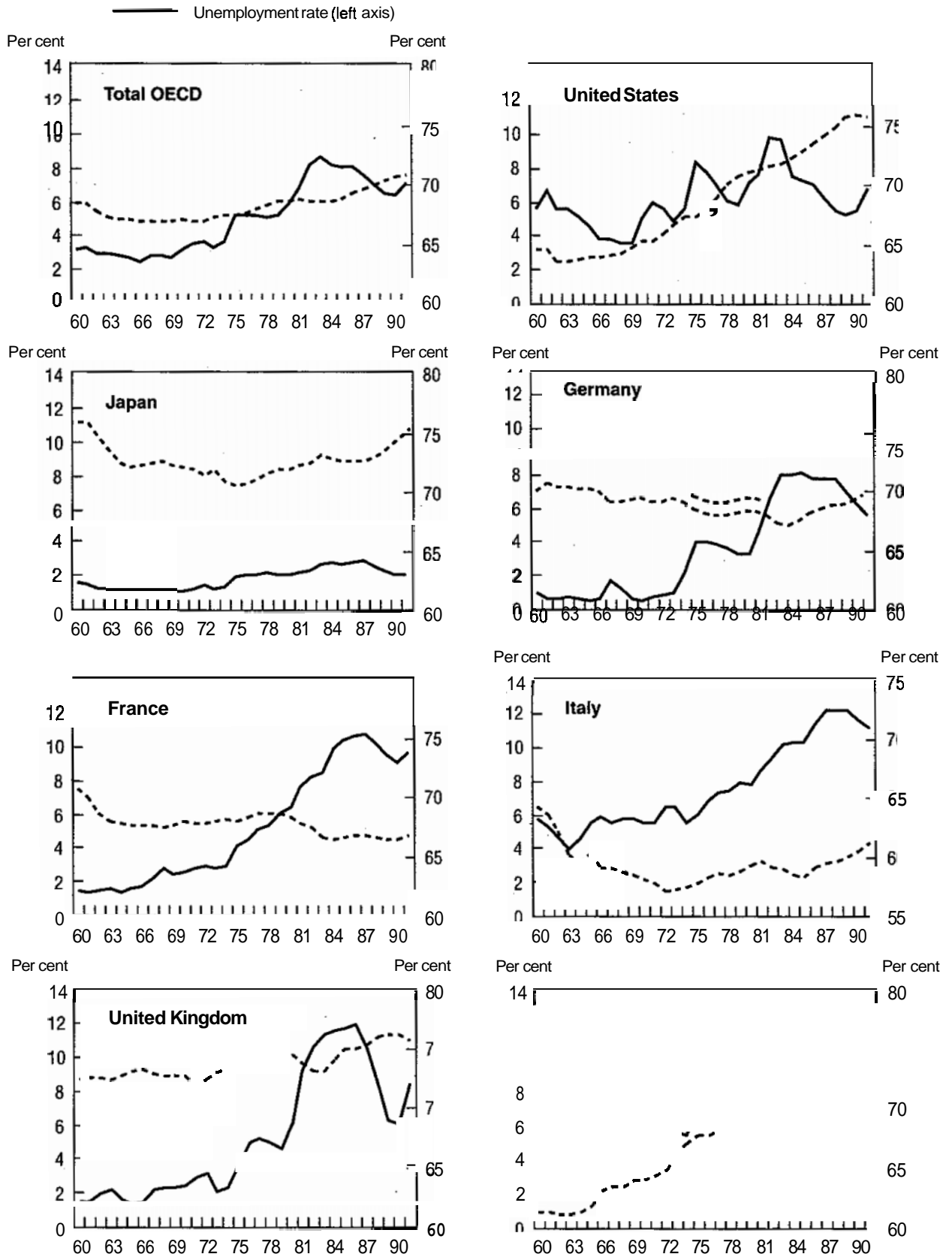
For the OECD region as a whole, labour-force participation rates fell somewhat through the 1960s but since around 1970 they have risen steadily (Figure 1).<sup>1</sup> The fall in the 1960s may be interpreted as mainly a result of increasing school attendance and of rapidly rising real incomes leading to increased demand for leisure, including effects of an increase in the coverage as well as in the generosity of tax-financed public pension schemes. The subsequent trend rise in the aggregate participation rate can be fully accounted for by the increase in female participation, which more than offset the stagnation or further reduction of male participation rates. Indeed, for the OECD as a whole, the current difference between male and female participation rates, respectively 82 and 61 per cent in 1991, is only about half the size it used to be two decades ago, when male and female participation rates were 88 and 48 per cent respectively (1973). While predominantly reflecting a gradual shift in attitudes, cultural and social norms, these developments have, in many countries, coincided with increased availability of publicly-financed day-care institutions, taking over selective parts of the traditional family roles of women. Reform of tax systems, especially where these have included a shift from the family to the individual as the basic income tax unit, may also have contributed.

The long-term trends in aggregate participation rates over the last two decades have been different across geographical areas. In North America, participation rates were broadly stable during the first half of the 1960s but rose steadily thereafter. Japan and many continental European countries experienced a prolonged period of falling participation early on. In some of these countries the participation rate reached a trough in the mid-1970s, but in others, such as France, it kept falling. Male participation rates have been on a declining trend over the past twenty years in virtually all European countries, but have remained stable in North America and in Japan. Female participation rates, on the other hand, have been rising in the entire OECD area.

The data presented in Figure 1 are suggestive of some impact of unemployment on participation rates. For the OECD as whole, periods of sharply rising unemployment tended to be associated with a stagnation in the aggregate participation rate, and similar patterns can be seen for individual countries. This negative relationship between unemployment and participation does not only hold over time, but also across countries, as indicated by the evidence presented in Figure 2. High unemployment rates are associated with significantly lower rates of participation across countries (Panel A); and increases in participation rates were, on average, smaller in countries with large increases in unemployment over the past twenty years (Panel B).

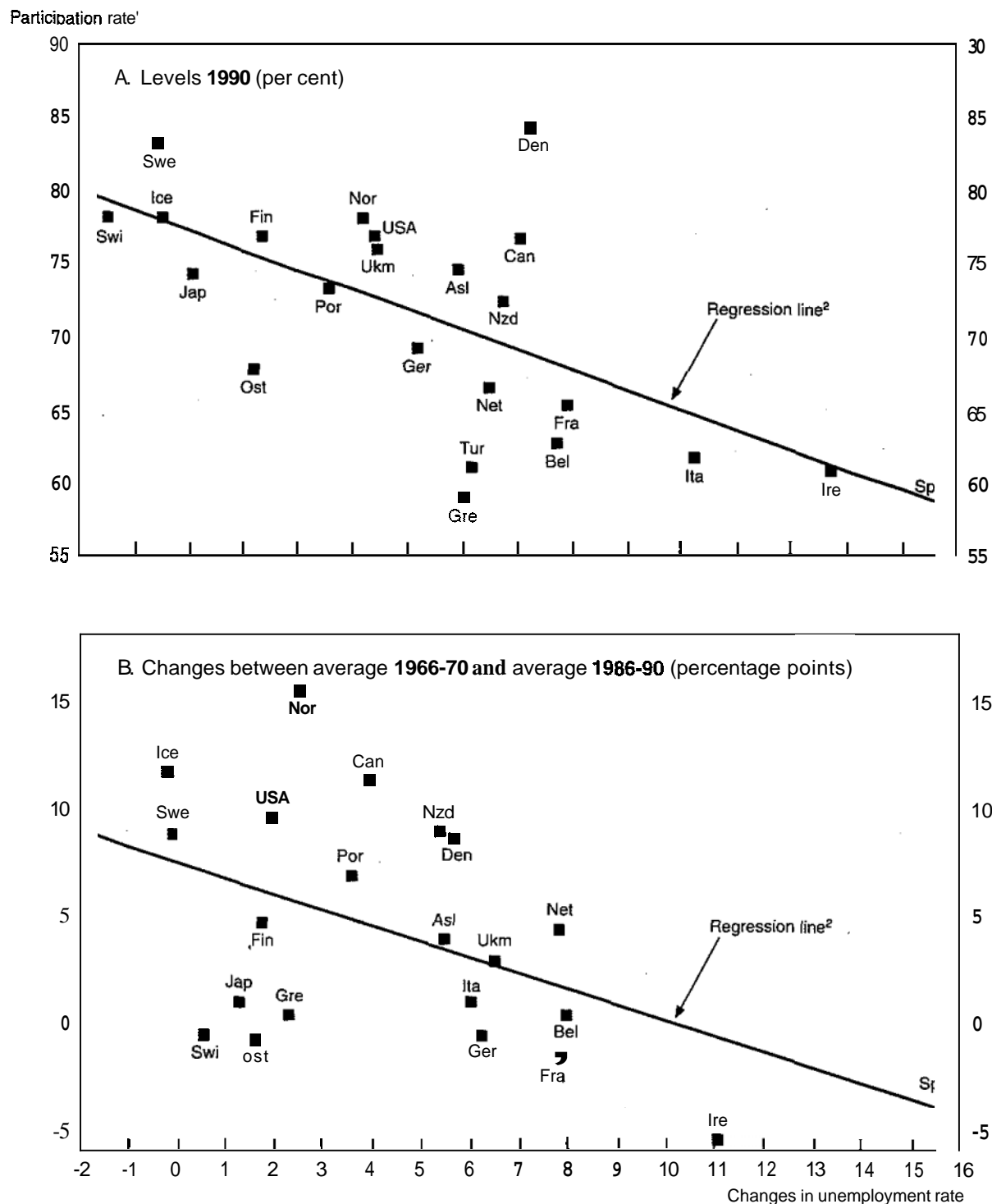
Cross-country evidence might be thought of as representing long-run relationships. Interpreted in this way, the data presented in Figure 2 point towards a negative long-run relation – both in levels and in changes – between unemployment and labour-force participation, suggesting that with rising measured, or “open”, unemployment its “hidden” component may increase as well. Thus, there seems to be little evidence that countries with low levels – or increases – of open

Figure 1. Unemployment and labour force participation rates



1. Labour force as a share of population between 15-64 years of age

Figure 2. Unemployment and participation rates, cross-country trends and levels



1. Labour force as a share of total population 15-64 years.

2. The two lines are based on the estimated equations:

$$\text{participation rate} = 80.0 - 1.36 * \text{unemployment rate} \quad R^2 = 0.41$$

t-values (31.5) (-4.03)

$$\text{changes in participation rate} = 7.40 - 0.74 * \text{changes in unemployment rate} \quad R^2 = 0.23$$

t-values (4.40) (-2.70)

Excluding Spain alone from the two estimations leaves the slope coefficient significant at the 5 per cent level. Excluding also Ireland preserves the significance of the levels equation whereas the slope in the equation in changes becomes insignificant.

unemployment have achieved this outcome at the expense of relatively lower levels of participation, and cross-country differences in labour-market slack, open as well as hidden, may actually be even larger than indicated by official unemployment figures.

For some countries, more direct evidence exists in the form of data on the number of "discouraged workers". This is a sub-category of the inactive population which conceptually is close to unemployment as it comprises persons who have stopped to search actively for work because of a (perceived) lack of jobs, even though they would have accepted one at the going wage and employment conditions. However, definitions differ across countries, making comparison difficult, and available time-series are in most cases relatively short. Over time, nevertheless, the number of discouraged workers has been positively correlated with measured unemployment in most countries, with the notable exception of Japan, supporting the evidence presented above (OECD, 1987). In contrast, the same study of discouraged workers in seven OECD countries also indicated that in the mid-1980s countries with lower measured rates of unemployment had a higher ratio of discouraged to unemployed workers. In interpreting the latter finding it should, however, not only be borne in mind that these data are difficult to compare internationally but also that non-participation is a much broader concept than discouraged workers.<sup>2</sup>

In summary, the long-run relation between unemployment and labour-force participation appears to be negative: countries with low unemployment have high participation rates, with Japan and, at least until recently, Sweden as notable examples; at the other end of the spectrum, high unemployment coincides with low participation in Spain and Ireland.<sup>3</sup> In general, therefore, cross-country evidence does not support the notion of a long-run trade-off between levels of unemployment and non-participation.

## II. UNEMPLOYMENT CYCLICALITY: THE ROLE OF LABOUR-FORCE PARTICIPATION AND OTHER FACTORS

The extent to which the unemployment rate fluctuates over the business cycle differs significantly across OECD countries. Based on one measure of such fluctuations, the standard deviation of changes in the average annual unemployment rate, it appears that the variability of the unemployment rate is high in North America, the United Kingdom, Finland, Ireland and Spain while it is low in Japan, Austria, Switzerland and some of the other Nordic countries (Table 1, last column).<sup>4</sup>

Several different factors operate simultaneously to affect the magnitude of unemployment variability over the business cycle. Indeed, variations of unemployment are the net result of bilateral and bi-directional flows between all of the three labour-market states that a person can belong to: employment, unemployment or non-participation. Unfortunately, there is little data coverage of these flows for most countries, so the following analysis relies on observations of the state, or "stock", variables.<sup>5</sup>

Table 1. The cyclical of unemployment

	Variability of output <sup>1</sup>	Employment responsiveness <sup>2</sup>	Responsiveness of labour force to employment <sup>3</sup>	Responsiveness of real consumption wages <sup>4</sup>	Variability of unemployment rate <sup>1</sup>
	1970-91	1970-91	1970-91	1970-91	1970-91
United States	1.02	0.64	0.30	-0.46	1.12
Japan	0.94	0.19	0.81	-3.29	0.20
Germany	0.84	0.45	0.44	-1.64	0.73
France	0.68	0.38	0.17	-0.93	0.50
Italy	0.93	0.15	0.46	-0.47	0.57
United Kingdom	1.02	0.68	0.27	-0.78	1.27
Canada	1.11	0.62	0.35	-0.58	1.12
Australia	0.87	0.79	0.45	0.70	1.09
Austria	0.86	0.33	0.91	-2.59	0.39
Belgium	0.92	0.49	0.06	-0.12	0.96
Denmark	0.87	0.59	0.30	0.02	1.01
Finland	1.35	0.37	0.27	-1.39	1.24
Greece	1.37	-0.05	1.01	..	0.87
Iceland	1.53	0.28	0.89	..	0.42
Ireland	1.00	0.54	0.20	-0.47	1.30
Netherlands	0.80	0.63	0.18	-0.73	1.05
New Zealand	1.79	0.24	0.62	-0.64	0.82
Norway	0.85	0.59	0.74	-1.22	0.58
Portugal	1.49	-0.19	0.98	-0.29	1.08
Spain	0.96	0.85	0.25	-0.65	1.32
Sweden	0.77	0.50	0.56	-3.92	0.42
Switzerland	1.13	0.65	0.91	-3.24	0.20
Turkey	1.18	0.38	0.22		0.80

1. Standard deviation of first difference (in log and multiplied by 100, for output).
2. The estimated coefficient  $b$  in the regression  $c$  employment deviation from trend  $> = a + b^* c$  output deviation from trend  $>$ , where the trends have been established using the Hodrick-Prezcott filter, imposing identical smoothing factors for employment and output in each country.
3. The estimated coefficient  $b$  in the regression  $c$  labour force deviation from trend  $> = a + b^* c$  employment deviation from trend  $>$ , where the trends have been established using the Hodrick-Prezcott filter, imposing identical smoothing factors for labour force and employment in each country.
4. The estimated coefficient  $b$  in the regression  $c$  real wage deviation from trend  $> = a + b^* c$  unemployment deviation from trend  $>$ , where the trends have been established using the Hodrick-Prezcott filter, imposing identical smoothing factors for real wages and unemployment in each country.

Source: OECD Secretariat.

In a mechanical sense, cyclical fluctuations in output may lead – in varying degrees across countries – to variations in employment which, in turn, may trigger different responses of the labour force and, ultimately, unemployment. And, to start with, the volatility of production differs across countries.

An indication of the extent of *cyclical fluctuations in output* across OECD countries over the period 1970-1991 is given in Table 1, column 1. According to the measure presented in the table, some countries, such as France, the Netherlands and Sweden, have experienced less cyclical fluctuations in output than others, such as Finland, Greece, Iceland, New Zealand and Portugal. Obviously, these differences may be attributed to a host of different factors like the

degree of exposure to autonomous supply or demand shocks, the sectoral composition of output, or the importance of automatic stabilisers.

There are also noticeable cross-country differences in the *employment response* to cyclical variations in output (Figure 3). The estimates presented in Table 1, column 2, and in Figure 3 indicate that employment fluctuations show strong covariation with output variations in North America, the United Kingdom, Australia, the Netherlands, Spain and Switzerland, while in countries like Japan and Italy employment reacts very little, *i.e.* there are almost entirely offsetting pro-cyclical movements in productivity per person. Among the various explanations for relative stability of employment, a traditional one is labour hoarding: as a result of adjustment costs, firms will be reluctant to lay off workers in a downturn and will first tend to reduce the number of hours worked.<sup>6</sup> Among the institutional factors influencing adjustment costs and thereby the flexibility of employment is employment protection legislation,<sup>7</sup> and the specific incentives in unemployment benefit systems for the use of temporary layoffs as opposed to part-time and/or short-time working.<sup>8</sup>

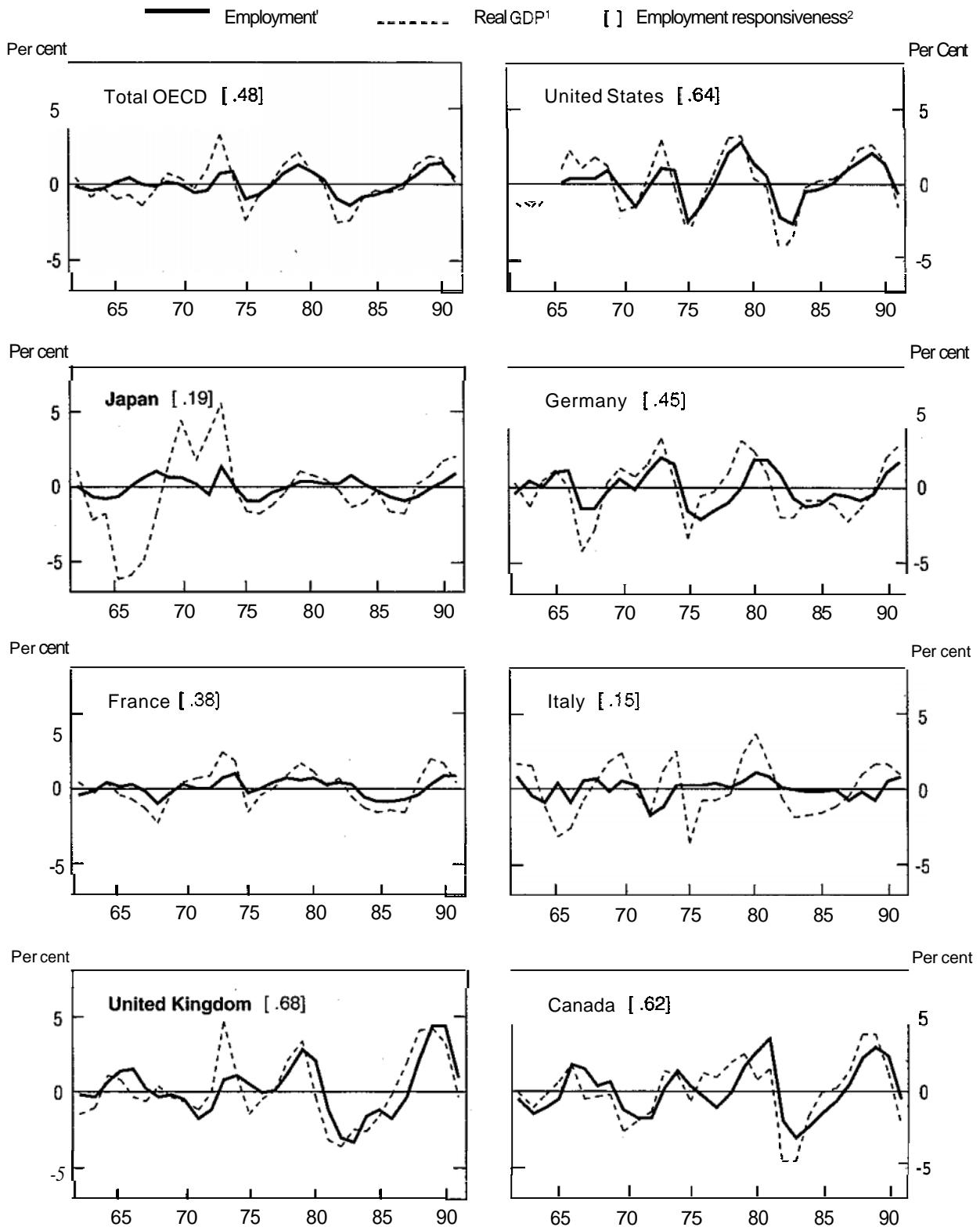
The strength of the overall employment response to business-cycle conditions also depends on variations in self-employment. As self-employment exhibits less cyclical volatility than wage and salary employment,<sup>9</sup> a relatively high proportion of self-employment will tend to reduce the cyclical variability in overall employment. In general, the past decade has seen a reversal of the long-term trend away from self-employment, with self-employment growing faster than overall, non-agricultural employment in the majority of OECD countries.<sup>10</sup>

Several procedures can be applied to gauge the *sensitivity of the labour force* to cyclical conditions. One empirical indicator is based on the estimated elasticity of trend deviations of the labour force with respect to trend deviations of employment, as illustrated in Figure 4. This measure of labour-force “responsiveness” provides a quantitative estimate of the extent to which the effect of cyclical employment fluctuations on unemployment is cushioned by pro-cyclical variations in the labour force.<sup>11</sup> The empirical estimates of the strength of labour-force “responsiveness” presented in Figure 4, indicate that the cyclicity of the labour force differs widely across countries. In Japan, for example, employment deviations from trend are almost entirely matched by cyclical fluctuations in the labour force, while France is located at the other end of this spectrum with virtually no short-run labour-force response to cyclical swings in employment.<sup>12</sup> Despite a different methodology and different coverage over time, these results confirm, by and large, the empirical evidence on cycles in labour-force participation in seven major OECD countries as presented in OECD (1986).

The degree of labour-force “responsiveness” to employment conditions can also be gauged by estimating the elasticity of participation rates with respect to the employment share in the working-age population from structural participation-rate equations. The results of an analysis along these lines are presented in Table 2. In all countries, with the exception of Germany and France, total participation rates are significantly affected by employment rates; the estimated long-run elasticities are particularly high in Italy and Japan, but are in the range of 0.4 to 0.6 in most other countries.

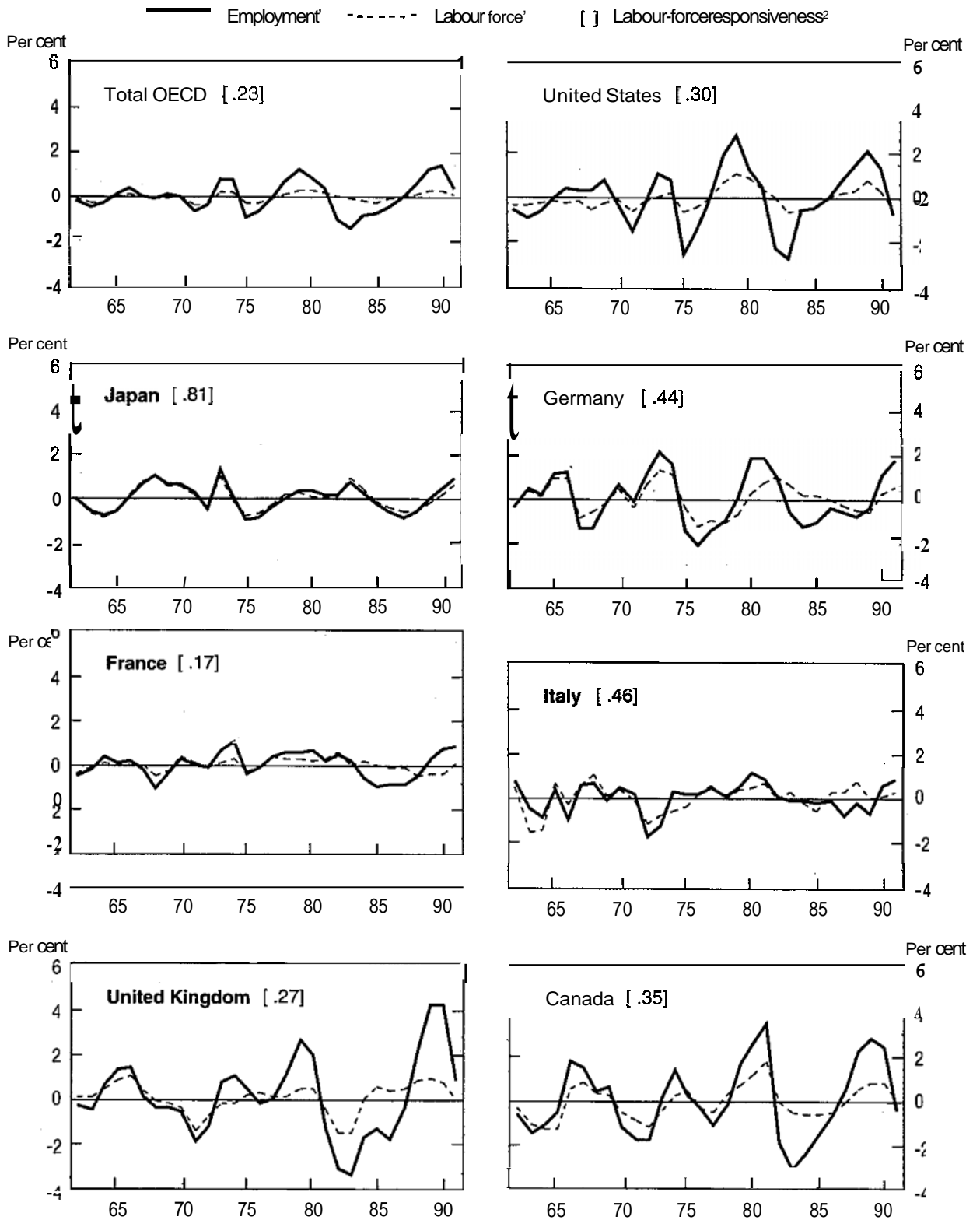


**Figure 3. Trend deviations of output and employment**



1. The curves show the difference between actual and trend figures for employment and real GDP. The trend figures are calculated using a Hodrick-Prescott filter.
2. The responsiveness indicator in each panel of the graph is the elasticity of trend deviations of employment with respect to trend deviations of real GDP estimated on annual data over the period 1970-91.

**Figure 4. Trend deviations of employment and labour force**



1. The curves show the difference between actual and trend figures for employment and labour force. The trend figures are calculated using a Hodrick-Prescott filter.
2. The responsiveness indicator in each panel of the graph is the elasticity of trend deviations of labour force with respect to trend deviations of employment estimated on annual data over the period 1970-91.

Table 2. **The influence of employment shares on participation rates**

	Elasticities of participation rates with respect to the overall employment share in working-age population <sup>1</sup>					
	Total	Male	Female	15-24	25-54	55+
United States	<b>0.4</b>	0.2	1.1	<b>1.6</b>	<b>2.3</b>	2.2
Japan	<b>0.8</b>	0.7	1.5	<b>8.6</b>	<b>0.1</b>	0.9
Germany	..	..	..	..	..	..
France	..	..	..	..	..	..
Italy	<b>1.3</b>	0.7	<b>3.4</b>	<b>3.7</b>	<b>1.0</b>	<b>1.8</b>
United Kingdom	<b>0.6</b>	<b>0.4</b>	<b>0.7</b>	0.7	<b>0.3</b>	<b>1.4</b>
Canada	<b>0.6</b>	<b>0.3</b>	..	<b>0.9</b>	..	..
Australia	<b>0.5</b>	0.2	<b>0.9</b>	..	<b>0.5</b>	<b>1.6</b>
Finland	<b>0.4</b>	<b>0.3</b>	<b>0.5</b>	..	..	<b>2.7</b>
Netherlands	<b>0.4</b>	<b>0.2</b>	<b>0.7</b>	<b>0.8</b>	<b>0.3</b>	<b>3.6</b>
Norway	<b>0.4</b>	..	<b>1.3</b>	..	..	..
Portugal	<b>0.4</b>	..	<b>0.6</b>	..	..	..
Spain	0.2	..	..	..	0.2	..
Sweden	<b>0.6</b>	<b>0.5</b>	<b>0.8</b>	2.7	<b>0.4</b>	..

.. = Insignificant.

1. Results refer to long-run elasticities and are based on the  $a_1$  and  $a_3$  coefficients obtained from the estimation of

$\text{Log PR} = a_0 + a_1 \log \text{PR}(-1) + a_2 \log \text{RDI} + a_3 \log \text{ES} + \text{time trends.}$

where PR = participation rate; logistic transformation

RDI = real disposable income per head

ES = overall employment share in working-age population.

The estimated elasticities are evaluated at the average value of the participation rates over the estimation period.

The elasticity of participation rates with respect to overall employment conditions, as proxied by the total employment share in the working-age population, differs considerably between main demographic groups (Table 2). In almost all countries, the elasticity of participation rates with respect to employment opportunities is higher for females as compared with males.<sup>13</sup> Also, participation rates of both the younger and older age groups appear to be generally more elastic than that of prime-age adults.<sup>14</sup>

The higher sensitivity of female labour-market participation to overall employment conditions matches with the observation that women usually comprise the majority, and often a large one, of discouraged workers. However, a “mechanical” interpretation of the above results in terms of discouragement effects driving people out of the market who are ready to re-enter in a cyclical upturn may be misleading in several respects (OECD, 1987):

- The cyclical inflow into the status of labour-market “discouragement” does not seem to be particularly concentrated among people with recent work experience.
- Discouraged workers, as defined in labour-force surveys, appear to be no more likely to enter the labour force than other members of the inactive population who say they would want a job but cite non-economic reasons for non-searching.

- A significant part of discouraged workers has not been in the labour force for many years, pointing toward discouragement being not only a cyclical but also a longer-term phenomenon and raising doubts about the readiness of discouraged workers to re-enter the labour force when economic prospects improve.

In the way the evidence was presented above, an implicit causal ordering was assumed, running from output via employment to labour force and unemployment. In the real world, causal influences are unlikely to be this simple. indeed, considering in particular the link between employment and labour force, Elmeskov and Pichelmann (1993) found evidence of bi-directional causal links, with the relative strength of the two unidirectional links varying across countries. Nevertheless, based on both formal causality tests and evidence concerning the cyclical co-variation between real wages, productivity, employment and unemployment, it was concluded that, for most countries, the bulk of the evidence suggested that the strongest causal link was the one presented above.

The quantitative evidence on the discussion of unemployment cyclicity is summarised in Table 1. The variability of the unemployment rate differs widely across countries reflecting, *inter alia*, cross-country differences in the variability of output. Unemployment variability also depends positively on the extent to which employment responds to fluctuations in output, as indicated by the responsiveness indicator from Figure 3. Responsiveness of the labour force to employment, as illustrated by Figure 4, reduces unemployment variability. All of the three different factors operating on unemployment variability – output variability, employment responsiveness and labour-force responsiveness – are affected by the flexibility of real wages in the face of cyclical variations of activity. One measure of real wage flexibility is the (numerical) elasticity of trend deviations of the real consumption wage with respect to trend deviations of the unemployment rate.<sup>15</sup> In a cross-country regression it turns out that this measure of real-wage flexibility gives a contribution in addition to the indirect effects via the three other influences. All variables have the expected signs and some are significant in the equation explaining unemployment variability:

$$\begin{aligned}
 <\text{unemployment variability}> = & 0.68 \\
 & (0.22) \\
 & + 0.55 * <\text{output variability}> \\
 & (0.22) \\
 & + 0.37 * <\text{employment responsiveness}> \\
 & (0.24) \\
 & -0.48 * <\text{labour-force responsiveness}> \\
 & (0.25) \\
 & -0.14 * <\text{real wage responsiveness}> \\
 & (0.051)
 \end{aligned}$$

Standard errors are given in parentheses.

### III. UNEMPLOYMENT AS A SOCIAL AND ECONOMIC INDICATOR

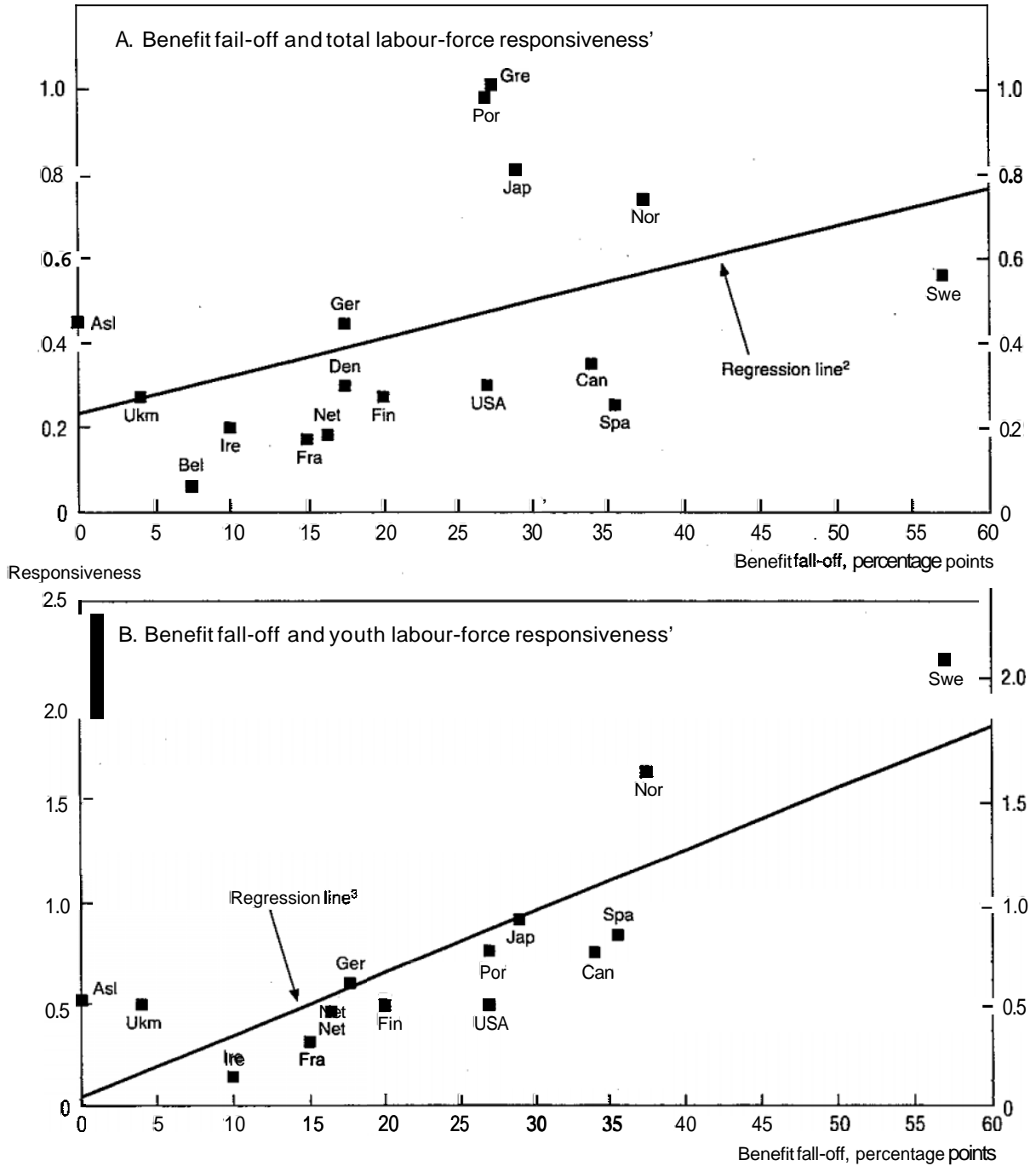
The various mechanisms affecting the cyclical fluctuations of unemployment as discussed above have implications for the interpretation of measured unemployment as a social and economic indicator. The implications depend, however, on what unemployment is meant to indicate. Three roles of unemployment are considered below, namely:

- a measure of under-utilisation of labour;
- an indicator of social hardship;
- a determinant of wage pressure.

From the point of view of under-utilisation of labour, both the cyclical employment responsiveness and labour-force responsiveness have important implications. If expanding output leads to a strong employment response while the labour force remains unchanged, then unemployment falls strongly with rising output. However, to the extent an increase in production gives rise to rising productivity and rising employment induces an increase in the labour-force, potential output expands as a result of increasing actual output.<sup>16</sup> Coming out of a downturn, countries with responsive productivity and labour force may thus be able to expand for longer, or more strongly, before inflationary pressures develop and corrective policies are called for. In this sense, cyclical fluctuations of productivity and cyclical labour-force variations – and not just measured unemployment – are relevant for gauging the full extent of under-utilisation of labour and the associated output loss during a slowdown.

Some of the same factors which reduce the usefulness of unemployment as a measure of labour utilisation render it dubious as an indicator of social hardship. Given the flexible response of the labour force to changes in employment, and given the flexibility of hours worked with respect to output, changes in measured unemployment under-represent changes in gainful employment and earned income. Unemployment, accordingly, does not fully reflect the amount of economic hardship caused by cyclical downturns. On the other hand, unemployment compensation partly cushions against economic hardship caused by job loss. To the extent that the status of “official” unemployment confers the right of receiving income transfers exceeding those available to non-participants of otherwise identical income and wealth characteristics, there is of course an obvious difference between the unemployed and the non-participants. Preferential access to income support may be one reason for individuals to remain “unemployed” rather than drop out of the labour force once they lose their job. Figure 5 indicates, that in countries where unemployment benefits are reduced significantly with the length of an unemployment spell, the labour force tends to respond more strongly to changes in employment.

Concerning the role as indicator of wage pressure, a major question is whether unemployment or a wider concept including persons outside the labour force serves best as the key variable linking labour-market conditions to wage-price formation.<sup>17</sup> Table 3 shows the key coefficients of simple estimated wage equations, specified so as to assure both static and dynamic homogeneity and with both unemployment and participation rates included. There are, however,



- Toiai labour-force responsiveness has been estimated as described in Figure 4. Youth labour-force responsiveness has been estimated from simple linear equations linking labour-force growth to employment growth and time trends. The indicator concerning the fall-off of unemployment benefits over individual spells of unemployment is based on OECD (1991) and refers to 1988. It is defined as the difference between the long- and short-term replacement rate indicator from that publication averaged across gender.
- The line is based on the estimated equation:  

$$\text{responsiveness} = .23 + .0089 * \text{benefit fall-off} \quad R^2 = .14$$

t-values (1.8) (1.9)
- The line is based on the estimated equation:  

$$\text{responsiveness} = .049 + .031 * \text{benefit fall-off} \quad R^2 = .67$$

t-values (.30) (5.3)

**Table 3. Wage equations and tests for the influence of labour force variations'**

Results based on estimating:

$$\text{Dlog } W/PC = c_0 + c_1 \cdot \text{DLlog } W/PC + c_2 \cdot \text{D}^2 \log PC + c_3 \cdot \text{Dlog } PY/PC + c_4 \cdot \text{DLlog } PY/PC + c_5 \cdot U/POP + c_6 \cdot \text{D}(U/POP) + c_7 \cdot \text{LF}/POP + c_8 \cdot \text{D}(\text{LF}/POP)$$

	Basic equation estimates				Testing $c_7 = c_8 = 0$			Testing $c_5 = c_6 = 0$			Testing $c_5 = -c_7$ and $c_6 = -c_8$		
	$c_5$	$c_6$	$c_7$	$c_8$	$c_5$	$c_6$	F	$c_7$	$c_8$	F	$c_7$	$c_8$	F
United States	-0.2	-0.9***	-0.1**	-0.2	-0.4"	-0.7***	4.8"	-0.1	-0.1	12.2***	-0.2***	0.6***	7.5***
Japan	-2.9"	-3.9'	0.5	-1.7***	-2.0	-3.7'	2.7'	0.4	-0.9	5.5"	0.4	-0.7	5.6"
Germany	-0.8"	-1.8"	0.4	-1.0	-1.1***	-1.5"	1.5	0.9***	-0.6	7.7***	0.6***	0.3	3.7"
France	-1.0***	-1.2	-0.1	1.9"	-0.9***	-1.0	2.8	0.4	1.5	7.8***	0.5***	1.7"	1.8
Italy	-1.3"	-1.6	0.5	-0.6	-1.4***	-2.3	1.1	0.2	-1.5	3.6"	0.8"	-0.8	1.5
United Kingdom	0.1	-0.8	-0.3	-0.1	0.0	-0.6	0.2	-0.1	0.6	0.8	-0.0	0.5	0.3
Canada	-0.0	-1.3	-0.0	-2.4	-0.3	-0.4	1.3	-0.0	-0.7	1.6	-0.0	0.1	1.9
Australia	-1.1'	0.1	0.9	-2.6	-1.1'	1.1	1.4	0.6	-2.7	2.2	0.9**	-1.4	0.9
Austria	-0.4	-4.4***	1.1'	-0.4	-0.4	3.0"	2.3	0.3	-0.3	6.6"	0.3	0.5	5.7"
Belgium	-1.6***	-1.6	0.1	2.2	-1.8***	-1.2	0.6	-1.8	7.4	7.9"	1.5***	1.6	0.1
Denmark	-1.2***	0.7'	0.6***	-0.5	-0.4***	0.1	5.6**	-0.2'	-0.5	10.3***	0.3	-0.1	13.3***
Netherlands	0.2	-3.0	2.0	7.5	-0.8	-1.7	1.0	1.1	5.2	1.9	0.6'	2.4'	0.5
New Zealand	-0.0	0.1	-0.1	1.7	-0.0	-0.4	0.8	-0.1	1.7	0.0	-0.1	1.3	0.2
Norway	0.7	-2.4'	-0.3'	0.3	-0.3	-1.9	3.3'	-0.2	0.1	2.1	-0.3"	0.6	1.4
Portugal	-2.0-	-0.1	-0.0	0.1	-2.1***	0.0	0.0	-0.5	0.2	3.1'	-0.4	0.2	4.6**
Spain	0.5	-0.8	1.4	-2.6	-0.2	-0.4	1.5	0.8	-1.0	0.6	0.4'	0.2	0.3
Sweden	-0.4	-6.2***	-0.1	-0.2	-0.9	-5.8***	0.2	-0.1	1.8'	6.0**	-0.1	1.9	3.3'
Switzerland	-2.7	-2.0	0.4'	-0.8	-5.0"	1.1	2.3	0.5"	-1.0	2.1	0.5"	-0.7	2.0
Turkey	-14.9'	-7.2	-1.8	3.0	-6.5	-5.5	1.9	-0.6	2.6	2.2	-0.4	3.0	2.3

1. The variables are W = business-sector wage rate; PC = private consumption deflator; PY = business-sector value-added deflator; U = unemployment; POP = population 15-64 years old; LF = labour force. L is a lag operator and D is the first difference operator.

Asterisks denote levels of significance:

\* = 10 per cent.

\*\* = 5 per cent.

\*\*\* = 1 per cent.

two differences from traditional wage equations that should be noted. First, the unemployment rate has been measured relative to the total population between 15 and 64 years of age, so as to have the same denominator as the participation rate, thereby allowing tests of linear constraints between the sets of coefficients of, respectively, unemployment and participation.<sup>18</sup> Second, other estimation work has demonstrated the importance of including both level and first difference terms of the slack variables (Elmeskov, 1993).

With both unemployment and participation rates appearing in level and first differences, lack of data does not allow a more elaborate specification and, in consequence, the statistical properties of the estimated equations leave a lot to be desired. Nevertheless, the table gives the impression that compared with participation rates, unemployment rates do a better job in explaining wage increases. Of the 38 estimated coefficients of levels or first differences of unemployment rates, only seven have the wrong sign, and of these only one at a level of significance exceeding 10 per cent. Fifteen coefficients are significant at a level above 10 per cent with the right sign. On the other hand, of the 38 estimated coefficients to participation rates, 21 come in with the wrong sign and of these, four are significant at least at the 10 per cent level. Of the 17 coefficients with the right (positive) sign, three are significant at the 10 per cent level or higher.

Table 3 also reports the results of more formal tests for the role of labour-force participation relative to unemployment. The first test concerns the exclusion of both the level and change of participation rates. This is accepted for all countries except four: the United States, Japan, Denmark and Norway. Of these countries, it was only for Denmark that a correctly signed and significant coefficient to participation rates was found in the original specification. The opposite exclusion restriction, concerning levels and changes of unemployment, is rejected in more than half the countries, and of those where it is accepted, only for Switzerland does the participation rate get a significant coefficient of the right sign. The final set of tests concern the restriction that the effects of unemployment and cyclical labour-force variations on wages are the same. This restriction is rejected for seven countries. However, where accepted, the restriction entails significant and correctly signed coefficient estimates in the cases of France, Italy, Australia, Belgium, the Netherlands, Spain and Switzerland. In sum, for most countries variations in labour-force participation appear to play, at most, a secondary role compared with measured, or open, unemployment in explaining inflationary pressures.

One of the reasons why non-participation fails to have the same damping influence on wages as unemployment may be that different groups in the labour market react differently to changes in employment, as discussed above. Prime-age male labour is often assumed to carry a disproportionate weight in wage determination and, as shown above, is characterised by a much less responsive labour supply, while other groups with a more tenuous attachment to the labour force typically carry a much smaller weight in wage determination. In addition, to the extent outflows from the labour force are concentrated more heavily on persons with long spells of unemployment, these are generally found to exert less influence on wages even if they remain in the labour force and can, therefore, be assumed to have only marginal, if any, effect when they drop out.



#### IV. SOME TENTATIVE CONCLUSIONS AND REMAINING QUESTIONS

This paper has reviewed evidence on trends and cycles in unemployment and labour-force participation across OECD countries. Cross-country differences are important for both trends and cycles. The empirical regularities presented in the text affect the interpretation of unemployment figures in some dimensions but less in others. They do not, however, support the view that cross-country differences in unemployment rates can be attributed to different participation rates. On the contrary, unemployment rates are just a partial reflection of cross-country differences in trends and levels of employment rates.

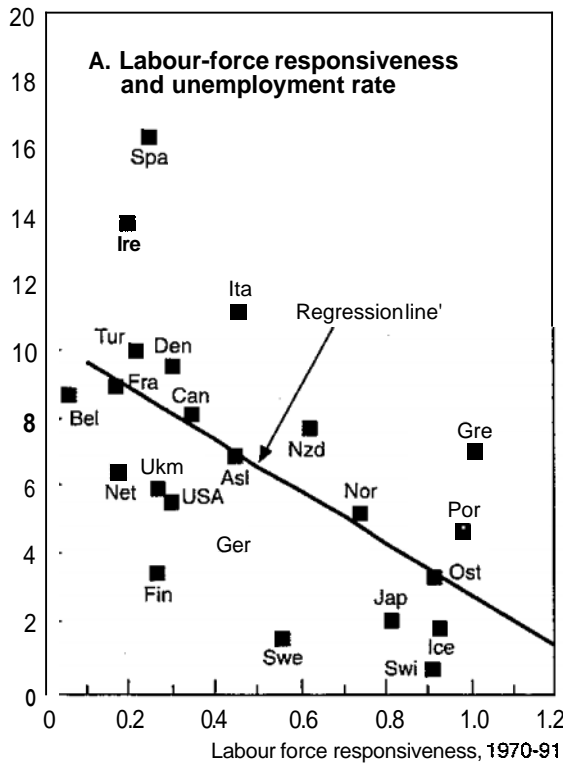
Some puzzles posed by the interactions between trends and cycles remain unsolved. Indeed, the cyclicity of unemployment is related to its trend increase: countries with very volatile unemployment rates typically have experienced larger increases in unemployment over long periods than countries with more cyclically stable unemployment.<sup>19</sup> With the degree of labour-force responsiveness being a major influence on unemployment volatility, it is perhaps not surprising, that a relationship is found also between this variable and the increase, as well as the level, of unemployment (Figure 6, Panels A and B).

Such a relationship between cycle and trend is difficult to reconcile with the view that, following a shock, unemployment tends to revert quickly towards a constant natural rate of unemployment. However, it is increasingly acknowledged that in many countries unemployment tends to persist at or around whatever level it is brought to by a shock to the economic system (see, for example, Barro, 1988; Alogoskoufis and Manning, 1988; or Elmeskov and MacFarlan, 1994).<sup>20</sup> Thus, to the extent countries have been hit by predominantly negative shocks over recent decades, the observed empirical regularity may arise. Alternatively, persistence effects may be stronger in the wake of an upward shock to the unemployment rate than to a downward shock,

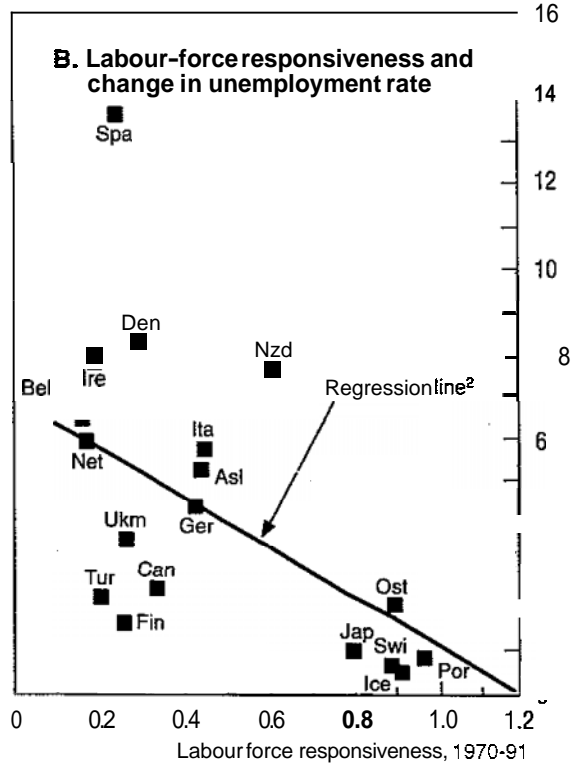
The degree of labour-force responsiveness does not, however, appear to bear much relation to trends or levels of participation rates (Figure 6, Panels C and D). If the interpretation of the evidence in Panels A and B in terms of unemployment persistence in the wake of negative shocks is maintained, Panels C and D seem to suggest that such persistence is much less prevalent for labour-force participation. In other words, participation rates tend to return to their underlying trends while unemployment rates do not. Moreover, the data in Figure 2 even suggested that the trend growth of labour-force participation was stronger in countries with low (increases in) unemployment. On this interpretation, a country with a high degree of labour-force responsiveness could, in the wake of a negative shock, experience a bigger fall of participation rates relative to trend but, over the longer run, trend participation rates would be higher than in countries with less responsive labour forces, because persistent unemployment increases were avoided. These interactions between trends and cycles may seem puzzling and more research is necessary before the hypotheses presented above can be either falsified or regarded as more than an informed conjecture.<sup>21</sup>

Figure 6. Unemployment, participation and labour-force responsiveness

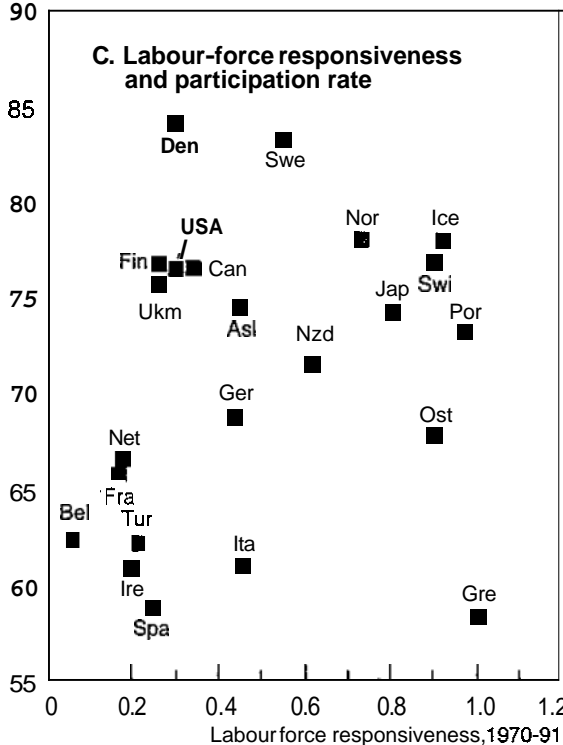
Unemployment rate, 1990 (Per cent)



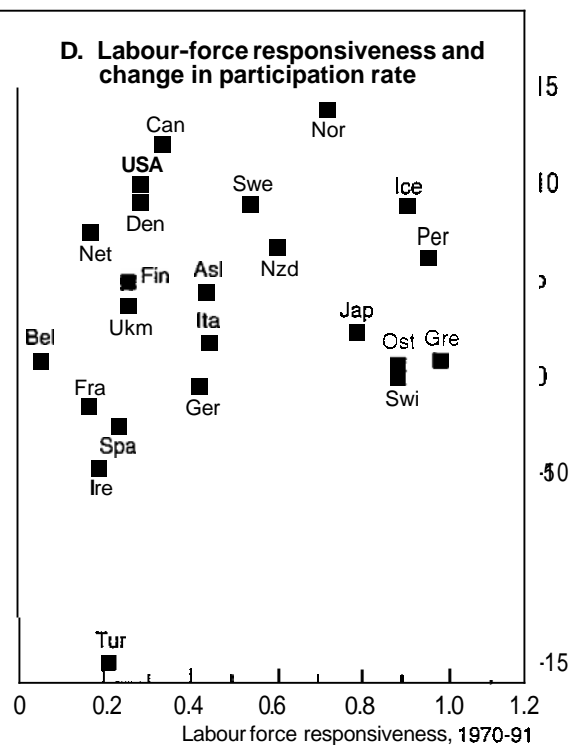
Change in unemployment rate, 1970-90 (Percentage points)



Participation rate, 1990 (Per cent)



Change in Participation rate, 1970-90 (Percentage points)



1. The fitted regression line is:

$$\text{unemployment rate} = 10.4 - 7.6 * \text{responsiveness} \quad R^2 = .32$$

t-values (8.0)(-3.4)

2. The fitted regression line is:

$$\text{change in unemployment rate} = 6.9 - 5.7 * \text{responsiveness} \quad R^2 = .24$$

t-values (5.8)(-2.8)

## NOTES

1. Time-series diagrams in this article are presented only for the OECD in aggregate and the seven major OECD countries. Similar diagrams for the smaller OECD countries can be found in Elmeskov and Pichelmann (1993).
2. Discouraged workers are but one category of potential labour-force participants whose behaviour is affected by existing demand and supply conditions: young persons may choose to stay on in the education system rather than enter the labour market at times of high unemployment: older persons who are eligible for early retirement or similar schemes may choose to leave the labour force in conditions of high unemployment, etc.
3. Distorting measurement practices, however, put an important caveat on these findings. For example, Sweden's employment rate – for many years an OECD maximum according to standard labour-force statistics – is close to the OECD median if the employed are defined as “people who have worked at least one hour in the survey week”. Reporting of long maternity leaves, etc. as “employment” reduces unemployment and increases participation, as compared with other countries.
4. Unemployment is a trended variable in most countries and therefore the variability of first differences as opposed to levels are used to indicate the cyclical volatility. In general, very similar cross-country rankings are obtained when more sophisticated procedures to assess the magnitude of cyclical variations in unemployment are applied (see Elmeskov and Pichelmann, 1993).
5. Some of the available evidence on gross flows is surveyed in Elmeskov and Pichelmann (1993).
6. Several explanations for pro-cyclical movements in labour productivity are surveyed in Bernanke and Parkinson (1991).
7. Bertola (1990) illustrates the impact of job protection on employment dynamics in various, primarily European, countries.
8. Leonard and Schettkat (1991) attribute a large part of the difference between unemployment fluctuations in United States and Germany to the availability of income support in case of short-time working in the German system.
9. For an analysis of the cyclical sensitivity of self-employment, see OECD (1986), Note C.
10. One possible reason for the rise in the proportion of self-employed in overall employment may be less favourable labour-market conditions providing a “push factor”. In addition, many countries have introduced schemes to help unemployed people set up their own business. However, the evidence reviewed in OECD (1992) provides only weak support, if any, for a positive relationship between changes in unemployment and in self-employment over the past two decades.
11. Responsiveness of the labour force to worsening employment conditions does not only reflect withdrawal from or postponing (re-)entry into the labour market. For exam-

ple, in countries like Austria and Switzerland the high cyclical nature of the labour force may partly be due to cyclical migration flows of so-called guest-workers.

12. In interpreting the results it should be noted that they are based on yearly observations. At least for the United States, it seems that a large share of the movements in and out of the labour force are of much higher frequency. As an example, in 1976, 78 per cent of those who withdrew from the labour force re-entered within 12 months (Clark and Summers, 1979).
13. This seems to imply that other factors outweigh the so-called "added-worker effect", which refers to individuals joining the labour force because a family's principal income earner has lost his/her job. The existence of an added-worker effect has been documented in a number of research projects based on panel data (Arellano and Meghir, 1992; Konig *et al.*, 1992; Smith, 1991)
14. Once out of the labour force, older workers tend to quit the labour market more permanently than other workers (for a comprehensive analysis of labour-market participation and retirement of older workers, see OECD, 1992).
15. The indicator of real-wage responsiveness is based on regressions using annual data over the period 1970-91 (see Elmeskov and Pichelmann, 1993 for further details).
16. Provided that potential output is defined with respect to actual labour supply and productivity. To the extent potential output is defined with respect to cyclically adjusted labour supply and productivity, it is obvious that cyclical swings in productivity and non-participation are implicitly seen as part of the slack.
17. It may also be argued that cyclical fluctuations in labour productivity could play a role. Thus, slack in the form of reduced hours or reduced work intensity may serve to reduce wage pressure in line with open unemployment. In many cases, short-term fluctuations of labour productivity has entered significantly in Phillips-curve type wage equations, see, for example, Chan-Lee *et al.* (1987).
18. This does not materially affect levels of significance of the relevant terms and in most cases the order of magnitude of the estimated coefficients remains the same. Estimations using traditionally defined unemployment rates are presented in Elmeskov and Pichelmann (1993).
19. Regressing the rise of the average unemployment rate between the period 1960-64 and 1985-91 on the indicator of unemployment variability from Table 1, gives the following results:

$$D\langle \text{unemployment} \rangle = -0.54 + 7.55 * \langle \text{unemployment variability} \rangle$$

(1.86) (2.32)

with standard errors in parentheses below estimated coefficients. Two countries, however, stand out as major outliers. The United States with very volatile unemployment experienced hardly any increase in unemployment over the period, while France with cyclically stable unemployment experienced a massive increase of unemployment.

20. Empirical analysis typically finds it very difficult to reject the notion that unemployment rates contain a unit root, though over the very long run they are, of course, bounded. Among the hypotheses which have been invoked to explain such persistence are insider/outsider mechanisms in wage formation. See, for example, the paper by Elmeskov and MacFarlan in the current issues.
21. At present, it is only possible to speculate about the causes for the potential asymmetry between persistence of unemployment and non-participation. Among such causes could be the existence of "scarring" effects from unemployment, *i.e.* that a spell of unemployment puts persons at a disadvantage in obtaining a new job and influencing wages compared to a person entering (or re-entering) the labour force.

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