YOUNG MEDITERRANEANS IN THE DUTCH LABOUR MARKET: A COMPARATIVE ANALYSIS OF ALLOCATION AND EARNINGS*

By JOOP HARTOG and NICK VRIEND

1. INTRODUCTION

INTEREST in the position of Mediterraneans on the Dutch labour market is rather recent. After the Second World War the Dutch economy had to be reconstructed and empolyment was low.[1] In the mid fifties a very expansive economic development led to labour shortages in a few specific industries, followed in the sixties by general labour shortages and wage-explosions. The common answer to these problems was the recruitment of Mediterraneans, supported by the Dutch government. The policy makers strongly thought that this immigration was and had to be a temporal phenomenon. The function of the 'guest-workers' was considered to allow a flexible restructuring of some industries and the removal of bottle-necks in the labour market during booms. And indeed, the immigration of 'guest-workers' appeared to be cyclically determined. However, the experience of the seventies contradicted this view. In spite of rising unemployment figures, immigration during the first half of that decade almost equaled the levels of the mid-sixties. Moreover, in the sixties yearly return-migration was about 30% of the number of Mediterraneans residing in the Netherlands, whereas these figures had fallen down to only a few per cent in the seventies. Lastly, family reunion appeared as a mass phenomenon. As a result the total number of Turks and Moroccans in the Netherlands increased from less than 100 in 1960, via ±75,000 in 1972 to almost 250,000 in 1981. All this suggests that their residence is more or less permanent. Thus immigration changed from a business cycle to a more structural phenomenon, and therefore an analysis of their position in the Dutch labour market seems to be valuable.

Foreign workers can be found in almost all industries and regions. In this no difference exists with Dutch workers. Such differences do exist, however, with respect to some characteristics of the jobs involved. This is stated in many Dutch studies.[2] Usually immigrants occupy unskilled jobs with low

[1] The following history is very sketchy. A more elaborate one can be found in Hartog & Vriend (1989).

[2] See Muus (1984) for a survey.

wages and low social status. The 'quality-of-work' is often bad or the work is even dangerous, and only rarely there appear to be chances of more attractive work. These conclusions are very clear and unanimous. However, they are based only on frequency tables and merely descriptive by nature. What is lacking is a theoretically structured study, analysing earnings, job capacities required and offered, and 'quality-of-labour' aspects in their intrinsic relationship. Moreover, such an analysis should directly compare immigrants and Dutch workers at a micro-level. This paper pretends to be the first study that tries to fill these gaps in Dutch labour market knowledge.

2. THE THEORY

As noted in the introduction a proper analysis of the labour market position of immigrant workers requires a theory which stresses the various aspects of the heterogeneity of labour. Neither, Human Capital nor Segmented Labour Market theories seem to be suited for this task.

Starting-points of Human Capital (HC) theory are an axiom concerning the optimizing behaviour of individuals and the idea that there exists a homogeneous production factor, 'human capital'. This unobserved variable is defined as the value of the income-generating qualities of an individual and consists of initial capacities, related to personal characteristics, social background and health, plus additions by means of investments. HC theory then deduces an earnings function which relates essentially three variables. The first is investment in 'human capital', which takes the form of the number of years of education and experience. The costs involved, besides the direct costs, are the earnings foregone. The second variable is the rate of return of these investments, and the third the resulting income. The question, then, is how these variables determine each other. Is HC a theory which tries to explain the demand for schooling, or the differences in the rates of return, or does it focus on differences in earnings? Empirically, much effort has been put into estimating *ex post* differences in rates of return. These are the net effects of all the factors causing both possibilities and capacities to be different for each individual. These factors, and thus these rate-of-return differences, cannot be explained by HC theory which needs to introduce auxiliary hypotheses concerning market imperfections, uncertainty, genetic factors and social background. Another problem concerns the information individuals need to make a deliberate investment decision. Particulary with regard to immigrant workers uncertainty seems too large for a life-time income approach. The most important problem related to our topic is the fact that a labour market position is not determined by earnings alone, but is much more heterogeneous. Usually HC theory even assumes that the production factor 'human capital' is homogeneous. Thus heterogeneity on the supply side of the labour market is slighted, but the demand side doesn't get any attention at all. Allocation of individuals over jobs with different requirements and characteristics is not

analysed. This is, however, one of our main points of interest, because earlier research[3] suggested that it was mainly the demand side that determined the timing and size of the immigration of Mediterraneans.[4]

Segmented Labour Market (SLM) theory, which is usually considered to be a radical attack on, and alternative for, HC theory, stresses the importance of the demand side of the labour market. SLM theory tries to induce a theory from the observation that the actions of an individual are to a large extent dependent on the actions of other individuals and firms, institutions, procedures, etc. Reality is not homogeneous, information and mobility not perfect. A result is the occurrence of discontinuities, which can even lead to a segmentation of the labour market. The general view is that there are 'good' and 'bad' jobs, which are occupied by individuals who also differ with respect to some characteristics. Theoretical explanations of this segmentation usually point to the technological development and the related division of labour, and to the role of uncertainty in economic processes. The most important criticism to SLM theory is that there is no coherent theory from which testable hypotheses can be derived. Particularly the separation of the segments leads to problems of implementation.[5] Cain (1976) then concludes that SLM theory "does not begin to offer a theory of the labor market that can replace neoclassical theory".[6] However, maybe such a challenge has never been the pretention of SLM theory. Piore (1983) asserts that the two theories are not necessarily in conflict. The hostility towards SLM theory is caused by methodological differences, not by the content of their claims. As noted, HC theory is strongly deductive, whereas SLM theory is inductive, a fact which has led to reproaches that SLM theory is eclectic and *ad hoc*. Moreover, SLM theory emphasizes discontinuities, while HC theory stresses homogeneity and continuity. This clearly explains the incomprehension and confusion about the separation of the segments. But Gordon (1972) has already mentioned that SLM theory makes only minor claims on general validity, a fact often slighted, also by adherents of SLM theory. Clearly, in reality discontinuities can be of various kinds, they may differ from place to place, they can shift, etc. The main merit of SLM theory is their recognition of the heterogeneity of labour, and its implication that this can lead to important discontinuities. What SLM theory needs is a firmer economic-theoretical basis.

A labour market theory which is based on a very general economic framework is offered in Lucas (1972, 1977). Lucas starts with optimizing agents on both the supply and the demand side of the labour market. Because jobs and workers are heterogenous, the question arises how these

---

[3] Hartog & Vriend (1989).

[4] Introducing demand side variations by allowing job specific human capital is no solution to our problems, since the specificity of human capital is not operationally specified *a priori*.

[5] Van Ophem (1987) defined an empirical borderline between segments for The Netherlands, but concludes to rejection of SLM theory in his data.

[6] Cain (1976), p. 1247.

are paired in the short run. We will see that this is accomplished by flexible wages.

The short run choice by an individual i of a job j depends on a utility function which is to be maximized. In doing this, each individual i will take into account the wage offered to him for job j w_{ij}, but also job characteristics such as level of complexity of the task involved, number of working hours per week and so-called 'quality-of-labour' variables. These job characteristics together constitute the vector Z_j. It is assumed that the appreciation of these characteristics depends on a vector of personal characteristics G_i, which is given to each individual in the short run. Simply observable characteristics are e.g. years of schooling, sex and age. The utility function may now be written as:

$$U_i = U(G_i, Z_j, w_{ij}, \varepsilon_i), \quad \text{for each } i, j, \tag{1}$$

with ε_i = a disturbance term which reflects the aspects of individual i's tastes not contained in G_i.

Individual i will choose that combination of wage and job characteristics which maximizes his utility. As an illustration, suppose there is a job characteristic Z_{jk} which is distasteful to all. For a group with common wage offers for all relevant jobs a possibility frontier (PF) can be drawn which bounds the combination possibilities of wage and job characteristics for such an individual (see Fig. 1). Optimizing behaviour requires a choice where indifference curve and possibility frontier (PF) are tangential, i.e. a point where the marginal rate of substitution between wage w and job characteristics Z_{jk} are equal to the rate of their shadow prices:[7]

$$\frac{\delta w}{\delta Z_{jk}} = -\frac{\delta U/\delta Z_{jk}}{\delta U/\delta w}. \tag{2}$$

In case of a universally distasteful characteristic the wage w_{ij} will be an increasing function of the value of job characteristic Z_{jk} for every individual
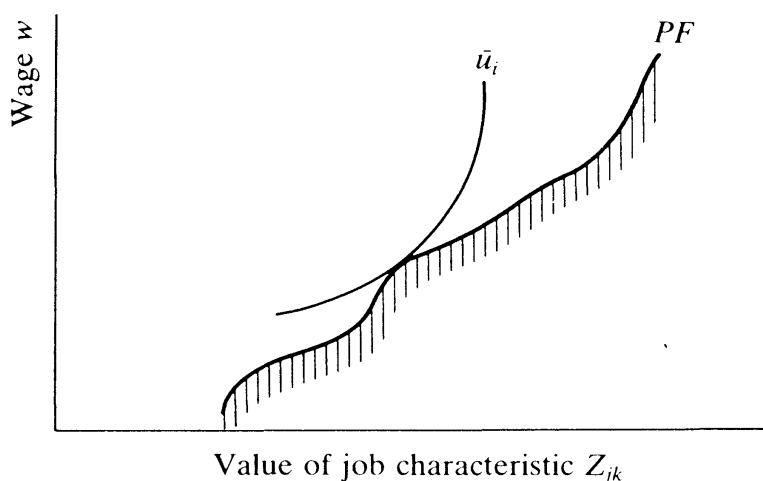

Value of job characteristic Z_{jk}

FIG. 1. Selection of a job

[7] For the sake of analytical convenience, it is assumed that there exists a continuum of jobs.

i with common wage offers. Different locations of individuals along PF are associated with unobservable differences in preferences, reflected in ε_i. The assumed optimizing behaviour leads to a set of labour supply functions:

$$S_{ij} = S(W_i, Z_j, G_i, \varepsilon_i), \quad \text{for each } i, j, \tag{3}$$

with $S_{ij} = 1$ if individual i selects job j,

     0   otherwise

W_i is the vector of all wages w_{ij} offered to individual i.[8]

In an analogous way we can derive labour demand functions. The net profit for a firm of hiring individual i depends on his wage w_{ij} and his productivity which varies according to some personal characteristics (vector G_i). But this productivity will also depend on the extent to which the personal characteristics G_i match the requirement of a job j with certain characteristics Z_j. Moreover, the willingness of an individual to supply effort in his job may depend on some qualitative aspects of the job. The short run net profit function thus is:

$$\pi_i = \pi(w_{ij}, Z_j, G_i, u_i), \quad \text{for each } i, j, \tag{4}$$

with $u_i = $ a disturbance term which reflects the aspects of individual i's productivity not contained in G_i.

A firm offering jobs j with given characteristics Z_j has to decide for any potential employee whether he will be hired or not, and if so, to what job he will be allocated. By considering the allocation of a given individual i to different jobs (with different values of a job characteristic Z_{jk}) we obtain an iso-profit curve $\bar{\pi}_i$. Because of the error term u_i, this results in a set of
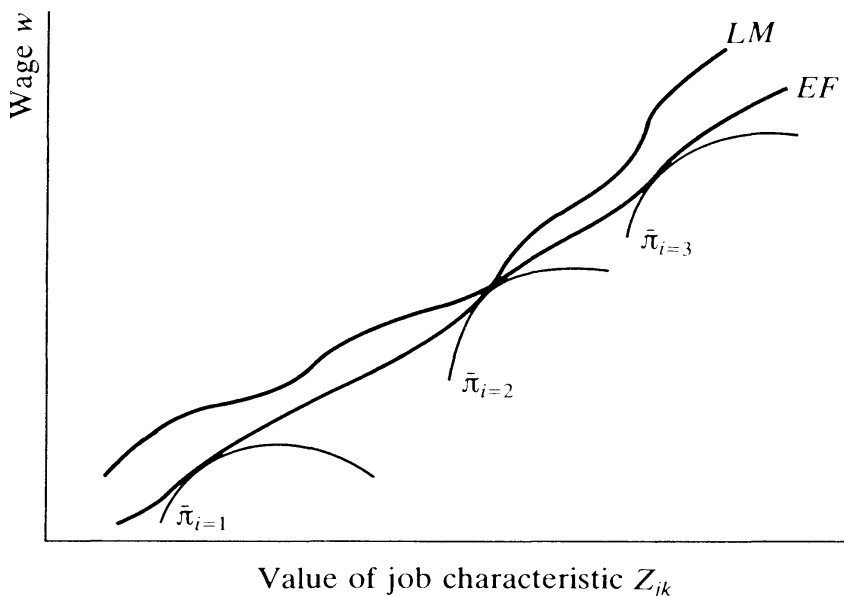

Value of job characteristic Z_{jk}

FIG. 2. Selection of a worker

---

[8] Note that the choice of individual i depends of the wages of all the relevant jobs, but only the characteristics of job j count. Lucas (1977) points to MacFadden's axiom on the irrelevance of the alternative set effect (MacFadden, (1974)).

iso-profit curves forming together an iso-profit efficiency frontier (EF). Profit maximization requires that the firm chooses individual i for job j (with a particular value of characteristic Z_{jk}) so that the efficiency frontier EF is tangential to the curve which reflects the prevailing market wages (LM) (see Fig. 2).

The formal optimum conditions are:

$$\frac{\delta w}{\delta Z_{jk}} = -\frac{\delta \pi / \delta Z_{jk}}{\delta \pi / \delta w}. \tag{5}$$

A firm selects an individual i for a job j by the slope condition and thereby determines a desired relation between a job (known by its job characteristics) and the type of individual i (known by his personal characteristics). This results in the labour demand functions:

$$D_{ij} = D(W_i, Z_j, G_i u_i), \quad \text{for each } i, j, \tag{6}$$

with $D_{ij} = 1$ if the firm wishes to hire individual i for job j,
     0   otherwise.

Market equilibrium requires consistency of the plans of all individuals i and all firms with respect to all jobs j. That is:

$$D_{ij} = S_{ij}, \quad \text{for each } i, j, \tag{7}$$

In all points of equilibrium the optimum conditions (2) and (5) apply and thus indifference curves $\bar{u}_i$ and iso-profit curves $\bar{\pi}_i$ are tangential (Fig. 3).

The market equilibrium can be described by two reduced form equations. A hedonic wage equation:

$$w_{ij} = w(Z_j, G_i, \varepsilon_i, u_i), \quad \text{for each } i, j, \tag{8}$$

and an equation which expresses the allocation of individuals over jobs:

$$T_{ij} = t(Z_j, G_i, \varepsilon_i, u_i), \quad \text{for each } i, j, \tag{9}$$

Value of job characteristic Z_{jk}
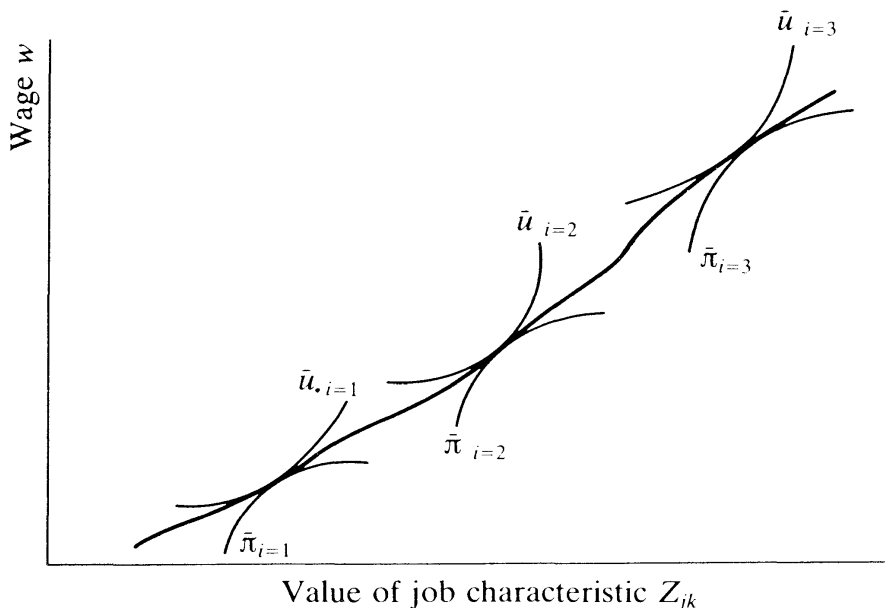
FIG. 3. Equilibrium positions

with $T_{ij} = 1$ if individual i occupies job j because both firm and individual
              want so,

       0   otherwise.

Lucas' model is an equilibrium framework in which workers' characteristics and job characteristics are matched, and in which the observed wage function reflects the common slopes of indifference curves and iso-profit curves at the realized equilibrium matches. Clearly, the equilibrium requirements are far-reaching. Equilibrium is achieved by labour mobility, but discrimination, unemployment and rationing (possibly related to each other) may form obstructions to such mobility. Imperfect knowledge is another possible barrier, which may lead to statistical discrimination. These points are of some importance in evaluating the empirical results. Moreover, they indicate the needed direction of a further development of this framework.

For our empirical research concerning the labour market position of young Mediterraneans, the model seems to be a promising starting-point. Besides variables which traditionally appear in allocation and earnings analyses, it offers a place to so called 'quality-of-labour' variables, not *ad hoc* empirically, but in an integrated framework. Even so, the model is not without limitations. The worker supply functions (3) are rather special in relating the individual supply decision for a particular job to all wages but only to the characteristics of the job under consideration. This specification, motivated by reference to McFadden's Axiom on the Irrelevance of the Alternative Set (see footnote 8) seems unduly restrictive. Equations (8) and (9) only catch the equilibrium structure. The wage function connects the points of tangency such as illustrated in Figure 3, describing the common slopes for workers and firms at the realized equilibrium matches. Identifying the underlying supply and demand parameters is not straightforward (Epple, (1987); Bartik, (1987)) and will not be attempted here. Similarly, allocation function (9) only summarizes the equilibrium matches of individuals with characteristics G_i to jobs with characteristics Z_j. Again, no attempt is made to retrieve the underlying structural parameters. A fully developed structural model would also require the specification of frequencies (or densities) of workers and firms by characteristics and explicit solutions for such models have not yet been developed.[9] So, our aim is much more modest. In Sections 4 and 5 we will develop specifications for the allocation and the wage functions, respectively, that only summarize the observed equilibrium and we will compare the estimated results for Dutch and Mediterranean workers without seeking to identify the underlying supply and demand parameters.

---

[9] Tinbergen (1956) is perhaps the only example, and his model is quite restrictive in some respects.

3. THE DATA

The data of the young Mediterraneans concern Turks and Moroccans of the age 16–25. Of all the Mediterraneans residing in the Netherlands these two nationalities account for 75%, and 20% of them belong to the examined generation. A detailed account of composition and representativity of the sample, and of the methods of data collection can be found in Brassé et al. (1983), which also offers a mainly descriptive analysis of these data. The survey was held in 1981 among 600 young Turks and Moroccans, distributed over five cities. About 150 questions concerning many aspects of their life in the country of origin and their residence in the Netherlands resulted in 250 variables. Main characteristic of the group is the fact that it is more or less a 'transition generation' instead of a 'second generation'. None of them was born in the Netherlands, 85% were older than 12 years at the time of arrival and the average period of residence was 4.5 years. Because we restricted our analysis to the position of the employed, we could use only 308 observations. Among the unemployed a group of 36 Mediterraneans was unemployed for less than 1 year. Because some variables concerning their last job had been reported, we could use these observations as well in the allocation analysis, but not in the earnings function.

The data of the young Dutch come from a labour mobility survey held in 1985 for the Institute of Social Scientific Research of the Katholieke Hogeschool Tilburg (IVA) and the Organisation of Strategic Labor Market Research (OSA). The sample comprised 4020 households in the Netherlands of which the head aged 18 or more. One hundred questions resulted in about 600 variables concerning the labour market position since 1980. With respect to some variables it appeared possible to construct a sample concerning the same year as the data of the young Mediterraneans, i.e. 1981. After removing the useless cases we had left 390 observations of 1981 and 223 of 1985.

Before proceeding to our analyses, we make a little pause here to see if the prevailing picture of the labour market position of immigrant workers is confirmed by these samples. The frequencies of job characteristics[10] represented in Table 1 suggest a positive answer. Almost 90% of the young Mediterraneans were employed at the three lowest job levels, and only 40% of the young Dutch. Truncating the earnings distribution at a net hourly wage of Dfl 8, or less, these percentages are 80 resp. 40. Bad working conditions and heavy work clearly dominate among the young Turks and Moroccans. This does not apply, however, for monotonous work, shift labour and irregular working times. Pessimism about the future of their job is of frequent occurrence among both groups, but was stronger among the Mediterraneans, which is perhaps related to the fact that they less often have a permanent contract.

[10] All job and personal characteristics are defined in the appendix.

TABLE 1
Frequencies of job characteristics

		Young Mediterraneans 1981 %	Young Dutch 1985 %
Job Level	1	27.5	4.9
	2	42.8	22.9
	3	18.6	14.8
	4	7.2	35.4
	5	3.6	14.3
	6	0.3	4.0
	7	—	3.6
Net Hourly Wage	0–4	7.5	2.2
	5	15.4	5.8
	6	15.7	6.3
	7	20.3	5.8
	8	21.6	19.7
	9	12.1	20.6
	10	5.6	17.0
	11–15	1.9	19.3
	16–20	—	3.1
Bad Working Conditions		59.8	32.7
Heavy Work		40.2	26.0
Monotonuous Work		41.2	49.8
Bad Working Times		24.2	33.6
Part-time		5.9	17.9
No Permanent Labour Contract		16.3	11.2
No Future		41.5	29.1
n		308	223

4. ALLOCATION

Equation (9) is the equilibrium allocation function, with a dependent variable equal to 1 if an individual with given characteristics occupies a particular job, and equal to zero otherwise. This suggests as an empirical counterpart a set of equations, one for each job, predicting whether an individual does or does not occupy the particular job, such as, for example, a set of logit equations for each separate job. However, this would yield a very large number of equations and may not be easy to interpret. Instead, we singled out one particular job characteristic, the 'job level' and explained the probability of reaching the different job levels from individual characteristics. Job level is an ordinal variable, measuring the level of complexity and difficulty of the job task (see the details in the Appendix). It is one of the most important variables to portray differences between jobs. Job level is not a common variable in economic research. Yet, the theory outlined above points to the relevance of difference between jobs. The existence of important differences in the task components of jobs, in the demands they

put on workers, can hardly be denied. Precise measurement of such differences is more problematic however. The variable we use here is taken from job analyst's grading of job titles. It is a systematic approach, which can be expected to draw out real differences between jobs. Certainly there will be measurement error and an undesirable effect of the casually observed actual allocation of individuals to job levels, but given the substantial differences in job content, and the crude measurement in only 7 intervals, we feel justified in using this variable to represent the demand side of the labour market. Hence, the allocation function we estimated was of the following kind:

$$Z_{j1} = f(G_i, \varepsilon_i, u_i) \qquad (10)$$

with Z_{j1} = the job level,

G_i = the vector of personal characteristics,

ε_i = a disturbance term which reflects the aspects of individual i's tastes not contained in G_i,

u_i = a disturbance term which reflects the aspects of individual i's productivity not contained in G_i.

Because the dependent variable job level is measured as a discrete, ordinal variable, with 7 levels, OLS is not suited. The appropriate procedure is an 'ordered-response' model.[11] The ordinal dependent variable is assumed to have an underlying continuous response variable Y_i. The value of the unobserved variable Y_i depends on the explanatory variables of equation (10). For convenience we write these as matrix X_i. The functional relation is assumed to be linear, and there is an $N(0, 1)$ distributed error term θ_i:

$$Y_i = X_i \beta + \theta_i. \qquad (11)$$

The link between this unobserved continuous variable Y_i and the discrete, ordinal job levels is constituted by a set of boundaries α which divide the variable Y_i in intervals, so that individual i has a job with level z if the following holds:

$$\alpha_{z-1} < Y_i < \alpha_z, \qquad z = 1 \dots 7 \qquad (12)$$

with $\alpha_0 = -\infty$,

$\alpha_7 = \infty$.

The αs constitute boundaries in the $N(0, 1)$ distribution if all of the explanatory variables are zero or irrelevant so that $E(Y) = 0$. However, if

[11] As presented in Maddala (1983), p. 46. The ordered-response model has an advantage over the multinomial logit model (which was estimated for a Dutch sample by Hartog & Van Ophem (1986)) in explicitly acknowledging the rank order property of the dependent variable. It has the drawback of imposing a one-dimensional ranking of jobs, instead of allowing different rankings for different workers (as suggested by one of the referees). To do so, one should a priori assign jobs to different sets (type of industry, broad occupational groups, etc) and test the difference in rankings. This is an interesting topic for further work.
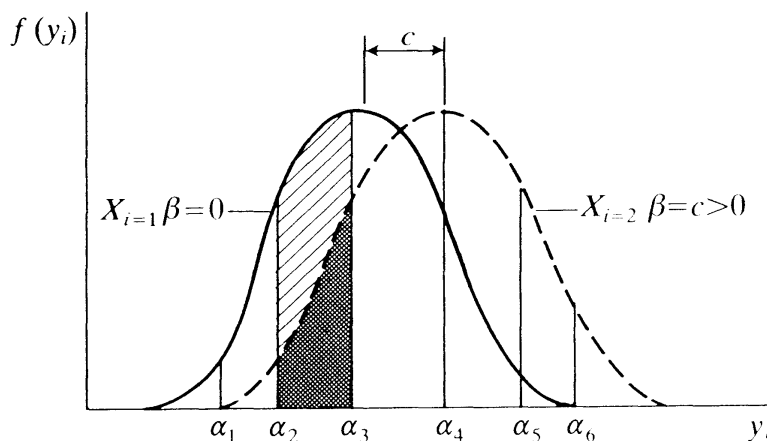
FIG. 4. Probabilities of Job Levels for Two Different Individuals

$X_i \neq 0$ and $\beta \neq 0$ the entire normal distribution will shift along the Y_i-axis, while the αs are fixed (see Fig. 4). In this way the probability of job level z is a segment of a (shifted) normal distribution for each individual i:

$$P_{iz} = \Phi(\alpha_z - X_i\beta) - \Phi(\alpha_{z-1} - X_i\beta), \qquad z = 1 \ldots 7. \tag{13}$$

The parameters $\alpha_1 - \alpha_6$ plus the vector β are estimated simultaneously through maximization of the following likelihood function,[12] using the computer routine GRMAX:[13]

$$L = \pi^n_{i=1} \pi^7_{z=1} \{\Phi(\alpha_z - X_i\beta) - \Phi(\alpha_{z-1} - X_i\beta)\}^{Z_{iz}} \tag{14}$$

with $Z_{iz} = 1$ if individual i ends up at job level z

0 otherwise.

n is the number of individuals i.

We estimated this 'ordered-response' model for the young Mediterraneans and a group of young Dutch, both sets of observations from 1981. The results are given in Table 2.

A first observation indicates that the 'ordered-response' model 'works'. The α's are neatly ordered, and statistically different from zero. To interpret the magnitudes of the coefficients, one should remember that the ordered-response model predicts a frequency distribution as the segments in a standard normal distribution. The coefficients therefore are measured in standard deviations of that normal distribution.

The predicted frequency distribution of individuals by job level is shaped by three factors: the α's, the β's and the personal characteristics X. The personal characteristics are the qualities of the individuals, the βs indicate the valuation of the qualities for labour market allocation and the αs are the boundaries of the job level intervals. The latter may be taken as an indication of the demand side facing the individuals. Each of these sets of factors will now be discussed in turn.

[12] See Maddala (1983), p. 48.
[13] Developed by G. Ridder (University of Amsterdam). See Ridder (1982).

TABLE 2
Ordered-response Parameter Estimates For Job Level 1981

		Young Mediterraneans 1981		Young Dutch 1981	
α's:	α_1	−0.54	(−1.80)	0.97	(2.11)*
	α_2	0.80	(2.65)**	1.75	(3.82)**
	α_3	1.68	(5.36)**	2.23	(4.85)**
	α_4	2.39	(7.18)**	3.24	(6.93)**
	α_5	3.69	(7.51)**	4.09	(8.41)**
	α_6	—	—	4.77	(9.36)**
β's:	Part-time	0.01	(0.05)	−0.30	(−1.44)
	Female	−0.56	(−4.09)**	0.42	(3.86)**
	Father Skilled	0.34	(2.05)*	0.09	(0.79)
	Not Master of Dutch	−0.60	(−3.59)**	—	—
	Years of Schooling in Turk./Mor.	0.07	(2.86)**	—	—
	Years of Schooling in the Neth.	0.07	(1.50)	0.17	(5.11)**
	Dutch Education Diploma	1.15	(3.46)**	0.26	(2.27)*
	Years of Working Experience	−0.06	(1.84)	0.01	(0.36)
	Missing Values Part-time	0.40	(1.99)*	—	—
	Missing Values Experience	−0.18	(−0.29)	—	—
	Missing Values Job Level Father	0.08	(0.58)	—	—
	n	344		390	

(*t*-statistics); * = significant at 5%; ** = significant at 1%

It is clear that the αs are different for young Mediterraneans and young Dutch. This is confirmed by a statistical test[14] on the restriction that the αs are equal for both groups. The hypothesis is rejected at every conventional level of significance. The αs for the Mediterraneans are lower than for the Dutch, at all job levels. The sizes of the intervals are also different. The intervals for job levels 3 and 5 are wider for Mediterraneans than for Dutch youngsters, and the converse holds for the intervals of levels 2 and 4. The average size is smaller for the Mediterraneans.[15] This indicates that Mediterraneans and Dutch face a different demand side. Remarkably, and unexpectedly, the demand side is better for the Mediterraneans. If personal characteristics were irrelevant, it would be easier for them to reach higher job levels than for the Dutch. This holds in particular for the first four job levels, as the probabilities of reaching the higher job levels are negligible in this case.[16] The expected job level would be 1.96 for Mediterraneans and 1.19 for the Dutch.

[14] Log likelihood ratio test.
[15] For the Mediterraneans, the widths are 1.34, 0.88, 0.71 and 1.30 giving an average of 1.06, for the Dutch they are 2.72, 0.48, 1.01 and 0.85, averaging 1.27. For the Dutch, the sixth interval has a width of 0.68 which, if included, reduces the average to 1.15.
[16] The αs imply predicted probabilities of the first four job levels of 0.295, 0.493, 0.165 and 0.038 for Mediterraneans and 0.834, 0.126, 0.027 and 0.006 for the Dutch.

The valuation of personal characteristics, as reflected in the βs, is also different for the two groups. Again, this is confirmed by statistical tests.[17] Equality restrictions on the βs, while assuming the αs of one group are a linear transformation of those of the other group, are rejected. This also holds if sex is excluded from the equality restrictions.[18] With the exception of the effect of years of schooling in the Netherlands and for working part-time, the coefficients are larger in (absolute) magnitude for the Mediterraneans than for the Dutch. In that sense, personal qualities count more for the former than for the latter. Working part-time and years of experience are insignificant for both groups. The insignificance of experience should be viewed in the light of the nature of the sample: no one is older than 25. For the Mediterraneans we find a significant effect of family background (father in skilled job), whereas for the Dutch we do not. This may perhaps be explained from the fact that informal recruitment channels (friends, relatives, etc.) are more important for them.

The effect of sex is remarkably different for the two groups. Given all other qualities, young Turkish and Moroccan females end up at a lower job level than the Mediterranean males. This is in agreement with earlier evidence concerning the allocation of adult Dutch. Therefore, it is the more striking that for the young Dutch females just the opposite applies. This result is confirmed for another group of young Dutch from 1985 (not reported here), and asks for further analysis. Perhaps it is related to the classification of particularly the unskilled functions in job levels.

Turning to the effect of schooling, we observe that the coefficients for years of schooling of the Mediterraneans in Turkey/Morocco, respectively, in the Netherlands are both lower than this coefficient of the young Dutch. In fact, the coefficient for Dutch schooling years is not even significant for Mediterraneans. This could point to a 'quality' difference: Mediterraneans learn less in a year than the Dutch, e.g. because the general level of the education system in Turkey/Morocco is lower, or because the Mediterraneans have too many problems with the Dutch language in the Dutch education system. But if we look at the coefficients related to the possession of a Dutch education diploma, it is clear that the selection requirements are different for the two groups. Apparently, instead of years of education, the possession of a Dutch education diploma is the important signal to employers about the expected qualities of the young Mediterraneans. Another very significant variable appears to be the extent of mastery of the Dutch language. A further analysis suggested that particularly the ability to write Dutch, and to a lesser extent the ability to speak or read, is the important variable. However, due to inconvenient multicollinearity, this conclusion is only provisional.

To facilitate the interpretation of the estimated coefficients of Table 2 we

---

[17] Log likelihood ratio test.

[18] This exclusion is applied for comparability with the results on earnings; see below.

TABLE 3
Probability Distribution (× 100) Plus Effects of Deviations

Young Mediterraneans 1981

Job Level:	1	2	3	4	5	6	7	Expectation
Reference Individual:	8.9	40.8	31.2	13.5	5.5	0.2	—	2.67
Part-time	−0.2	−0.2	0.1	0.2	0.1	0.0	—	0.01
Female	12.6	8.7	−9.7	−7.5	−3.9	−0.2	—	−0.50
Father Skilled	−4.3	−9.0	2.7	5.6	4.7	0.4	—	0.34
Not Master of Dutch	13.8	8.8	−10.5	−7.9	−4.1	−0.2	—	−0.53
Years Schooling T/M + 2	−2.0	−3.5	1.5	2.3	1.7	0.1	—	0.14
Years Schooling Neth. +2	−2.0	−3.5	1.5	2.3	1.7	0.1	—	0.14
Dutch Education Diploma	−8.2	−29.1	−4.5	14.2	23.7	4.0	—	1.19
Years Experience +2	−1.8	−3.0	1.3	1.9	1.4	0.1	—	0.12

Young Dutch 1981

Job Level:	1	2	3	4	5	6	7	Expectation
Reference-Individual:	27.8	29.8	17.3	20.5	4.1	0.5	0.1	2.45
Part-time	10.8	0.4	−2.7	−6.3	−1.9	−0.3	−0.0	−0.33
Female	−12.1	−4.5	1.6	9.3	4.6	1.0	0.2	0.51
Father Skilled	−2.9	−0.6	0.6	2.0	0.8	0.1	0.0	0.11
Years of Schooling +2	−10.1	−3.4	1.6	7.6	3.5	0.7	0.1	0.41
Dutch Education Diploma	−8.0	−2.3	1.4	5.8	2.5	0.5	0.1	0.31
Years Experience +2	−7.0	−0.1	0.1	0.4	0.2	0.0	0.0	0.02

calculated the probability distribution over the job levels for both groups for an equally qualified reference-individual.[19] Furthermore, we computed for each variable the effects of a specified deviation with regard to these reference values. The results are given in Table 3. Most striking is the fact that the expected job level of the Mediterranean reference-individual is slightly higher than of the Dutch, 2.67 against 2.45. Although surprising, similar results are reported by Brassé and Sikking (1986) in data collected from individual firms. This means that for the reference-individual, the effect of more favourable αs is not (competely) annihilated by the valuation of personal qualities (schooling, in particular). If we compare this with the average job levels computed from Table 1 (respectively 2.18 and 3.57), we come to realize that the mean Dutch has better (imputed) qualities than the reference-individual, while on average these are clearly worse than for the reference-individual for the young Turks and Moroccans. For instance, not being fluent in the Dutch language already leads to a drop of the expected

[19] See the appendix for details.

job level below that of the young Dutch (2.67 − 0.53 = 2.14). The importance of this fact is made clear if we realize that this applies to more than 70% of the examined Mediterraneans. Another drop of half a job level may be expected for the Turkish and Moroccan females. Two more years of school attendance has about three times as much effect for the Dutch than for the Mediterraneans, unless the latter manage to conclude this with the obtainment of a Dutch education diploma. The jump to be expected then is substantial, and almost four times as large as for the Dutch. Lastly, young Dutch women may expect to end up half a job level higher than the males.

Finally, to evaluate the effect of three components of different positions for Dutch and Mediterraneans, the frequency distribution of job levels has been predicted for the latter with each of these components taken in turn from the Dutch: their αs, their βs and their mean characteristics. Results are given in Table 4. The table illustrates dramatically that it is the difference in mean characteristics that explains the difference in allocation. If Mediterraneans had, on average, the Dutch characteristics, their job level distribution would be quite similar to the distribution observed for the Dutch, and it would certainly not be a worse distribution. These results again confirm the observations of Brassé and Sikking (1986) concerning some Dutch firms in various industries. At Dutch αs, the Mediterraneans would be worse off than they are in fact, at Dutch βs (but Mediterranean βs for language facility and homeland schooling) their distribution would be barely affected.

5. EARNINGS

The earnings function we estimated with OLS was:

$$\ln (w_{ij}) = Z_j\alpha + G_i\beta + \mu_i \qquad (15)$$

with μ_i a $N(0, \sigma)$ distributed error term.

TABLE 4
Simulating the Mediterraneans' Job Level Distribution

Job Level:	1	2	3	4	5	6	7	Expectation
(Mediterranean) Observed	0.275	0.428	0.186	0.072	0.036	0.003	—	2.18
Predicted at:								
Mean (Mediterranean) X	0.268	0.496	0.181	0.040	0.011	—	—	2.02
Dutch α	0.813	0.140	0.032	0.015	—	—	—	1.25
Dutch β	0.189	0.488	0.243	0.060	0.020	—	—	2.23
Mean Dutch X	0.010	0.151	0.295	0.270	0.245	0.003	—	3.52
Dutch Observed	0.069	0.162	0.159	0.354	0.174	0.059	0.023	3.67

TABLE 5
Earnings Functions 1981–1985 *respectively*

Dependent: ln (*Net Hourly Wage*)

		Young Mediterraneans 1981		Young Dutch 1985	
	Intercept	0.53	(5.31)**	0.27	(1.36)
Z_i:	Bad Working Times	0.10	(4.39)**	0.10	(3.15)**
	Bad Working Conditions	−0.02	(−1.02)	0.01	(0.28)
	Heavy Work	−0.01	(−0.65)	−0.02	(−0.51)
	Monotonous Work	−0.01	(−0.70)	−0.02	(−2.47)*
	No Future	0.01	(0.43)	−0.03	(−0.58)
	No Permanent Labour Contract	−0.02	(−0.84)	0.20	(−0.69)
	High Job Level	−0.16	(−0.95)	0.07	(1.94)
	Low Job Level	0.01	(−0.10)		(0.86)
G_j:	Female	−0.18	(−8.08)**	−0.03	(−0.93)
	Age	0.07	(16.46)**	0.08	(10.21)**
	Father Skilled	−0.04	(−1.66)	−0.02	(−0.64)
	Weak Legal Position	−0.03	(−1.15)	—	—
	Not Master of Dutch	0.00	(0.05)	—	—
	'Overschooling'	0.01	(0.17)	−0.08	(−0.99)
	'Underschooling'	−0.01	(−0.17)	−0.15	(−1.25)
	Dutch Education Diploma	−0.08	(−1.27)	0.01	(0.26)
	Less Experience than 'Normal'	−0.06	(−1.41)	−0.05	(−1.34)
	Company Training	0.12	(1.69)	0.02	(0.68)
	Part-Time	0.10	(2.40)*	0.07	(1.69)
	Missing Values Experience	−0.14	(−0.88)	—	—
	Missing Values Job Level Father	−0.05	(−2.13)*	—	—
	n	308		223	
	$\bar{R}^2$	0.63		0.41	

(*t*-statistics), * = significant at 5%, ** = significant at 1%

Unfortunately, becuase of lack of data, concerning the young Dutch this was only possible for 1985 (instead of 1981). The results are presented in Table 5.

It turns out that many of the variables have insignificant coefficients. Of the so-called 'job quality' variables, both for the Mediterraneans and the Dutch, only the occurrence of shift labour and irregular working times is compensated by earnings differences. For the latter monotonous work even leads to a significantly lower wage. In Section 3 we noticed that a number of aspects of a job, of which one could presume that they are universally negatively valued, occurred more frequently among Mediterraneans. In the earnings equation it appears that these aspects are not compensated. It may be that this is a reliable finding and that the market does not behave as theory assumes. It may also be due to the measurement of the variables. They are graded by individuals' own evaluation and this may contain too

much interpersonal variation in the scales of measurement. However, this seems less relevant for the type of labour contract and the lack of a significant earnings effect is remarkable. The equality of the compensation for bad working times is striking. A first explanation could point to the fact that this happens to be arranged by Collective Labor Agreements (CAOs). However, immediately the question emerges why, e.g., bad working conditions are not compensated with help of CAOs. The job level appears to have no influence on the earnings among the Mediterraneans and only a moderate one among the Dutch. We did not eliminate this variable however, as other research (Hartog (1985)) convincingly indicated it should be included.

The personal characteristics of importance turn out to be sex and age. Mediterranean females earn 18% less than the males, whereas Dutch females do not earn significantly less than males. Every additional year of age leads to a wage increase of 7 to 8%. Experience and schooling have been measured somewhat differently from usual in the earnings function literature. Experience was not simply included in years, because of its strong relation to age and schooling in a sample of young workers. Hence, only an exceptional experience situation was highlighted, with the expected negative earnings effect, but not significantly. It is known from related research that earnings depend both on job level and schooling (see e.g. Hartog (1985)). Here, the effect was specified by including dummies for deviations of schooling compared to what is 'required' in the job; this specification was clearly supported in Hartog (1986) and Hartog Oosterbeek (1988). In the present sample, this is not the case. Similarly, the diploma has no significant earnings effect. So far then, neither schooling variables nor job levels affect earnings significantly. Part-time works leads, in accordance with other evidence for the Netherlands (Hartog et al. (1985)), to a higher net hourly wage.

If one compares the earnings functions, they appear very similar, some of the significant coefficients are barely different and most variables are insignificant in both equations. Therefore, we tested some restrictions. Despite the fact that the observations come from two different years, we imposed an 'equality restriction' on all coefficients. To meet the objection of difference in time somewhat, we included an extra dummy for the observations of the Young Dutch from 1985. Moreover, we imposed 'nil restrictions' on a number of coefficients that were insignificant in Table 5. Testing for all these restrictions simultaneously led to rejection of the hypothesis. However, if we excluded the variable sex from the 'equality restrictions', this was no longer the case. The results are given in Table 6.

With exception of the young Turkish and Moroccan females there is no difference concerning the earnings function between the two groups. The coefficients are equal and the dummy that distinguishes the observations of the Dutch from 1985 from the Mediterraneans from 1981 is insignificant. With respect to the finally estimated earnings function the following points

TABLE 6
Earnings Functions with Restrictions

Dependent: ln (*Net Hourly Wage*)

		Young Mediterraneans 1981 and Dutch 1985	
	Intercept	0.46	(5.55)**
	Dummy Dutch 1985	−0.03	(−0.96)
Z_i:	Bad Working Times	0.11	(5.80)**
	Monotonous Work	−0.05	(−2.66)*
	High Job Level	0.12	(2.46)*
	Low Job Level	−0.01	(−0.42)
G_j:	Dutch Female	−0.04	(−1.57)
	Mediterranean Female	−0.18	(−7.85)**
	Age	0.07	(19.61)**
	'Overschooling'	−0.01	(−0.26)
	'Underschooling'	−0.05	(−1.40)
	Part-time	0.08	(2.97)**
	n	531	
	$\bar{R}^2$	0.61	

F-statistic for all restrictions $F(28,493) = 1.05$

(*t*-statistics); * = significant at 5%, ** = significant at 1%;

can be noticed. For all these young people bad working times are compensated with an 11% differential, but to monotonous work just the opposite applies. Part-time work and higher job levels are better paid, but the lowest job levels do not significantly fare worse than the intermediate. Comparative advantage in the sense that schooling is rewarded best at a properly matching job level, with overschooling and underschooling leading to lower wages, is slightly suggested. Dutch young females are not significantly worse off than the males. Besides the far-going similarity of the earnings functions, the most important conclusion concerns the considerably lower wages (almost 20%) the young Mediterranean females have to accept relative to all the other young workers.

6. CONCLUSIONS

The analysis of two samples of young workers in the Dutch labour market has led to some clear conclusions. The earnings functions for young Mediterreans and for young Dutch appear statistically indistinguishable; only Mediterranean females stand out, with a significant earnings disadvantage of 18%. The allocation of workers to job levels is quite different for the two groups. If personal characteristics were irrelevant, Mediterraneans

would have a better job level distribution than their Dutch counterparts. However, these personal characteristics appear to be important for both groups and in the more favourable demand structure, the effect of the personal characteristics sex, family background and experience are even stronger for the Mediterraneans. The effect of sex is quite opposite for the two ethnicities: Mediterranean females' job level distribution is shifted downwards, Dutch females' distribution is shifted upwards. Among the schooling variables, it is mainly the possession of a Dutch diploma that could boost Mediterraneans' job level: school years per se whether in their homeland or in Holland are far less important than for Dutch youngsters. A last most important variable turns out to be the extent of mastery of the Dutch language, implying a strong negative effect for most of the Mediterraneans.

In assessing the results of the analysis, a number of limitations should be considered. The model and the variables we use are silent on cultural differences between the two groups, on discrimination and on different validity of variables for different groups. Yet such aspects are present under the surface at many places. The differences between Dutch and Mediterranean females, for example, may be related to different cultural and social norms pertaining to their position, and to discriminatory practices that to some extent follow from them, through statistical discrimination. Discrimination may take the form of applying 'acceptable' criteria of selection (like fluency in Dutch) where such criteria are barely relevant. Different validity of variables may be relevant in assessing job quality, where Mediterraneans may be inclined to grade less critically than Dutch workers. A combination of factors may be relevant for the differential effect of education. Schools in Turkey and Morocco may produce different qualities than Dutch schools. There is, however, information on these matters (and a list of equivalences) in the Department of Labour, but employers are reluctant to use this. Similarly, the fact that years of education in Holland may have different output for the two groups of workers may lead employers to dismiss Mediterraneans' schooling too easily. These points should be kept in mind when it comes to an interpretation and explanation of the empirical findings presented here.

It is also important to remember that the findings apply to samples of young workers, not older than 25, and that the Mediterraneans are a special group. Mostly, they immigrated during their teenage years, in the middle of the period of an individual's most important educational years. It is therefore not clear to what extent the results apply to other groups: adults, children of Mediterraneans born in the Netherlands, etc. It is evident that more work is needed. The expansion should also lead to inclusion of unemployment as an important variable, both as a dimension of the labour market position and as an intermediary variable, affecting allocation and earnings. Since many studies indicate that unemployment hits minorities and majorities differently, this is perhaps the most important direction for

further research. It would also be most desirable to obtain more information on individuals' personal characteristics. Differences between Dutch and Mediterraneans are certainly not exhaustively described by the variables available here. This might help in explaining some of the findings reported here, like e.g. the higher standardized job level for Mediterraneans and the differential effects of schooling.

University of Amsterdam, The Netherlands
European University Institute, Italy

APPENDIX

Definitions of job and personal characteristics in alphabetical order (* indicates dummy).

*bad working conditions**
a work environment embracing at least one of the physical conditions: a lot of noise, often extremes of heat or cold, or a lot of odours, toxic condtions or dust.

*bad working times**
a job with mainly shift labour or irregular working times.

*company training**
a) Mediterraneans: individual has attended a company training.
b) Dutch: individual is attending a company training or has done so at this firm.

*Dutch education diploma**
a) Mediterraneans: individual has obtained a Dutch education diploma.
b) Dutch: individual has obtained diploma of last attended education.

*father skilled**
job level father 3 or higher.

*heavy work**
a job with mainly heavy physical requirements.

*high job level**
job level 6 or 7.

job level
an occupational classification taken from Ministry of Social Affairs and Public Health (1952) in which jobs have been divided in 7 intervals on the basis of required level of mental ability, taking as criterion the extent of complexity of occupations:

level 1: Very simple labour, requiring no consultation and which can be performed after a few days of experience.
level 2: Simple labour, requiring some understanding and consultation, which can be performed after a few weeks of experience.
level 3: Somewhat complex labour, requiring understanding and consultation and a few months of experience.
level 4: Fairly complex labour, requiring consultations, initiative, substantial experience and perhaps some theoretical knowledge.
level 5: Complex labour, requiring explicit ability, a large experience and theoretical knowledge.
level 6: Very complex labour, requiring explicit ability, intermediate theoretical school and experience.

level 7: Applied work on a scientific basis or purely scientific work.

less experience than 'normal'*
individual which has more than 3 years less experience than can be considered as normal in view of his age and level of education.

level of education
standard classification in 6 levels (CBS, 1978). Level 1 consists of 'no education', level 2 of 'only elementary education' and level 6 of 'academic education'.

low job level*
job level 1 or 2.

monotonous work*
a job that consists mainly of simple repetitive or short-cycle operations.

net hourly wage
a) Mediterraneans: net weakly earnings divided by average number of working hours/week.
b) Dutch: the same, now explicitly including shift labour and risk allowances.

no future*
a) Mediterraneans: individual doesn't think to get better work ever, and the firm doesn't offer any help with company training.
b) Dutch: "My job is a job without future", or individual expects to become unemployed within 12 months.

not being master of Dutch*
speaking, writing and reading of Dutch on average worse than passable (these abilities were judged by the Mediterraneans themselves).

'overschooling'/'underschooling'*
interpreting job level as required level of education, one can compare this level with the actual level of education. 'Overschooling' and 'underschooling' are dummies with value 1 if schooling is above or below one of the following 'matching' combinations:

job level		level of education:
1 or 2	with	1 or 2
3, 4 or 5	with	3 or 4
6 or 7	with	5 or 6

part-time*
working time less than 36 hours/week (but more than 14).

reference-individual
individual working full-time, male, father unskilled, master of Dutch, 9 years of schooling (7 in Turk./Mor., 2 in the Neth.), no diploma, 3 years of experience.

weak legal position*
Mediterranean who has not the same rights on the labor market as the Dutch, i.e. he has no permanent permit of labour or residence.

years of schooling in the Netherlands (incl. grade school)
a) Mediterraneans: computed by the authors, taking into account level of education, duration of residence in the Netherlands, and the period of availability for the labour market.
b) Dutch: computed by the authors, taking into account year of finishing last education, age and level of education.
years of schooling in Turk./Mor. (incl. grade school)
computed by the authors, taking into account level of education and age at the time of arrival in the Netherlands.

REFERENCES

BARTIK, T. J. (1987), "The Estimation of Demand Parameters in Hedonic Models", *Journal of Political Economy*, 95(1), 81–88.

BECKER, G. S. and CHISWICK, B. R. (1966), "Education and the Distribution of Earnings", *American Economic Review Papers and Proceedings*, Vol. 56, May, pp. 358–369.

BECKER, G. S. (1975), *Human Capital*, second edition, Chicago.

BLAUG, M. (1976), "The Empirical Status of Human Capital Theory: A Slightly Jaundiced Survey", *Journal of Economic Literature*, Vol. 14, nr. 4, December, pp. 1215–1257.

BRASSÉ, P., W. VAN SCHELVEN, L. VAN DER VALK and M. DE VRIES (1983), *Jonge Turken en Marokkanen op de Nederlandse arbeidsmarkt*, Instituut voor Sociale Geografie, Amsterdam.

BRASSÉ, P. and E. SIKKING (1986), *Positie en kansen van etnische minderheden in Nederlandse ondernemingen*, Ministerie van Sociale Zaken en Werkgelegenheid, Den Haag.

CAIN, G. (1976), "The Challenge of Segmented Labor Market Theories to Orthodox Theory: A Survey", *Journal of Economic Literature*, Vol. 14, nr. 1, September, pp. 829–855.

Centraal Bureau voor de Statistiek, Den Haag, *Maandstatistiek van Bevolking en Volksgezondheid*, nr. 9, 1982; *Standaard Onderwijsindeling* SOI-1978; *Statistiek van de Buitenlandse Migratie* 1948–1980.

EDWARDS, R. C., M. REICH and D. M. GORDON (eds.) (1975), *Labor Market Segmentation*, Massachusetts.

EPPLE, D. (1987), "Hedonic Prices and Implicit Markets: Estimating Demand and Supply Functions for Differentiated Products", *Journal of Political Economy*, 95(1), pp. 59–80.

GORDON, D. M. (1972), *Theories of Poverty and Underemployment*, Massachusetts.

HARTOG, J. (1985), "Earnings Functions: Testing for the Demand Side", *Economics Letters* 19(3), pp. 281–285.

HARTOG, J. (1986), "Earnings Functions: Beyond Human Capital", *Applied Economics*, 18(12), pp. 1291–1309.

HARTOG, J., VAN OPHEM, H. and PFANN, G. (1985), *Allocatie en Beloning*, OSA werkdocument nr. 11, Den Haag.

HARTOG, J. en VAN OPHEM, H. (1986), "Allocation, Earnings and Efficiency", Research Memorandum 8619, University of Amsterdam, FEW.

HARTOG, J. and OOSTERBEEK, H. (1988), "Education, Allocation and Earnings in the Netherlands: Overschooling?", *Economics of Education Review*, 7(2), 185–194.

HARTOG, J. and VRIEND, N. (1989), "Postwar Labor Mobility: The Netherlands", in: Thirlwall, A. and Gordon, I. (eds), *European Factor Mobility: Trends and Consequences*, MacMillan, London.

LUCAS, R. E. B. (1972), Working Conditions, Wage-Rates and Human Capital: A Hedonic Study, unpublished Ph.D. Dissertation, Massachusetts Institute of Technology.

LUCAS, R. E. B. (1974), "The Distribution of Job Characteristics", *Review of Economics and Statistics*, 16(4), pp. 530–540.

LUCAS, R. E. B. (1975), "Hedonic Price Functions", *Economic Inquiry*, Vol. 13, June, pp. 157–178.

LUCAS, R. E. B. (1977), "Hedonic Wages and Psychic Wages in the Returns to Schooling", *American Economic Review*, 67(4), pp. 549–558.

McFADDEN, D. (1974), "Conditional Logit Analysis of Qualitative Choice Behavior", in P. Zarembka (ed.), *Frontiers in Econometrics*, New York.

MADDALA, G. S. (1983), *Limited-Dependent and Qualitative Variables in Econometrics*, Cambridge.

Ministerie van Sociale Zaken en Volksgezondheid (1952), *Classificatie van de beroepen naar hun onderlinge verwantschap*, Den Haag.

MUUS, Ph. J. (1984), *Overzichtsstudie arbeidsmarktpositie minderheden*, Den Haag.

VAN OPHEM, J. (1987), "An Empirical Test of the Segmented Labour Market for the Netherlands", *Applied Economics*, 19(11), pp. 1497–1514.

PIORE, M. J. (1980), *Birds of Passage, Migrant Labor and Industrial Society*, Cambridge.

PIORE, M. J. (1983), "Labor Market Segmentation: To What Paradigm Does It Belong", *American Economic Review Papers and Proceedings*, Vol. 73, no. 2, May, pp. 249–253.

RIDDER, G. (1982), GRMAX: een algemeen likelihood programma, Note AE 3/82, Amsterdam.

ROSEN, S. (1974), "Hedonic Prices and Implicit Markets", *Journal of Political Economy*, 82 (1), pp. 34–55.

TINBERGEN, J. (1956), "On the Theory of Income Distribution", *Weltwirtschaftliches Archiv*, 77, pp. 156–175.