Evangelisches Studienwerk e.V.

Schriftenreihe des Promotionsschwerpunkts
Makroökonomische Diagnosen und Therapien der Arbeitslosigkeit

Nr. 2/1998

Heterogeneous Labour, the Unemployment Equilibrium, and the Natural Rate

by

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Stuttgart-Hohenheim
ISSN 1436 - 1655

HETEROGENEOUS LABOUR, THE UNEMPLOYMENT EQUILIBRIUM, AND THE NATURAL RATE - A NOTE

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June 1998

Contents

Introduction 1

Employment and layoff decisions in the case of heterogeneous workers 2

"Structural" unemployment as a barrier to demand policies? 9

References 11

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* For their valuable comments I am grateful to participants at conferences on the topic of unemployment in Berlin and Maastricht in 1997. Particularly, I owe much gratitude to the members of the research seminar at the University of Hohenheim where the paper was presented in May 1998.

Introduction

Despite the impression that what we "see" in the macroeconomic system of many countries is an unemployment equilibrium the question how to explain such a state of the economy is yet unsettled. The most striking evidence of the failure of economic theory to provide an answer to that question can be found in new classical economics where a full-employment equilibrium, called the NAIRU, is taken as the benchmark. Given this background, state-of-the-art macroeconomics analyse employment-cum-inflation games in equilibrium but offer no insights in the problem of involuntary unemployment. Tobin's early remark that there is no reason to believe that the "natural" rate is independent from the previous level of actual unemployment has been confirmed by contemporary research; figures of the estimated NAIRU mostly track the path of past unemployment rates (Tobin 1972, Stiglitz 1997). But even if the conversion of long-term demand-determined unemployment in so-called "structural" unemployment can be explained by an analysis of labour turnover and screening mechanisms prevalent on the labour market, it remains an open issue how and why unemployment exhibits enough persistence in the first place so that the endogenous process of workers losing their marketability may commence.

Studying the forces which may support the stickiness of an unemployment equilibrium can follow two different lines of thought (which of course have to be merged if a complete picture is to be designed):

- The first asks why some sort of wage rigidity exists so that a desirable process of endogenous stabilization will not set in. Roughly speaking, these questions refer to the shape and the -- lacking -- shifts of the macro supply curve. A restrictive move of the macro demand curve thus may produce lower output and inflation but the market system fails to send out signals that could trigger off the working of a real balance effect.

• A second approach may yet question the logic and empirical content of this real balance effect. Even if labour reacts to wide-spread unemployment by lowering wage claims it cannot be ruled out that some unfavourable effects acting on investors' profit expectation may shift the demand curve further down. This is the Postkeynesian message that anti-inflation policies may propagate a long and painful recession because disinflation in case of flexible wages and prices tends to increase the real rate of interest and to depress the marginal efficiency of capital (Tobin 1975, 1993).

This second strand of thought will not be considered in this paper. The focus rather is on wage rigidity. It is argued that the macroeconomic event of unemployment alters the microeconomic conditions of the employment decisions of firms and labour-market structure in such a way as to make the employed labour force and the unemployed into "non-competing groups". The idea put forward is rooted in the insider-outsider tradition (Blanchard/Summers 1986, Lindbeck/Snower 1988) although it differs from this approach as it does not stress the differences in the *institutional* organisation of the behaviour of these groups but rather an aspect of *economic* distinction between employed and unemployed workers which emerges when a layoff process unfolds. Nominal wages thus prove to be sticky and an unemployment equilibrium emerges. In the next section, the microeconomic logic of hiring and firing is worked out claiming to contribute to the explanation of the persistence of unemployment after a macroeconomic demand shock has hit the economy. The final section draws some policy conclusions and asks whether the existence of so-called "structural" unemployment precludes the use of expansive demand policies.

Employment and layoff decisions in the case of heterogeneous workers

Difficulties in macroeconomics to explain unemployment already start with the question how the entrepreneur will choose those workers to be dismissed from a -- as it is generally assumed in macro theory -- homogeneous labour force. Sometimes the problem is being circumvented by simply referring to the reduction of a quantity labelled "*N*" (accurately being defined as hours of work), hoping that the reader might not ask how the lowering of overall working time will be distributed amongst the persons employed in the firm. A somewhat surprising, but nevertheless straightforward conclusion is that it is impossible by macroeconomic reasoning alone to derive and explain unemployment; the macroeconomic feature of a recession should just consist of an increase of short-time work. Additional microeconomic assumptions about organisational rigidities (implying that full-time attendance of the workforce is required) have to be added to arrive at the result that the dismissal of some workers is the optimal solution from the firm's point of view.

If economic theory then sticks to the simplification of homogeneous labour we might expect that the entrepreneur will throw a dice in order to come to a low-cost lay-off decision. But this is not what we observe. The vague impression is that specific persons are chosen. Therefore two conclusions might be drawn:

- Entrepreneurs suppose that workers differ in their qualifications, abilities and productivity.
- This profile of the employed workforce is not mirrored by a corresponding wage structure. Otherwise the decision as to whom to dismiss again could be solved by a lottery because the firm could not gain by firing a "bad" worker; each one earns his individual marginal product.

The second point allows us to disregard the "simple" case of heterogeneous labour -- a variety of partial labour markets with an optimal vector of relative wages -- altogether in the following analysis. The economy can be represented by a single labour market where the case of heterogeneous labour is defined as the tension between a "structured" labour force and a hypothetical uniform (average) wage rate. The question is how such a case can be reconciled with rational behaviour.

Keynes has often been criticized for accepting the "First Postulate" of classical theory in his chapter 2 of the "General Theory". However, quite often in the discussion it has been ignored that Keynes based his assumption of a decreasing marginal productivity of labour not on the usual neoclassical approach of a given and fully utilised capital stock but on the hypothesis that workers differed in their qualification and productivity.[1] Following an analytical tradition of Ricardo and Marshall he assumes that entrepreneurs employ available factors of production according to their "quality ranking". Keynes' conception is reproduced in figure 1. The volume of labour demand is derived from goods demand Y. Nominal marginal product of labour equals the nominal wage. As it stands the Keynesian story looks pretty much like the neoclassical one if the main reason of divergence is ignored: whereas the neoclassical mainstream teaches that the real wage determines employment the Keynesian "quantity equation" only makes use of the production function to establish a causal link from nominal wages to the level of prices.

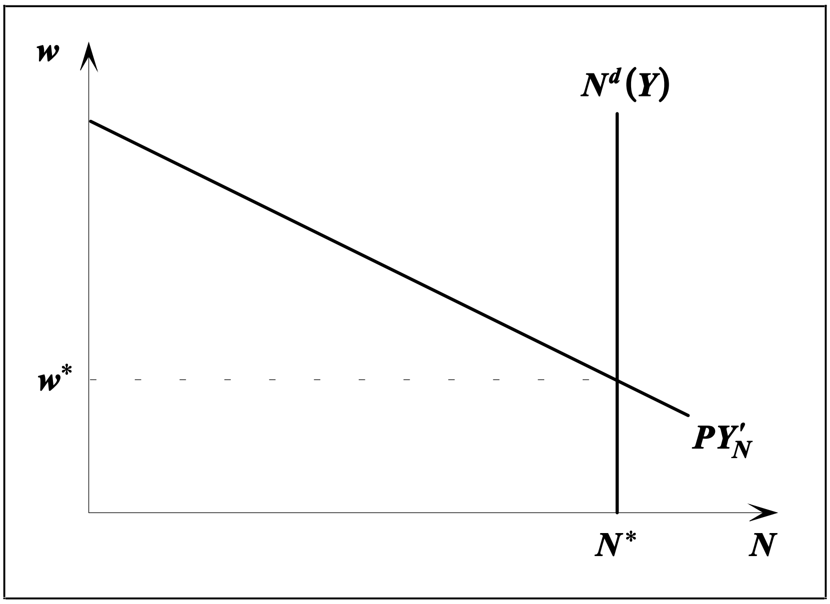

Figure 1: Employment equilibrium in Keynes

[1] Keynes (1936: pp. 41-2, pp. 295-6). Otherwise his type of unemployment would have been the "capital shortage" case which received some attention in the 1980s (Bean 1989). Note however that Keynes' theory lacks consistency as he makes use of supply constraints in the production of capital goods when he gives reasons for the decrease of the marginal efficiency of capital. See also Sardoni (1994).

There is however a problem in Keynes' solution which stems from his specific microfoundation of the labour productivity curve. If labour is homogeneous as in the neoclassical case it seems straightforward that capital earns the rent of the growing scarcity of physical equipment as the employment of the variable factor increases. But Keynes assumed idle capacity; the negative slope of $P\,Y_N'$ can only be based on figuratively arranging workers according to their individual abilities (so that $P\,Y_N'$ proves to be a Barone-type curve). Hence, why should the unions accept that capital walk away with the whole profit from the unequal distribution of workers' qualification? It seems obvious that these rents might be distributed otherwise.

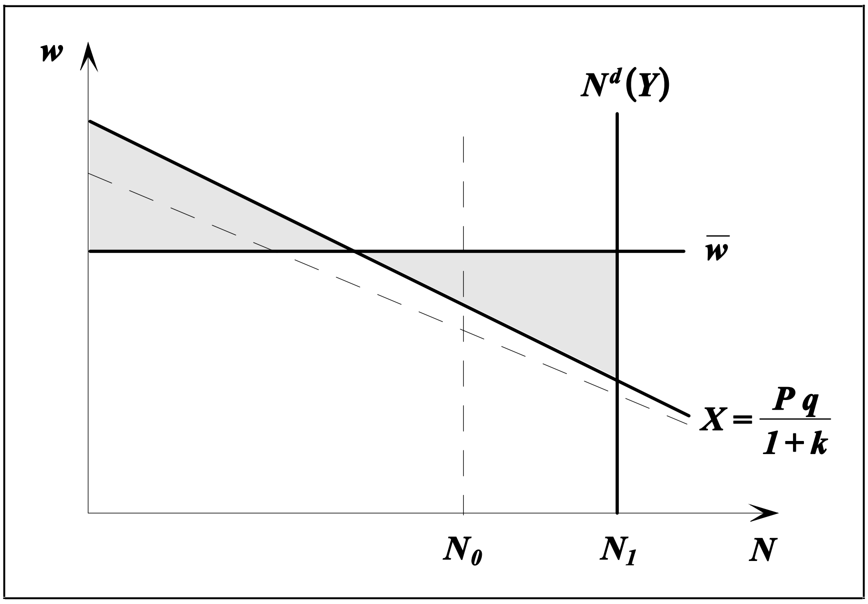

Figure 2: Wages and employment in case of heterogeneous workers

A modification of the Keynesian model would adopt the notion of labour demand $N^d(Y)$ as being derived from goods demand and the production function (figure 2). Again there is ample capital equipment and workers are ordered following their individual productivity $q = q(N)$, where $q' < 0$. As all capital units are alike these differences in productivity stem from the individual abilities of workers. By taking into account given or expected output prices P and the mark-up k on wage costs q determines the value productivity line X. It is now suggested that the firm and employed workers bargain over a "fair" distribution of income. A possible outcome would be rent sharing[2]; the contract wage $\overline{w}$ then has to equilibrate nominal wage costs and *average* nominal productivity (so that the shaded triangles are of equal size); note that a conjecture on output and prices is necessary to agree on some $\overline{w}$ if the contract is to be settled at the beginning of the period.[3]

The practice of not aiming to establish an optimal wage *structure* corresponding to $q = q(N)$ simply might be explained by referring to prohibitive transaction and surveillance costs. More refined arguments can easily be found in the efficiency-wage and fairness literature. As a general conclusion it might be argued that looking at and paying for *group* productivity might be an appropriate strategy on the side of firms in spite of the fact that the individual worker might face an incentive problem as he cannot directly earn the yield of his efforts.[4] On the other hand, the firm might be tempted to capture a higher rent by dismissing some of the "worst" workers. But with lower production it would run the risk of losing some of its goods-market share; moreover most probably workers will urge for a new negotiation aiming to raise $\overline{w}$.

If output and employment increase during the contract period prices have to rise because of rising marginal costs. An increase of nominal wages would be passed on to the goods market by raising P. If labour demand drops from N_1 to N_0 the entrepreneur

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2 None of the results in the paper rest on that particular assumption. The firm and the workers just have to agree on *any* distribution.

3 If the parties involved in the bargain expect some *rate of change* of prices they have to agree on a rate of nominal wage increase so that the expected real wage is appropriate with respect to the profit mark-up.

4 Cf. e.g. Akerlof (1982). Keynes did not address the problem of how a uniform nominal wage might be compatible with heterogeneous workers; he maintained that assumption throughout his book although he noted that nominal wage negotiations are used for attempts to change relative income positions on the side of wage earners (see Summers 1988). As an aside, the empirical fact of wide-spread uniform wages in spite of heterogeneous workers might help to explain the necessity and existence of (some sort of) labour unions as firms need a bargaining opponent who strives for the *average* pay of his clientele. With heterogeneous labour the firm cannot bargain with single applicants and workers as they would opt for being paid according to their individual abilities.

will dismiss those workers with the lowest productivity if legal and other regulations restricting the choice of the persons to be fired do not exist.[5] The adjustment of the firm in terms of the quantity of labour is thus linked with in increase of efficiency, i.e. average productivity is higher. If the nominal wage does not change profit per unit of employment would grow. This even might lead employed workers to demand higher wages in spite of the existence of unemployment. On the other hand, if the fall in demand goes along with a lower output price, the *X*-curve shifts downwards[6] and the real wage rises with a constant $\overline{w}$. A marked price decrease would overcompensate the efficiency effect so that profits shrink. Thus labour might have to consent to a lower nominal wage. In order to simplify the analysis it is assumed that by way of an appropriate recontracting the nominal wage is modified in order to compensate for efficiency and price changes so that the pre-crisis level of profits per unit of employment and thus the former pattern of rent sharing is maintained.[7]

All these preceding considerations refer to the potential necessity of modifying the terms of the *employment* contract. The basic question however concerns the state of competition on the labour market which prevails when goods demand has stabilized on a lower level. Obviously the unemployed are unable to compete with the active workforce at *given* wages because their productivity is lower compared to the employees. This information is conveyed to the entrepreneurs through the formal status of an applicant for a vacancy: being unemployed reveals an inferior qualification -- this holds at least if each entrepreneur expects that all his colleagues practice the same pattern of labour dismissal like he does himself. As a consequence, the firm would lose

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[5] A different pattern of adjustment occurs if the firm decides to close a whole plant. Quite often in that case, the firm will be exposed to some pressure to maintain at least some of the employed staff. In the aftermath then the task of decreasing the working staff arises anew; here again an evaluation of single workers' abilities will play a role in the dismissal decision.

[6] Note that also the slope of X varies with P.

[7] In figure 2, changes in labour demand and in prices are chosen in such a way that no nominal wage adjustment is necessary in order to preserve profits.

some of its profits by replacing an average-productivity by a low-productivity worker at the given wage rate $\overline{w}$.

Therefore unemployed applicants should be ready to work in exchange for a relatively lower wage. But the employer in general has good reasons to reject the offer of such a contract (as long as there is no sign of increased goods demand):

- If the uniform-wage rule is to be maintained $\overline{w}$ has to be lowered for all workers which may induce a reduction of the effort level of competent workers; thus even the preservation of the existing profit level is uncertain.
- Finally the firm cannot expect to gain by giving up the uniform-wage system as stipulating lower wages for newly hired workers will provoke claims for higher wages amongst the group of highly productive workers.

Thus firms hardly have an incentive to hire unemployed workers as substitutes for employed "insiders" even if the former claim a lower wage. The achievement of a higher average productivity for the firm offers better prospects than the alternative strategy of running a low-quality production at low wages. On the other hand, even the unemployed themselves may be reluctant to reduce their wage claims as this might amount to the acceptance of a "downgrading" of their qualification. Such a step can be assessed as both unfair and unwise:

- As in normal states of demand even low-productivity workers receive the average wage there are no individual deficiencies which justify a change of his *relative* wage.
- In case of a recovery of demand an unemployed worker would rejoin his former income group if he had kept his wage claim, but he would not gain anything if he had begun to work for a lower wage.[8]

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[8] Even the possibility of such a behaviour on the side of the unemployed presupposes the existence of a "secondary" labour market capable of absorbing workers after being laid-off on the "first" market. An inclusion of "secondary" labour market thus would allow an analysis of structural change. If social benefit payments are not provided generously and thus wages are forced to be flexible downwards low-pay service industries might emerge. As the U.S. case shows, however, even then full employment cannot be expected to prevail permanently.

Thus on both sides of the market significant forces work in favour of wage rigidity. The "qualification boundary" between the employed workforce and the unemployed is microeconomic in substance, but is drawn as an endogenous variable in the macroeconomic process. The welfare costs of existing shortcomings of qualification and productivity at the lower end of the ranked workforce are shared by all workers (by earning a lower real wage) as long as full employment prevails; however after a restructuring of firms which use the enforced cut of their workforce for enhancing efficiency these costs are born by the unemployed only, namely in form of a reduced opportunity of finding a job.

Labour market segmentation will be intensified by additional mechanisms: As a recession typically is accompanied by a faster rate of structural change the human capital of unemployed persons being fired in shrinking branches is further devalued. The individual decay of qualification is linked to the duration of unemployment because workers are kept separated from the steady process of learning on the job. The dilemma becomes perfect as entrepreneurs in turn use the individual duration of unemployment as a screening device for assessing the expected productivity of applicants (Nickell 1988, Pissarides 1992, Blanchard/Diamond 1994).

The main results of the analysis so far are as follows:

- The explanation of unemployment needs giving up the assumption of homogeneous labour. Otherwise, from a macroeconomic point of view, in the case of lower goods demand only a reduction of working hours can be derived.
- If effective demand falls firms respond by laying off workers thus combining a quantitative adjustment with an efficiency-enhancing strategy: firing workers with the

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Moreover, as Freeman (1995) has argued, it is disputable whether some statistically measured full employment should be appreciated on welfare-theoretic grounds as the low pay increases the incentive, particularly for young persons, to embark on a criminal career; thus the European long-term unemployment have to be contrasted with at least a part of American prisoners.

lowest qualification implies that the average productivity of the employed workforce increases.

• The dismissal of workers creates a group of labour-market "outsiders" the members of which can be distinguished from the still-employed "insiders". But it is not only their formal status and the weak institutional representation of their interests by the employees' unions which undermine the market position of the unemployed workers; this is being highlighted by the traditional insider-outsider theory. The decisive point is that the unemployed can be distinguished *economically* by their expected lower qualification from the employed workers. This causes a market segmentation which deepens as unemployment persists.

• The endogenous loss of marketability of dismissed workers amounts to a transformation from cyclical, demand-determined to "structural" unemployment. It implies that the effective labour curve shifts inwards following an unemployment shock which in turn weakens the response of wages to unemployment and finally blocks the road for the real balance effect.

• The more fundamental finding is that the equilibrium level of full employment is lower: the market process exhibits hysteresis as the equilibrium position of the NAIRU depends on the history of employment variations.

"Structural" unemployment as a barrier to demand policies?

Any (un-) employment equilibrium emerging from a demand reduction is in no way a "natural" equilibrium. In Europe, particularly in Germany, the by far largest part of unemployment is assessed as being "structural", i.e. matching problems with respect to the requirements of existing or potential jobs, on the one hand, and the qualifications or abilities of the unemployed, on the other, are said to preclude a demand-determined return to full employment. From the preceding analysis it follows, however, that it is impossible to define a definite amount of "structural" unemployment irrespective of the state of macro demand. Under the realistic assumption of heterogeneous workers an efficient labour-turnover process will allocate workers according to their abilities on the available jobs so that persons equipped with the lowest qualification remain unemployed. It is evident that a neoclassical policy strategy of promoting labour market flexibility would tend to accentuate the labour market segmentation between "good" and "bad" workers insofar as this policy would increase the efficiency of the turnover process. Accordingly, it appears as if demand policies *never* were appropriate because of matching problems on the labour market.

The empirical finding that unemployed workers have a low qualification does not explain the extent of unemployment. This would be an arbitrary and misleading procedure as nearly every level of demand-determined unemployment, if maintained, tends to alter its shape so that it *appears* to be supply-side determined. Unemployment then *by definition* might be coined as being "structural" insofar as the qualification of the unemployed is lower compared to those who still are employed. However, it is more useful to state the opposite proposition: *there is no structural unemployment*; this category represents a confusion of macro and micro topics, employment and efficiency, respectively (Riese 1997). For methodological reasons unemployment is always and everywhere a macroeconomic variable, some quantity of unemployed persons, a subgroup of potential labour supply (which itself cannot be defined independently of macroeconomic conditions). The volume of employment is always and everywhere directly determined by goods demand and -- linked through production technology -- labour demand, although of course other macroeconomic variables like, e.g., even the nominal wage rate may exert some indirect influence on goods demand.

Isolated policy strategies which enhance labour market flexibility thus will only support the realization of efficiency gains whereas the level of employment is bound to fall. On the other hand, it is always possible to expand total employment in the economy by way of an increased demand; it may lead however to a loss of efficiency on the micro level as entrepreneurs are forced to hire workers with inferior abilities.[9] A high level of employment thus will be associated with relatively low real income per head whereas a shrinking level of employment allows to solve efficiency problems within the firms and therefore to pay higher incomes to the employed persons. Matching problems surely were of equal importance in the 1960s in Germany; but they had to be tackled on the *firm level* as vigorous demand dynamics and full employment left no other choices to the employers.

The main economic policy conclusion is that the solution of the problem of "structural" unemployment is basically the same as in the case of cyclical unemployment. An increase of effective demand has to be the first step; this may have to be accompanied by wage moderation in case of heterogeneous labour. On the other hand, only lowering wages and enhancing labour market flexibility will revalue the currency, increase efficiency, but not employment.

[9] Thus firms may have to be compensated for bearing efficiency losses if demand policies call for a higher level of employment and if a spiral of rising wages and prices is to be avoided. This may justify a complementary policy of wage moderation and wage differentiation. On the other hand, the decreasing burden of fixed costs in case of a higher production activity might neutralize -- at least partly -- the labour-induced cost pressure.

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