

Paqué, Karl-Heinz

**Working Paper — Digitized Version**

## Measuring structural unemployment: Some neglected issues

Kiel Working Paper, No. 505

**Provided in Cooperation with:**

Kiel Institute for the World Economy – Leibniz Center for Research on Global Economic Challenges

*Suggested Citation:* Paqué, Karl-Heinz (1992) : Measuring structural unemployment: Some neglected issues, Kiel Working Paper, No. 505, Kiel Institute of World Economics (IfW), Kiel

This Version is available at:

<https://hdl.handle.net/10419/47062>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# Kieler Arbeitspapiere Kiel Working Papers

---

Kiel Working Paper No. 505

Measuring Structural Unemployment.  
Some Neglected Issues

by

Karl-Heinz Paqué

✓

Institut für Weltwirtschaft an der Universität Kiel

The Kiel Institute of World Economics

The Kiel Institute of World Economics  
D - 2300 Kiel, Düsternbrooker Weg 120

Kiel Working Paper No. 505

Measuring Structural Unemployment.  
Some Neglected Issues

by

Karl-Heinz Paqué

Ag 919 / 92  
Weltwirtschaft  
Kiel

February 1992

The author himself, not the Kiel Institute of World Economics, is responsible for the contents and distribution of each Kiel Working Paper. Since the series involves manuscripts in a preliminary form, interested readers are requested to direct criticism and suggestions to the author.

Since the mid-1980s, discussions on structural unemployment among macroeconomists have mostly taken place within a particular framework which may be called the mismatch philosophy. Roughly speaking, it interprets structural imbalance to mean a mismatch of labour demand and labour supply between 'sectors' - be they regions, industries or occupations - and structural unemployment to denote that part of total unemployment which can be explicitly ascribed to this mismatch. Two families of mismatch measures have been developed and applied, one focusing on the link between structural imbalance and the NAIRU (the non-accelerating-inflation rate of unemployment), the other on the link between structural imbalance and the location of the Beveridge-curve. By and large, both families have generated the same empirical insight that structural imbalances in Western European countries have not been a major factor in the rise of non-cyclical unemployment in the last two decades. By now, this claim has become something like an established fact in the relevant literature, though apparently not in the general public.

This paper is no more than a critical note on the mismatch philosophy. Its main point is that, under empirically acceptable assumptions, all measures developed so far - and probably all measures likely to emerge from refining the mismatch tools - are bound to seriously underestimate the extent of structural unemployment by any reasonable standard. For all that matters empirically, no period with a high share of mismatch in total unemployment is ever likely to emerge. Hence, if structural means mismatch, economists might as well stop worrying about structural labour market issues altogether. Of course, this unpleasant consequence raises the question whether the mismatch philosophy really captures the essence of what structural imbalances ought to mean. To answer this question, we shall set out an alternative framework which conforms more to what the term 'structural unemployment' actually denotes in the policy debate.

The paper has a very simple structure. The first two sections present and evaluate the two distinct though related mismatch families, i.e. structural unemployment as a 'mismatch share' of the aggregate NAIRU (Section I) and as a dislocation of the aggregate Beveridge-curve (Section II). The discussion will cover both conceptual and empirical issues; as far as data for empirical illustrations are used, they are taken

from Germany, i.e. from that European country, which is probably the richest source of different regimes of regional imbalances in the post-war period with a very uneven distribution of unemployed Eastern refugees in the early 1950's, a widening(?) North-South growth gap in the late 1970's and the 1980's, and an extreme - maybe even unique - East-West prosperity and unemployment gap after economic unification in 1990. In Section III, we shall sketch an alternative philosophy of structural imbalances and unemployment.

### I. Mismatch and the NAIRU

The rationale of a link between mismatch and the NAIRU is based on a very simple idea: if wages react more sensitively to changes in unemployment at low than at high unemployment rates, then a sectoral equalization of unemployment rates will reduce overall wage pressure at a given average unemployment rate, or conversely, will reduce the average non-inflationary unemployment rate at a given real wage level. The intuition behind this idea is straightforward: if the stability gain of 'cooling down' the low-unemployment sector of the economy overcompensates the inflationary cost of 'heating up' the high-unemployment sector, then an overall improvement of the unemployment/inflation trade-off can be (hypothetically) realized by removing the structural imbalance. The very percentage share, by which the NAIRU can thus be reduced, may reasonably be called the share of structural in total equilibrium unemployment.

So much for the basic rationale of the approach which can be translated into a more rigorous operational framework within the realm of formal NAIRU-theory.<sup>1</sup> Let the multi-sectoral economy be characterized by a production technology of the Cobb-Douglas-type

$$(1) \quad y = \phi \prod_i N_i^{\alpha_i}$$

with  $y$  being the single product ('output') of the economy,  $N_i$  the level of employment in sector  $i$  ( $i=1,2,\dots,n$ ),  $\phi$  ( $0<\phi<1$ ) an efficiency parameter

---

<sup>1</sup> See Layard, Nickell, Jackman [1991], pp. 308-311, and Jackman, Layard, Savouri [1991].

and  $\alpha_i$  ( $i=1,2,\dots,n$ ) the partial production elasticities of the sectoral labour inputs which add up to unity due to constant returns to scale ( $\sum \alpha_i = 1$ ). Assuming normal-cost pricing, (1) implies a price equation of the form

$$(2) \quad p = (\theta\phi)^{-1} \prod_i w_i^{\alpha_i}$$

with  $\theta$  ( $0 < \theta < 1$ ) being an index of product-market competitiveness and  $w_i$  ( $i=1,2,\dots,n$ ) the sectoral wage rates. In essence, (2) states that the price level is a weighted geometric mean of the sectoral wage rates with the weights being the partial production elasticities  $\alpha_i$  and the mean being scaled up depending on the efficiency of production technology ( $\phi$ ) and the competitiveness of the product market ( $\theta$ ). Dividing by  $p$  and taking logs, we obtain

$$(3) \quad \log (\theta\phi) = \sum \alpha_i \log (w_i/p)$$

which can be interpreted as a feasible real wage frontier giving the locus of all sectoral real wage rates which are consistent with a constant price level. To proceed any further, we now need a set of sectoral real wage functions. Let these be of the standard double logarithmic form

$$(4) \quad \log (w_i/p) = \beta_i - \gamma \log u_i$$

with  $u_i$  ( $i=1,2,\dots,n$ ) being the sectoral unemployment rates and  $\beta_i$  ( $i=1,2,\dots,n$ ) and  $\gamma$  constant parameters ( $\beta_i, \gamma > 0$ ). Note that this wage equation implies equal unemployment elasticities of the real wage across all sectors: each sector's real wage reacts to the respective sector unemployment rate, but it does so with the same degree of wage flexibility or rigidity. Given (3) and (4), we can now derive an unemployment frontier

$$(5) \quad \log (\theta\phi) = \sum \alpha_i \beta_i - \gamma \sum \alpha_i \log u_i$$

which denotes the locus of all combinations of sectoral unemployment rates that are consistent with aggregate equilibrium, i.e. with the absence of inflationary pressures. Under some rather innocent simplifying

assumptions, this locus can be drawn for the two-sector case as a convex curve in  $u_1, u_2$ -space, with the convexity being the consequence of the convenient form of a double-logarithmic wage function. The convexity implies that the minimum average unemployment rate consistent with equilibrium is always at the point of equality between the intersectoral unemployment rates.<sup>1</sup>

By some simple algebraic manipulations of (5) - adding the term  $(\gamma \log u)$  on both sides, dividing by  $\gamma$  and rearranging - we obtain

$$(6) \quad \log u = 1/\gamma \cdot [\sum \alpha_i \beta_i - \log (\theta\Phi)] - \sum \alpha_i \log (u_i/u) \quad := N + S,$$

i.e. the log of average unemployment is split into two additive terms, namely a constant (N) which is independent of mismatch and thus represents the non-structural component ( $N = 1/\gamma [\sum \alpha_i \beta_i - \log (\theta\Phi)]$ ), and the term S (with  $S = - \sum \alpha_i \log (u_i/u)$ ), the structural component, which varies with the degree of mismatch, i.e. the deviation of  $\log u_i$  from  $\log u$ . Note that N is positive by assumption about its constituent parameters (without loss of generality) and that S is positive due to the convexity of the wage and the unemployment frontiers.

Empirically, S is the core of the matter: if we can obtain an estimate of the  $\alpha_i$  and thus of S, we can decompose any aggregate unemployment rate into a structural and a non-structural part. The most straightforward and perfectly reasonable approach is to assume that the  $\alpha_i$  which are by definition partial production elasticities and the wage shares of sectoral labour, equal the respective sectoral shares in the total labour force (L). With  $\alpha_i = L_i/L$  and  $u = \sum (L_i/L) u_i$ , S can be written as

$$(7) \quad S = - [\sum (L_i/L) \log u_i - \log \sum (L_i/L) u_i]$$

or, in non-logarithmic form,

$$(8) \quad e^S = \prod_i (u_i^{L_i/L}) / [\sum_i (L_i/L) u_i]$$

---

<sup>1</sup> For a diagrammatic exposition, see Layard, Nickell, Jackman [1991], p. 309.

which is nothing but the ratio of the geometric mean of the sectoral unemployment rates - weighted by the labour shares - divided by the respective arithmetic mean. If one interprets the term  $N$  in (6) as the log of the minimum average unemployment rate which could be reached in the absence of structural imbalance (i.e.  $u_i = u$  for all  $u_i$  so that  $S = 0$ ), then the share of mismatch in total unemployment ( $MS_0$ ) is given by

$$(9) \quad MS_0 = 1 - 1/e^S$$

with  $e^S$  defined as in (8).

So much for the framework of analysis. Table 1 gives a rough quantitative impression of the magnitude of  $MS_0$  for the case of regional imbalances in Germany. The main message of the numbers in the table is certainly that they are not very high at any time: in the early 1950s - a period of a widely appreciated regional gap with the rural Northern states of West Germany flooded by refugees with unemployment rates above 20 per cent compared to less than 5 per cent in the South -, the measure  $MS_0$  stays as low as about 15 per cent. Since the early 1970s, it has remained even well below 10 per cent: although it rose significantly from the late 1970s to the late 1980s, the rise took place in a negligible range from 2.6 per cent in 1975-79 to 5.8 per cent in 1985-89. If one takes these numbers at face value, all the fuzz about rising regional imbalances in the last decade was grossly overdone. However, the most striking fact is the quantitative picture which  $MS_0$  gives of German unification. Even if the vast number of short-term employees in East Germany (the former German Democratic Republic) are fully counted as unemployed, no more than 20 per cent of total unemployment in Germany can be characterized as 'regional' - despite an Eastern 'unemployment rate' of 26.9 per cent as compared to 6.5 per cent in the West and despite more than half (50.3 per cent) of all unemployed persons being located in the East. Any 'naive' observer would speak of a dramatic - if not even a historically unique - predominance of a regionally concentrated crisis, but the measure  $MS_0$  remains remarkably unimpressed.



Table 1: Share of Regional in Total Unemployment, Various Measures \*

	MS <sub>0</sub>	MS <sub>1</sub>	MS <sub>2</sub>	SP=MS <sub>3</sub>
West Germany (11 states)				
1950-54 <sup>**</sup>	15.3	8.2	15.7	62.6
55-59 <sup>**</sup>	13.5	7.6	14.7	66.9
60-64	16.6	5.4	10.5	79.3
65-69	11.8	3.9	7.6	73.2
70-74	6.2	2.0	4.0	52.5
75-79	2.6	1.5	2.9	32.8
80-84	3.4	2.3	4.5	36.5
85-89	5.8	3.4	6.6	41.5
West Germany (142 labour offices)				
1975-79	5.0	3.6	7.1	61.7
80-84	5.0	4.3	8.4	58.3
85-89	7.0	4.8	9.3	61.5
United Germany (East vs. West)				
1991, min. <sup>***</sup>	4.4	5.5	10.7	18.9
, max. <sup>****</sup>	19.7	13.2	24.7	43.5

Notes: \* in p.c of total; annual observations at the end of September; for five-year periods arithmetic average of annual observations

\*\* nine states, excluding the Saar and Berlin

\*\*\* number of unemployed persons measured excluding short-time employed persons

\*\*\*\* number of unemployed persons measured including short-time employed persons

To obtain a more complete picture of the sensitivity of  $MS_0$  to variations in sectoral unemployment rates, let us focus on a world with two sectors (1,2) which is described by just two parameters, namely the relative weight of the sectors determined by the index  $\mu$  for sector 1 ( $0 < \mu < 1$ ) and  $(1-\mu)$  for sector 2, and the relative performance of the sectors determined by an index  $\lambda$  with  $u_1 = (1-\lambda)u_2$  for  $0 < \lambda < 1$ , i.e. without loss of generality, we take sector 1 to have the 'good' and sector 2 the 'bad' labour market.

Under these assumptions,  $MS_0$  is given by

$$(10) \quad MS_0 = 1 - (1-\lambda)^\mu / (1-\mu\lambda).$$

Table 2 presents a matrix of parameter constellations of  $\mu$  and  $\lambda$ . Picking for interpretation the simplest case of two equally sized sectors ( $\mu=0.5$ ), we find the intuition of our naïve observer fully vindicated: at a  $\lambda$  of 0.5 - meaning the unemployment rate in sector 2 being twice as high as in sector 1 - the share of structural in total unemployment is less than 6 per cent. If  $\lambda$  is 0.8 - meaning, e.g., an unemployment rate of 2 per cent in sector 1 and 10 per cent in sector 2 - no more than 25 per cent of all unemployed persons can be categorised as structural, although 83.3 per cent of all jobless find themselves in the 'bad' one of the two equally sized sectors. Only at very extreme states of inequality ( $\lambda > 0.9$ ), which are way off any practical relevance, does the structural component in unemployment become a serious rival to the non-structural one. This general pattern is fully supported for other values of  $\mu$  with the  $MS_0$  at  $\mu=0.5$  being rather close to its maximum overall  $\mu$ .<sup>1</sup> All this is not surprising given the anatomy of the index as depending on a ratio of a geometric and an arithmetic mean (equation 8): although these types of means tend to differ, the difference is usually quite small and so will be the share of structural mismatch.

Note that our conclusions as to the order of magnitude of mismatch unemployment are fairly robust with respect to the choice of a production

---

<sup>1</sup> It can be shown that  $MS_0$  has a maximum at  $\mu_1 = \lambda^{-1} + [\log(1-\lambda)]^{-1}$  which is between 0.50 and 0.68 in the empirically relevant range  $0.1 < \lambda < 0.9$ .

Table 2: The Share of Structural Unemployment  $MS_0$  for Selected Parameter Configurations of  $\lambda$  and  $\mu$  (Equation 10)\*

$\mu$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
$\lambda$									
0	0	0	0	0	0	0	0	0	0
0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.2	0.2	0.4	0.5	0.6	0.6	0.6	0.5	0.4	0.2
0.3	0.5	0.9	1.3	1.5	1.6	1.5	1.4	1.1	0.6
0.4	1.0	1.9	2.5	3.0	3.2	3.2	2.9	2.3	1.3
0.5	1.8	3.3	4.4	5.3	5.7	5.7	5.3	4.3	2.6
0.6	2.9	5.4	7.4	8.8	9.6	9.8	9.2	7.6	4.7
0.7	4.7	8.6	11.8	14.2	15.7	16.3	15.6	13.3	8.5
0.8	7.5	13.7	18.8	22.7	25.5	26.8	26.3	23.3	16.1
0.9	12.7	23.1	31.3	37.8	42.5	45.4	46.1	43.4	33.7
0.95	18.1	32.2	43.1	51.3	57.4	61.5	63.3	62.1	53.5
0.99	30.0	50.4	64.3	73.8	80.2	84.5	87.0	87.9	85.5
0.999	44.3	68.6	82.0	89.5	93.7	96.0	97.4	98.0	98.0

\* Figures for  $MS_0$  in per cent.

technology.<sup>1</sup> If the sectoral production functions (equation 1) are of the CES- rather than the Cobb-Douglas-type, the index tends to be lower (higher) if the elasticity of substitution ( $\sigma$ ) between sectoral labour inputs is higher (lower) than the Cobb-Douglas-benchmark level of one. This result has intuitive plausibility: the more substitutable sectoral labour is, the less a dispersion of unemployment rates can be viewed as reflecting a genuine mismatch and a cause of wage pressure. However, in the empirically relevant range, the difference between the respective Cobb-Douglas- and the CES-index remains very small.<sup>2</sup> For most relevant sectoral units, the empirical evidence points to a  $\sigma$  greater than one so that the Cobb-Douglas-model should mark something like an upper limit for mismatch. For regions in particular, it would be quite unrealistic to assume a  $\sigma$  of much lower than one since the labour force is likely to be quite similar in characteristics between regions. If anything, a  $\sigma$  of greater than one might be expected.

Note also that the choice of an alternative empirically relevant specification of the wage function does not alter the quality of our conclusions either. As can be seen from equations (6)-(8), the structural component of unemployment does *not* depend on the parameters  $\beta_1$  and  $\gamma$  of the wage function (4) so that any decomposition of unemployment which is based on a calculation of the structural component, is also invariant to the parametric characteristics of wage behaviour as long as the double logarithmic form of the wage equation and the Cobb-Douglas form of the production function are retained.<sup>3</sup> If the double logarithmic wage function is replaced by a semi-logarithmic one - empirically a quite common alternative at least for selected ranges of unemployment rates -

---

<sup>1</sup> See, with a slightly different intention, Layard, Nickell, Jackman, 1991, p. 311 and Annex 6.1, pp. 550-551. They prove the following point for a linearized version of the above model.

<sup>2</sup> In the linearized model version, this is so because the ratio of the indices just equals  $[1 - \gamma(\sigma-1)]$  with  $\gamma$  being the elasticity of the sectoral real wage with respect to the unemployment rate, which should be no greater than, say, 0.1 in actual practice so that the ratio will be quite close to 1.

<sup>3</sup> Again, the result has intuitive appeal: in a Cobb-Douglas world, factor shares are independent of factor prices so that the 'weighting' of the different sectors will be invariant to changes in the sectoral real wage structure brought about via the wage function by a sectoral differentiation of unemployment rates.

the unemployment frontier (equation 5) becomes

$$(11) \quad \log (\Theta \Phi) = \sum \alpha_i \beta_i - \gamma \sum \alpha_i u_i,$$

and the decomposition (equation 6) now reads as

$$(12) \quad u = 1/\gamma [\sum \alpha_i \beta_i - \log (\Theta \Phi)] - [\sum \alpha_i u_i - u] := N + S.$$

For  $\alpha_i = L_i/L$ , the term S vanishes since  $u = \sum (L_i/L)u_i$ ; mismatch unemployment is then zero. More general formulations may allow for a curvature of the wage function anywhere 'between' the semi-log and the double-log case, but the fact remains that only relative or log-differences of sectoral unemployment rates matter for mismatch; hence the standard double logarithmic specification sets something like an upper limit for the share of structural unemployment at a given intersectoral dispersion of unemployment rates.<sup>1</sup>

From all this, it can quite safely be concluded that the low shares of structural unemployment as given in Tables 1 and 2 are not statistical curiosities brought about by whatever awkward parameter constellation. Rather they must be taken as benchmarks - if anything: upper benchmarks - which are the direct consequence of the core assumptions underlying NAIRU-theorising, namely a well-behaved production function of the Cobb-Douglas- or the CES-type and a double- or semi-logarithmic wage equation. If these seemingly innocent assumptions produce such low levels of mismatch in the empirically relevant ranges, then it is perfectly justified to conclude that - for all that matters in practice - structural unemployment is bound to play no significant role in the NAIRU-framework. Of course, this result by itself is most interesting and valuable: it means that a set of standard convexity assumptions is powerful enough to reduce the sectoral dispersion of labour market disequilibria to a virtually irrelevant matter in the sense that this dispersion has very little bearing on aggregate wage pressure.

Oddly enough, the most fervent proponents of mismatch philosophy do not draw any such conclusion. As far as they pay attention to the

---

<sup>1</sup> For a proof of this proposition in a linearized version of the model, see Layard, Nickell, Jackman, p. 311 and p. 334 (footnote 12).

absolute magnitude of the index at all, they point out that one should not just look at one index defined over one structural characteristic like, say, regions; but rather at a whole set of indices with respect to different structural dimensions (e.g., regions, occupations, industries etc.); if the underlying multi-dimensional imbalances are close to orthogonal, the share of structural unemployment may well add up to a reasonably high number.<sup>1</sup> This pragmatic argument does not touch upon, let alone remove, the core of our point, and it is important to understand why. Our point is based on a comparison of the mismatch approach with a naive or intuitive standard of structural unemployment. E.g., when Table 1 tells us that, in a world of equally sized sectors, less than 6 per cent of all unemployed persons are categorized as structural if one sector has double the unemployment rate of the other, we conclude that there must be a fundamental discrepancy between the philosophy underlying the NAIRU-mismatch approach and the philosophy underlying our heuristics which - although still unspecified - clearly speaks for much higher shares of structural unemployment. This discrepancy permeates virtually all numbers in the Table; it is driven to an obvious extreme in the case of a semi-log-linear wage function which implies zero mismatch all throughout, whatever the intersectoral dispersion of unemployment rates. It cannot be defined away by a reference to a multi-dimensional case in which the reference standard is blurred by the complexity of the issue; more generally, a reference to 'other causes' does not provide an acceptable refuge from the consequences of a ceteris-paribus argument if the different causes can logically and empirically be separated, which is no doubt the case for the various structural dimensions of mismatch.

In a similar vein, it might be argued that one should not take too seriously the level of the index, but rather focus exclusively on its development over time which tells the story of whether structural unemployment has increased, decreased or remained constant in relative importance. Although this case for turning a blind eye is often not made explicitly, it seems to underlie the general methodology of economists using mismatch indices in macroeconomic models or in unemployment accounting which is to ascribe changes in unemployment to changes in

---

<sup>1</sup> See Layard, Nickell, Jackman [1991], p. 310, who estimate for Britain in a linearized version of the model a mismatch share of unemployment over six different dimensions of roughly 1/3.

various exogenous 'causes'. Such a procedure and its underlying premise are unsatisfactory: after all, mismatch indices such as  $S$  in equations (6) and (7) - and also the ones to follow in section II of this paper - have unambiguous implications for the share of structural unemployment within the logic of their own framework, and one cannot simply escape this fact by a subsequent correlation analysis without becoming severely inconsistent. E.g., what should be thought of a study which shows that, for two equally-sized sectors, a rise of  $\lambda$  from 0.5 to 0.6 implies a much larger rise of the share of structural unemployment than the one indicated in Table 2 (namely from 5.7 to 9.6 per cent)? Obviously, a subsequent unemployment accounting based on a correlation analysis does not have the same force as the implications and restrictions which the mismatch approach invariably involves.

The conclusion to draw from all this is plain: if one seriously wants to clarify the issue, one has to specify, juxtapose and evaluate the two different philosophies underlying the candidates for measuring structural unemployment. Before doing precisely that, let us briefly sketch the second family of mismatch indices which is based on the Beveridge- or U/V-curve.

## II. Mismatch and the Beveridge-Curve<sup>1</sup>

The modern literature on the Beveridge-curve identifies structural unemployment as the result of a mismatch between job vacancies and unemployed persons. Structural unemployment is taken to exist "if, given the configuration of vacancies, it would be possible to reduce unemployment, or more precisely, to increase the rate of job hiring by moving an unemployed worker from one sector to another"<sup>2</sup> with the sector being an occupation, industry, region or any other structural category, and the rate of job separations assumed to be exogenously determined. Conversely, structural balance or zero structural unemployment is postulated to prevail whenever it is impossible to increase the rate of job hirings and thus to reduce unemployment through intersectoral movements of unemployed persons.

---

<sup>1</sup> Parts of this section are based on Paqué [1989], pp. 2-11.

<sup>2</sup> Jackman, Roper [1987], p. 11.

In more technical terms, the state of structural balance can be described as that configuration of the existing stock of unemployment across sectors which, given the sectoral pattern of vacancies, maximizes aggregate hires. Hence, to obtain a set of operational first-order conditions for structural balance, one has to postulate a hiring function  $H(\cdot)$ . If, for any sector  $i$ , this function is assumed to have the common form

$$(13) \quad H_i = H_i(U_i, V_i) \quad \text{with} \quad \partial H_i / \partial U_i, \partial H_i / \partial V_i > 0$$

where  $U_i$  and  $V_i$  are the numbers of unemployed persons and vacancies in sector  $i$  and  $H(\cdot)$  is a convex, linear-homogeneous function, then it can easily be shown that maximization of aggregate hires  $H = \sum H_i$  subject to  $\sum U_i = U = \text{constant}$  (taking  $V_i$  as given) requires the ratio of unemployed persons to vacancies to be equal across all sectors and thus equal to the respective overall ratio.<sup>1</sup> This implies that

$$(14) \quad U_i/U = V_i/V \quad \text{for} \quad i = 1, 2, \dots, n,$$

with  $U$  (and  $V$  respectively) being the aggregate number of unemployed workers (and vacancies respectively). Following the logic of equation (14), a measure of mismatch ( $M$ ) can be defined as

$$(15) \quad M := 1/2 \sum_i |U_i/U - V_i/V|.$$

$M$  can be interpreted as the share of the unemployed persons (or vacancies) which would have to be moved across sectors to achieve structural balance at a given configuration of vacancies (or unemployed persons). Multiplying  $M$  by  $U$  (or  $V$ ) yields the respective absolute number of unemployed persons (or vacancies).

For years,  $M$  has been the most frequently used index of structural mismatch in the modern literature.<sup>2</sup> As has been recognized, it does *not*

<sup>1</sup> See Jackman, Roper [1987], pp. 11-12.

<sup>2</sup> See i.a. Jackman, Layard, Pissarides [1984], Johnson, Layard [1985], Layard, Nickell, Jackman [1985], Layard [1986], Pissarides [1986], Jackman, Roper [1987] for the United Kingdom, and Franz, König [1986], Burda, Sachs [1987], Franz [1989] and Franz [1991] for West Germany.



measure the extent of structural unemployment in the sense that, if structural balance were established, unemployment would fall by the share  $M$ ; rather, it measures the share of unemployed persons which would have to be moved to achieve a maximum of hirings, with yet no quantifiable implications on how much employment could be thus gained. However, it is the potential employment gain which gives us an idea of the dimension of a structural unemployment problem, and not the sheer number or share of people to be moved. Fortunately, the hiring function can serve as the basis for an operational measure of structural unemployment: one may ask by how much total unemployment could be reduced if structural balance were achieved at a given level of aggregate hirings.

To answer this question, one has to specify the parametric shape of the hiring function. In the literature the most widely used sectoral hiring function is of the linear-homogenous Cobb-Douglas-type

$$(16) \quad H_i = \gamma_i V_i^\alpha U_i^{1-\alpha} \quad \text{with } 0 < \alpha < 1 \text{ and } \gamma_i > 0 \text{ for } i = 1, 2, \dots, n.$$

In sectoral steady state, entries to unemployment  $E_i$  and exits from unemployment  $H_i$  are equal in each sector. Assuming the entries to be proportional to employment  $N_i$ , i.e.  $E_i = e_i N_i$ , with  $e_i$  being a constant entry rate for any sector, substituting  $e_i N_i$  for  $H_i$  in (16) and rearranging yields

$$(17) \quad e_i / \gamma_i = (V_i / N_i)^\alpha (U_i / N_i)^{1-\alpha}.$$

Taking a weighted average of all equations  $i$  ( $i=1, 2, \dots, n$ ) with the weights being the shares in total employment, we obtain

$$(18) \quad \sum (N_i / N) (e_i / \gamma_i) = \sum (N_i / N) (V_i / N_i)^\alpha (U_i / N_i)^{1-\alpha}$$

which after some further algebraic manipulations becomes

$$(19) \quad \sum (N_i / N) (e_i / \gamma_i) = (V/N)^\alpha (U/N)^{1-\alpha} [\sum (V_i / V)^\alpha (U_i / U)^{1-\alpha}] := N' \cdot S'.$$

Basically, equation (19) says that aggregate hirings are a multiplicative function of a structural component  $S'$ , which depends on the sectoral distribution of unemployed persons and vacancies, and a non-structural component  $N'$ , which depends only on the aggregate vacancy and unemployment 'rates'.<sup>1</sup> It can easily be shown that  $S'$  varies between 0 and 1 and reaches its maximum for an equal ratio of unemployed persons to vacancies in all sectors.<sup>2</sup> Roughly speaking, the term  $N'$  describes a convex Beveridge-curve, i.e. the locus of all points with constant aggregate hirings in  $(V/N, U/N)$ -space at a given degree of search efficiency  $\gamma_i$  in all sectors; in turn,  $S'$  denotes the loss in terms of hirings that is incurred due to the sectoral mismatch of vacancies and unemployment. In graphical terms,  $S'$  stands for a rightward displacement of the Beveridge-curve which is exclusively due to the sectoral imbalance.<sup>3</sup>

Equation (19) contains the germ for two different - though closely related - measures of structural unemployment. The common feature of these two measures is that they take mismatch unemployment to be the aggregate unemployment which could be spared at a given level of hirings if there were no structural imbalance, i.e. if  $S'$  in equation (19) were equal to 1. The two measures differ in what they keep constant in this hypothetical exercise.

Rewriting (19) as

$$(20) \quad H_0 = S' \cdot v^\alpha u^{1-\alpha}$$

with  $H_0$  being a constant weighted average level of hirings,  $v$  the aggregate 'vacancy rate' ( $:= V/N$ ) and  $u$  the aggregate 'unemployment rate' ( $:= U/N$ ), we can now define a hypothetical state of structural balance ( $S' = 1$ ) with the same level of hirings  $H_0$ , but possibly different aggregate vacancy and unemployment rates ( $v^*, u^*$ ), i.e.

<sup>1</sup> Strictly speaking,  $U/N$  is not an unemployment rate, but the ratio of the number of unemployed persons and the number of employed ones.

<sup>2</sup> See i.a. Layard, Nickell, Jackman [1991], p. 335, footnote 19.

<sup>3</sup> Other causes of rightward shifts may be found in changes of the 'average' search efficiency  $\gamma$  which is held constant here.

$$(21) \quad H_0 = (v^*)^\alpha (u^*)^{1-\alpha}.$$

Together, (20) and (21) imply that

$$(22) \quad 1/S' = (v/v^*)^\alpha (u/u^*)^{1-\alpha}.$$

Depending on the restrictions we impose on the right-hand side of this equation, we can now derive two different measures of mismatch unemployment. If we assume that  $v/u = v^*/u^*$ , i.e. if we compare the hypothetical shift of the Beveridge-curve caused by structural balancing along a straight line through the origin in  $u/v$ -space, then (22) becomes  $1/S' = u/u^*$  and the share of mismatch in total unemployment ( $MS_1 := (u-u^*)/u$ ) is given by

$$(23) \quad MS_1 = 1 - S' = 1 - \sum (v_i/V)^\alpha (U_i/U)^{1-\alpha}.$$

If we instead assume that  $v = v^*$ , i.e. if we compare the hypothetical shift of the Beveridge-curve at a given level of  $v$ , i.e. parallel to the  $u$ -axis in  $u/v$ -space, equation (22) becomes  $1/S' = (u/u^*)^{1-\alpha}$  and the share of mismatch in total unemployment ( $MS_2$ ) is given by

$$(24) \quad MS_2 = 1 - (S')^{1/(1-\alpha)} = 1 - [\sum (v_i/V)^\alpha (U_i/U)^{1-\alpha}]^{1/(1-\alpha)}.$$

Note that  $0 \leq MS_1, MS_2 \leq 1$  and that  $MS_1 \leq MS_2$  since  $0 \leq S' \leq 1$  and  $0 < \alpha < 1$ . This makes intuitive sense: given a convex  $u/v$ -curve, moving along a straight line through the origin is 'the shorter way' than moving parallel to the  $u$ -axis so that less is ascribed to mismatch in the  $MS_1$ - than in the  $MS_2$ -framework. Economically,  $MS_1$  appears to be the preferable measure: if the ratio  $(u/v)$  is taken as a rough index of the state of the business cycle at whatever degree of structural imbalance - a most plausible interpretation - then it is  $MS_1$  which can be considered as something like a 'cyclically adjusted' mismatch share of unemployment.<sup>1</sup>

---

<sup>1</sup> The measure  $MS_1$  is developed in Jackman, Roper [1987], pp. 13-14, the measure  $MS_2$  in Layard, Nickell, Jackman [1991], p. 326. To our knowledge, the two measures have not yet been explicitly juxtaposed and compared with respect to their exact economic meaning.

To give the two measures empirical content, we have to make an assumption about the magnitude of the partial hiring elasticities  $\alpha$  and  $(1-\alpha)$ . Following the bulk of the econometric evidence on Beveridge-curves, we take  $\alpha$  to be 0.5.<sup>1</sup> Note in advance, however, that the quality of our conclusions does not depend strongly on the exact value of  $\alpha$ , at least as long as it remains in the empirically relevant range, say,  $1/3 \leq \alpha \leq 2/3$ .

Table 1 presents calculations of  $MS_1$  and  $MS_2$  for Germany in selected periods and for selected regional disaggregations. As in the case of  $MS_0$ , the main message of the numbers is that they are not very high at any time, with  $MS_1$  being even lower than  $MS_0$  and  $MS_2$  falling more or less in the order of magnitude of  $MS_0$ . Hence, basically, our conclusions on the low share of mismatch in total unemployment holds not only for  $MS_0$  but also for  $MS_2$  and a fortiori for  $MS_1$ .

To obtain a more systematic picture of the sensitivity of the mismatch measure to sectoral variations, let us again focus on a world with just two sectors (1, 2) which is described by two parameters, namely the shares of sector 1 in total vacancies ( $\delta$ ) and in total unemployment ( $\epsilon$ ), with  $0 \leq \delta, \epsilon \leq 1$ ; consequently, sector 2's respective shares are given by  $1-\delta$  and  $1-\epsilon$ . For  $\alpha = 0.5$ , the two measures of the share of mismatch unemployment thus boil down to

$$(25) \quad MS_1 = 1 - \{(\delta\epsilon)^{1/2} + [(1-\delta)(1-\epsilon)]^{1/2}\} \quad \text{and}$$

$$(26) \quad MS_2 = 1 - \{(\delta\epsilon)^{1/2} + [(1-\delta)(1-\epsilon)]^{1/2}\}^2$$

respectively. Table 3 depicts the values of  $MS_1$  and  $MS_2$  for different parameter configurations of  $\delta$  and  $\epsilon$ . Note that the equality of the partial hiring elasticities of vacancies and unemployment makes the two parameters interchangeable so that we can confine each measure to just one half of the table's matrix, with the diagonal of structural balance for  $\delta = \epsilon$  being common to both. The striking fact is that, for a wide range of  $\delta$  ( $0.2 < \delta < 0.8$ ) and  $\epsilon$  ( $0.2 < \epsilon < 0.8$ ),  $MS_1$  stays below 20 per cent

---

<sup>1</sup> See, e.g., Hannah [1983], Jackman, Layard, Pissarides [1986], Jackman, Roper [1987], Blanchard, Diamond [1989].

Table 3: The Share of Structural Unemployment  $MS_1$  and  $MS_2$  for Selected Parameter Configurations of  $\delta$  and  $\epsilon$  (Equations 25 and 26)\*

$MS_2$		$\epsilon$ ( $\delta$ )										
		0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
$MS_1$ $\delta$ ( $\epsilon$ )	0	0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	10.0
	0.1	5.1	0	2.0	6.5	12.6	20.0	28.6	38.5	50.0	64.0	90.0
	0.2	10.6	1.0	0	1.3	4.8	10.0	16.8	25.3	36.0	50.0	80.0
	0.3	16.3	3.3	0.7	0	1.1	4.2	9.1	16.0	25.3	38.5	70.0
	0.4	22.5	6.5	2.4	0.6	0	1.0	4.0	9.1	16.8	28.6	60.0
	0.5	29.3	10.6	5.1	2.1	0.5	0	1.0	4.2	10.0	20.0	50.0
	0.6	36.8	15.5	8.8	4.7	2.0	0.5	0	1.1	4.8	12.6	40.0
	0.7	45.2	21.6	13.6	8.3	4.7	2.1	0.6	0	1.3	6.5	30.0
	0.8	55.3	29.3	20.0	13.6	8.8	5.1	2.4	0.7	0	2.0	20.0
	0.9	68.4	40.0	29.3	21.6	15.5	10.6	6.5	3.3	1.0	0	10.0
	1	100.0	68.4	55.3	45.2	36.8	29.3	22.5	16.3	10.6	5.1	0

\* Figures for  $MS_1$  and  $MS_2$  in per cent.

and  $MS_2$  below 36 per cent. Only for extremely unequal distributions of unemployment and vacancies, with  $\delta$  being close to zero (or one) and  $\epsilon$  being close to one (or zero) can the share of structural in total unemployment measured by  $MS_1$  and  $MS_2$  compete in magnitude with the non-structural share.

What does all this mean in the more familiar language of unemployment and vacancy rates, now defined as the number of unemployed (vacancies) divided by the labour force? If one assumes the two sectors to have an equally-sized labour force with an average unemployment and vacancy rate of, say, 5 per cent, then the restrictions  $\delta = 0.2$  and  $\epsilon = 0.8$  imply that, in sector 1, the unemployment rate is 2 per cent and the vacancy rate 8 per cent, in sector 2 vice versa. Any 'naïve' observer would obviously interpret this as a situation of severe structural imbalance, with something like three quarters of both the numbers of vacancies and unemployed to be regarded as structural. However, the measures  $MS_1$  and  $MS_2$  do not bear out anything like that, as they classify no more than 20 (36) per cent of the unemployed as structural. Other numbers from the table could be easily chosen so as to support the general impression that  $MS_2$  and a fortiori  $MS_1$  are very conservative indices of structural unemployment in the empirically relevant range. All this parallels our judgement on  $MS_0$ .

Of course, one might again discuss various lines of reasoning which could be brought up in defence of the measures  $MS_1$  and  $MS_2$  or, more generally, of measures based on shifts of the Beveridge-curve. In particular, one might offer alternative parametric shapes of the Cobb-Douglas hiring technology. However, in view of the empirical evidence which broadly supports a hiring function of the type (16) with  $\alpha = 1/2$ , any such attempt would remain an ad-hoc adjustment to avoid unpleasant implications of an otherwise most plausible model specification. To be sure, marginal variations within the present framework do not really touch upon the main conclusions: as long as the basic convexity assumptions as to the hiring technology are retained, there is no real escape from the fact that structural unemployment is empirically irrelevant. We shall therefore move straight on to the core of the matter which is more of a conceptual than of a technical nature and which is common to the two families of measures discussed so far.

### III. Alternative Philosophies of Structural Unemployment

To repeat, the two families of mismatch measures have basically the same implication, namely that structural unemployment as a share of total (equilibrium) unemployment is of a very small magnitude, in actual practice probably too small to matter for economic policy making. Or, to put it differently: whatever the reasons for a high aggregate rate of unemployment in steady-state-equilibrium may be, they are unlikely to have a pronounced intersectoral dimension which should be taken as a target for corrective policy measures. E.g., even if unemployment rates look very different across regions, the mismatch evidence on regional unemployment ought to make one conclude that policy should focus on the aggregate, not on selected regional units, i.e. policy should tackle causes of equilibrium unemployment common to the economy as a whole, not to specific regions. This is a strong policy conclusion which can hardly be avoided if one takes the mismatch measures seriously.

Of course, it is no analytical coincidence that both families of mismatch measures have the same type of policy implications as their underlying philosophies and the technical consequences therefrom are very similar. In particular, both approaches take structural imbalance to mean a sort of 'distortion' within an economy which does at least some harm to the *aggregate* performance and which can be cured - at least hypothetically - by an appropriate rearrangement between sectors of the economy to achieve a state of 'optimal' aggregate performance defined as structural balance; if at all, the quantitative relevance of the structural imbalance can be measured by the extent of its doing harm to the performance of the whole. It is clear that the indices  $MS_0$ ,  $MS_1$  and  $MS_2$  are brain-children of this philosophy as they are based on the premise that a structural imbalance is nothing but a mismatch, i.e. a 'distortion', in the allocation of unemployed persons over the sectors of the economy which either leads to a greater than minimal aggregate real wage pressure and thus a higher than minimal NAIRU or to a less than maximum aggregate level of hirings at given vacancies or at a given ratio of unemployed persons to vacancies. In both cases, the result is unambiguous: the distortion does very little harm to the aggregate performance. Technically, the reason for this result lies in the vice or virtue of convexity: without appropriate convexity assumptions at crucial points of

the models - be it on the production function, the wage equation or the hirings function - structural unemployment does not exist; however, with convexity assumptions which are theoretically sound and empirically well confirmed, structural unemployment does exist, but only as a marginal issue. To put it differently: convexity assumptions are needed to distill sectoral performances into a single measure of aggregate performance, which is the core of the underlying philosophy; but in assuming convexity, it becomes evident that mismatch is an empirically almost irrelevant matter.

Does the 'mismatch philosophy' really capture the essence - not the manifold ambiguities - of what is meant by a structural imbalance in the policy debate? In our view, it does clearly not. A 'naive' economist is likely to follow the logic of a completely different philosophy which might be called the 'comparative sectoral approach'. Roughly speaking, it amounts to simply juxtaposing the labour market performance of different sectors: some best-performing sector is taken as the relevant standard for all others, and the negative deviation of the others from this standard is taken as the informational basis for measuring the extent of the 'structural imbalance'. Note that the performance of the economy as a whole is per se irrelevant; only the intersectoral difference in performance counts, independent of whether it hampers the aggregate performance or not.

An extreme example of a regional imbalance - the present East-West unemployment gap in unified Germany - nicely illustrates the point. When the 'naive' economist speaks of a high structural unemployment in the East (broadly defined, i.e. including short-time workers), he probably means that part of Eastern unemployment which can be ascribed to the specifically regional crisis due to the transformation of the East from a command system into a market economy. In this sense, the unemployment rate of 5-6 per cent prevailing in the West, is the reference standard for comparison; similarly for the long-standing north/south-gap in West Germany, when the industrial crises in branches like iron and steel and shipbuilding in the 1970s and early 1980s had a particularly pronounced regional component; similarly also for the early 1950s when the labour



supply in the rural North was drastically expanded by a flood of ethnic German refugees from Eastern Europe.

In its simplest form, the approach comes down to calculating the equilibrium unemployment rates of the relevant sectors, taking the lowest one as a benchmark for a 'non-structural' jobless rate and then classifying the unemployment in all sectors which goes beyond this rate as structural. Formally, this means that structural unemployment (SU) in each sector is given by

$$(27) \quad SU_i = U_i - u_{\min} L_i \quad \text{for } i = 1, 2, \dots, n$$

with  $L_i$  being the labour force in sector  $i$  and  $u_{\min}$  the unemployment rate in the best-performing sector  $n$ . Summing over the  $SU_i$  yields

$$(28) \quad \sum SU_i = \sum U_i - u_{\min} \sum L_i$$

Dividing (28) by total unemployment  $U$ , we obtain the share of structural unemployment SP (P for 'performance') as

$$(29) \quad SP = 1 - u_{\min}/u$$

In our view, it is this comparative sectoral approach and not the mismatch philosophy which really addresses the main structural question of the economic policy debate, namely the question whether an economy is integrating or disintegrating in terms of the performances of its different sectors, be they regions, industries, occupations etc. For example, when a German economist speaks of the above mentioned regional imbalance of unemployment between the West and the East, he is very unlikely to have in mind the policy questions of how much overall wage pressure could be reduced or by how much aggregate hirings could be increased through a hypothetical reshuffling of labour between the relevant regions; he rather compares the performance of both regions in supplying 'their' labour with jobs, thereby implicitly taking the best performing region as a kind of reference standard for the whole of the country.

Of course, it might look tempting to criticise this approach for being 'atheoretical' as it does not provide a theory of linking the sectoral with the aggregate performance. As far as it goes, this critique is justified: there is in fact no such link in the comparative sectoral approach, but that is precisely its advantage over the mismatch philosophy since it reduces structural imbalance to what it is in the policy debate, namely a purely comparative attribute to denote differential equilibrium performances of sectors. In a more fundamental sense, the approach is not atheoretical at all: any theory which helps to explain why the sectoral performances differ will be important for diagnosis and for deriving adequate 'structural' policy conclusions, i.e. policy recipes which aim at improving the performance of the 'bad' sectors and thus to equalize the equilibrium unemployment rates at the lowest feasible level. The comparative sectoral approach merely implies that there is nothing more to consider than just the very theories of sectoral equilibrium unemployment rates, in particular no theory of a link between sectoral and aggregate performances.

In this context, it is most interesting to note that a close relative of the NAIRU-mismatch model of section I leads to a measure of structural unemployment which is formally identical with (29). To show this, let us assume that the real wage in any sector  $i$  is determined *not* by the unemployment rate in that very sector, but rather by the unemployment rate in some 'leading' sector of the economy which happens to be the one with the tightest labour market, i.e. with the lowest unemployment rate.<sup>1</sup> Formally, this means that the wage function for sector  $i$  is given by

$$(30) \quad \log (w_i/p) = \beta_i - \gamma \log u_L$$

with  $u_L$  being the unemployment rate in the leading sector and all other parameters and variables defined as in section I. The corresponding unemployment frontier reads as

$$(31) \quad \log (\Theta\Phi) = \sum \alpha_i \beta_i - \gamma \log u_L,$$

---

<sup>1</sup> For the following formal analysis of this case, see Layard, Nickell, Jackman [1991], p. 312.

the decomposition of log unemployment in a non-structural and a structural component as

$$(32) \log u = 1/\gamma [\sum \alpha_i \beta_i - \log (\theta\Phi)] - \sum \alpha_i \log (u_L/u),$$

and thus the share of mismatch in total unemployment as

$$(33) MS_3 = 1 - u_L/u,$$

which is formally identical with (29). The economic logic of this result is straightforward: if unemployment in sector  $i$  does not enter the wage function in sector  $i$ , aggregate wage pressure will not depend on a weighted average of all sectors' unemployment rates; it will rather depend exclusively on the jobless rate of the leading sector which has the tightest labour market ( $u_L = u_{\min}$ ). As mismatch unemployment in the NAIRU-context is defined as that share of total unemployment, which can be spared without changing aggregate wage pressure, this share will naturally be determined by the (log-)difference between the leading sector's and the average unemployment rate.

Although (29) and (33) are formally identical, they are based on totally different approaches to the matter: (29) is the direct outcome of a theoretical concept which takes a structural imbalance to mean a difference in sectoral performance and which, as a reasonable approximation, measures 'sectoral performance' by the respective sectoral unemployment rates. It is independent of the particular parametric constellation of production, wage and hiring functions. In contrast, (33) is to apply only for the special case that a sector has no 'autonomous' wage function, but is rather externally dominated by the state of the labour market in a leading sector.<sup>1</sup> Whether and to what extent this happens to be the case is a purely empirical matter with very dramatic quantitative consequences. This can be seen for the case of Germany in

---

<sup>1</sup> Within the NAIRU-framework, one may even derive 'mixed' cases with the real wage in sector  $i$  determined both by unemployment in sector  $i$  and in the leading sector. See Layard, Nickell, Jackman [1991], p. 334, footnote 13. For our argument in the text, this case has no particular relevance.

Table 1 which presents the measures  $SP=MS_3$  for the relevant regional units and periods. It is obvious that  $SP$  turns out to be vastly higher than any of the mismatch measures compiled in the Table so far, and that  $SP$  reaches dimensions which are plausible in view of what has been said in the preceding sections of the paper. If we again enter a world of two sectors (1,2) which can be described by two parameters  $\mu$  and  $\lambda$  that determine the relative weight ( $\mu$ ) and the relative performance ( $\lambda$ ) of the sectors as in section I,  $SP=MS_3$  is given by

$$(34) \quad SP = MS_3 = (1-\mu)/(1/\lambda-\mu).$$

Table 4 presents this share of structural unemployment for selected parameter configurations of  $\mu$  and  $\lambda$ . From the Table, it is immediately clear that  $SP$  implies much higher shares of structural unemployment than  $MS_0$ ,  $MS_1$ , and  $MS_2$ , and again that the orders of magnitude of  $SP$  are more plausible than the ones we obtained from the prior measures. E.g., for equally sized sectors ( $\mu=0.5$ ), a large intersectoral spread of the unemployment rates between, say, 2 per cent in sector 1 and 8 per cent in sector 2 ( $\lambda=0.8$ ) now finds its due reflection in a share of structural unemployment of almost 2/3 which fully confirms the intuitive economic policy judgement. Other measures could be easily picked to support this conclusion.

The picture conveyed by the Tables 1 and 4 also indicates how much quantitative weight the NAIRU-mismatch approach puts on the empirical matter of wage determination. If there are two different countries with exactly the same 'structural characteristics' - say, for the two-sector case  $\mu=0.5$  and  $\lambda=0.8$  so that  $SP = MS_3 = 66.7$  per cent and  $MS_0 = 29.4$  per cent -, but different types of sectoral wage functions - say, country A having type (4) and country B type (30) - then the two countries will be judged to have a very different share of structural unemployment (2/3 for country B, less than 1/3 for country A). Again, the inevitable model specifics of the mismatch philosophy lead to utterly implausible results: hardly any serious economist would advise the government of B to focus on 'structural policy' and the government

Table 4: The Share of Structural Unemployment  $SP(=MS_3)$  for Selected Parameter Configurations of  $\lambda$  and  $\mu$  (Equation 34)\*

$\mu$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
$\lambda$									
0	0	0	0	0	0	0	0	0	0
0.1	9.1	8.2	7.2	6.3	5.3	4.3	3.2	2.2	1.1
0.2	18.4	16.7	14.9	13.0	11.1	9.1	7.0	4.8	2.4
0.3	27.8	25.5	23.1	20.5	17.6	14.6	11.4	7.9	4.1
0.4	37.5	34.8	31.8	28.6	25.0	21.1	16.7	11.8	6.3
0.5	47.4	44.4	41.2	37.5	33.3	28.6	23.1	16.7	9.1
0.6	57.4	54.5	51.2	47.4	42.9	37.5	31.0	23.1	13.0
0.7	67.7	65.1	62.0	58.3	53.8	48.3	41.2	31.8	18.9
0.8	78.3	76.2	73.7	70.6	66.7	61.5	54.4	44.4	28.6
0.9	89.0	87.8	86.3	84.4	81.8	78.3	73.0	64.3	47.4
0.95	94.5	93.8	93.0	91.9	90.5	88.4	85.1	79.2	65.5
0.99	98.9	98.8	98.6	98.3	98.0	97.5	96.7	95.2	90.8
0.999	99.9	99.9	99.9	99.8	99.8	99.8	99.7	99.5	99.0

\* Figures for SP in per cent.

of A to stick to aggregate measures only because B has a leading sector in wage determination while A has not!<sup>1</sup>

All this reveals a kind of schizophrenic attitude not untypical for economists: on the level of theory, they apply sophisticated tools which are consistent with their general analytical apparatus, but which may have quite outrageous empirical implications. On the level of policy practice, they forget about these tools and their unpleasant implications and simply resort to an off-hand judgement. The crucial range in the middle - meaning a theory which is empirically plausible and consistent with a well-founded policy intuition - is often left untouched. Examples for this professional schizophrenia abound: the poor record of allocation theory which took ridiculously small Harberger-triangles as the relevant measure of inefficiency caused by monopolistic price distortions and which was justly ignored by policymakers who wanted to make a sound case for a competitive market economy; or the failure of traditional (not the new!) growth theory as an account of international differences in growth performance which made policymakers turn away to more ad hoc interpretations of economic development. In this sense, the attitude of embedding the idea of structural unemployment in the framework of macroeconomic orthodoxy and thus in effect depriving it of basically all empirical relevance may be just another case in point. To be sure, policymakers do not care - and rightly so!

---

<sup>1</sup> Layard, Nickell, Jackman [1991], pp. 314-315, quote empirical evidence for regions in Britain and the United States pointing to the absence of a leading region. In contrast, econometric estimates of the author for West Germany speak more for a wage function of type (30) than of type (4). Again, drawing the conclusion from such evidence that structural unemployment should - *ceteris paribus* - be considered much larger in West Germany than in the two other countries appears to be rather farfetched.

## Bibliography

- Blanchard, O., P.A. Diamond (1989), "The Beveridge Curve". *Brookings Papers on Economic Activity*, 1 (1989), pp. 1-60.
- Burda, M.C., J.D. Sachs (1987), *Institutional Aspects of High Unemployment in the Federal Republic of Germany*. NBER Working Paper Series 2241. National Bureau of Economic Research. Cambridge, Massachusetts.
- Franz, W. (1989), "Beschäftigungsprobleme auf Grund von Inflexibilitäten auf Arbeitsmärkten?". In: H. Scherf (ed.), *Beschäftigungsprobleme hochentwickelter Volkswirtschaften*. Berlin.
- Franz, W., (1991), *Arbeitsmarktökonomik*. Berlin, Heidelberg 1991.
- Franz, W., H. König (1986), "The Nature and Causes of Unemployment in the Federal Republic of Germany since the 1970s: An Empirical Investigation". *Economica*, Vol. 53 (Supplement), S. S219-S244.
- Hannah, S.P. (1983), "Cyclical and Structural Determinants of the UV-Relation". *Applied Economics*, Vol. 15, pp. 141-151.
- Jackman, R., R. Layard, C. Pissarides (1984), *On Vacancies*. Discussion Paper 165 (Revised). London School of Economics, Centre for Labour Economics, London.
- Jackman, R., R. Layard, S. Savouri (1991), "Mismatch: A Framework for Thought". In: F. Padoa Schioppa (ed.), *Mismatch and Labour Mobility*. CEPR. Cambridge University Press. Cambridge 1991.
- Jackman, R., S. Roper (1987), "Structural Unemployment". *Oxford Bulletin of Economics and Statistics*, Vol. 49 (1987), pp. 9-36.
- Johnson, G.E., R. Layard (1986), "The Natural Rate of Unemployment: Explanation and Policy", in: Ashenfelter, O.C., R. Layard (eds.), *Handbook of Labour Economics*, Vol. 2, pp. 921-999.
- Layard, R. (1986), *How to Beat Unemployment*. Oxford University Press, Oxford.
- Layard, R., S. Nickell, R. Jackman (1985), *European Unemployment Is Keynesian and Classical, But Not Structural*. CEPS Working Documents 13. Brussels.
- Layard, R., S. Nickell, R. Jackman (1991), *Unemployment, Macroeconomic Performance and the Labour Market*. Oxford University Press. Oxford 1991.
- Paqué, K.-H. (1989), "Is Structural Unemployment a Negligible Problem? A Critical Note on the Use of Mismatch Indices". Kiel Working Paper 357. Institute of World Economics, Kiel.
- Pissarides, C. (1986), "Unemployment and Vacancies in Britain". *Economic Policy* 1, pp. 500-541.