THE CONSEQUENCES OF INTERREGIONAL LABOR MIGRATION FOR THE REGIONAL LABOR MARKET: THEORY, METHODOLOGY AND DUTCH EXPERIENCE

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Abstract—An important problem of interregional migration is whether migrants fulfill vacancies which could also have been filled by native unemployed. It is argued that this problem could adequately be analyzed by means of ex post comparison of both categories with regard to age, education, family status and work experience.

In a Dutch case study this comparison has been made by means of logistic regression and the results have been cross-validated. The migrants are found to have superior labor market characteristics. The implications of this finding for some migration theories and regional policy are discussed.

I. Introduction

HUMAN migration has long been an issue of major interest in regional science, economics and geography. This interest is quite understandable because migration can have substantial consequences for the region of origin, the region of destination, and the nation as a whole, as well as for the migrant. Not all aspects of migration, however, have been given equal attention. Most research deals with the description and explanation of migration flows and the migration decision in terms of individual and household characteristics such as age, education and income gain.

In contrast to this interest in the migration decision and the explanation of macro flows is the scanty interest in the *effects* of migration, in particular the economic effects (see, among others, Sjaastad, 1962; Greenwood, 1975). This paper ameliorates this neglect. It focuses on the consequences of labor migration for the regional labor market, in particular on the way in which, and the degree to which, the migrants who became employed in their region of destination affect the labor market positions of the native unemployed.

In this regard two important situations can be distinguished:

1. a migrant applies for a job for which *no* native candidate is suited;
2. a migrant fulfills a vacancy which could have been filled by native unemployed with the same labor market characteristics; hence the migrant crowds out a native unemployed and *supersedence* occurs.

The consequences of interregional migration may be highly different in these situations. In the former case the consequences for the organization to which the vacant position belongs range from neutral at one extreme to positive at the other. The consequences are positive when the migrant is a "key-worker" who fills a job which is vital to the organization.

The second situation is characterized by inefficiency because the vacancy could have been occupied with lower costs, viz., without the costs involved with migration. Furthermore, migration prevents a decrease of the regional unemployment rate when the competing unemployed native job searcher stays in his region. This is of particular importance when migrants become employed in regions with relatively high unemployment rates and the reduction of interregional differences in unemployment rates is one of the goals of (regional) economic policy.

The organization of this paper is as follows. In section II the methodological and theoretical aspects of the analysis of supersedence will be dealt with. In section III the results of a Dutch case study will be presented. The paper is completed with a discussion of the implications of the results for various economic theories on migration and unemployment and for government migration and relocation policy.

II. Methodological and Theoretical Aspects of the Measurement of Supersedence

This section consists of two parts. First, *UV* analysis, which is the only method used so far to measure supersedence, is briefly described and criticized. Next, an alternative, which consists of comparing ex post personal characteristics of the

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native unemployed and the employed migrants, is presented.

UV Analysis

The purpose of *UV* analysis is to analyze the relationship between unemployment (U) and vacancies (V) in order to get insight into labor market imperfection. This kind of imperfection is basically defined as the *simultaneous* existence of both unemployment and vacancies within a region and/or occupational group.[1]

Muysken et al. (1982) applied *UV* analysis to Dutch data and found that for almost every vacancy an unemployed worker in the same region and occupational group is available. Similar results for the United Kingdom are obtained by Gleave and Palmer (1980) and for the United States and Canada by Abraham (1983).

On the basis of their findings Muysken et al. (1982) and Gleave and Palmer (1980) come to the conclusion that only a very small part of the labor market imperfections can be removed by geographical mobility.

It is obvious that the conclusions of both studies imply that under the given circumstances migration would lead to supersedence of the native unemployed. However, *UV* studies can be criticized from various points of view. In particular, the following methodological objections can be raised:

- —First, *UV* analysis is a *snapshot* analysis which compares unemployment and vacancies at a given point in time only. It does not take into account the role of migration in the fulfillment of vacancies in the past.
- —Second, *UV* analysis as applied by the above-mentioned authors takes place at a rather *aggregate* level and assumes homogeneity of labor within the occupational groups distinguished. However, the existence of both vacancies and unemployment in a given professional category in a region does usually not allow the conclusion to be drawn that the unemployed native job searchers possess all the qualifications required, and could therefore fulfill the local vacancies.

[1] For detailed information see, among others, Brown (1976).

For these reasons *UV* analysis is *not* appropriate to analyze supersedence. Therefore, an alternative will now be presented.

Ex Post Comparison of Personal Characteristics of Native Unemployed and Employed Migrants

The alternative procedure to shed light on the problem of supersedence rests on the following train of thought. If supersedence has taken place then the employed migrants must have the *same* required characteristics for the vacancies available in the region under consideration as the competing native unemployed. Conversely, if no supersedence has taken place then the employed migrants have other labor market qualifications. So, the answer to the question of supersedence can be obtained by comparing *ex post* the labor market characteristics of the native unemployed and of the employed migrants.

The next problem is to measure differences in labor market characteristics, if any, between the employed migrants and the native unemployed. It is obvious that those personal characteristics which determine the entry probabilities of the unemployed into employment are also the most relevant characteristics with respect to which the employed migrants and the native unemployed have to be compared. The set of relevant characteristics will be discussed below and the technique to estimate the differences will be described in section III.

The variables determining the entry of the unemployed into employment which are mentioned in the international literature have been empirically tested for the Netherlands in Van Dijk and Folmer (1985) on the basis of data from the Labor Force Survey 1979. The main findings of this study will now be summarized. Furthermore, the expected differences between the native unemployed and employed migrants with respect to each variable are discussed. In view of the case study to be presented in the next section special attention will be paid to the Dutch experience.

With regard to *age* the entry probability is usually assumed to decrease with this variable because young age groups with the most up-to-date formal schooling are more flexible and have a longer payback period for the employer on investments in on-the-job training. The empirical results indeed showed strongly decreasing probabilities of getting a job for the older age groups. Moreover,

the Ministry of Social Affairs and Employment (S.O.Z.A.W.E., 1982) reports that relatively high unemployment rates occur for those over 60 and below 25 years of age. In particular, long-term unemployment is highly concentrated in the older age groups. As far as migration goes, Evers and Bartels (1981), among others, show that younger people are overrepresented in migration flows.

Given these findings and considerations we expect substantial differences in age between the employed migrants and the native unemployed. The former are expected to be concentrated in the younger age groups and the latter in the older.

The probability of getting a job is theoretically expected to increase with the level of *education* and to be highest for those with occupation-specific education. The reason for this is that people with a higher level of education or occupation-specific education are better equipped to search for jobs and have higher productivity rates.

The empirical findings confirmed these theoretical expectations. Furthermore, S.O.Z.A.W.E. (1982) shows that in 1979 45% of all the unemployed in the Netherlands belonged to the groups with low levels of education. Concerning migration, it is well known that higher educated people have relatively high migration rates. Furthermore, occupation-specific educated persons have somewhat lower migration rates than persons with a general education (cf. Greenwood, 1975, 1981).

On the basis of these considerations we expect substantial differences with respect to education between the native unemployed and the employed migrants. The former are likely to be concentrated in the categories of lower education, in particular lower occupation-specific education, and the employed migrants in the categories of higher education.

With regard to *family status*, family heads and, to a lesser extent, spouses and children are theoretically expected to have higher chances of obtaining a job than singles (unmarried; widowed and divorced people) because employers value family membership as an indicator of reliability and stability (Nickell, 1980). A partially counteracting force is the fact that spouses, and, to a lesser extent, singles and children, mainly apply for jobs with high turnover rates (Valkenburg and Vissers, 1978). This implies that in spite of the relatively high unemployment rates for these groups the probability of getting a job may be rather high because of the high number of job openings. The empirical results showed that spouses have the highest entry chances, which may be due to reliability and high turnover rates. The estimate for heads of households is relatively low, which may be due to lower turnover rates. Singles and children have the lowest probability of obtaining a job. Moreover, S.O.Z.A.W.E. (1982) shows relatively high unemployment rates for females and school-leavers (i.e., children) and low rates for married men.

With regard to the relation between family status and migration we have to take into account that the decision to migrate is often a family decision. Furthermore, it is well known that migration rates decrease with increasing family size (see, among others, Shaw, 1975). Therefore, we expect singles to have relatively high migration rates compared to family heads. The migration rates for working children living in a family are assumed to be lower and the same holds for families with working spouses (see, among others, Clark, 1982).

On the basis of these considerations a confusing picture arises so that we cannot expect substantial differences between native unemployed and employed migrants with regard to family status. The largest deviation will probably exist for children living with their families, who are underrepresented among the migrants and overrepresented among the unemployed.

The last personal characteristic to be discussed is *work experience*. On the one hand, people with work experience are expected to have higher entry chances than people without because their accumulated capital may lead to higher productivity. On the other hand, they may also ask for higher wages. A priori the outcomes of these two opposing tendencies are not clear. The empirical results obtained by Van Dijk and Folmer (1985) indicate that the benefits of experience are more than offset by the wage costs.

For the groups to be compared it is obvious that the unemployed without work experience consist mainly of school leavers and spouses. Migration rates are relatively low for these groups and unemployment rates are relatively high. Therefore, a difference between the native unemployed and the employed migrants with respect to this variable is expected. Those with work experience are likely to be overrepresented among the employed migrants.

Until now we have considered the effects of the various labor market characteristics separately. Besides additive effects, *interactions* among the inde-

pendent variables may be of importance. However, in the Dutch case study, the interactions were found not to contribute to the explanation of the entry probabilities. Therefore, they are not expected to lead to important differences between native unemployed and migrants. Nevertheless, several plausible interactions will be tested below.

We want to end this section with the following remark. It is well known that a substantial part of the migrants in the Netherlands are so called on-the-job searchers, i.e., they move from one job to another. Therefore, the question arises whether the variables identified above also determine the probability of moving from one job to another. In this respect the following considerations are relevant. An on-the-job searcher may be more attractive to an employer than an unemployed with the same job qualifications for the following reasons. First, when the only reason for the on-the-job searcher to apply is the quality of the vacant job it is obvious to the employer that he evaluates the vacant position higher than his present job. For a migrant this applies even more because of the social and economic migration costs he has to incur. For an unemployed job searcher, on the other hand, any job may be better than no job, which may lead to doubts about his work performance. The possible difference in interest between the on-the-job searcher (in particular the potential employed migrant) and the unemployed may be used as an (additional) selection criterion by the employer. Second, when a migrant applies for reasons other than those directly related to the vacant job (such as the situation in the housing market or the quality of the environment) it may be difficult for the employer to discover the true motives. Under such circumstances the employer may be inclined to interpret the interest shown by the migrant also as an indicator of good work performance. Finally, the employed migrants are more likely to have up-to-date skills than either the unemployed migrants or the unemployed natives. A countervailing tendency, which favours native unemployed above migrants with the same job qualifications occurs because of lower costs and fewer housing problems for the former (Van Dijk, 1983).

Because the native unemployed and the employed migrants differ by definition with respect to employment status and migration costs, the effects of these variables cannot be investigated here. Therefore, we will make the assumption that both qualifications neutralize each other and that the set of variables identified above is sufficient to measure the differences between the native unemployed and the employed migrants.

III. A Dutch Case Study

This section is made up of three parts. In the first the main characteristics of the study region are described. Furthermore, attention is paid to Dutch labor market policy and its concern over supersedence. In the second part the econometric aspects are dealt with. The data set is defined and the estimation technique is briefly described. In the final part the estimation results are interpreted in the framework of the theoretical expectations outlined in section II.

The Study Region

The region under investigation in this case study is the northern part of the Netherlands consisting of the provinces Groningen, Friesland and Drenthe. This region is characterised by a structural shortage of jobs, a situation which has existed almost continuously since World War II. From reports by the Dutch Ministry of Economic Affairs (E. Z. 1977, 1981) it is clear that one of the major goals of Dutch regional economic policy is the reduction of differences in unemployment rates between regions. Therefore, it is not surprising that the North is one of the two important regions where the central government's regional economic policy is concentrated.

Two important instruments of Dutch regional economic policy are the relocation of governmental organizations and the stimulation of new investments and the relocation of private firms by means of subsidies and accelerated fiscal depreciation. (For details on Dutch regional economic policy and on these instruments in particular see, among others, Folmer, 1986.) Another, though less important, instrument is the stimulation of migration to the problem regions of key-workers for which shortages exist by offering them subsidies for migration costs.

In spite of the regional policy mentioned above, the North still shows regional unemployment rates above the national average. Moreover, since 1970 the net outmigration from the North has turned into net inmigration. So, the question arises how unemployment in the North has been affected by migration. In other words, has supersedence of

native unemployed by migrants taken place? This question applies to both the relocation of private firms and governmental organizations, and to migration policy. In this respect, the following considerations are of importance.

At first sight, the relocation of a governmental organization or a private firm only leads to a small decrease in unemployment because a substantial part of the "new" jobs at the new location are usually filled by workers who migrate with their relocated organization or firm. Furthermore, accompanying family members of these migrants may also apply for jobs at the new location which may lead to supersedence in some submarkets.

In the case of migration-stimulating policy, it may occur that inmigration of one family member reduces labor shortages in one submarket, while other family members produce a worker surplus in another submarket (cf. Schiffel and Goldstone, 1976). In the latter case supersedence may occur.

From this discussion it follows that the analysis of supersedence is of great interest for the situation in the North and for regional policy measures in particular.

The Data

In order to answer the question whether or not supersedence has taken place in the North, data from the Labor Force Survey 1979 will be analyzed. This survey inter alia contains information about the region of residence of an individual, both in 1978 and in 1979. (Further information about the data base can be found in, among others, Van Dijk and Folmer, 1985.)

The sample of migrants in the present study consists of those individuals who are employed in April 1979 and who moved to the North between April 1978 and April 1979. Concerning the definition of a migrant we want to make the following remarks. First, it is assumed that the employed migrants to the North also work in the North. This is a realistic assumption because the Ministry of Economic Affairs (E.Z., 1981) reports that commuting flows between the North and the rest of the country are very small and net-commuting nearly equals zero. Second, migration occurs partly on internal labor markets of large organizations at different locations (see Johnson and Salt, 1980). Furthermore, workers may migrate together with their firms or governmental institutions. In such situations migrants may fill vacancies for which native unemployed are also suited. However, in this case supersedence in the sense as defined above does *not* occur, because vacancies are not made available to anyone outside the firm or organization. Hence, there is no competition between migrants and native unemployed for the same vacancies.

Unfortunately, the magnitudes of these types of migration are not known in the Netherlands. This implies that the number of migrants on internal labor markets and the number of workers who migrate with their firms cannot be subtracted from the total number of migrants, so that supersedence may be overestimated.

From the definition of a migrant it follows that the move to the North may have occurred anywhere between April 1978 and April 1979. Therefore the question arises what group of unemployed the employed migrants have to be compared with. Three relevant cases can be distinguished:

1. Individuals who are unemployed in April 1979 and who have been unemployed for at least one year (*long-term unemployed*).
2. Individuals who are unemployed in April 1979 and who have been unemployed for less than a year (*short-term unemployed*).
3. Individuals who were unemployed in April 1978 but were employed in April 1979 (*recently employed*).

For the first group there cannot be any doubt that its members were looking for a job at the moment the migrants entered the regional labor market. The second group consists of temporary unemployed, such as seasonal and frictional unemployed, in addition to potentially long-term unemployed. Finally, people in the third group were unemployed at the beginning of the period and found a job during that period. It consists of temporary unemployed and long-term unemployed at the end of the unemployment stage.

Each of the three groups may have been confronted with supersedence and will therefore be studied below. However, in so far as the second and third group consist of temporary unemployed supersedence is probably of little importance. This is also the case when the native unemployed and the employed migrants were simultaneously in the same labor market for only a short spell. The first group, on the other hand, has been most inten-

sively exposed to supersedence and is the most relevant one in this case study.

Estimation Procedure

By means of logistic regression a linear function will be estimated which provides the best discrimination between the employed migrants and the native unemployed.[2] Maximum likelihood estimates will be obtained by the computer package GLIM (Baker and Nelder, 1978). This program also produces an estimate of the asymptotic covariance matrix of the estimator which can be used for testing purposes.

With regard to the testing we want to make the following remark. Although the relevant personal characteristics have been studied thoroughly, there is some uncertainty about possible interactions. Therefore, various possible interactions will be tried out and the model with the best fit will be chosen. As described by, among others, Lovell (1983), this kind of analysis, where one and the same sample is used for both identifying an appropriate model and for testing purposes (usually denoted as data mining), may lead to an overestimation of the fit to the *population* because the greatest possible use of any and all idiosyncrasies of the particular sample at hand has been made.

Various methods to deal with the problems of data mining have been developed. In this study only a simple method will be used because of the availability of a fairly well-established hypothesis with respect to the differences between the employed migrants and the native unemployed. The procedure consists of randomly splitting the total sample into two sets, viz., the training and the validation set. The first set, containing 80% of the observations, will be used to find an appropriate model. The second set (i.e., the validation set) will be used to cross-validate the most appropriate discrimination function estimated from the first set. That is, the estimated coefficients in the training and the validation sets will be compared with regard to sign and significance. If a coefficient has different significant signs or if it has the same sign but is significant in the training set and insignificant in the validation set, it is assumed to have been affected by data mining and will not be included into the model. Moreover, the individuals in the validation set will be classified on the basis of the discrimination function from the first set. An overall percentage correctly predicted lower than 70% will be interpreted as an indication of data mining (see also Mosteller and Tukey, 1977 and Press and Wilson, 1978).

TABLE 1.—CROSS-VALIDATION RESULTS

	Number of Cases	Percent Correctly Predicted
Migrants vs. long-term Unemployed:		
Migrants	33	58%
Long-term unemployed	55	87%
Total	88	76%
Migrants vs. short-term unemployed:		
Migrants	33	61%
Short-term unemployed	65	91%
Total	98	81%
Migrants vs. recently employed:		
Migrants	33	82%
Recently employed	27	67%
Total	60	75%

The decision whether or not to include a given interaction into the list of explanatory variables will be made as follows. If the decrease in scaled deviance[3] because of the provisional inclusion of the interaction into the model is equal to or larger than the loss of degrees of freedom the interaction will be included. Otherwise the interaction will be left out.[4]

The best model turned out to be the one with all the personal characteristics included. None of the interactions tried out was found to be important. As described above, the next step in the estimation procedure is cross-validation. The percentages of correctly classified migrants and native unemployed in each case are given in table 1.

From table 1 it follows that the overall percentage correctly predicted in each category is greater than 74%. This finding, in combination with the fairly well-established hypothesis concerning the relevant personal labor market characteristics, leads to the conclusion that the chosen model

[2] For detailed information about the use of logistic regression for the present kind of estimation problem see, among others, Press and Wilson (1978) and Maddala (1983).

[3] The scaled deviance is defined as $-2\log(h/s)$ where h and s are the likelihood functions of the hypothesized and the saturated models, respectively. The saturated model contains all possible linearly independent parameters, whereas in the hypothesized model a set of parameters is restricted. For further details, see Baker and Nelder (1978).

[4] Further details on this selection procedure can be found in Van Dijk and Folmer (1985).

TABLE 2.—MAXIMUM LIKELIHOOD LOGIT ESTIMATES OF DIFFERENCES BETWEEN EMPLOYED MIGRANTS AND NATIVE UNEMPLOYED

	Employed Migrants versus: Long-term Unemployed		Short-term Unemployed		Recently Employed	
Grand mean	−0.715	(0.632)	−1.357	(0.563)	−0.148	(0.681)
Family Status:						
Single	—		—		—	
Family head	0.490	(0.366)	0.396	(0.339)	−0.627	(0.478)
Spouse	0.550	(0.574)	−0.428	(0.438)	−0.279	(0.623)
Child	−0.546	(0.458)	−0.745	(0.399)	−1.293	(0.501)
Education:[a]						
Low/unknown	—		—		—	
Lower medium: gen.	1.269	(0.526)	0.646	(0.478)	0.830	(0.557)
Lower medium: o. s.	0.170	(0.360)	0.062	(0.358)	0.051	(0.400)
Upper medium: gen.	1.703	(0.553)	0.502	(0.460)	1.846	(0.671)
Upper medium: o. s.	1.727	(0.342)	1.457	(0.326)	1.727	(0.406)
High: o. s.	2.646	(0.442)	1.623	(0.386)	2.066	(0.509)
High: scientific	3.655	(0.805)	1.914	(0.559)	2.152	(0.718)
Age:						
14–19	—		—		—	
20–24	−0.000	(0.538)	0.392	(0.464)	0.178	(0.529)
25–39	−0.508	(0.571)	0.439	(0.484)	0.570	(0.578)
40–54	−1.836	(0.642)	−0.244	(0.578)	0.485	(0.711)
55–59	−2.591	(0.921)	−1.325	(0.845)	0.704	(1.160)
60 or more	−3.049	(1.025)	−0.554	(1.076)	6.325	(9.626)
Work Experience:						
yes	—		—		—	
no	−1.784	(0.394)	−1.373	(0.335)	−1.690	(0.414)
Number of migrants	168		168		168	
Number of unemployed	275		322		134	
Number of observations	443		490		302	
Degrees of freedom	427		474		286	
Scaled deviance	419.3		502.7		326.6	
Pearson χ^2	421.8		481.7		316.7	

Note: The estimated coefficients are differences on the log-odds scale. Standard errors are given in parentheses. The migrants are coded as one. The standardized coefficient under the hypothesis of no difference (i.e., that the coefficient concerned is equal to zero) follows approximately Students' t-distribution. However, the χ^2-test on the difference in scaled deviances for the situations H_0: $\beta = 0$ versus H_1: $\beta \neq 0$ is to be preferred (see Baker and Nelder, 1978). It should be noted that the coefficients in table 2, which are significant at the 5% level according to the t-test, have also been found to be significant at the same level according to the χ^2-test on differences in scaled deviances.

[a]A low level of education means less than 7 years of formal schooling, lower medium 7–9 years, upper medium 10–12 years, and high more than 12 years of formal schooling. Gen. = general education; o. s. = occupation specific education.

has not been affected by data mining in an irresponsible way.

The final step in the estimation procedure is the estimation of the chosen model on the basis of *all* observations. The results of this step are discussed below.

Estimation Results

The three models ultimately estimated are presented in table 2. The coefficients are differences on the log-odds scale with respect to the grand mean, which in each of the three cases corresponds to the reference group of singles with lower or unknown education, without work experience and aged between 14 and 19.[5] A positive sign indicates that the migrants (coded as 1) are dominant in the category concerned and a negative sign that the native unemployed (coded as 0) are dominant. An estimate of zero means that there is no difference because the category is equally distributed over both groups.

The first thing to note in table 2 is that the overall fit of the model for the long-term unemployed is quite satisfactory. This follows from the

[5] Because the reference group is represented by the grand mean and the coefficients are differences on the log-odds scale from the grand mean the coefficients for the category of each variable corresponding to the reference group are set to zero.

probability levels[6] for the scaled deviance and Pearson chi-square. Using the approximation formula

$$U_a = \left\{ z_a + \sqrt{(2n-1)} \right\}^2$$

where u_a is the a^{th} quantile point of the cummulative chi square distribution, z_a is the a^{th} quantile of the cumulative normal distribution and n is the number of degrees of freedom, the probability level is found to be 60% for the scaled deviance.[7] The probability level for the Pearson chi-square is about 56%. The probability level for the scaled deviance of the model for the short-term unemployed is 17% and for the recently unemployed 5%. The probability levels for the Pearson chi-square values are 40% and 10%, respectively.[8]

Let us now turn to the individual variables. In the discussion to follow a t-value larger than 1.6 is considered to be significant.

The first thing to note is that the results are globally in agreement with the theoretical expectations mentioned above. In all three models there are substantial differences between the employed migrants and the native unemployed with regard to the variables work experience and education, whereas family status plays only a minor role. Age is only an important discriminating variable in the model where long-term unemployed and employed migrants are compared.

The comparison of the *long-term unemployed* and the employed migrants shows no significant difference with respect to the reference group (i.e., the grand mean is not significant). However, in the categories of general education of all levels and of occupation-specific education of the levels above lower-medium the migrants are dominant. The long-term unemployed, in their turn, are dominant in the higher age groups (above 40) and in the category without work-experience. For family status no significant differences have been found. The expected difference for children did probably not occur because, in spite of the high unemployment rate, the *duration* of employment is relatively short in this category.

In the comparison of the employed migrants and the *short-term unemployed* the dominance of the latter in the reference group attracts attention. Significant deviations from the reference group occur for the better educated (upper medium occupation-specific education and higher) and for the ones without work experience. The migrants are dominant among the better educated and the native unemployed among the ones without work experience. It should be noted that age is not an important discriminating variable between employed migrants and short-term unemployed.

In the third model, where employed migrants and *recently employed* are compared, we notice less outspoken differences than in the other groups. Significant differences occur only with regard to education and work experience. A possible explanation for the less outspoken differences in this case is that the group of recently employed, in contrast to the long-term unemployed, consists to a relatively large extent of young persons and other persons who were only temporarily unemployed. This assumption is supported by the strong concentration in the categories "children" and "no work experience." Unemployed in these categories can be characterised as frictional rather than structural. Before these persons get their first job, or when they move from one job to another, they are usually unemployed for a short time. The assumption is also supported by the fact that no significant differences exist with respect to age.

On the basis of these findings we may conclude that because of the substantial differences in labor market characteristics between the employed migrants and the long-term native unemployed both categories opt for different segments of the labor market. To a lesser extent this also applies to short-term unemployed and recently employed natives. This leads to the general conclusion that supersedence of native unemployed by employed migrants plays only a minor role.

[6] The probability level is defined as the probability of obtaining a sample value (i.e., scaled deviance, Pearson chi-square) as extreme as the one actually obtained if the postulated model is true.

[7] The scaled deviance is under quite general regularity conditions asymptotically distributed as a chi-square variable (cf. Baker and Nelder, 1978).

[8] The probability levels for both the scaled deviance and the Pearson chi-square for both models could be improved by combining categories within several variables. For the sake of comparability between the three groups and to arrive at as close a correspondence as possible between theoretically and empirically distinguished categories the three models will be presented here in terms of the categories distinguished in section II.

IV. Conclusions

In this paper the problem of supersedence of native unemployed by employed migrants has been studied. The main finding is that the employed migrants differ substantially from the native unemployed with respect to education, age, and work experience. In other words, unemployment and net inmigration may simultaneously exist without supersedence.

The main finding of the case study has implications for various theories, in particular the classical economic theory and the Keynesian and the expectational theories of migration. According to Hart (1975) the first is explicitly based on the assumption of homogeneity of labor, whereas the other two do not explicitly take the heterogeneity of labor into account. Therefore, the problem whether or not supersedence will occur when net inmigration accompanies unemployment cannot be analyzed with these theories.

The results of our analysis indicate that migrants belong to the better skilled and higher educated part of the labor force. It should be noted that this finding conforms with theories which view the labor market as being "balkanised" or "compartmentalised" with hardly any mobility between the compartments.

Turning now to some policy implications of our analysis, in section III the effectiveness of Dutch migration and relocation policy was questioned because of possible supersedence effects. From the present analysis it follows that at least in the *short* run the negative supersedence effects are of little importance. In fact, if the (policy-induced) migration of key workers did not occur vital functions might remain unfilled. It also follows from the analysis that possible supersedence effects of family members of the migrants are also of little importance. Moreover, in case of relocation not only jobs filled by migrants, but also vacancies for which lower job qualifications are required are usually relocated. As shown above, migrants seldom apply for such vacancies and therefore these vacancies become available for unemployed natives. Thus relocation policy has a direct positive effect on regional employment.[9]

As concluded above, the *direct* benefits of relocation and migration policy for native unemployed are rather small in so far as only jobs for which lower qualifications are required become available. The direct benefits, however, could be increased by means of a policy of re-educating the northern working population, including both the unemployed and the employed. In this way part of the native unemployed could become better suited for relocated jobs presently filled by migrants. However, re-schooling is typical *long*-run policy. Therefore, a combined policy of stimulating migration and relocation on the one hand and re-schooling on the other is the most appropriate.

REFERENCES

Abraham, Katharina G., "Structural/Frictional vs. Deficient Demand Unemployment: Some New Evidence," *American Economic Review* 73 (Sept. 1983), 708–724.

Baker, Robert W. M., and John A. Nelder, *The GLIM-system. Release 3. Generalised Linear Interactive Modelling.* Available from Numerical Algorithms Group, 7 Banbury Road, Oxford OX 2 6 NN Great Britain.

Brown, A. J., "*UV* analysis," in G. D. N. Worswick (ed.), *The Concept and Measurement of Involuntary Unemployment* (London: Allen & Unwin, 1976).

Clark, William A. V., "Recent Research on Migration and Mobility: A Review and Interpretation," *Progress in Planning* 18 (1) (1982), 1–56.

E. Z. (Ministry of Economic Affairs), *Nota regionaal sociaal-economisch beleid 1977–1980.* (Report regional socioeconomic policy 1977–1980) (Den Haag: Staatsuitgeverij, 1977).

_____, *Nota regionaal sociaal-economisch beleid 1981–1985* (Den Haag: Staatsuitgeverij, 1981).

Evers, Gerard H. M., and Cornelis P. A. Bartels, *Policy Relevant Characteristics of Labor Mobility in the Netherlands*, Laxenburg, I.I.A.S.A. Working Paper WP-81–157, 1980.

Folmer, Hendrik, *Regional Economic Policy—Measurement of Its Effects* (The Hague: Martinus Nijhoff, 1986).

Folmer, Hendrik, and Peter Nijkamp, "Some Methodological Aspects of Impact Analysis of Regional Economic Policy," *Papers of the RSA* (1985).

Gleave, David, and David Palmer, "Spatial Variations in Unemployment: A Typology," *Papers of the RSA* 44 (1980), 57–71.

Greenwood, Michael J., "Research on Internal Migration in the United States: A Survey," *Journal of Economic Literature* 13 (June 1975), 397–433.

_____, *Migration and Economic Growth in the U.S.: National, Regional and Metropolitan Perspectives* (New York: Academic Press, 1981).

Hart, R. A., "Interregional Economic Migration: Some Theoretical Considerations (Part I and II)," *Journal of Regional Science* 15 (Aug. 1975), 127–138; and (Dec. 1975), 289–305.

[9] The following additional, indirect positive effects of relocation policy are of importance. First, the relocation of a governmental organisation or a private firm may improve the regional profile, which may in turn lead to new investments and to new employment in the region (see Folmer and Nijkamp, 1985). Second, net inmigration leads to higher regional expenditures, which, in its turn, leads to additional employment opportunities for which the native unemployed may be suited (cf. Van Dijk and Oosterhaven (1985)).

Johnson, John H., and James Salt, "Labour Migration Within Organizations: An Introductory Story," *Tijdschrift voor Economische en Sociale Geografie* 71 (5) (1980), 277–284.

Lovell, Michael C., "Data Mining," this REVIEW 65 (Feb. 1983), 1–12.

Maddala, G. S., *Limited-dependent and Qualitative Variables in Econometrics*, Econometric Society Monograph in Quantitative Economics (Cambridge: Cambridge University Press, 1983).

Muysken, Joan, Chris de Neubourg, and Huib van der Burg, *Regional and Occupational Labour Market Imperfections; The Netherlands 1955–1980*, Groningen, R.U.G. Research memorandum no. 105 (1982).

Mosteller, Frederick, and John W. Tukey, *Data Analysis and Regression. A Second Course in Statistics* (Reading, MA: Addison-Wesley, 1979).

Nickell, S. J., "A Picture of Male Unemployment in Britain," *The Economic Journal* 90 (Dec. 1980), 776–794.

Press, S. James, and Sandra Wilson, "Choosing between Logistic Regression and Discriminant Analysis," *Journal of the American Statistical Association* 73 (Dec. 1978), 699–705.

S.O.Z.A.W.E. (Ministry of Social Affairs and Employment), *Rapportage arbeidsmarkt 1982* (*Labor Market Report 1982*) (Den Haag: S.O.Z.A.W.E., 1982).

Schiffel, Dennis, and Seymour Goldstone, "Employment, Induced Inmigration and Labor Market Equilibrium," *Growth and Change* 7 (Oct. 1976), 33–40.

Shaw, R. Paul, *Migration Theory and Fact—A Review and Bibliography of Current Literature* (Philadelphia: Regional Science Research Institute, 1975).

Sjaastad, Larry A., "The Costs and Returns of Human Migration," *Journal of Political Economy* 70 (Oct. 1962), 80–93.

Valkenburg, F. C., and A. M. C. Vissers, *Theorie van de dubbele arbeidsmarkt* (*Theory of the Dual Labor Market*) (Tilburg: I. V. A., 1978).

Van Dijk, Jouke, *De gevolgen van arbeidsmigratie voor de arbeidsmarkt*-Verslag van een enquete onder werknemersmigranten en werkgevers in de provincie Groningen (*The Consequences of Labor Migration for the Labor Market*) Groningen, R. U. G. Research memorandum no. 126 (1983).

Van Dijk, Jouke, and Hendrik Folmer, "Entry of the Unemployed into Employment: Theory and Dutch Experience," *Regional Studies* 19 (July 1985), 243–256.

Van Dijk, Jouke, and Jan Oosterhaven, "Regional Impacts of Migrants' Expenditures—An Input-Output Vacancy Chain Approach," *London Papers of Regional Science* 15 *Integrated Analysis of Regional Systems* (London: Pion, 1985).