

UNEMPLOYMENT PERSISTENCE

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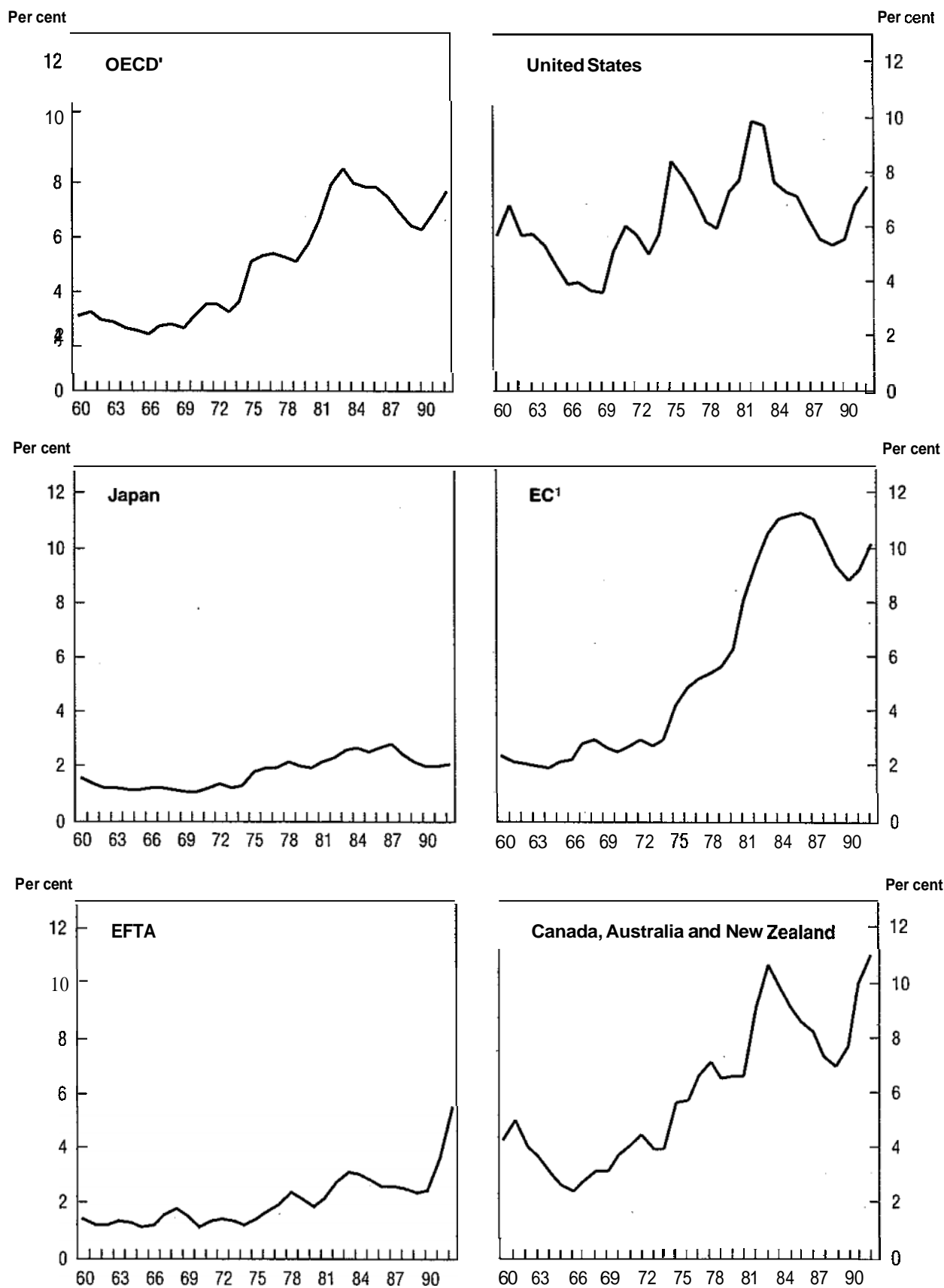
INTRODUCTION

One of the most disturbing features of the high rates of unemployment currently observed in many OECD countries is the apparent tendency for unemployment, after rising during a cyclical downturn, to persist at or around the higher level even when economic activity picks up again. Thus, as illustrated in Figure 1, the cyclical pattern of unemployment seems to be one of relatively steep increases followed by gradual reductions that are too small to take unemployment back to its previous position. At the aggregate OECD level, this has been a feature of each of the four unemployment cycles which can be discerned since 1966. The problem appears to be particularly acute in most European economies. For example, the EC unemployment rate rose from 6 per cent to over 10 per cent during the period of economic weakness in the first half of the 1980s, then subsequently fell back but bottomed out at a rate above 8 per cent in 1990.

This paper discusses some recent evidence relating to the persistence of unemployment. The focus is on assessing the empirical relevance of three alternative perspectives on unemployment persistence. In one of these, the presence of stubbornly higher rates of unemployment is seen as a consequence of changes in the underlying structural influences that determine the demand for and supply of labour; that is, there has been a corresponding rise in the “natural” rate of unemployment. The other two perspectives stem from the notion that “unemployment breeds unemployment” – *i.e.* that the present level of “structural” unemployment depends, in part, on the past level of actual unemployment. In these circumstances, there may be a long period of divergence between the short-run equilibrium, or structural, unemployment rate and the long-run equilibrium, or natural, rate of unemployment. The extreme case is where equilibrium unemployment, even in the long run, is determined solely by actual unemployment; in this situation, the concept of a unique natural rate disappears.

Section I presents some background evidence on unemployment trends. The three perspectives on unemployment persistence are described in more detail in Section II, in the context of a simple analytical framework which is set out at the beginning of the section. Section III presents several pieces of evidence that shed light on the character of persistence. Section IV provides concluding comments, including a brief discussion of the policy implications of the paper’s findings.

Figure 1. Unemployment rate



1. Includes only western Germany.

I. TRENDS IN STRUCTURAL UNEMPLOYMENT

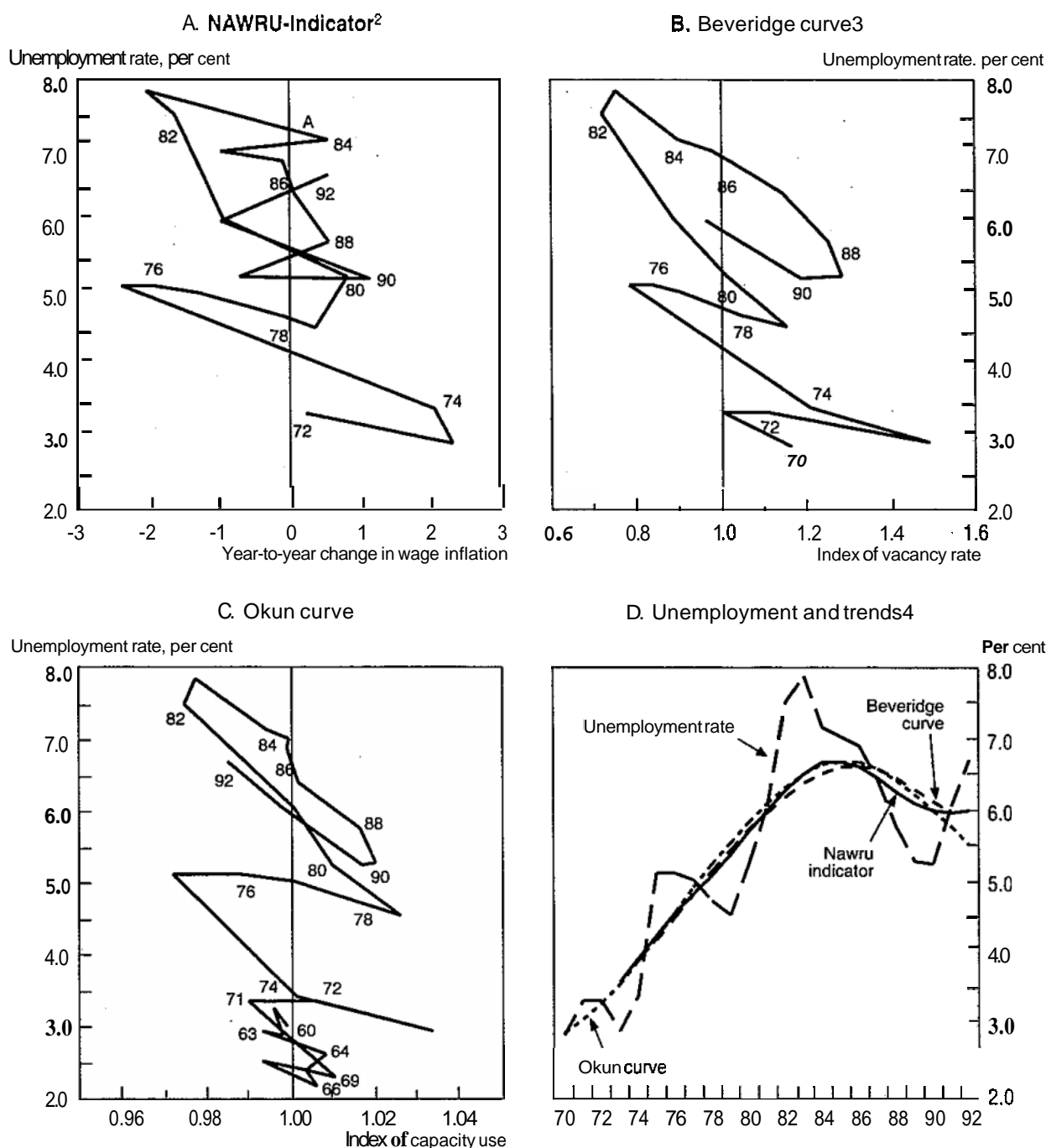
The focus of this paper is on trend rather than cyclical aspects of unemployment. From a policy standpoint, this implies an emphasis on forms of unemployment that need to be addressed mainly through structural policies, rather than through policies directed at demand management and macroeconomic stabilisation more generally. This distinction between trend and cyclical unemployment, and the respective policy assignments, is not so clear-cut, however: for example, as noted above, there may be a tendency for unemployment originating from cyclical disturbances to develop into a longer-term structural problem; and an economy's structural characteristics, including its labour market institutions, determine the influence of cyclical disturbances on different aspects of economic activity (including the relative impacts on unemployment and real wages).

The structural character of the general upward trend in unemployment in OECD countries is illustrated in Figure 2.¹ Panel A suggests that the rate of unemployment needed to stabilise wage inflation in any given year (the so-called NAWRU) has risen significantly compared with the 1960s. A NAWRU indicator can be obtained by estimating the implied unemployment rate corresponding to a zero year-to-year change in wage inflation.² Similarly, panel B indicates that the rate of unemployment associated with a given vacancy rate has increased (*i.e.* the "Beveridge curve" appears to have moved outwards), suggesting that vacant jobs are filled less easily than previously.³ Finally, physical production capacity (the capital stock) appears to have developed in such a way that a normal rate of capacity utilisation is now reached with employment much below the available supply of labour, as shown in panel C (the "Okun" curves).

The developments illustrated in panels A, B, and C can be translated into the alternative trend measures of structural unemployment shown in Figure 2, panel D, together with the actual unemployment rate. The "raw" indicators of structural unemployment have been smoothed to obtain the trends shown in panel D. Using the same methods, Figure 3 illustrates actual and structural unemployment rates in the United States, Japan, and for the EC and EFTA groups.

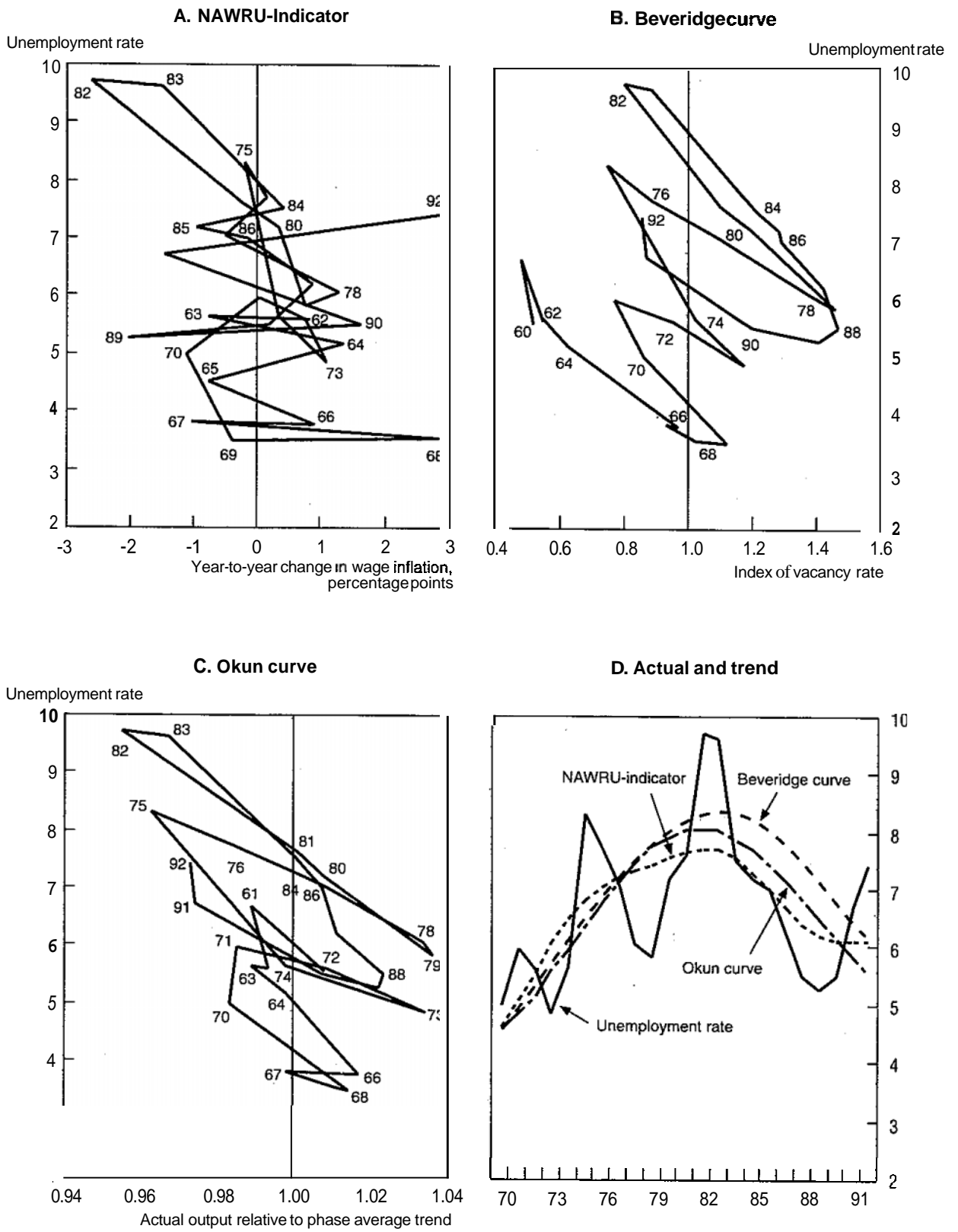
The alternative indicators of structural unemployment generally track the evolution of actual unemployment quite closely, resembling a moving average of the actual rates. For the OECD as a whole (Figure 2, panel D), structural unemployment rose steadily throughout the 1970s and the first half of the 1980s, and then showed a modest decline up to the early 1990s. As indicated in Figure 3, however, this overall pattern masks considerable differences in the experiences of individual countries and regions. For example, the rise in structural unemployment has been particularly pronounced in the European Community. In the United States, previous increases were reversed during the 1980s, and in Japan, levels of structural unemployment have remained relatively low. The EFTA countries have in the past succeeded in keeping unemployment rates low even in the wake of adverse economic shocks, but have recently experienced sharp increases in actual unemployment rates and an upward trend in Structural unemployment.

Figure 2. Indicators of the trend OECD unemployment rate¹



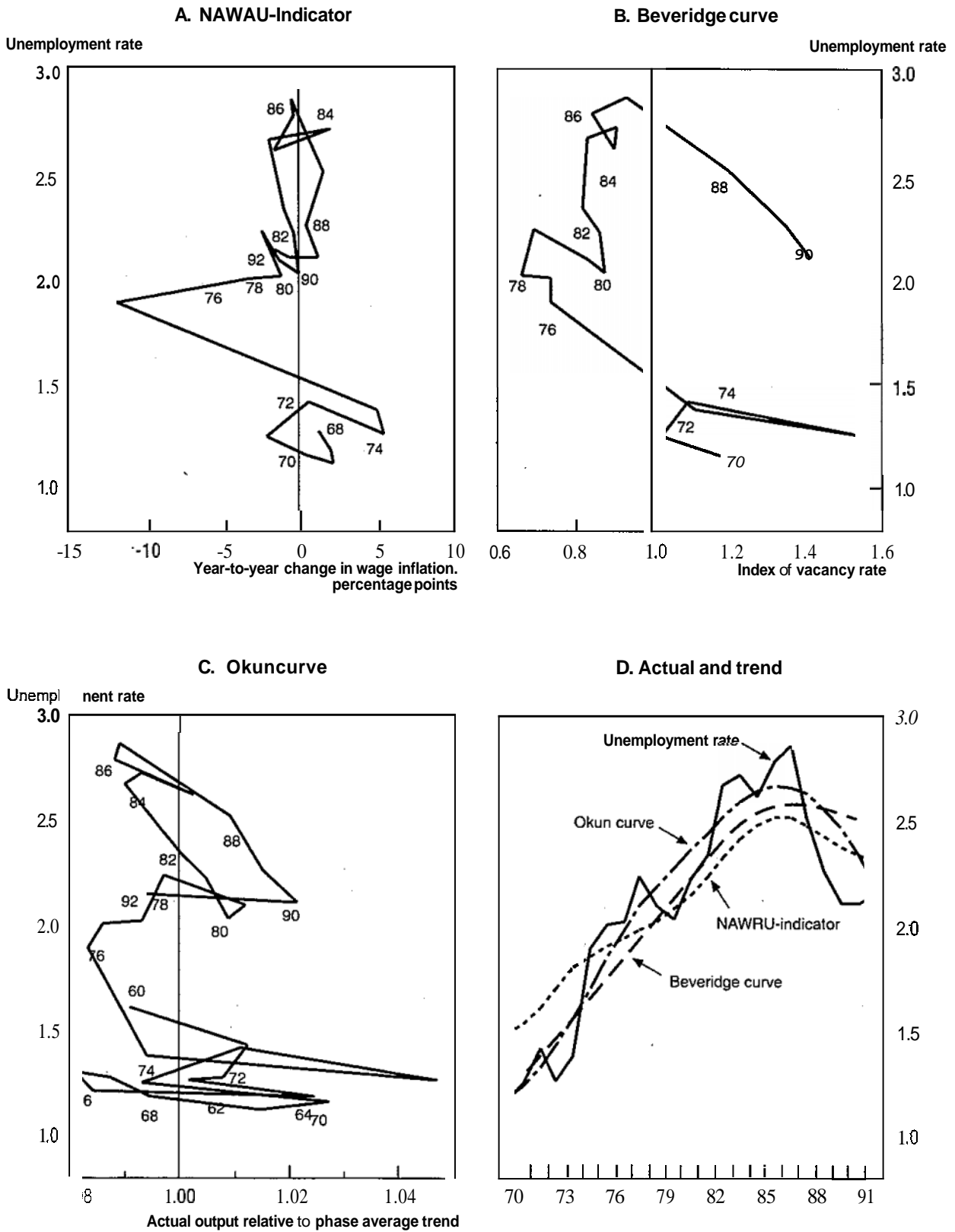
1. Italy, Australia, Finland, Greece, Iceland, Ireland, the Netherlands, New Zealand, Portugal, Spain and Turkey are excluded. The figure is explained in more detail in the Technical Annex.
2. Consecutive yearly observations can be combined to provide an estimate of the NAWRU based on linear interpolation, e.g. in 1983 wages decelerated by about 2 percentage points at an unemployment rate of 7.7 per cent while in 1984 wages accelerated by about 1/2 percentage point at an unemployment rate of 7.1, suggesting a NAWRU of about 7.2 per cent as indicated by point A.
3. The index of vacancy rate is calculated by weighting together, with labour force weights, individual country indices based on average for the period 1970-91 equal to 1. Individual country indices are calculated from actual vacancy rates except in the case of the United States and Canada, where only indices of help wanted advertising are available.
4. The trends are based on yearly estimates of unemployment rates which would have (a) stabilised wage inflation. (b) resulted in a normal vacancy rate or (c) led to a normal rate of capacity utilisation. These estimates have subsequently been smoothed using a Hodrick-Prescott filter.

Figure 3. Actual and trend unemployment' in the United States



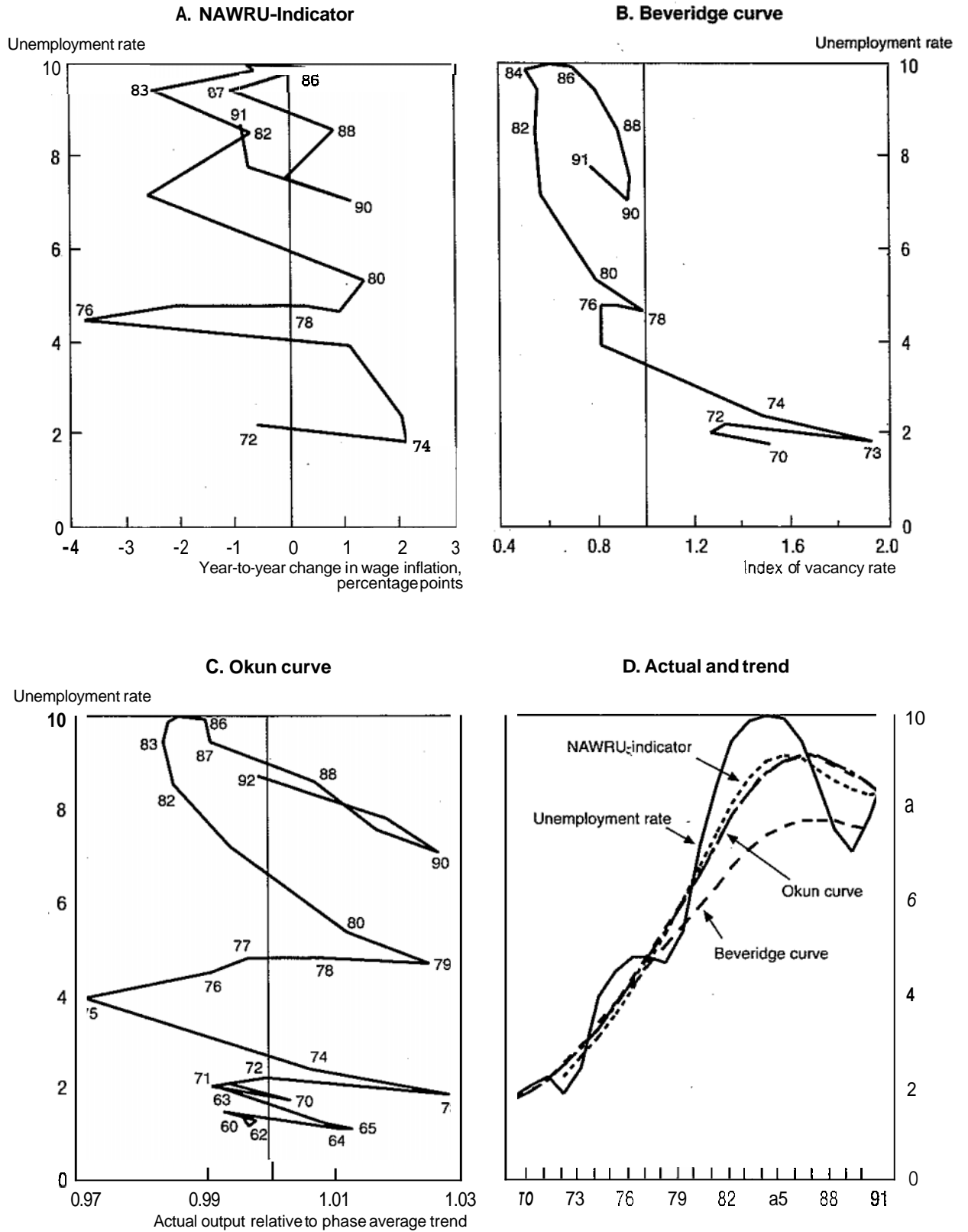
1. For explanations see Figure 2

Figure 3. (cont.) Actual and trend unemployment1 in Japan



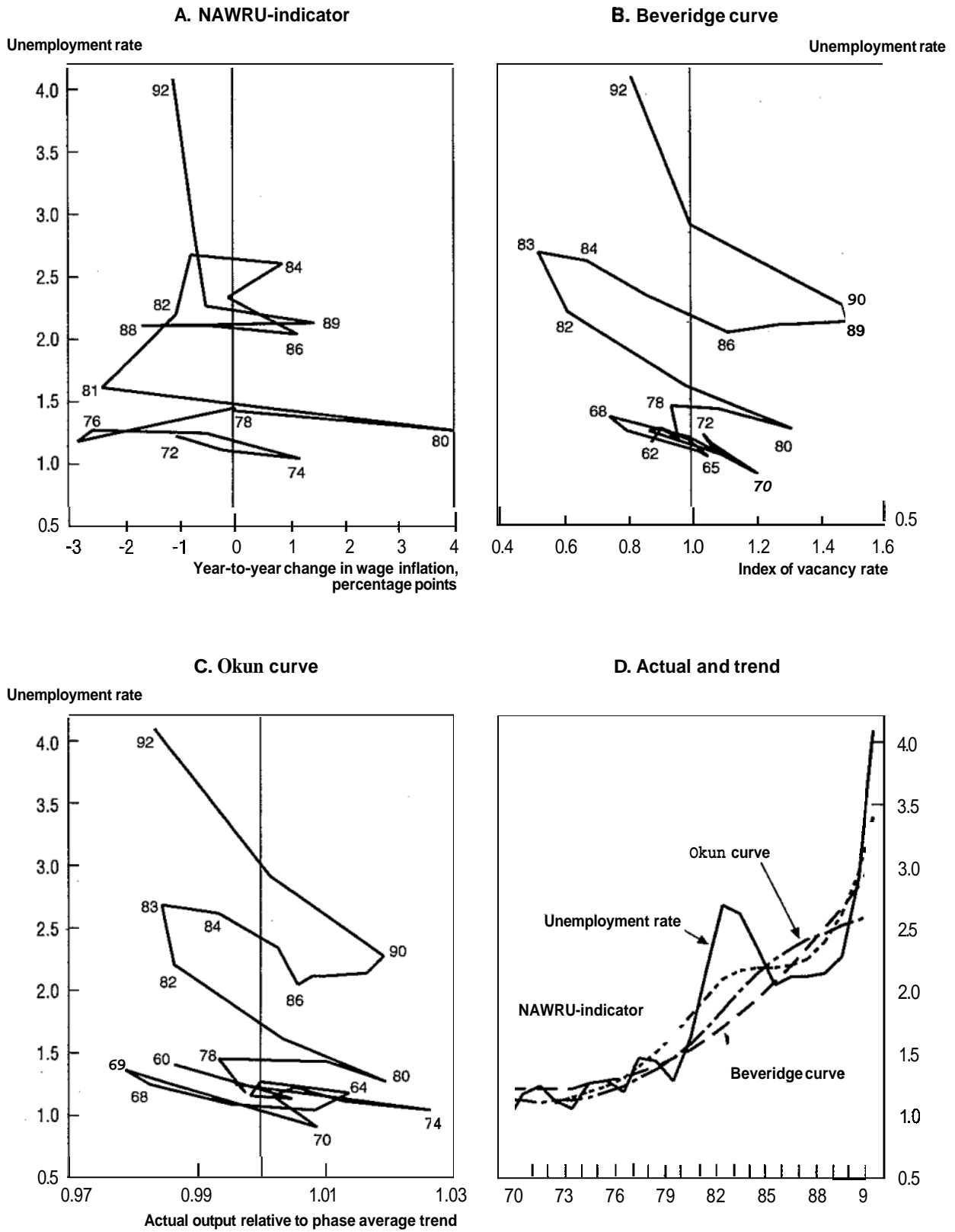
1. For explanations see Figure 2.

Figure 3. (cont.) Actual and trend unemployment, EC²



1. For explanations see Figure 2.
2. Germany, France, United Kingdom, Belgium and Denmark.

Figure 3. (cont.) Actual and trend unemployment,¹ EFTA²



1. For explanations see Figure 2.
 2. Finland and Iceland are excluded

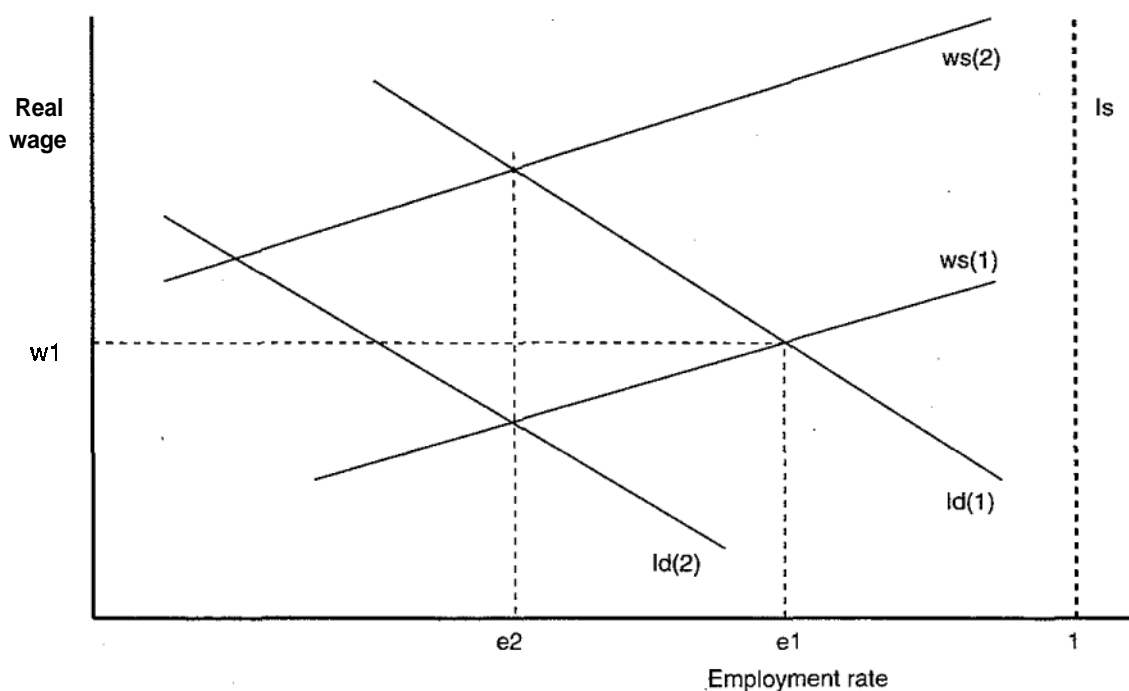
II. SOURCES OF UNEMPLOYMENT PERSISTENCE

A. Analytical framework

The distinction between some possible sources of unemployment persistence can be explained with the assistance of Figure 4. This now widely-used framework⁴ incorporates three main relationships:

- A labour demand relationship (l_d): if firms operate in a competitive product market, this relation is the traditional labour demand curve derived from price-taking, profit-maximising behaviour, and with its slope in the short run reflecting the diminishing marginal product of labour. Many applications of this framework assume imperfectly competitive product markets, in which prices are set as a mark-up on marginal labour costs [and with the mark-up possibly varying with the level of aggregate activity and (un)employment]. In this case, the relation (often referred to in this context as the “price-setting” schedule) shows the combined employment and price decisions of firms.
- A wage-setting schedule (w_s): in general, an upward sloping relationship is postulated between wage-setting behaviour of labour market agents, and employment. Such a relationship can be formally derived from models emphasising the institutional elements affecting wage determination (such as the role of unions and employer associations), or from more micro-based approaches (including efficiency-wage or formal wage-bargaining models). The upward slope of this schedule {and its slope relative to the labour supply curve discussed next) reflects changes in the incentives and relative

Figure 4. Labour demand and wage-setting schedules



bargaining strength of labour market participants (including, in the efficiency-wage framework, the incentives for granting higher wages) as employment and unemployment rates vary.

- A labour supply curve (l_s): This relationship relates aggregate participation behaviour to real wages. Reflecting the general empirical findings regarding this relationship, the curve is usually depicted as either steeply-sloped, or simply vertical (*i.e.* perfectly inelastic) as in Figure 4.

Figure 4 shows labour demand and wage-setting schedules denoted by $l_d(1)$ and $w_s(1)$ respectively. These produce equilibrium rates of employment e_1 and wages w_1 . The equilibrium rate of unemployment is then given by the difference $(1 - e_1)$ between labour supply and equilibrium employment at w_1 . In a dynamic context, when unemployment is above the long-term rate there is a tendency for real wages to fall, and vice versa.⁵ This relationship can be represented in expectations-augmented Phillips curves (as demonstrated in Manning, 1992).

B. Sources and mechanisms

This model can now be used to illustrate the principal sources of or perspectives on unemployment persistence.

1. A changing natural rate

One view regarding the stubbornly high unemployment observed in many OECD countries is that it reflects increases in the natural rate of unemployment. This view may, at least superficially, seem to be validated by the empirical estimates of structural unemployment presented above. The natural rate can be defined as the long run, equilibrium unemployment rate as determined by the underlying structural characteristics of the labour market.⁶ The apparent persistence of higher unemployment could be a result of structural changes that have produced adverse responses on the supply and/or demand sides of the market – *i.e.* leftward shifts of the wage-setting and/or labour demand relationships. In this case, the observed rise in unemployment could not be expected to be eventually self-correcting (or at least not fully so).

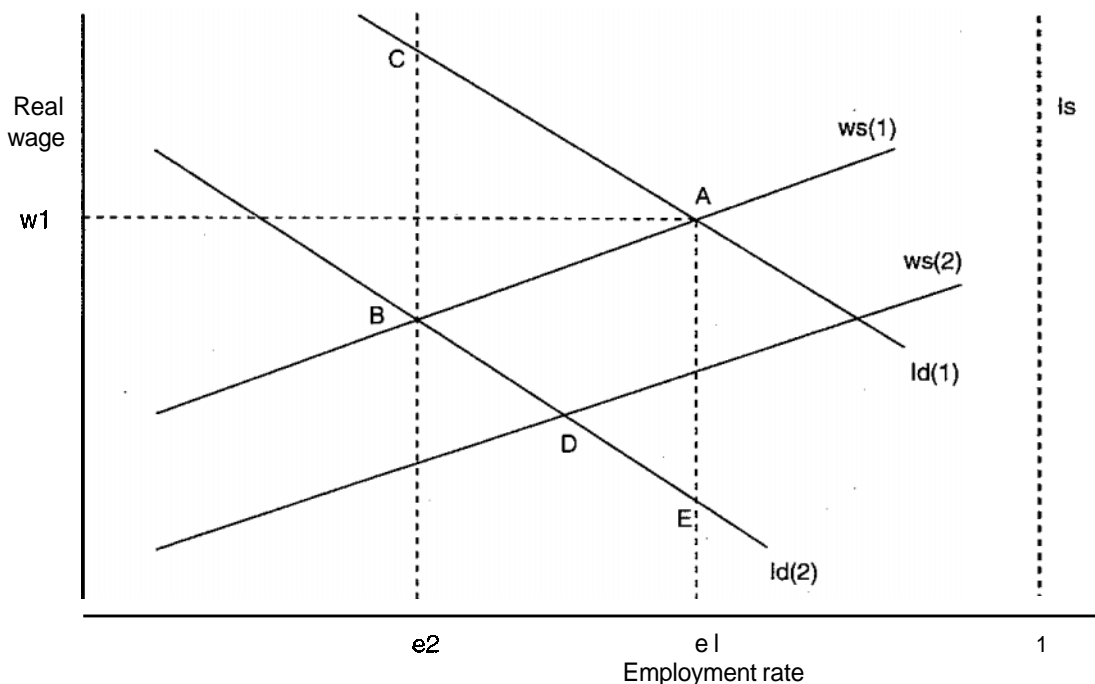
For example, leftward movement in the wage-setting relationship [$w_s(1)$ to $w_s(2)$] occur as a result of changes in bargaining institutions or practices that cause wage setters to seek (or concede) a higher rate of “wage mark-up” at each level of unemployment (*cf.* Layard *et al.*, 1991). Contributing to such a shift could be structural changes reducing the incentives to take up job offers or move to different regions; or demographic changes that increase the share of the labour force made up by groups tending to have higher rates of unemployment (*e.g.* young workers). A leftward shift in the labour demand curve in Figure 4 [$l_d(1)$ to $l_d(2)$] might result from a deterioration in competitive conditions in product markets (leading to persistently higher rates of price mark-up), or from increased demand uncertainty or production volatility. In both the cases illustrated in Figure 4, the equilibrium employment rate falls to e_2 and the unemployment rate rises to $(1 - e_2)$.

2. Full hysteresis

An alternative view on unemployment persistence is that the structural unemployment rate depends, at least in the short term, on recent developments in actual unemployment. For example, a temporary negative demand shock that pushes up the actual unemployment rate may produce an increase in structural unemployment, persisting even after demand has recovered. This phenomenon has been labelled as “hysteresis” in much of the economics literature.

“Full” hysteresis arises when the equilibrium employment (and unemployment) rate depends totally on current employment (and unemployment). The concept of a long-run natural rate of unemployment, towards which unemployment moves following short-run distortions, disappears. In Figure 5, suppose a temporary demand shock (such as a tightening of macroeconomic policy, or the terms of trade loss associated with an oil price shock) moves the labour demand schedule to the left [from $Id(1)$ to $Id(2)$].⁷ The short-run equilibrium therefore moves from A to B, with employment and unemployment rates now given by e_2 and $1 - e_2$ respectively. Under full hysteresis, e_2 and $1 - e_2$ also represent long-run equilibria. The somewhat imprecise notion of hysteresis may be extended by distinguishing between anticipated and unanticipated shocks. Under this interpretation, there is a vertical long-run wage-setting schedule, which moves to whatever is the prevailing level of employment. For example, the benefits of an anticipated recovery in demand back to $Id(1)$ would be captured in higher wages for those currently employed rather than in higher employment and lower unemployment, and the new equilibrium would be represented by point C. Only unantic-

Figure 5. Slow adjustment and full hysteresis



ipated demand (or supply) side changes will shift this long-run schedule (that is, cause the equilibrium employment and unemployment rates to move).⁸

3. *Slow Adjustment*

In the third perspective on persistent unemployment, which is referred to here as “slow adjustment”, wage-setting behaviour does respond over time to the presence of higher unemployment. Slow adjustment implies that, following the demand shock moving $ld(1)$ to $ld(2)$ in Figure 5, the wage-setting schedule moves down in response to the higher unemployment occurring at point B. However, wage adjustment is gradual rather than instantaneous, and may be only partial. The wage-setting schedule may, for example, eventually come to rest at $ws(2)$ with an equilibrium represented by point D (implying a long-run wage-setting schedule which is steep but positively-sloped, connecting points A and D); if the long-run natural rate of unemployment is stable, the eventual equilibrium would be at point E (or somewhere between A and E if labour demand also recovers, shifting the demand schedule back to the right).

4. *Mechanisms*

Several mechanisms have been suggested which could contribute to either full hysteresis or slow adjustment (which might alternatively be labelled as partial hysteresis).⁹

The most commonly-cited source of hysteresis focuses on the possibility that unemployment, particularly over the longer term, may erode the skills and attitudes to work of the unemployed, lead to a loss of training opportunities, and as a result, make those affected less and less “employable”. Furthermore, employers may use unemployment (and, in particular, long-term unemployment) as a screening device to eliminate some candidates for vacant jobs.¹⁰ The vicious cycle that thereby develops may be aggravated when, as a result of repeated failures in the search and application process, the unemployed reduce their intensity of job search.

The attitudes and behaviour of those still in employment may also contribute to unemployment persistence. High unemployment may not strongly affect wage growth if bargaining processes are driven mainly by employed “insiders”, with unemployed “outsiders” having little influence. The unemployed may, for example, lose their union membership status, and bargaining objectives may be determined by the real wage/employment trade-off faced by those still in employment. In these circumstances, the real wage aspirations of the employed may adjust only sluggishly, or not at all, to a rise in unemployment, once the new higher level has become established. Moreover, the unemployed may also be slow to realise that past skills (and associated earnings’ levels) are obsolete, unemployment income benefits may support an unrealistically high reservation wage, and minimum wages or rigid pay scales may prevent people who, in the eyes of employers, are scarred by unemployment from pricing themselves into a job.¹¹ The influence of unemployment on wage formation would be further weakened if bargaining goals are set by high-seniority insiders who face little prospect of job loss, particularly in countries with strict employment protection legislation.^{12,13}

Even if, as in the slow-adjustment case, wages do gradually adjust in response to higher unemployment, there may be some form of “speed limit” on the rate at which this process can lead to lower unemployment. If unemployment were to fall at a rate which exceeds this speed limit, this may lead to upward pressure on wages. The speed limit may for example be determined by the rate at which wage expectations of the employed and/or the unemployed adjust, or by other factors which influence the rate at which outsiders can be re-absorbed into the work force.

Some writers (e.g. Sneessens and Dreze, 1986) have suggested that, following a period of weak economic activity, “capital shortages” arising from lower investment levels during the downturn may prevent a rapid return to previous rates of employment and unemployment. As a result, there may be a speed limit on the rate of growth in output and employment also because the capital stock is restored only gradually. If the speed limit is exceeded, pressures are likely to emerge in product and then in labour markets. In this regard, the “Okun curve” measure of structural unemployment illustrated in Figures 2 and 3 indicates that there has been an increase in the unemployment rate corresponding to a “normal” rate of capacity utilisation, suggesting that the capital stock may no longer be sufficient to allow the rates of unemployment observed in the 1960s and 1970s to be quickly restored¹⁴.

A sluggish response of labour demand to improving economic conditions could also result from high transaction costs of changing the level of employment. An important example here may be the costs of hiring and firing, and related features of employment protection legislation. Indeed, such legislation is likely to “bite” more during periods of high unemployment, when voluntary quits are few, than in times of buoyant activity (Blanchard and Summers, 1988). Adjustment speeds are, therefore, likely to be more strongly retarded when unemployment is high than when it is low.

In Figure 5, capital shortages, employment protection legislation, and other demand-side effects imply that after moving to the left during an economic downturn, the labour demand curve does not quickly return to its former position as conditions improve (and as the wage-setting schedule may be shifting downwards).¹⁵ Unemployment therefore persists at a higher level long after the downturn has passed.

III. EVIDENCE

This section discusses various pieces of evidence that may indicate whether persistent unemployment can best be viewed as reflecting a changing natural rate of unemployment, as a consequence of slow adjustment back to a lower natural rate, or as full hysteresis. This assessment draws first on estimated equations relating wage growth to unemployment, including the incidence of long-term unemployment. Subsequent sub-sections consider briefly the evolution of wage shares; unit root tests on unemployment rates; the implications of differing

degrees of unemployment volatility; and evidence drawn from studies using panel data.

A. Wage equations¹⁶

The results obtained from the estimation of simple wage equations provide an indication of the relative significance of the various perspectives on persistent unemployment set out in Section II. If the increase in structural unemployment illustrated in Figures 2 and 3 represented an increase in the long-term equilibrium level of unemployment (*i.e.* reflecting a changing natural rate), then the rate of wage growth should respond at most to deviations of actual unemployment from this level, rather than to the full rate of unemployment. Table 1 shows the coefficients obtained when both the unemployment level and its deviation from trend are entered as explanatory variables in a wage equation.¹⁷ Two basic specifications of the equation are shown: the first is a standard Phillips curve with no priors (such as homogeneity) imposed (equation 1), while, in the second, both static and dynamic homogeneity are imposed (equation 2).¹⁸ The results are also shown from estimating these equations with the unemployment level term in logarithmic form.

The results in Table 1 do not support the “changing natural rate” explanation of unemployment persistence – that is, the view that the upward trend of unemployment in OECD countries represents a sustained rise in equilibrium unemployment. Only for Denmark is the coefficient to the deviation of unemployment from trend both negative and strongly significant across all specifications; even in this case, however, the unemployment level term is also negative and significant. The deviation from trend is also significant, but at a relatively low level, for France and Austria in one specification of the wage equation.

Under the extreme alternative hypothesis of full hysteresis, unemployment would show no tendency to revert towards its former level following an economic shock, and instead would remain “stuck” at its post-shock level. In this case, real wages should respond neither to levels of unemployment nor to their deviation from trend, but at most to changes in unemployment. Equations 3 and 4 of Table 1 show the results obtained when the change in the unemployment rate is entered instead of its deviation from trend in wage equations which are otherwise the same as those described above.

The estimations suggest that, in most countries, the level of unemployment continues to have a restraining effect on wage growth with this specification, but unemployment changes have an independent influence on wages in some cases. With the exception of Spain, in all cases where the change in the unemployment rate is significant, the level term still has a negative sign and in many cases is significant. There is nevertheless a number of countries, including the United Kingdom and Canada, where the level term remains insignificant, even at the 10 per cent level, across all the specifications in Table 1.¹⁹

Table 1 indicates that, in some countries, both the level and change in unemployment may influence wage growth. This finding is consistent with the suggestion that there may be some form of speed limit on the rate at which unemployment, once above its equilibrium level, can fall back if an acceleration of wages is

Table 1. Testing for the influence of unemployment on wage formation

- (1) $D\log WR = c + L \cdot A(M) \cdot D\log WR + B(L) \cdot D\log PCP + C(L) \cdot D\log PGDPB + d \cdot f(UNR) + g \cdot (UNR - UTREND)$
 (2) $D\log(WR/PCP) = c + L \cdot A(M) \cdot D\log(WR/PCP) + B(M) \cdot DD\log PCP + C(L) \cdot D\log(PGDPB/PCP) + d \cdot f(UNR) + g \cdot (UNR - UTREND)$
 (3) $D\log WR = c + L \cdot A(M) \cdot D\log WR + B(L) \cdot D\log PCP + C(L) \cdot D\log PGDPB + d \cdot f(UNR) + e \cdot DUNR$
 (4) $D\log(WR/PCP) = c + L \cdot A(M) \cdot D\log(WR/PCP) + B(M) \cdot DD\log PCP + C(L) \cdot D\log(PGDPB/PCP) + d \cdot f(UNR) + e \cdot DUNR$

Equation	(1)		(2)		(3)		(4)		(1)		(2)		(3)		(4)	
	Level		Level		Level		Level		Logs/100		Logs/100		Logs/100		Logs/100	
Ass. for f()	Level		Level		Level		Level		Logs/100		Logs/100		Logs/100		Logs/100	
Coefficients	d	g	d	g	d	e	d	e	d	g	d	g	d	e	d	e
Panel A. Using half-yearly data																
United States	-0.11	0.12	-0.24 [*]	0.24	-0.05	-0.31 [*]	-0.10 [*]	-0.40 ^{**}	-0.69	0.12	-1.34 ^{***}	0.22	-0.38	-0.32	-0.66	-0.41 ^{***}
Japan	-2.65 ^{***}	0.94	-1.99 [*]	0.85	-2.37 ^{***}	0.56	-1.68 ^{***}	-1.03	-5.54	0.61	-4.43	0.68	-5.27 ^{***}	0.39	-4.04	-1.12
Germany	-0.42	-0.02	-0.37 ^{***}	0.15	-0.41 ^{***}	-1.16	-0.38 ^{***}	-1.43	-0.69	-0.24	-0.67 ^{***}	-0.09	-0.66	-1.25	-0.66	-1.26
France	-0.25^{**}	-0.10	-0.18 ^{***}	-0.20	-0.26	-0.60	-0.23	-0.79	-1.26	-0.17	-1.10	-0.21 [*]	-1.33	-0.64	-1.29	-0.70
Italy	-0.42	-0.40	-0.38	0.34	-0.44 [*]	-0.82	-0.37 ^{***}	-1.03	-3.53	-0.36	-3.43	0.33	-3.60	-0.76	-3.37 ^{***}	-0.98
United Kingdom	0.00	-0.04	-0.04	0.13	-0.01	-0.14	-0.01	-0.51[*]	-0.04	-0.03	-0.27	0.12	-0.07	-0.14	-0.14	-0.50
Canada	-0.05	-0.15	-0.08	-0.17	-0.11	-0.04	-0.13	-0.28	-0.28	-0.17	-0.47	-0.19	-0.65	-0.05	-0.85	-0.29
Panel B. Using yearly data																
United States	-0.07	-0.19	-0.32	-0.05	-0.20	-0.33	-0.30 ^{**}	-0.42	-0.63	-0.18	-1.84[*]	-0.09	-1.34	-0.35 [*]	-1.88 ^{***}	-0.44
Japan	-2.70	1.04	-1.99	1.09	-2.25	-0.61	-1.47	-2.41	-5.63	0.59	-4.63	0.87	-5.12^{***}	-0.73	-3.90	-2.37
Germany	-0.83^{**}	0.13	-0.84^{**}	0.36	-0.76	-0.75	-0.73	-0.96	-1.58	-0.37	-1.63	-0.22	-1.48	-0.95 [*]	-1.47 ^{***}	-0.88
France	-0.68	-0.17	-0.51^{**}	-0.45	-0.71 ^{***}	-0.36	-0.61 ^{***}	-0.77	-3.52	-0.42	-3.11 ^{***}	-0.56	-3.77 ^{***}	-0.49	-3.49	-0.76
Italy	-0.79^{**}	-0.06	-0.70	0.60	-0.85^{**}	-0.80	-0.79	-1.01	-6.65	-0.06	-6.36	0.51	-7.14	-0.82	-7.15	-1.06
United Kingdom	-0.01	0.04	-0.07	0.44	-0.00	0.06	0.01	-0.47	-0.08	0.04	-0.47	0.42	-0.05	0.07	-0.16	-0.46
Canada	-0.15	-0.00	-0.26	0.03	-0.14	0.15	-0.25	-0.25	-1.09	-0.03	-1.87	-0.02	-1.05	0.14	-1.87	-0.26
Australia	-0.41	-1.20	-0.41	-1.20	-0.85 [*]	0.80	-0.81 [*]	0.80	-1.76	-1.36	-1.86	-1.35	-3.62	0.63	-3.68 [*]	0.62
Austria	-0.24	-1.55	-0.15	-1.66	-0.22	-2.21 [*]	-0.29	-2.10	-1.91	-1.08	-1.03	-1.51 [*]	-1.41	-1.80	-1.07	-2.01 ^{***}
Belgium	-1.17^{**}	0.08	-1.01 ^{***}	-0.14	-1.15	-0.51	-1.09	-0.84	-5.39	-0.73	-4.97 ^{***}	-0.79	-6.57 ^{***}	-0.56	-6.33 ^{***}	-0.80

Denmark	-0.26	-0.67	-0.28**	-0.64'	-0.46	0.39	-0.38"	0.16	-0.96**	-0.75	-1.08**	-0.70	-1.59	0.24	-1.44	0.13
Netherlands	-0.70	-0.07	-0.11	-0.63	-0.54	-0.74	-0.41	-0.97	-2.64	-0.45	-0.86	-0.59	-2.53	-0.75	-1.93	-0.97
New Zealand	-0.07	-0.92	-0.05	-0.70	-0.05	-0.24	-0.02	-0.37	-0.47	-0.88	-0.63	-0.72	-0.52	0.05	-0.65	0.12
Norway	-0.62	0.70	-0.41	0.47	-0.28	-0.99	-0.12	-1.29	-1.72	0.64	-1.52	0.53	-0.92	-0.94	-0.71	-1.19
Portugal	-1.47	-0.35	-1.22	-0.54	-1.76	-0.25	-1.40	-0.11	-7.20	-0.21	-5.87"	-0.45	-7.87	-0.23	-6.55"	-0.07
Spain	-0.45	0.56	-0.44"	0.56	-0.20	0.33	-0.13	-0.18	0.92'	-0.30	0.47	-0.07	0.96**	-1.55'	0.95"	-1.46
Sweden	1.57	-4.00	-1.78	0.04	-0.63	-3.68	-0.66	-4.46'	0.88	-2.90	-3.49	0.08	-1.45	-3.63*	-1.43	-4.43
Switzerland	-4.21"	3.56	-4.21"	3.56	-3.87	1.44	-3.56	0.79	-0.81**	0.60	-0.73	0.92	-0.83	0.61	-0.71"	-0.68
Turkey	0.33	-1.95	0.34	-1.96	-1.13	-2.57	-0.68	-1.43	12.05	-3.43	7.98	-2.77	-9.02	-2.33	-4.73	-1.29

Notes: The variables are as follows: VR: wage rate per employee in the business sector; PCF: private consumption deflator; PGDPE: value-added deflator in the business sector; UNR: unemployment rate; UTREND: trend unemployment rate. D is the first difference operator and L and M are lag operators. Order of L-polynomials = 2 for estimations on half-yearly data and 1 for estimations on yearly data; Order of M-polynomials = 1 for estimations on half-yearly data and 0 for estimation on yearly data. For most countries the estimation period stretches from the mid-1960s to 1991. In the cases of France, Australia, Austria, Belgium, the Netherlands and Turkey, the estimation period begins in the early 1970s. Asterisks represent significance: ** = 5 per cent; * = 10 per cent. For the sake of cross-country comparability and in the light of sometimes short data series, common, relatively parsimonious specifications have been used. This sometimes leads to less than satisfying statistical properties of the estimated equations. Thus, of the estimated 152 equations using annual data, only 101 showed neither signs of structural instability nor autocorrelated residuals.

to be avoided. In such cases, the NAWRU indicator of structural unemployment discussed in Section I would be higher than the long-term equilibrium rate of unemployment. Indeed, these effects may provide an explanation for the seemingly contradictory findings of a strong upwards trend in the NAWRU indicator and insignificance of the deviation of unemployment from its trend in the estimated wage equations. The speed limit concept may, for example, be relevant in relation to the experiences of several countries in the late 1980s where inflation began to rise even though unemployment may still have been above its long-run equilibrium level (see below also). In effect, unemployment fell “too rapidly”, with the resulting (positive) effect on wage growth more than offsetting the (negative) effect of the unemployment level.

As discussed earlier, the hysteresis hypothesis stems in large part from the proposition that the long-term unemployed have a relatively weak impact on wage formation processes in comparison with those recently becoming unemployed – whether as a result of diminishing skills, employer screening, or other insider-outsider forces. Under full hysteresis, their influence is negligible. These propositions can be assessed using wage equation estimates reported recently in the *OECD Employment Outlook 1993*, in which real wage growth across OECD countries is regressed on the aggregate unemployment rate, the average incidence of long-term unemployment during the 1980s (defined as long-term unemployment as a proportion of total unemployment), and productivity growth. The estimates predict that, for a given level of aggregate unemployment, a 10 percentage point increase in the incidence of long-term unemployment is associated with an increase in real wage growth of about 0.7 percentage points per annum.

Table 2 draws on the empirical results and other data provided in the *Employment Outlook*. It shows the estimated semi-elasticities of real wage growth with respect to the aggregate unemployment rate in each country, and then provides the implied estimates of the semi-elasticities of real wage growth with respect to the rates of short-term and long-term unemployment (i.e. short- and long-term unemployment as a proportion of the labour force). As expected, the semi-elasticity with respect to aggregate unemployment represents an average between a relatively stronger (negative) effect on real wage growth coming from short-term unemployment, and a relatively weaker effect from long-term unemployment. Apart from some countries where the rate of long-term unemployment appears perversely to have a positive effect on real wage growth,²⁰ long-term unemployment appears in most cases to exert a non-negligible restraining influence on real wage growth. This finding holds in the EC countries, where the problem of long-term unemployment is particularly acute. For example, in Belgium, Ireland, Italy and Spain, where the rates of long-term unemployment are the highest, the degree of wage restraint coming from higher long-term unemployment ranges from 23 per cent to 40 per cent of the effect from short-term unemployment.

These results suggest that unemployment persistence can best be viewed as a phenomenon of slow labour market adjustment. The long-term unemployed maintain some, albeit weak, influence on the wage formation process, but nevertheless a stronger effect than that predicted under the hypothesis of full hysteresis.

Table 2. **Effects of short-term and long-term unemployment on real wage growth¹**

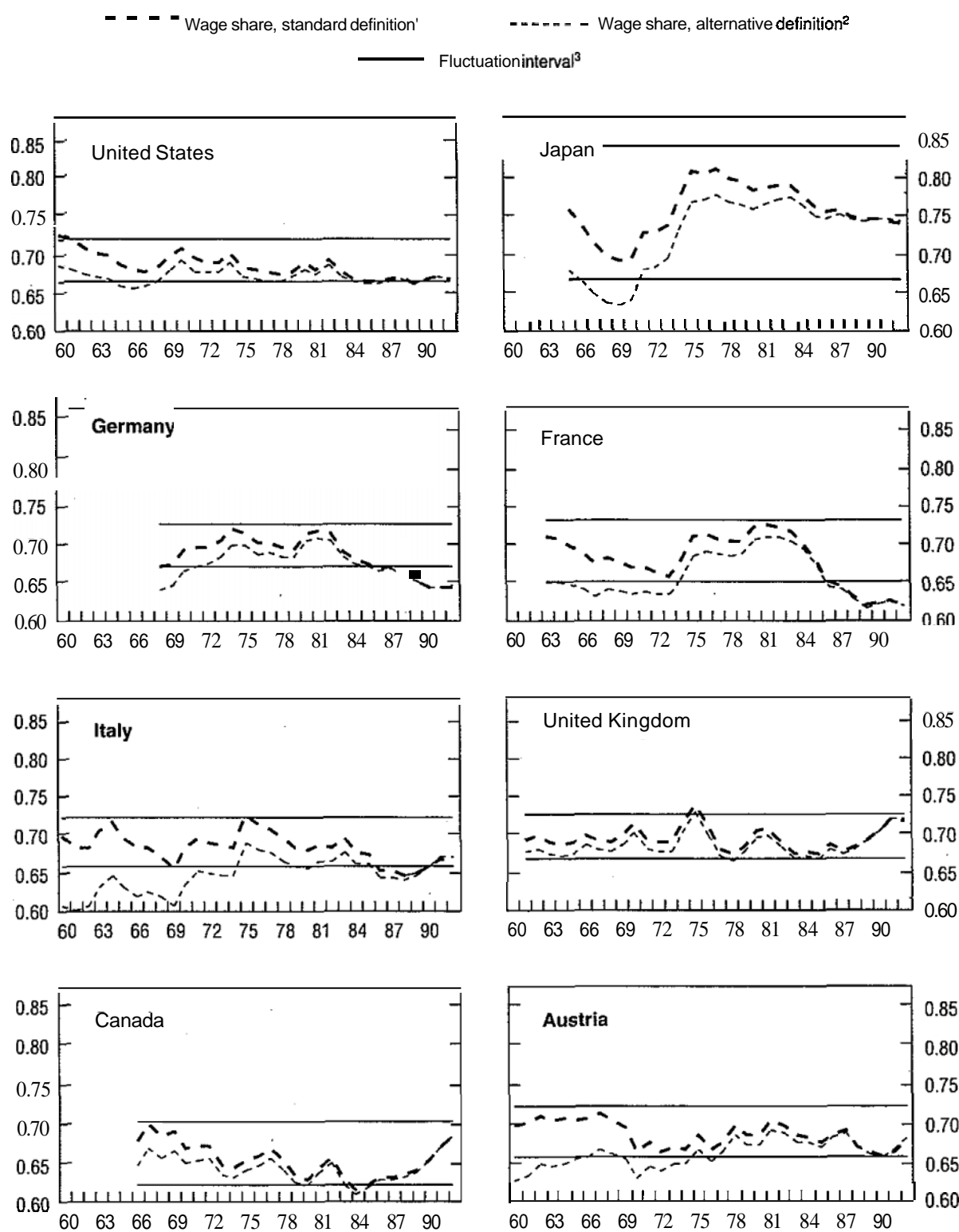
	Semi-elasticities of real wage growth with respect to rate of:		
	Total Unemployment	Short-term unemployment ²	Long-term unemployment ²
Australia	-0.55	-0.66	-0.05
Belgium	-0.78	-1.32	-0.53
Canada	4.39	4.43	0.19
Denmark	4.66	-0.84	-0.21
France	-0.58	-0.77	-0.16
Germany	-1.26	-1.72	-0.54
Greece	-0.62	-0.92	-0.16
Ireland	-0.39	-0.62	-0.20
Italy	-0.54	-1.21	4.44
Japan	-1.63	-2.11	0.79
Netherlands	-0.99	-1.34	-0.45
New Zealand	-0.93	-1.09	-0.37
Norway	-0.96	-1.17	-0.02
Portugal	-0.62	-1.09	0.13
Spain	-0.34	-0.46	-0.14
Sweden	-1.59	-1.60	-0.74
United Kingdom	-0.54	-0.68	0
United States	-0.60	-0.66	0.35

1. Estimated from data in OECD Employment Outlook, 1993, Tables 3.1, 3.2 and 3.5. The short- and long-term semi-elasticity estimates use the **most** recently available unemployment rate data.
2. As a proportion of the labour force.

B. Wage shares

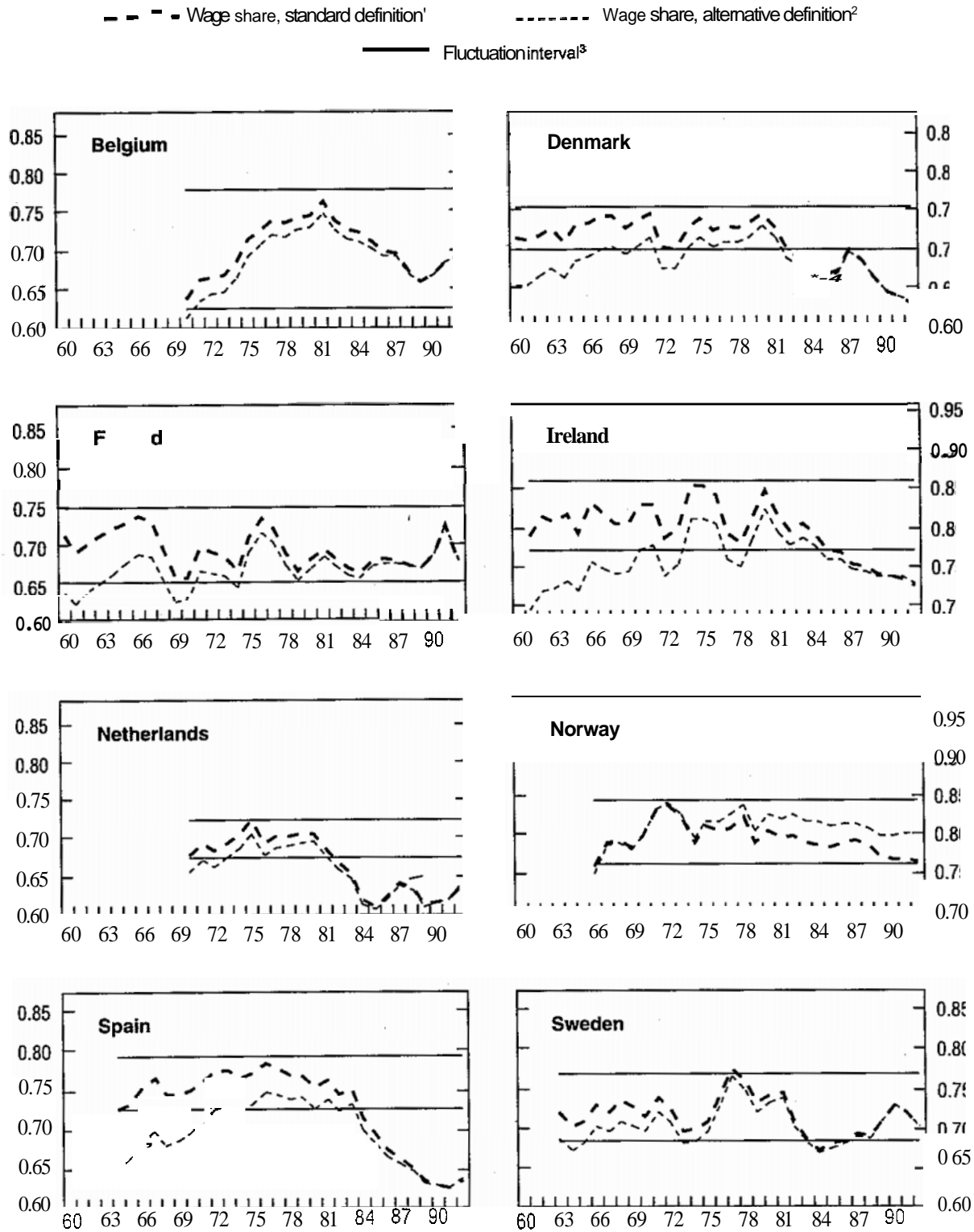
Further evidence suggesting that the rise in unemployment does not reflect, and has not caused, a corresponding rise in the (long-run) equilibrium rate of unemployment comes from trends in wage shares. As illustrated in Figure 6, wage shares in a number of, primarily European, countries declined during the 1980s, falling below the fluctuation range that applied in the two preceding decades. The decline in wage shares occurred in countries that are often cited in the context of persistently high unemployment, including France, Germany, Italy (until the late 1980s), Denmark, Ireland, the Netherlands and Spain. This pattern implies that average real wage growth over the 1980s fell below the growth in aggregate labour productivity. Such a result is consistent with real wage moderation in response to unemployment rising above its equilibrium level, with employment adjusting only after a lag.²¹ It would be difficult to reconcile with the hypotheses of full hysteresis or the natural rate rising in line with trend unemployment. There are, however, some important exceptions to the pattern outlined above. In some countries with high unemployment, including Canada, the United Kingdom and Australia, the wage share was either quite stable over the last two decades or moved up in the second half of the 1980s.

Figure 6. Wage shares in the business sector



1. Calculated by imputing a wage compensation to self-employed equal to average compensation for wage earners.
2. Calculated by imputing a wage compensation to self-employed rising from 70 per cent of average compensation in 1960 to 100 per cent in 1990.
3. Horizontal lines show fluctuation interval over the period up to and including 1980. They have been calculated as the mean wage share, based on the first method, +/- two times its standard deviation.

Figure 6. (cont.) Wage shares in the business sector



1. Calculated by imputing a wage compensation to self-employed equal to average compensation for wage earners.
2. Calculated by imputing a wage compensation to self-employed rising from 70 per cent of average compensation in 1960 to 100 per cent in 1990.
3. Horizontal lines show fluctuation interval over the period up to and including 1980. They have been calculated as the mean wage share, based on the first method, +/- two times its standard deviation.

Evidence regarding changing wage shares should be treated with caution, in part because the linkages between unemployment, income distribution, and wage adjustment are not straightforward. Other factors, including shifts in technology and rising real interest rates, could also lead to a shift in income distribution; however, such changes are generally common to all countries while the fall in wage shares is most clearly apparent in the high unemployment cases, suggesting that the unemployment rate is still an important influence. Evidence from trends in wage shares is also complicated by difficulties in imputing wages to the self-employed. Figure 6 attempts to correct for what may have been relatively generous imputations applied in earlier years, but without removing the impression of a significant downward shift in the wage share in certain high-unemployment countries during the 1980s.

C. Time-series properties

An assessment of the characteristics of unemployment persistence points quite naturally to the use of techniques for analysing the time-series properties of unemployment. Some test results are presented in Table 3. However, as elaborated below, these results are relatively weak and inconclusive; in addition to the limited number of observations, this reflects the difficulty of discriminating between the competing explanations of persistence with the different tests.

Unit root tests cannot reject the existence of a unit root in the unemployment rate for any country if the alternative hypothesis is one of stationarity. Taken at face value, this could be interpreted as rejecting a hypothesis of adjustment towards a constant natural rate. However, in practice it is difficult to discriminate between very slow adjustment and a unit root in small samples. If the alternative includes either a drift or the combination of a drift and a trend, the unit root hypothesis is rejected for a number of countries. At the 10 per cent level, for nine countries of the 23 examined, there are signs that unemployment reverts to a deterministic trend. This would seem to conflict with the notion of full hysteresis which, on the other hand, cannot be rejected for the remaining countries. Nevertheless, the specificity of the alternative hypothesis should be kept in mind – other specifications, *e.g.* involving discrete shifts in the deterministic component of unemployment, might have led to rejection of the unit root hypothesis in more countries.

Table 3 also reports some of the results of estimating simple ARMA models for unemployment rates in an attempt to shed some further light on the question of whether unemployment tends to revert.²² Interpreting the AR(1) coefficients as indicators of persistence suggests that shocks to unemployment do, indeed, have persistent effects in many countries. Again, however, it is difficult to discriminate between competing hypotheses. Only two AR(1) coefficients, those for Sweden and the United States, are significantly less than one, and thus conflicting with the hypotheses of either full hysteresis or a rising natural rate as explaining persistent unemployment. On the other hand, the large majority of point estimates are below one, though not significantly, suggesting that it would be inappropriate to reject the notion of very slow adjustment on the basis of the levels of significance.

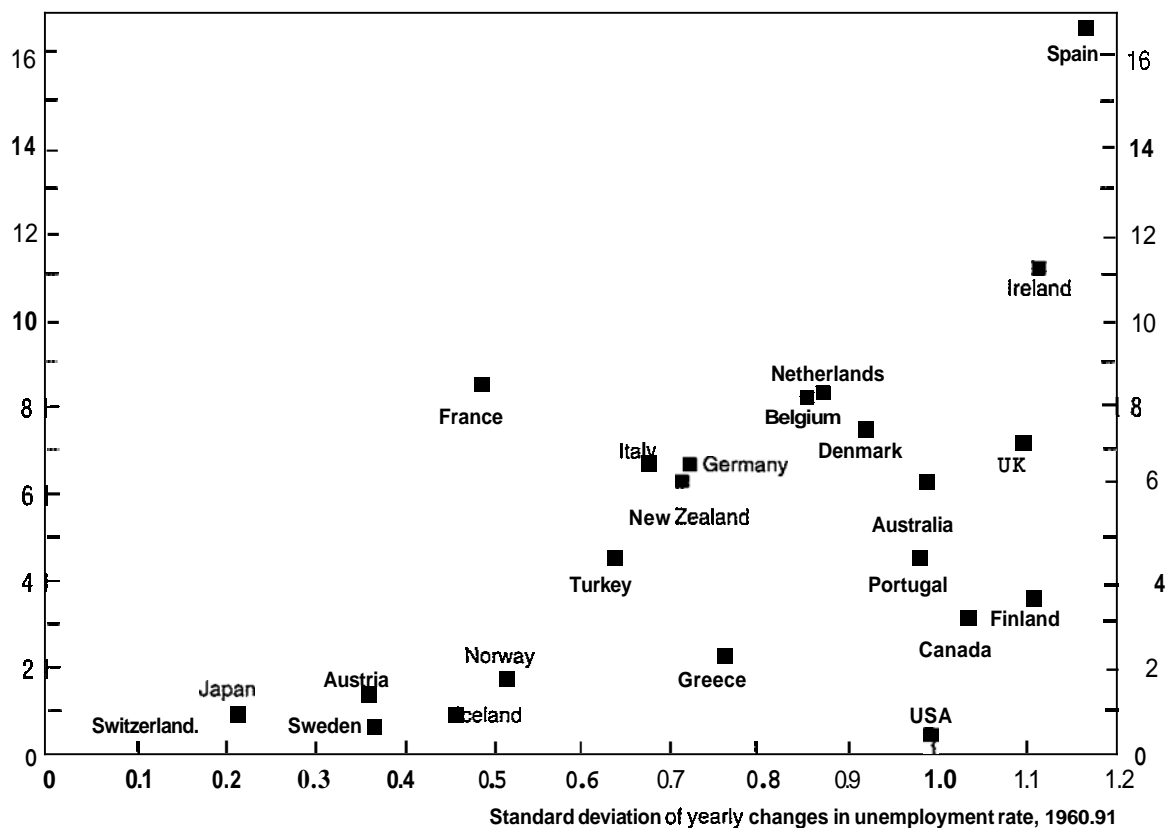
Table 3. Time-series properties of unemployment

	Probability of unit root ¹ against hypothesis of stationarity with:			Persistence ² (standard deviation)	
	Constancy	Drift	Drift and trend		
United States	0.59	0.08	0.09	0.35	(0.20)
Japan	0.87	0.80	0.69	0.91	(0.12)
Germany	0.54	0.55	0.11	0.95	(0.09)
France	0.99	0.95	0.51	1.04	(1.92)
Italy	0.98	0.91	0.30	1.03	(2.05)
United Kingdom	0.84	0.72	0.02	0.95	(0.10)
Canada	0.77	0.55	0.08	0.85	(0.19)
Australia	0.98	0.95	0.09	0.93	(0.12)
Austria	0.94	0.87	0.75	0.92	(0.12)
Belgium	0.62	0.56	0.54		
Denmark	0.99	0.91	0.37	0.97	(0.1)
Finland	0.98	0.89	0.01	0.45	(0.42)
Greece	0.79	0.63	0.62	0.96	(0.10)
Iceland	0.16	0.03	0.04	0.79	(0.17)
Ireland	0.97	0.91	0.33	1.03	(1.96)
Netherlands	0.74	0.74	0.15	0.96	(0.08)
New Zealand	1.00	1.00	1.00		
Norway	0.99	1.00	0.53	0.94	(0.25)
Portugal	0.39	0.23	0.36	0.67	(0.27)
Spain	0.89	0.86	0.01	0.96	(0.09)
Sweden	0.90	0.09	0.02	0.40	(0.25)
Switzerland	0.98	0.98	0.07	0.80	(0.20)
Turkey	0.97	0.68	0.20	0.91	(0.34)

1. Based on augmented Dickey-Fuller test. For the major seven countries, 5-yearly data covering the period 1961:1 to 1991:2 were used, while yearly data covering the same period were used for the small countries. The hypotheses being tested concern the noise process, Z, of the unemployment series, U, which also contains a deterministic trend, D, i.e. $U = D + Z$. Three different specifications of the deterministic trend are considered, $D = c$ (first column), $D = c_1 + c_2 \text{ TIME}$ (second column), and $D = c_1 + c_2 \text{ TIME} + c_3 \text{ TIME}^2$ (third column). In all cases, the noise component is assumed to be an AR(1) process and the test concerns the parameter α in $Z = \alpha Z(-1) + e$, where e is white noise. The null hypothesis of a unit root is represented by $\alpha = 1$ while stationarity implies that $\alpha < 1$. The table reports probabilities of accepting the null hypothesis. For additional information see Campbell and Perron (1991).
2. Coefficient on the AR(1) term in an estimated ARMA(1, x) process, where the length of the MA-process varies from country to country, depending on how many lags were significant at the 5 per cent level (in most cases the MA-process was of the first order). Yearly data were used for all countries. The estimation period was 1969-91.

D. Unemployment volatility

Amongst OECD countries, there appears to be a positive relationship between the year-to-year volatility of the unemployment rate, and the trend rise in unemployment. This relationship is illustrated in Figure 7. Countries such as Switzerland, Japan, and Austria, which have had the lowest volatility in unemployment since the 1960s also are amongst those with the lowest increases in unemployment rates between 1960-64 and 1985-91. Conversely, countries with the greatest variability in unemployment, notably Spain and Ireland, have exper-



experienced the largest increases in unemployment rates. There are some exceptions to this pattern: the United States has had virtually no trend increase in unemployment since the 1960s despite having relatively high unemployment volatility (possibly a reflection of the widespread use of temporary layoffs in the U.S. economy); and France has comparatively low variability in unemployment but has experienced a substantial trend increase in unemployment.

Despite these exceptions, an interpretation that could be placed on the general relationship suggested by Figure 7 is that even a temporary boost in unemployment caused by an adverse economic shock may in many cases contain elements which contribute to a rise in trend unemployment. This interpretation is consistent with the hypotheses of full or partial hysteresis in unemployment rates; it is not what one would expect if an increase in the underlying natural rate of unemployment were the sole source of unemployment persistence.

E. Evidence from panel data²³

Panel data can provide detailed information on individual transitions between different labour market states, including between employment and unemployment. These data have therefore been used to investigate labour market adjustment processes, and to explore the nature and sources of unemployment persistence. Pedersen and Westergård-Nielsen (1993) provide a comprehensive survey of recent findings in this area. As their survey makes clear, there is still a great deal of uncertainty about some key relationships, such as the strength and even direction of the “duration dependence” of unemployment – that is, whether the probability of leaving unemployment depends on the length of time one has been unemployed. For example, empirical findings depend critically on model specifications, including the extent to which individual characteristics, both observed and unobserved, are controlled for, and whether alternative “exit states” are modelled (*e.g.* moving from unemployment to a job with one’s previous employer versus moving to a new job or leaving the labour force).

However, the general impression conveyed by panel data studies is that, as the unemployment spell grows longer, the unemployed do adjust their attitudes and expectations in an effort to regain employment, even though the nature and speed of adjustment may change through time. There is very little evidence of an abrupt isolation of the unemployed from labour market adjustment processes, as would be expected if full hysteresis prevailed. For example, on the basis of available evidence, Pedersen and Westergård-Nielsen conclude that reservation wages appear to decline during unemployment spells, with post-unemployment wages usually lower than wages prior to unemployment. Nevertheless, the self-reinforcing character of unemployment is suggested by indications that search intensity may decline as the duration of unemployment and the period of search increases.

IV. CONCLUSIONS AND POLICY IMPLICATIONS

This article has reviewed the empirical relevance of some of the theories put forward to explain unemployment persistence. The mechanisms behind persistence are important because they carry implications for economic policy. Thus, if the persistence of unemployment at steadily higher levels reflects a rising natural rate of unemployment, the appropriate policy response is structural reform aimed at reversing or offsetting the factors which caused the rise. If full hysteresis or slow adjustment are the main causes behind persistence, the policy recommendations still include microeconomic reform. In many cases, structural policy actions effective in reducing the natural rate of unemployment are also likely to be effective in addressing hysteresis and slow adjustment, such as policies directed at improving the regional and occupational mobility of the unemployed. The overlap between microeconomic policy measures is not perfect, however. For instance, softening of employment protection legislation may be efficient in com-

bating hysteresis and slow adjustment but may have only modest effects on the natural rate of unemployment.

The picture is more complicated when it comes to macroeconomic policies, where the risks associated with inappropriate policy responses (or the lack of appropriate responses) may be significant. For example, expansionary macroeconomic policies have no role to play in the case of persistence created by a changing natural rate. In the case of slow adjustment, and taking into account the well-known difficulties (noted below) with fine-tuning the economy, activist macroeconomic measures may at most have a limited role to play, and could indeed be counter-productive – for example, if they distract from the need for structural reforms. With full hysteresis, however, expansionary policies could theoretically lower unemployment permanently at the price of a finite increase in inflation.

Both hysteresis and slow adjustment may be seen as justifying efforts to avoid large (negative) shocks to economies. This could be an argument for having strong automatic stabilisers, particularly if the starting point was one of low unemployment. Supporting such an argument would be the difficulties associated with policy activism, including the lags before such measures take effect, the difficulties in reversing expansionary policies during subsequent economic upswings, and the possibly adverse effects on private sector confidence and activity. **How**ever, automatic stabilisers are also likely to react to changes in unemployment caused by a rising natural rate, which may have a destabilising influence on the economy.

The preceding discussion points to the importance of identifying the underlying character and sources of persistent unemployment. This article has presented evidence both on the extent of persistence across OECD countries, and on the empirical relevance of various theoretical explanations of persistence. This empirical assessment rests more on the pattern of evidence from a range of different findings; no single indicator is ideal or conclusive. The two extreme explanations of persistence, as reflecting either corresponding changes in the natural rate of unemployment or full hysteresis, seem to receive little backing in the empirical evidence. This does not exclude that elements of these hypotheses are important for explaining unemployment persistence. They almost certainly are – to varying degrees across countries. Nevertheless, slow adjustment towards long-run equilibrium does seem to be an important part of the story, with the slowness of adjustment relating to both wages and employment. In relation to the policy discussion above, this suggests that the emphasis in tackling persistent unemployment should be on structural reforms which improve the ability of and incentives on the unemployed to become integrated back into the workforce. However, the tentative character of these conclusions and the need for further research is underlined.

NOTES

1. For further discussion and technical detail on the construction of the measures in Figure 2, see Elmeskov (1993), pp. 94-96.
2. In deriving these estimates, it is assumed that the NAWRU is constant between two consecutive periods, and that wage inflation is affected in a linear way by the difference between the current level of unemployment and the NAWRU (see Elmeskov, 1993):

$$D^2 \log W = -a * (U - \text{NAWRU}), a > 0$$

where D is the first-difference operator, and W and U are levels of wages and unemployment respectively. Using consecutive observations, an estimate of “a” can be calculated as:

$$a = - D^3 \log W / DU$$

which yields the estimated NAWRU as:

$$\text{NAWRU} = U - (DU / D^3 \log W) * D^2 \log W$$

To the extent that wage inflation is affected not only by the level of unemployment but also by its year-to-year changes, the derived short-run NAWRU will tend to move with actual unemployment and may, thus, differ from the long-run NAWRU obtained for a constant rate of unemployment.

3. In considering results relating to the Beveridge curve, it is important to bear in mind the poor or inconsistent quality of much of the data on job vacancies.
4. See, for example, Layard *et al.* (1991); Lindbeck (1992); Bean (1992); and Alogoskoufis and Manning (1988) for further details and extensions of this model.
5. The dynamics behind this model, including the impact of wage and price “surprises” (*i.e.* divergences between actual and expected levels of wages and prices), are discussed in more detail in Layard *et al.* (1991). In the static version presented here, it is nevertheless implicit that, in equilibrium, actual values of wages and prices are equal to their expected values.
6. In a dynamic context, the NAIRU (or NAWRU), the non-accelerating (wage) inflation rate of unemployment, coincides with the natural rate when actual price and wage changes are equal to expected changes, are equal to each other for a given level of productivity (*i.e.* real wages move in line with productivity), and have constant rates of change.
7. Note that the wage-setting schedule could also shift in response to some of these shocks.
8. In empirical applications, hysteresis is often taken to be represented by the effect of the change in rather than level of unemployment in equations explaining wage growth (see Section III). For example, a rise in unemployment is expected to reduce wage pressure, as a result of greater job insecurity amongst insiders and a rise in the proportion of short-term relative to long-term unemployed (see Layard *et al.*, 1991).

9. As discussed in Alogoskoufis and Manning (1988), the mechanisms described in this section may also influence the *slopes* of the short-run and long-run wage-setting (and/or labour demand) schedules, as well as their rate of adjustment through time.
10. Holmlund (1991) cites survey evidence from the United Kingdom suggesting that firms, in reviewing information on job applicants, do indeed use long-term unemployment as a screening device.
11. Alogoskoufis and Manning (1988) suggest that persistence in wage aspirations and slow adjustment in labour demand are the major reasons for the much stronger degree of unemployment persistence in Europe compared with the United States.
12. For more on the effects of job seniority, and on insider-outsider mechanisms more generally, see for example Lindbeck and Snower (1988) or Lindbeck (1992).
13. An indication as to whether persistence is due primarily to “insider” or “outsider” mechanisms comes from the Beveridge curve information in Figures 2 and 3. As described by Bean (1992), if insider forces were predominant, increased wage pressure at each level of employment would reduce firm's willingness to offer jobs (or supply vacancies) at that level of employment. That is, there would be a higher equilibrium unemployment rate and a reduced level of job vacancies, or a shift along the Beveridge curve. However, Figures 2 and 3 indicate that there has been an outward shift in the Beveridge curve in most OECD countries: this suggests a deterioration in the matching process between unemployed workers and job vacancies, consistent with the view that the unemployed, particularly the longer-term unemployed, tend to become outsiders as far as their labour market influence is concerned.. These conclusions should, however, be taken with a grain of salt as many other factors may affect the position of the Beveridge curve.
14. The structural rate of unemployment derived from the Okun curve is indicative only, partly because capital intensities are flexible also in the short run and partly because the measures of capacity use are uncertain (see Elmeskov, 1993).
15. Persistence in labour demand may also imply that the labour demand schedule is steeper (less elastic) in the short run than in the long run (see Alogoskoufis and Manning (1988)). Similarly, a speed limit on the rate at which the unemployed can be re-absorbed into the workforce and thereby influence wage-setting processes could be represented by a wage-setting schedule which is steeper in the short-run than in the long-run.
16. Much of the material in this and the following sub-sections is extracted from the Working Paper noted in note 1.
17. Clearly, many different trends can be constructed, giving the exercise a certain arbitrary character. As discussed above, however, various trend concepts tend to give relatively uniform results. Here, trend unemployment was estimated using a quadratic time trend, including also the log of time. Egebo and Englander (1992) found broadly uniform results from experimenting with a number of different trend terms in wage equations for a number of ERM member countries.
18. That is, the equation is specified in terms of real wages, and the relationship between unemployment and real wages is affected neither by a one-off inflationary impulse nor by a permanent shift in inflation.
19. Andersen (1992) also finds evidence of significant hysteresis in some of these cases.
20. This result probably stems from the parsimonious specification and estimation assumptions used in the model set out in the *Employment Outlook*; it is notable that the positive elasticity appears to occur particularly in countries with very low rates of long-term unemployment.

21. It could in principle also result as an equilibrium phenomenon if elasticities of substitution in the production process were so low that a proportionately much larger real wage loss was needed to increase employment by a given magnitude. Calculations in Elmeskov (1993) suggest that this is not the case.
22. This follows a procedure used in Barro (1988).
23. These are micro-data sets in which information is compiled (*e.g.* from surveys or administrative registers) across time on the same cross-section of individuals.

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