

THE PRODUCTIVITY OF THE DUTCH LABOUR MARKET IN MATCHING
UNEMPLOYMENT AND VACANCIES: A COMMENT

1 INTRODUCTION

In a recent paper in this journal, Van Ours (1991) investigates the relation between vacancies and unemployment in the Dutch labour market between 1961 and 1987. Different from usual Dutch analysis, his study is not based on a *UV*-curve. He explicitly bases his specification on a search-theoretic model, comparable to Blanchard and Diamond (1989) and Jackman, Layard and Pissarides (1989). He concludes that contrary to the results of traditional *UV*-analyses the matching function analysis indicates that the efficiency of the Dutch labour market got worse in 1969, but has not decreased in the seventies and eighties.

Although Van Ours' matching function is an improvement of the usual *UV*-analysis, I will show in this short paper that the conclusions he draws from his research about the development of the efficiency of the Dutch labour market are premature. Firstly, Van Ours presents two models. His conclusion is based on the second model, while the first model is more appropriate from a theoretical point of view. Secondly, Van Ours does not really test the two hypotheses about the development of the productivity of the matching process for this first model. A careful look at Van Ours' results leads to the conclusion that the productivity of the Dutch matching function decreased gradually. The fall in productivity in 1969 is only one incident in the history of the matching function, which is full of fluctuations.

2 THE MATCHING FUNCTION

Traditional *UV*-analysis is based on the idea that there is a relation between the stock of unemployed people and the stock of vacancies on the labour market. Vacancies and unemployment will always coexist, but if unemployment rises the number of vacancies will decrease and if unemployment decreases the number of vacancies will increase. Usually, this relation is assumed to be a Cobb-Douglas function:

$$I = C \cdot U^\alpha \cdot V^{1-\alpha} \quad (1)$$

in which U denotes the stock of the unemployed, V the stock of vacancies and C is a parameter which can be interpreted as the efficiency of the market. If both the number of vacancies and unemployed are high, C will be low which indicates a low efficiency of the labour market. Given α , it is possible to calculate the development of C , which is depicted in Figure 1. This graph is based on $\alpha = 0.4$, which is the estimation of Van Ours (1991).¹

This *UV*-analysis indicates a slowly decreasing efficiency of the labour market from 1961 till 1979. Kuipers and Buddenberg (1978), Van den Berg (1982) and De Neubourg (1985) provide similar results for this period. From 1979 till 1981, however, the efficien-

1 Data from Van Ours (1991), Appendix 1.

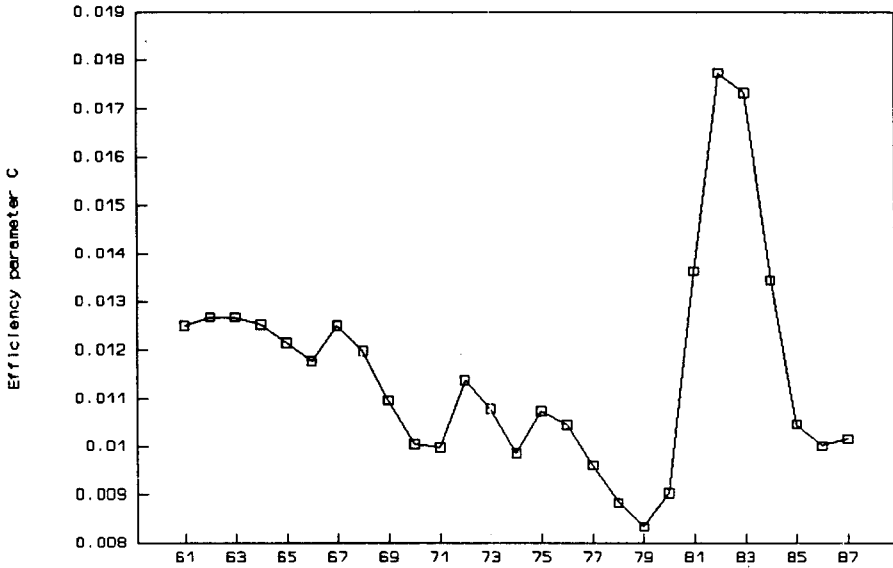


Figure 1 - Development of the efficiency parameter C of the UV -curve (1)

cy parameter C increases considerably, and from 1982 till 1985 C decreases again to the level of the early seventies.

This sudden temporary change in the level of C raises doubts about the validity of the UV -curve. Muysken and Meijers (1988) also report the instability of the UV -curve in this period.

Van Ours (1991) provides a search-theoretic foundation of the UV -relation which makes it possible to detect the shortcomings of the traditional UV -curve. Based on a Cobb-Douglas matching function he replaces (1) by:

$$F_v = k \cdot (U + S)^\alpha \cdot V^{1-\alpha} \quad (2)$$

This relation explains the flow of vacancies (*i.e.* the number of matches produced by the labour market) as a function of the number of job-seekers and the number of vacancies. From this point of view, the usual UV -curve is an 'iso-vacancy flow' matching function. Furthermore, apart from the unemployed, a part of the employed, S , are also looking for a new job. k is the productivity parameter of this matching process. In (2) it is implicitly assumed that the job-seekers who are employed (S) are equally productive in finding a job as the unemployed. This assumption is not very restricting since (2) can be rewritten as:

$$F_v = (k_u \cdot U + k_e \cdot E)^\alpha \cdot V^{1-\alpha} \quad (3)$$

in which the unemployed and the employed (E) both have their own productivity. By taking

$$S = \frac{k_e}{k_u} \cdot E \quad (4)$$

S can be interpreted as the searching equivalent of the employed, compared to the unemployed.

Based on (2) Van Ours carries out two estimations of the matching function. Figures 2 and 3 provide the developments of the productivity parameter k for both methods, based on $\alpha = 0.4$. Method 1 is based on data about duration of vacancies and unemployment. The assumption is made that

$$T_s = T_u \quad (5)$$

The average search period for the employed (T_s) equals the average period of search for the unemployed (T_u). Van Ours shows that under assumption (5), (2) can be rewritten as

$$k = \frac{1}{T_u^\alpha \cdot T_v^{1-\alpha}} \quad (6)$$

The second method is based on stock data about unemployment and vacancies. In this method the stock of employed job-seekers is ignored:

$$S = 0 \quad (7)$$

It is remarkable that the two methods, based on the same search theoretic foundation

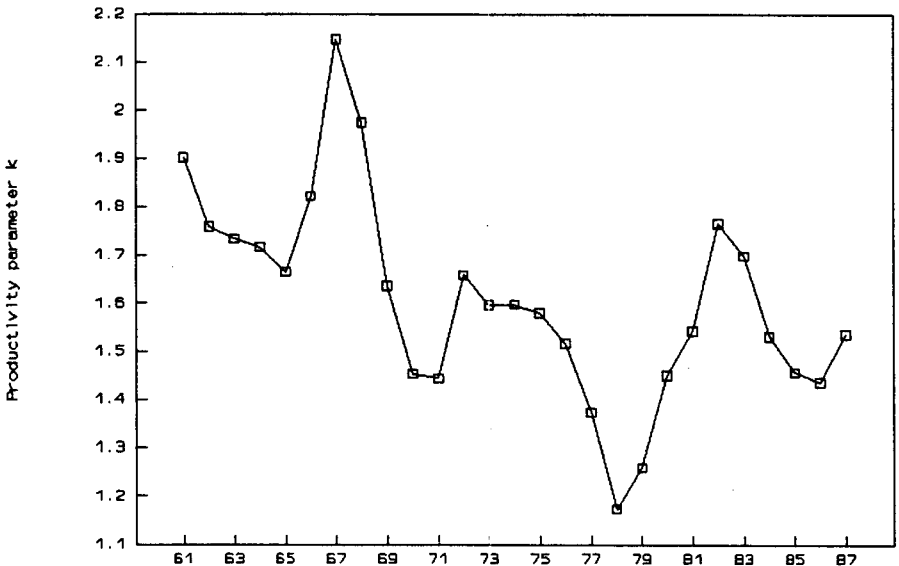


Figure 2 - The development of productivity parameter k according to method 1

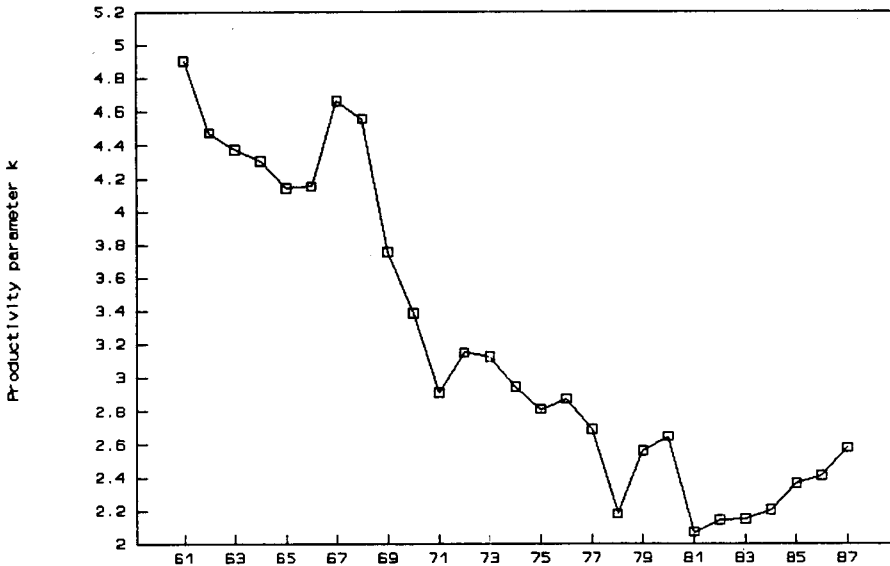


Figure 3 - The development of productivity parameter k according to method 2

lead to completely different developments of k . Furthermore, not only the development of k differs, but the average level of k is also not equal in both methods.

This difference in level can be explained by the different data sources, but also on theoretical grounds.

Firstly, method 2 uses the flow of vacancies registered at public unemployment offices. As Van Ours remarks, this number is much lower than the actual flow of vacancies. The number of jobs found by the unemployed ($F_u = U/I_u$) equals 832,000 in 1987 while there are only 254,000 matches registered in the same year for both employed and unemployed. Due to this underestimation of the flow of vacancies k will be estimated too low in method 2, which further increases the gap between method 1 and method 2.

Secondly, there is an explanation on theoretical grounds. Method 2 assumes $S=0$. Therefore it is assumed that all matches are made by the unemployed, while in practice a part of these matches are made by the employed. By assigning all matches to the unemployed, the productivity of this group in finding jobs will be overestimated:

$$k = \frac{F_v}{(U+S)^\alpha \cdot V^{1-\alpha}} = \left(\frac{U}{U+S}\right)^\alpha \cdot \frac{F_v}{U^\alpha \cdot V^{1-\alpha}} \quad (8)$$

The calculation of method 2 ignores the factor $(U/U+S)^\alpha$. This might also explain the sharp decrease of the productivity parameter k . Due to the rise in unemployment it is probable that U has risen relative to S . Therefore, the factor $(U/U+S)^\alpha$ has increased, and as a result, the overestimation of k will be reduced.

To correct the estimation of k in method 2, the total flow of vacancies can be replaced by the flow of vacancies occupied by the unemployed (F_u). Figure 4 shows the results.

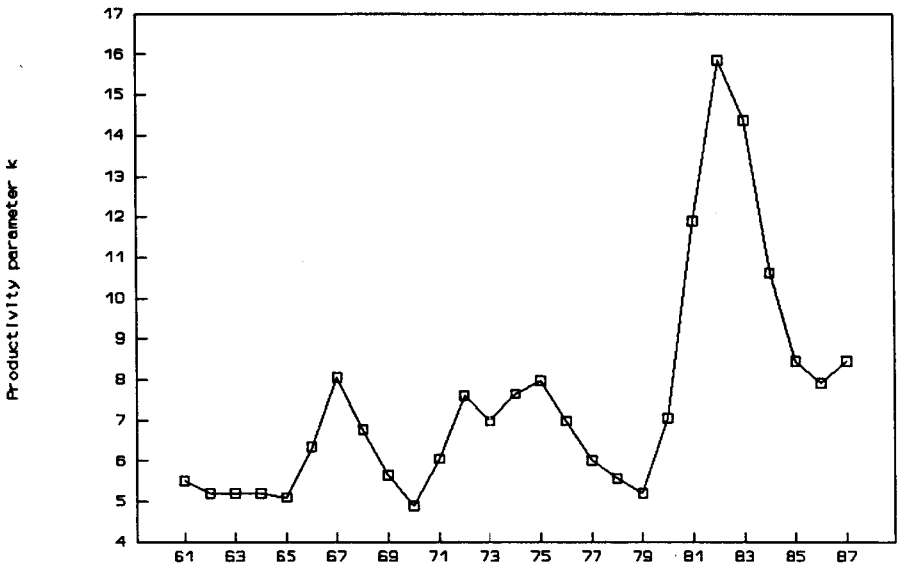


Figure 4 - The development of productivity parameter k , according to method 2, in which the total flow of vacancies has been replaced by the flow of vacancies occupied by the unemployed

According to the remark on the registration of vacancies, this correction leads to a rise in productivity. Furthermore, k tends to increase rather than decrease through time. This rise in productivity can, however, also be explained by the unrealistic assumption that there are no job-seekers who are already employed. The presence of employed job-seekers will put pressure on the unemployed job-seekers. Given the flow of vacancies this will lead to a decrease of the portion of jobs obtained by the unemployed:

$$\begin{aligned}
 k &= \frac{F_v}{(U+S)^\alpha \cdot V^{1-\alpha}} = \left(\frac{U+S}{U}\right) \cdot \frac{U}{U+S} \cdot \frac{F_v}{U^\alpha \cdot V^{1-\alpha}} \\
 &= \left(\frac{U+S}{U}\right)^{1-\alpha} \cdot \frac{F_u}{U^\alpha \cdot V^{1-\alpha}} \quad (9)
 \end{aligned}$$

The productivity parameter k will therefore be underestimated due to the neglect of factor $(U+S/U)^{1-\alpha}$, but this factor decreases as unemployment rises, so the underestimation will be reduced.

To get an appropriate description of the development of the productivity parameter, the search behaviour of the employed has to be taken into account.² One way of doing

2 Ignoring the search behaviour of the employed might also explain the parameter instability reported by Muysken and Meijers (1988, p. 9). Based on a 7-year average estimation, they show that the elasticity parameter α increases during the period 1964–1985. In a model in which $S=0$ the elasticity of the matching function with respect to unemployment equals α . If $S \neq 0$, however, the

this is by assuming that the total workforce (E) looks for a new job with the same intensity as unemployed people. The results of this assumption are depicted in Figure 5. This assumption is of course very unrealistic. According to this model, productivity rises simultaneously with the rise of the unemployment, indicating that the productivity of the unemployed exceeds the productivity of the employed.

An alternative and more appropriate way of correcting the estimates of k for the influence of search behaviour of the employed, is by estimating the total group of job-seekers $U+S$, under the assumption that the productivity of employed job-seekers equals the productivity of unemployed job-seekers. As noted before, it is not important whether a group with size S looks for a job with the same productivity as the unemployed or whether a group of, for example, twice the size of S looks for it with half the productivity of the unemployed. S can be interpreted as the search equivalent of the employed, compared to the unemployed.

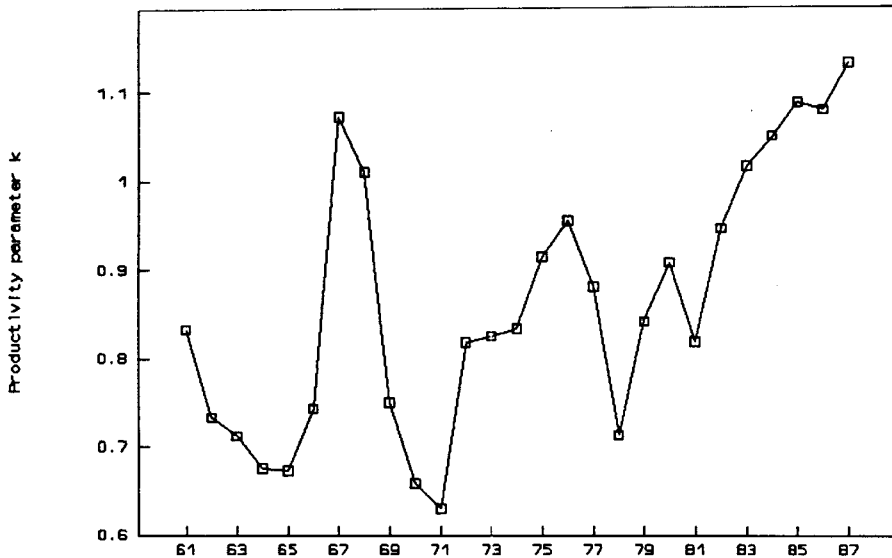


Figure 5 - The development of productivity parameter k , according to method 2, with the assumption that the search intensity of all people employed equals the search intensity of the unemployed

elasticity equals:

$$\frac{\left(\frac{\partial F(U, V)}{\partial U}\right)}{\left(\frac{F}{U}\right)} = \frac{U}{U+S} \cdot \alpha$$

This elasticity, therefore, underestimates α , but will increase if unemployment increases relatively to S .

This correction of the second method leads, however, to a specification which is equal to the specification of the first method.

$$k = \frac{F_v}{(U+S)^\alpha \cdot V^{1-\alpha}} = \frac{F_v}{(F_v \cdot T_u)^\alpha \cdot V^{1-\alpha}} = \frac{1}{T_u^\alpha \cdot T_v^{1-\alpha}} \quad (10)$$

Therefore, I conclude that the specification of method 1 is more appropriate. The development of productivity parameter k according to this method is illustrated in Figure 2.

3 A SUDDEN FALL OR A GRADUAL DECREASE?

Van Ours' conclusion that the efficiency of the labour market in The Netherlands got worse in 1969, but has not decreased in the seventies and eighties, was mainly based on estimations according to method 2. With respect to method 1 he only tested the relation between productivity parameter k and a trend variable t for the period 1971-1987. In this section, the two alternative hypotheses about the development of the productivity parameter are tested.

In Table 1 the results of three OLS estimations are presented. In the first estimation both a dummy variable for the period 1961-1968 and a trend variable are included. The parameter of the trend variable is highly significant, while the parameter of the dummy is not significant, implying that the model can be reduced by deleting the dummy variable.

The second estimation in which only the dummy variable is included confirms this conclusion. The \bar{R}^2 decreases compared to the complete model. In the third estimation only the trend variable is included. The corrected \bar{R}^2 and the t -value of the trend parameter increase, indicating the importance of the trend variable.

Table 2 presents the results of the same estimations, except for the fact that in these estimations an $AR(1)$ error term is included, to correct for the autocorrelation in the residuals in the estimations of Table 1. The results of these estimations are similar to the

TABLE 1 - ESTIMATION RESULTS FOR THE UNEMPLOYMENT DURATION-VACANCY DURATION CURVE

Constant	$\ln(T_v)$	$d\ 61-68$	$time$	DW	\bar{R}^2
0.71 (2.70)	-0.55 (-4.66)	-0.049 (-0.46)	-0.072 (6.97)	0.66	0.97
2.52 (26.86)	-1.24 (-11.82)	-0.65 (-5.78)		0.68	0.93
0.62 (3.69)	-0.52 (-5.28)		0.076 (12.38)	0.66	0.98

Dependent variable: $\ln(T_u)$.

t -values in parentheses.

TABLE 2 - ESTIMATION RESULTS FOR THE UNEMPLOYMENT DURATION-VACANCY DURATION CURVE WITH $AR(1)$ ERROR TERM

Constant	$\ln(T_v)$	d 61-68	$time$	$AR(1)$	DW	\bar{R}^2
0.72 (2.07)	-0.56 (-4.21)	-0.054 (-0.41)	0.070 (4.67)	0.67 (3.11)	1.43	0.98
4.09 (1.08)	-0.57 (-5.69)	-0.022 (-0.18)		0.98 (25.91)	1.56	0.98
0.64 (2.54)	-0.55 (-4.95)		0.73 (6.44)	0.69 (3.52)	1.41	0.99

Dependent variable: $\ln(T_u)$.

t -values in parentheses.

results in Table 1. Note that the $AR(1)$ parameter in the estimation with only a dummy is extremely high, indicating again the bad performance of this model. The estimation results in Table 2 imply $\alpha = 0.64$. In Figure 6 the development of k according to method 1 is depicted based on this α . Although the model does not explain the fluctuations in the development of the productivity parameter, this picture is a clear affirmation of the gradual decrease hypothesis.

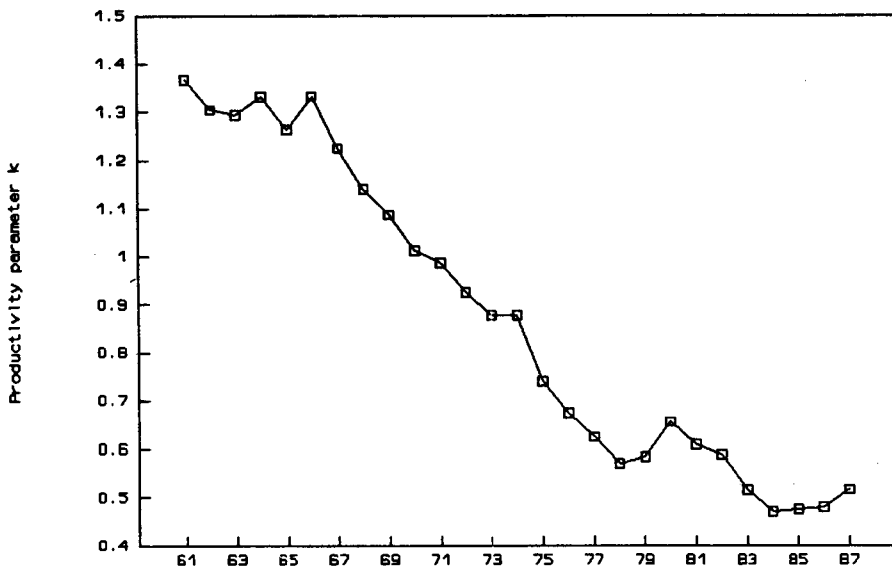


Figure 6 - The development of productivity parameter k according to method 1, with $\alpha = 0.64$

4 CONCLUSION

This paper shows that the model presented in Van Ours (1991), replacing the usual *UV*-curve, is better suited to analyse the Dutch labour market. However the conclusions about the efficiency of the Dutch labour market, drawn from this analysis, are premature. The figure showing the development of the productivity parameter is based on method 2, which is incorrect. The decrease of productivity in this version can be predicted on theoretical arguments based on the model. A test shows that in the correct model, based on method 1, the productivity of the matching function did not decrease drastically in 1969, but decreased gradually during the period 1961–1987. This gradual decrease has also been reported by Blanchard and Diamond (1989) for the United States and Jackman, Layard and Pissarides (1989) for the United Kingdom.

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