The Effective Unemployment and

the Sliding Equilibrium

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1. Introduction

The co-existence of two quite different explanations of involuntary unemployment – the NIRU (non inflationary rate of unemployment)[1] and the hysteresis approach – makes the connection between means and ends somewhat obscure, when discussing labour market policy. This is so, although there are examples where the analysis contains elements of both approaches, e.g. Layard and Nickell (1987a), 1987b), Jackman, Layard and Nickell (1991), and others and most authors emphasize that explaining the history of unemployment takes more than one theory. However, these approaches still operate with a (unique) long-run NIRU and hysteresis is only considered smoothing or obstructing the adjustment process towards the long-run equilibrium. Whereas, the present note offers a (simple graphic) illustration of a joint NIRU and hysteresis approach to the problem of equilibrium unemployment, which does not involve a long-run equilibrium in the traditional way. Rather, we model a whole range of levels where, for a given history, equilibrium unemployment can remain. In this approach equilibrium unemployment, as well as actual, is decomposed into two parts, one which interacts with wage changes and one which does not. The latter responds to deviations from equilibrium by the former and also to exogenous variables. The decomposing of the

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1. Introduction

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unemployment facilitates a characterization of the various parts of the overall unemployment by their particular accounts (as offered in the literature).

A common (general) framework, rich enough to encompass an unemployment-inflation trade-off and history dependencies, is needed in order to understand the variations of unemployment, across countries as well as across labour markets within the countries. This we shall touch upon in the closing discussion with a reference to the Danish unemployment problem.

2. Decomposing the unemployment

In a traditional Phillipscurve context the rate of wage change is a function of the rate of unemployment. But the group of unemployed people is not homogeneous, and due to differences in skills and average durations of unemployment spells, the same rate of unemployment might affect the wage change differently in two otherwise identical labor markets. Hence, let us define the *effective* unemployment, U_e, as the number of unemployed persons, U, weighted by their level of skills, search intensity, and duration of unemployment. That is, we calculate the number of fully skilled, fully searching and briefly unemployed persons according to some normalization:

$$U_e = U \cdot \epsilon (\mu, \lambda), \qquad \epsilon_1 > 0, \epsilon_2 > 0 \tag{1}$$

where μ is the quality of the unemployed labor force and λ the average search intensity. The quality is a function of the average level of skills q and average duration of unemployment spells d;

$$\mu = \mu(q,d), \quad \mu_1 > 0, \mu_2 < 0 \tag{2}$$

Total unemployment is the labor force L minus employment N, $U = L - N$ and $U = U_e + U_r$, where the subscript r indicates *residual* unemployment. Small u's are unemployment rates. The Phillipscurve is then:

$$\dot{w}/w = f(u_e) \tag{3}$$

where w is the wage rate. The literature offers a number of different foundations of the Phillipscurve, such as union bargaining, efficiency wage, etc. They apply here as well of cause. The decomposition is illustrated in figure 1.

The level of effective unemployment corresponding to no wage inflation we will called *institutional* unemployment, u_i^*. This is the long-run level of effective unemployment which depends on the institutional set-up, first of all the institutions for wage formations; the degree of unionization, the degree of decentralization in wage bargaining,
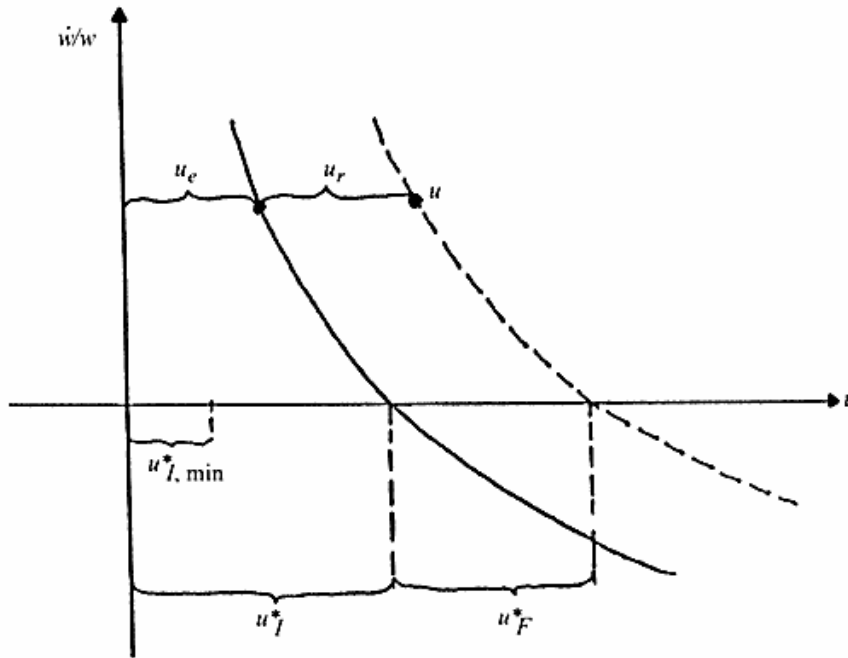
Figure 1. Unemployment decomposed.

etc. Further, u_I^* includes unemployment due to the matching procedure such as spells of *involuntary* spells of search during which the worker might meet employers but is rejected. The minimum obtainable long-run unemployment rate over all possible institutions is $u_{I,\,min}^*$, which will be called frictional unemployment.

There are numerous ways in which a given labor market institution can be utilized. Thus, there might be unemployment due to the way the institution is operating or brought to operate. This is called *functional* unemployment u_F^*. Thus, u_I^* is the minimum obtainable level of equilibrium unemployment *given* the institution, while u_F^* is the additional amount of equilibrium unemployment due to the fact that the institution is not exploited optimally with respect to employment. Functional unemployment might be caused by skill mismatch, lack of skills among the unemployed, benefit opportunities which do not induce incentives for the unemployed to search sufficiently intensive and other incentive problems not due to the wage setting institution. Hence, *voluntary* spells of search is functional unemployment.

It is not obvious that the goal of public policy should be to eliminate functional unemployment completely. For instance, som voluntary search unemployment might be a good idea, if it is due to the fact, that skilled workers are not being forced away from their area of experience during short unemployment spells.
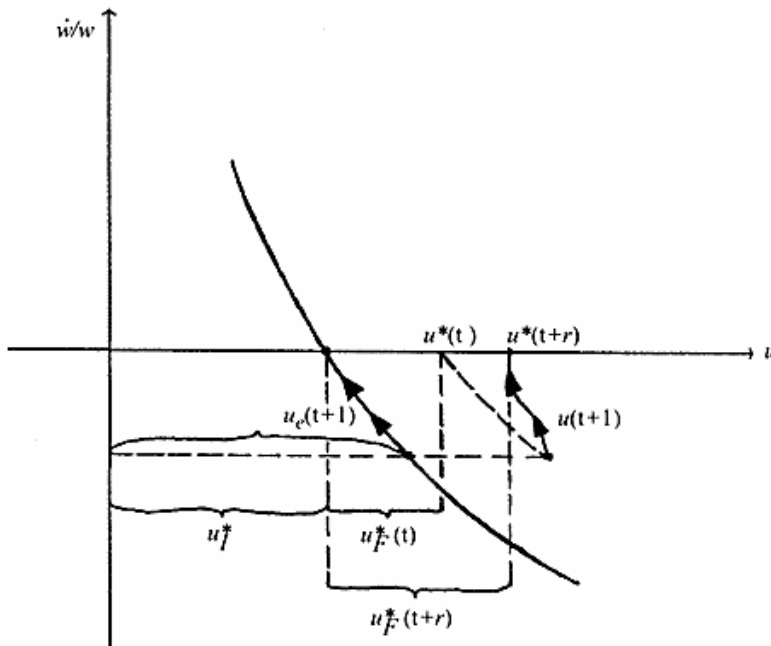
Figure 2. The sliding NIRU.

The NIRU is the sum of institutional and functional unemployment. That is, the equilibrium unemployment *given* the labor market institution and *given* how this is brought to function. Hence, there isn't much *natural* about the NIRU, as we see it.

3. The sliding NIRU.

In our framework so far, the long run equilibrium unemployment which is observable is constant over time as long as institutions and their performance are unchanged. This might not be the whole story. First, changes in the educational standard of the unemployed and/or the average duration due to entry and exit will change the scene. Secondly, if the effective unemployment differs from u_f^*, this might have an impact on the average quality of the unemployed and thereby influence the level of functional unemployment.

EXAMPLE 1: For simplicity, look at the following asymmetric steady state equilibrium, where entry and exit are assumed to match each other by number and quality, and where $u_c = u_f^*$ means no change in labor force quality. First define quality as

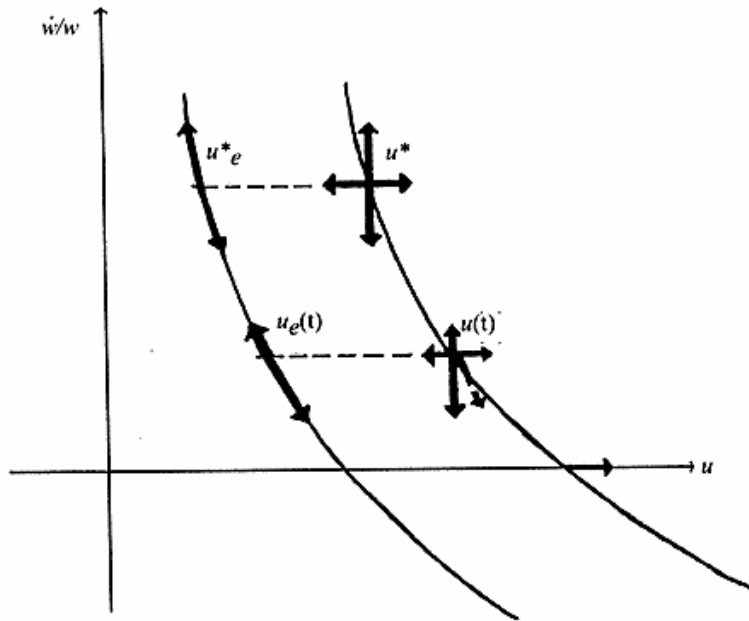$$\mu(t) = \mu(q(t), d(t)) \tag{2'}$$

Figure 3. »Equilibrium« due to the government's equilibrating response.

and assume the following:

$$\dot{q}(t) = 0, \dot{d}(t) = 0 \text{ when } u_e \leq u_I^*$$
$$\dot{q}(t) < 0, \dot{d}(t) > 0 \text{ when } u_e > u_I^* \tag{5}$$
$$d$$

The situation is illustrated in figure 2 where the initial equilibrium unemployment is $u^*(t)$. After a recession, causing an increase in the effective unemployment to $u_e(t+1)$, the economy does not return to the same level of equilibrium unemployment but to a higher level $u^*(t+\tau)$, say after τ periods. However u_I^* has not changed, while $u_F^*(t)$ has increased to $u_F^*(t+\tau)$ due to the decaying quality of the unemployed labor force. Thus, NIRU$(t) = u_I^* + u_F^*(t)$, and NIRU $(t+\tau) = u_I^* + u_F^*(t+\tau)$.

In this example, entry and exit ware assumed to match each other by number and quality, and without the recessive shock both levels of unemployment, u_I^* and $u_F^*(t)$, would have remained constant. A given constant mismatch would not change this. But a change in the rate of growth of a variable which influences the supply of labor, by number or quality, might have an impact on the *level* of equilibrium unemployment. The explanation is, that the level of functional unemployment is a measure of how well the institution is brought to cope with a given characteristic of entry and exit. If the

characteristic changes, then the task changes and an uncharged degree of functioning will cope differently with this new task. In other words: A given set of structural problems and a given characteristic of entry and exit yield a certain level of functional unemployment. Thus, if the current characteristic becomes more difficult to match, and the amount of structural problems remains the same – the level of functional unemployment will consequently rise.

Nevertheless, the *kind* of relationship between variables should be thought of as endogenous to some extent. If unemployment becomes very high, the relationship between the variables will come under pressure.

The framework discussed above suggest that the current equilibrium level of unemployment is not necessarily the one where wage inflation is zero. Consider the following symmetric description.

EXAMPLE 2: Let the characteristic of entry-exit match, by number and quality, be such that the system is drifting towards a steadily higher level of functional unemployment while institutional unemployment and wages are constant. Hence, the degree of functioning of the labor market cannot quite manage the changes in characteristics of labor supply. This is illustrated in figure 3 by the horizontal arrows. Suppose further the following symmetric version of (5), where c is a constant representing the mismatch of entry and exit characteristics.

$$\dot{q}(t) > 0, \dot{d}(t) < 0 \text{ when } u_e < u_I^* - c$$
$$\dot{q}(t) = 0, \dot{d}(t) = 0 \text{ when } u_e = u_I^* - c \qquad (6)$$
$$\dot{q}(t) < 0, \dot{d}(t) > 0 \text{ when } u_e > u_I^* - c$$

Now, by keeping the effective unemployment (sufficiently) below the level of institutional unemployment (constantly or steadily increasing demand policy and/or employment programs, as long as they reduce the effective unemployment) the government can create a constantly positive hysteresis effect. This is illustrated by the points $u_e(t)$ and $u(t)$ in figure 3, where backward pointing arrows represent the hysteresis effect, and arrows pointing up represent the effect of the public policy. The rates $u_e(t)$ and $u(t)$ will move as time passes, $u_e(t)$ down along the Phillipscurve and $u(t)$ as showed by the resulting effect, the dashed arrow. Consequently, if the hysteresis effect is assumed to increase (strictly monotonic), as the effective unemployment advances (sufficiently) below the level of institutional unemployment, there would be a unique point where the system can remain. This tense "equilibrium" is illustrated by u_e^* and u^* in figure 3. The equilibrium implies a constant rate of wage inflation.

Let us here emphasize, that the set-up is highly partial apparently: The consequences for the real wage, for the tax burden, etc. are not modeled. For the real wage to be
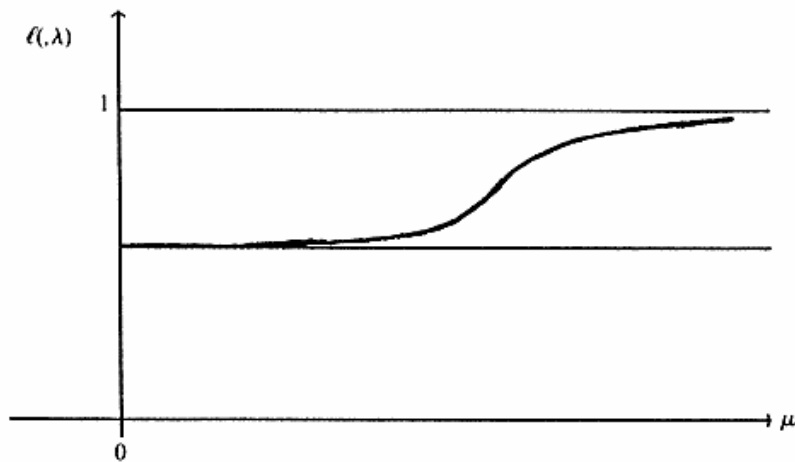
Figur 4.

determined for instance, we need to specify the wage-price relation and assume something about procuctivity growth. It might be that in this "equilibrium" price changes will match wage-changes and thus in equilibrium the real wage would remain constant. If so, we have pointed at positive hysteresis as the reason for unemployment to be low in equilibrium with inflation. Note further, that there do not exist equilibria in this model under zero inflation.

In these two examples, there is no long-run equilibrium or history independent NIRU. This does not, of course, imply that we consider all rates between zero and one to be likely levels of current equilibrium unemployment. On the contrary, we consider equilibrium unemployment to be bounded and further that there exist a range of rates, which the equilibrium unemployment hardly can exceed. This we can model by specifying the ϵ function from (1), for a given search intensity $\bar{\lambda}$, as illustrated in figure 4, where μ is normalized to take positive values only.

4. Discussion

The difference between unemployment among (low paid) unskilled and (high paid) qualified/skilled workers can be characterized by using the suggested decomposing of the overall unemployment.[2] The main problem of the Danish market for unskilled labor is functional unemployment due to the lack of outside pressure. Such pressure would presumably lower unemployment, because unskilled labor is a "standard good", and demand for such labor service is wage-elastic. Whereas, on the Danish market for qua-

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2. What follows is nothing more than conjectures, really, partly deduced from the design of the Danish benefit system, and partly from some preliminary and indirect empirical observations about the firm's hiring and firing behaviour.

lified labor the main problem is institutional unemployment. Here, there is a considerable outside pressure, but it is of such importance to the hiring firms, that they get the right manpower. Therefore, they do not consider taking the risk (not even a small one) of hiring unemployed labour. Thus, even a considerable outside pressure has only a vague impact on wage setting, wherefore the problem with unemployed qualified labour should not be attacked by increasing outside pressure but rather by working on the institution; the wage-setting, the firms behavior of recruiting, retaining and motivating workers, etc.

The case given by example 1 seems to illustrate the trend of Danish unemployment over the last 2 decades: It seems that the economy has drifted towards steadily higher equilibrium unemployment, and the explanation could be that during each recession decay has increased the functional unemployment as illustrated (shifted the u-curve towards east).

The problem in example 2, dealt with by letting the government create positive hysteresis effects, could alternatively have been approached by working on the functioning of the labor market, the so-called structural problems. But in the short run, doing so might not be possible for political or other reasons.

In practice both the choice of institution and the choice of the more detailed setup surrounding the institution are bounded by conditions from outside the standard analysis. For instance, a corporative institution with centralized wage bargaining might be the right institution as far as unemployment is concerned, but on the other hand, it might leave too little room for local "motivating-by-wage" management so that productivity growth ends up on an inefficiently low level. This is the real dilemma concerning the Swedish situation, we believe. Here, the "employment principle" is not a direct problem, because its aim is to prevent residual unemployment from developing by constantly creating positive hysteresis effects (the drawback being wage inflation). Concerning employment programmes; if the poorest equipped of the unemployed are reached, this part of the programme will not yield inflationary pressure but probably not a significant hysteresis effect either (if any).

Generally, our understanding of such trade-off in the choice of institution (and in the more detailed structural set-up) is insufficient, which should encourage labor-market studies emphasizing the role and *formation* of institutions.

References

Jackman, R., R. Layard and S. Nickell. 1991. *Unemployment – Macroeconomic Performance and the Labour Market.* Oxford.

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