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## Firm relocation decisions in The Netherlands: an ordered logit approach

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**FIRM RELOCATION DECISIONS IN THE NETHERLANDS:  
AN ORDERED LOGIT APPROACH**

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## 1 INTRODUCTION

In the past decade, the number of firm moves in The Netherlands has grown steadily and considerably. The mobility of firms is greater than is often assumed. In terms of numbers of firms it is not much less important than the (since Birch, 1979 and 1987) much more debated issue of new firm formation. In The Netherlands, the three firm demographic components of firm births, firm relocations and firm deaths amounted to totals of 80,000, 68,000 and 42,000 respectively in 1995. Furthermore, the number of firm migrations has grown substantially over time: in 1987 only 36.000 firms moved whereas in 1995 this number increased to 68.000. Also in terms of employment firm migration is an important phenomenon: in 1995 about 180.000 jobs were involved in the process of firm migration. The figures over time imply that the number of firm migrations is related to the cycle of economic rise and decline. Taking into account the spatial pattern of firm migration it is clear that firm migration causes a redistribution of firms and related employment and, therefore, has implications for spatial policy (Kemper and Pellenbarg, 1997).

Until now most firm migration studies are based on aggregated data and focus on the development of firm migration over time and space and by sector. Much less attention is paid to the decision making process of individual firms on the micro level. This paper explores the determinants of firm migration in The Netherlands, using individual data on firm and (re-) location characteristics from a sample of over 1,300 firms. The analysis is placed in and developed from the framework of the emerging demography of firms approach (cf. Gordijn & Van Wissen 1992, Van Geenhuizen 1995, Van Wissen 1996). Five demographic key events of firms (birth, growth, shrink, relocation and death) can be considered. All the types of demographic events can be related to firm activities and decisions with regard to finance, investment, production, marketing, etc. The demographic key events are to be understood in relation to a multitude of factors internal and external to the firm. In this paper we concentrate on only one of the firm demographic key events: firm migration.

In section 2 of the paper a theoretical framework of the firm migration decision is described. Section 3 discusses the firm relocation processes in The Netherlands in terms of numbers, sectoral composition, origins and destinations (regions), firm characteristics and relocation motives. This part of the paper uses aggregate data collected by the Dutch Chambers of Commerce (cf. KVK 1997 and 1998, Kemper & Pellenbarg 1997).

In section 4 of the paper, the propensity to relocation of individual firms are related to internal and external factors developed and hypothesised on insights from the previous paragraphs by means of an ordered logit analysis. The paper ends with a section of conclusions and policy implications.

## 2 THEORETICAL FRAMEWORK OF THE FIRM'S MIGRATION DECISION

Following Nakosteen and Zimmer (1987) we start with the following theoretical framework, which is rather close to the human capital model of labour migration. We assume that the firm's goal is to maximise profits. In this context the firm's migration decision is among many other factors that influence profitability. We also assume that the individual firm is a price taker in both product and factor markets. For a profit maximising firm  $i$  in region  $j$  the following profit function results:

$$E_{ij} = E(X_i, Z_j, \varepsilon_{ij}),$$

Where  $X_i$  denotes observed firm or market specific factors,  $Z_j$  are observed location specific factors, and  $\varepsilon_{ij}$  are unobserved firm-location specific effects, which is assumed to be randomly distributed across industries. We assume that firms in an industry  $K$  continuously monitor their profits relative to a fixed target threshold in that particular industry. The threshold depends on the competitive standards of the industry. Firms react to the inequality

$$E_{ijk}(X_i, Z_j, \varepsilon_{ij}) < E_k,$$

Standard economic theory suggests that marginal firms will close in the long run if output prices fail to compensate average variable cost. Intramarginal firms “adjust” by absorbing decreases in the market valuation of their exclusive cost advantages. Some marginal firms may consider migration in order to increase the profit rate again above  $E_k$ . Relocation is an option if the firm expects that in another location  $X_i$ ,  $Z_j$ , or  $\varepsilon_{ij}$  can be altered sufficiently to make  $E_k$  attainable. Firms that relocate are likely to have assessed the earnings prospects of a move and judged them to be favourable. We can view relocation as a capital investment project with net present value calculated at each point in time,  $t$ , and expressed in conventional fashion:

$$PV_i(t) = \int_t^{\infty} (E_{ij'} - E_{ij})^{-rt} dt - C_{ij'},$$

where  $j'$  denotes a competing location,  $r$  denotes shareholders' rate of discount, and  $C_{ij'}$  denotes the present value of moving costs. Nakosteen and Zimmer (1987) conclude that a firm that reacts to this calculation by relocating should tend to exhibit a rate profitability exceeding the rate that it expected as a result of remaining in its original location.

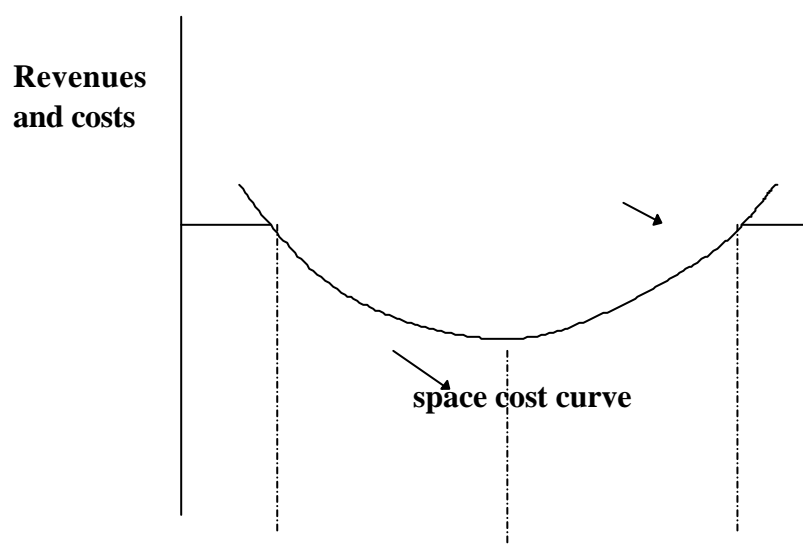
Yet location itself is one dimension of a broader investment decision that involves a significant commitment of resources, including fixed capital, over long-term time horizons. In a neo-classical landscape, location matters because costs and revenues vary over space. Besides spatial differences in prices of input and outputs, transport cost play an important role in location theory. According to McCann (1998) transport costs can not simply be separated from the prices of inputs and outputs because besides production cost also other logistic cost (like storage etc.) have to be taken into account. Since different firms have different cost and revenue structures, the optimal location of firms may show a broad spatial variety.

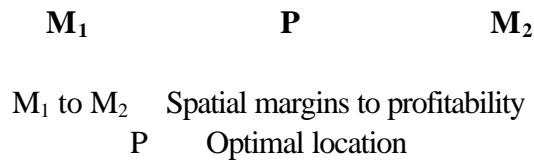
Firms may in practice locate in an area for apparently non-economic motives related to place of birth and recreational opportunity. However, whether the present location is chosen for reasons of good luck or judgement, to survive in the long run firms need to attain a certain profit rate. Uncertainty and imperfect information causes that firms often can not simply calculate an optimal location. Over time, possibly even before an investment has generated sufficient returns to recoup fixed expenditures, the assumptions underlying the investment can change as a result of, for instance, market dynamics, rival behaviour, technological innovation and resource depletion and discovery. Firms also miscalculate, even if for no other reason than in reality they do have perfect information (Hayter, 1997: 123).

Therefore, the behavioural theory of the firm may offer additional insight into the decision process with regard to location and migration decisions of firms. For Simon (1959) the idea of optimal decisions, and minimising and maximising, is a theoretical abstraction and he replaces this picture of the firm with the firm as a learning, estimating, searching, information-processing organism.

The decision-maker is more a satisficer than an optimiser. Bounded rationality does not imply irrational behaviour but recognises limitations to the abilities of decision-makers in evaluating information. In general, according to behavioural theory, firms consider only a limited number of choices. Alternatives are searched and evaluated in a strongly sequential way. Firms will often choose the first alternative which exceeds a certain reservation standard. The model of Nakosteen and Zimmer assumes that firms will continuously monitor their profits relative to a certain target level. Because the location affects the profits this should also imply a continuous evaluation of the present location.

Following the behavioural theory a firm will be located within the spatial margins of profitability (Smith, 1966; see figure 1). When a firm faces a profit rate which is out of line with the industry or even face losses in the near future this may be related to the location. Due to the dynamics in the economic environment of the firm an optimal location (P) may become less optimal. When the evaluation of the present location shows that the firm is reaching the spatial margins of profitability (M) a firm may start thinking about relocation as an instrument to improve the current level of profits. In this case the relocation decision is driven by *push*-factors, i.e. reasons to leave the present location. It is also possible that a firms' present location is still within the spatial margins of profitability, but that the decision maker gets information about one or more other locations with a higher expected profitability. In this situation the relocation decision is driven by *pull*-factors, i.e. forces that attract a firm to another location. Besides push and pull factors studies on firm migration often distinguish a third factor, the so-called *keep*-factor, i.e. reasons to stay at the present location. This factor mainly relates to the fixed and variable cost incurred with a move. The keep-factor reflects that the firm has done large investments (building, infrastructure) at the present location. If such a firm decides to relocate rather large investments have to be made at the new location. This implies probably a lower probability that the firm will move, because the difference between the profits of the new and the old location have to be rather large to compensate for the high (fixed) costs of moving. Also the variable cost can work as a keep-factor, when a firm depends strongly on sub-contractors and specifically skilled labour that or not or only in a limited way available elsewhere (Lloyd & Dicken 1977 and Pellenbarg, 1985).





**Figure 1. Spatial margins to profitability. Source based on Smith (1966:106).**

The interplay of the so-called *push*-, *keep*- and *pull*-factors is very important in the location decision process. Lack of space for expansion is always push-factor number one, and accessibility problems are a good number two. Both factors play the leading part again as pull-factors, but then they are more or less of equal importance (see Pellenbarg 1985, 1995 and the recent studies by Beernink c.s 1998 and Hanemaayer and Rekkers, 1998). The third key-variable in the explanation of the firm migration process is the labour market, in the sense that the wish to retain its present employees is keep-factor number one for most firms that are facing the necessity of finding a new location. The practical result of this keep-force is that managers always try to minimise the migration distance, so that employees, if possible, can stay working at the firm without the necessity of moving house. Now that the number of two-job households is increasing so much in the Netherlands, this consideration becomes even more important than it was before.

In fact, the identification of push-, pull- and keep-factors only gives a superficial kind of explanation of firm migration processes. In the course of time some firm migration research projects have tried to dig to a deeper level of explanation, taking into consideration how decision processes regarding firm migration develop in more detail, and which constraints have to be met, during these processes, by the decision makers. Already in the nineteen seventies Townroe (1973) developed an enlightening model with five successive decision stages, viz. 1) stimulus, 2) problem definition, 3) search, 4) formulation and comparison of alternatives, and 5) choice and action. The choice-stage was further divided into eight subsequent steps. Later, other authors have produced even more complicated models of the location decision making process (see among others Lloyd and Dicken 1977, p. 330). The application of their schemes and models in empirical research is scarce. Recently however Louw gave a good example of a practical application of decision stage models in his PhD thesis about locational choice behaviour of (migrating) large offices in the Netherlands (Louw 1996).

Louw divided the decision making process into three phases, viz. an *orientation phase*, a *selection phase* and a *negotiation phase*. This roughly corresponds to the phases 3, 4 and 5 of Townroe. It turns out then, that "spatial factors" (these are geographical position, accessibility, parking possibilities, proximity of facilities & public transport, and quality of the spatial surroundings) plays an important part in the first two phases. Financial and contractual factors are getting more important in the third phase, when it comes to negotiating a result. The dominance of spatial factors in the search process is most important for firms that want to own their site and building, and relatively less important in case a firm rents its premises.

Studies like the one undertaken by Louw no doubt contribute significantly to our understanding of the location decision making process, and more such studies should be welcomed. One particular challenge is to identify the role of the group of actors, which is taking part - in one form or the other - in the relocation process. Real estate agents, developers, consultants, accountants, builders, movers, facility managers and of course government officials of all kinds all

contribute somehow to what is taking place in the process of a firm's relocation, and thus may have some influence on the outcome of the decision process which is involved in the relocation.

Following Lloyd and Dicken (1977) this brings us to another categorisation of the factors influencing the firm's migration decision than the previously mentioned subdivision in push, pull and keep factors. The latter factors are based on characteristics of the present and possible alternative locations. The subdivision suggested by Lloyd and Dicken is based on the decision power of different actors and reflects to what extent the firm is able to control the situation and to what extent the firm has to accept external changes. One might expect that the firm has more control about the changes and developments in the firm than on the firm environment. Certain site factors are more or less fixed and can only be changed in the long run, while other factors may change within a short period. Therefore, we distinguish between:

- 'firm internal' factors (e.g., quality of management, organisational goals, ownership structure, growth rate of turnover, employment and profits),
- 'location' factors (absolute and relative characteristics of the location site, e.g. lot size and size of possible expansion space; distance to customers and suppliers), and
- 'firm external' factors (e.g., government policy, regional economic structure, technological progress, etc.).

With regard to the main subject of this paper, firm relocation, the example of explanatory variables might include:

(a) *Firm internal factors:*

- Organisational structure (e.g., relocation of activities from and to other establishments of a multi-establishment organisation; spatial concentration or dispersion of organisational growth);
- Management (e.g., knowledge and perception of alternative location sites);
- Organisational goals (e.g., minimisation of average home-to-work distance as part of a policy of maximisation of employee satisfaction, or firm location close to public transport alternatives);
- Financial reserves (e.g., availability of savings to pay for relocation costs);
- Size and structure of fixed capital good investments (inertia);

(b) *Location factors (site and situation):*

- Size of lot or premises (e.g., expansion of activities within existing building or on existing lot technical possible);
- Occupancy characteristics (owned versus rented; single or multi-tenancy);
- Availability of space for expansion;
- Accessibility (by road, by public transport);
- Public parking facilities;
- Quality of public space;
- Distance to suppliers;
- Distance to markets;
- Local government policy (with regard to land-use).

(c) *Firm external factors:*

- Changes in numbers, composition or location of suppliers and business customers (due to entries or exits in the population of firms);
- Labour market issues;



- Government policy (regional policy; subsidies available elsewhere, transport and mobility policy)
- Amount, location and quality of suitable location sites available elsewhere;
- General economic conditions.

The ultimate challenge however is to be able not only to describe and understand what is taking place, but to explain it in terms of a model and thus be able to predict the phenomenon on the basis of the expected development of its causal factors. No doubt a dependable prediction of the size and spatial pattern of future firm migration movements would be of great value for spatial planning purposes, especially where the planning of industrial sites is concerned. Because of this reason the *Rijksplanologische Dienst* (National Spatial Planning Agency) has already shown a special interest in the development of knowledge in this field. In section 4 we will describe a first step towards developing a model of the firm relocation process. Before we will describe the variables for this model, in section 3 a brief overview of the temporal, sectoral and spatial pattern of firm migration in The Netherlands will be given.

### **3. FIRM RELOCATIONS IN THE NETHERLANDS: STRUCTURES AND TRENDS**

#### **3.1 Firm relocations in the Netherlands**

As mentioned in the introduction, in the past decade, the number of firm moves in The Netherlands has grown steadily and considerably. The mobility of firms is greater than is often assumed. In terms of numbers of firms it is not much less important than the (since Birch, 1979) much more debated issue of new firm formation. In The Netherlands, the three firm demographic components of firm births, firm relocations and firm deaths amounted to totals of 80,000, 68,000 and 42,000 respectively in 1995. These figures originate from the "Mutation Balances" of the Chambers of Commerce. From 1987 onwards, the "Mutation Balances" delivers national data on births, relocations and deaths of firms. On the basis of these data a series of publications has been written to document and analyse the firm migration process in The Netherlands in the past ten years (Kemper & Pellenbarg 1988, 1991, 1993, 1995, 1997). In this section of our paper we will concentrate on the most recently published figures on firm migration, for the year's 1994/1995, using figures for earlier years only occasionally, for comparisons. Partly, this section of the paper is in fact a shortened and rewritten version of Kemper and Pellenbarg (1997). For a more ample description of the data (and its limitations) and a consideration of its implications for spatial policy, the latter article should be read.

In the period 1994/1995 the national total number of firm migrations has indeed grown considerably, i.e. with almost 10,000 moves compared to the previous two-year period 1992/1993. In the late 1980s and early 1990s the two-year growth was only 5,000 and 4,000. Proportionally, the growth of mobility in the two-year period's 1990/1991, 1992/1993 and 1994/1995 was 11%, 7% and 16.7%. The earlier supposition (of Kemper and Pellenbarg, 1995) that the number of firm migrations is related to the cycle of economic rise and decline is supported by these figures.

Table 1 shows the sectoral break down of the firm migrations in 1994/1995. A considerable part of the firm moves are found in the category "other". Migrating firms in the financial management sector dominate this category of moves. Such firms are usually very small, and move rather easily. If we ignore this category we observe just as in preceding years that most of the mobile firms are to be found in the wholesale and commercial service sectors, where the annual percentage of mobile firms (table 1: total migration factor) has now grown to 10 percent. In retailing and personal service the migration factor is only 4 to 5%. For all sectors together firm mobility rose from 7.4% in 1993 to 7.9% in 1995. The sectoral pattern of growth and decline of mobility in 1994/1995 is the reverse of that of 1992/1993. Then, in a recession period, the basic economic sectors became less mobile while non-basic sectors still gained in mobility. Now, in an economic growth period, the basic sectors show a growing mobility, while the non-basic sectors show fewer moves. The brief analysis in paragraph 3.2 of the spatial pattern of firm migrations will concentrate on the basic economic sectors, i.e. manufacturing, wholesale and commercial services, and moreover be confined to interprovincial moves only.

**Table 1: Firm mobility in The Netherlands.**

	Number of moved firms		Migration factor 1995 <sup>(*)</sup>		
	1994	1995	short distance	Long distance	Total
Manufacturing	3,700	3,950	5.8	1.6	7.4
Construction	3,620	4,250	6.6	1.1	7.7
Wholesale	9,300	9,800	7.4	2.7	10.1
Retail	6,280	6,550	3.6	0.6	4.2
Commercial services (a)	16,800	18,400	7.6	2.4	10.0
Personal services (b)	5,300	5,750	4.2	0.9	5.1
other (c)	18,000	19,000	6.3	3.0	9.3
<b>TOTAL</b>	<b>63,000</b>	<b>67,700</b>	<b>5.9</b>	<b>1.9</b>	<b>7.9</b>
total 1993		58,000	5.7	1.8	7.4
total 1991		54,000	5.5	1.8	7.3
total 1989		43,000	5.3	1.4	6.7
total 1987		36,000	4.9	1.2	6.1

(a) Transportation, storage, communication, banking and insurance, business services

(b) Hotels/restaurants, sports and recreation, house agents, laundry, hairdressing etc.

(c) Mainly financial holdings

(\*) Short distance: migration within Chamber of Commerce district; long: to another district.

Source: Kemper & Pellenbarg 1997.

### 3.2 The spatial pattern of firm relocations

Table 1 already indicated that short distance moves are much more frequent than long distance moves. In this paragraph we will concentrate on figures on long distance, inter provincial firm migrations. The total number of inter provincial movements in the Netherlands has grown strongly, after a stabilisation in 1992/1993, and now (1995) amounts to 6,300. The CoC counting of 6,300 long distance moves in 1995 is less than 10% of all firm moves, demonstrating that firm migration is indeed mostly short distance. It is first of all a local and regional phenomenon. Only a small minority of the migrant firms cover larger distances with their migrations. Still, the long distance migrations are the most interesting ones: they contribute more than other locational decisions to the change of the economic map" of the country, even if we recognise their relative modest absolute numbers.

Table 2 shows the magnitude of the inter provincial firm migrations in terms of the *balance* between in- and outgoing migrations, for the three sectors of manufacturing, wholesale and commercial services. Clearly, the provinces of North and South Holland (containing the three major cities of the country, viz. Amsterdam, Rotterdam and The Hague) are the big losers. The pattern of inter provincial firm migrations in The Netherlands can rightfully be characterised as a flight from the Randstad, and a comparison with figures for earlier years indicates that this flight is growing in magnitude. The migration deficit (number of emigrating firms minus number of immigrating firms) of

the three Randstad provinces together which is now (1994/1995) on an annual average of 517 (table 2) was in 1992/1993, 1990/1991 and 1989/1990 respectively 433, 320 and 106. Especially the province of North Holland (with Amsterdam) saw a strong growth of the migration deficit. In South Holland (with Rotterdam and The Hague) the deficit dropped slightly. It is remarkable to see how the province of Utrecht now definitely has assumed the status of expulsion region that also characterises the Randstad as a whole. Until 1991 Utrecht had a migration surplus, but since then it loses more firms than it receives.

**Table 2: Firm migration 1994/1995 for three economic sectors, by province (2-year average).**

Province	Migration In	Migration Out	Balance (in-out)	Manufac- turing	Wholesale	Commercial services
Groningen	138	183	-45	4	-8	-41
Friesland	158	107	51	11	5	35
Drenthe	180	141	40	7	15	19
Overijssel	301	298	3	2	8	-7
Flevoland	330	194	136	10	44	82
Gelderland	765	659	106	13	41	53
Utrecht	863	893	-31	-5	-23	-3
North Holland	1083	1254	-171	-38	-75	-59
South Holland	1017	1329	-313	-32	-91	-191
Zeeland	103	89	14	-2	8	8
North Brabant	858	658	201	23	71	107
Limburg	215	205	10	7	5	-2

Source: Kemper & Pellenburg 1997

The net winners in the long distance migration process are the provinces of North Brabant, Flevoland and Gelderland, a situation which has been unchanged since the first Mutation Balance data were issued ten years ago. These three provinces constitute a ring around the Randstad where the outflow of firms of the Randstad lands. But also the more peripheral provinces such as Friesland, Drenthe, Zeeland and Limburg have positive migration balances. At present, the only province outside the Randstad that loses on balance more firms to migration than it gains is the province of Groningen.

When the migration for the period 1994/1995 is compared to the period 1990/1991 (see Kemper & Pellenburg, 1993 and 1997 for details) the outward flows from the three Randstad provinces have amplified in this short period. The biggest migration flows no longer are between the Randstad provinces themselves, but between them and the adjoining provinces to the East and South. And growing numbers of firms are moving over greater distances, such as from the northern part of the Randstad to the southern provinces of North Brabant and Limburg, and vice versa from the southern part of the Randstad to provinces in the North and East. All in all, the periphery of the Netherlands becomes more and more involved in the overflow of economic activity of the national core region, the Randstad. Only the most distant province in the Northeast, Groningen, is not (yet?) taking part in this scheme of national economic redistribution.

### **3.3 Employment effects**

Migrant firms usually are (very) small firms. Migration is typical for young firms that have survived the often difficult and hectic starting-up phase and are now entering a growth phase, characterised by accommodation problems. For small firms, unable to expand at their existing site, migration is a usual answer to such accommodation problems. The larger the firm grows, the more difficulties become associated with changing one location for the other, especially the loss of investment in fixed assets. The larger and older firm will therefore often turn to other strategies to accommodate firm growth, for instance the creation of branch plants or a take over of another firm (Pellenbarg 1995).

The employment data for firm migration in the Netherlands do reflect the characteristic of migrant firms as small firms. On average, in the period 1994/1995 a yearly total of 180,000 jobs were involved in the firm migration process, indicating an average size of the migrant firm of 2.8 employees. The inter provincial migrations (6,300 in 1995) are responsible for 17,000 transferred jobs, of which we count 3,400 in manufacturing, 5,800 in the wholesale sector and 7,800 in commercial services. Small numbers, but we have to keep in mind that migrant firms are growing firms, so that an exodus of firms for a region means the loss of future growth, or vice versa in the case of a region with a net influx. Measured over longer periods, the contribution of the firm migration process for individual regions sometimes has been rather substantial (Pellenbarg 1985).

Just like in foregoing periods, the provinces of Zuid- and Noord-Holland are losing the greatest numbers of jobs. Moreover, in Zuid-Holland the numbers of jobs that are lost on balance in the firm migration process are increasing steadily, but in North Holland the job loss due to firm migration is lessening in 1994/1995, thanks to a smaller employment loss in manufacturing and commercial service migration. Noord-Brabant is the province with the biggest employment gains in the firm migration balance, which could be expected when looking at the number of firm migrations to this province. The employment balance for Utrecht was not so good. There is still a surplus, but it is decreasing, following the trend of the balance in terms of firm numbers, which already turned negative in recent years. Gelderland, after a negative employment balance in 1992/1993, shows a positive balance again in 1994/1995. Flevoland witnessed a lower employment effect of firm migration especially in manufacturing and wholesale, Overijssel saw a positive employment effect turn into a (small) negative effect, and finally Groningen and Friesland have small positive employment effects, especially caused by firm migration in the manufacturing sector.

## **4. FIRM MIGRATION: AN EMPIRICAL APPLICATION**

### **4.1 Introduction**

In section 3 an overview is given of the sectoral, temporal and spatial patterns of firm migration in The Netherlands. It has been shown that firm migration is an important element in the demography of firms with a clear spatially different impact on the regional economy and regional employment. The next step is to get insight in the driving forces underlying the process of locational change. In section 2 a theoretical framework is developed for the firms' migration decision. The decision process with regard to firm migration is an interplay of so-called *push*-, *keep*- and *pull*-factors, which are related

to characteristics of the present and possible alternative locations. For the empirical analysis in this paper we will, however, use the subdivision suggested by Lloyd and Dicken (1977). This subdivision is based on the decision power of different actors and reflects to what extent the firm is able to control the situation and to what extent the firm has to accept external changes three groups of explanatory variables to explain firm migration decisions:

- (a) firm internal factors
- (b) location factors (site and situation)
- (c) firm external factors

In paragraph 4.2 we will discuss the data and the variables in the model. Paragraph 4.3 deals with the estimation procedure and 4.4 with the empirical results.

## **4.2 The explanatory model**

### ***The data***

In this section we will develop a model for the explanation of firm migration in the Netherlands. The model will be empirically tested on micro data for Dutch firms. The discussion in section 3 is mainly based on aggregated data and these data do not allow an explanatory analysis because the number of background explanatory variables is rather limited. For the analysis in the section we make use of a very rich micro data set derived from regular surveys among the panel of firms managed by the Faculty of Spatial Sciences of the University of Groningen. We use the results of the questionnaire for which data are collected in 1995/1996. A detailed description of the data can be found in Van Steen (1998a). Due to the panel character of the data for most firms in the sample we have also information at earlier points in time. The questionnaire held in 1995/1996 especially focussed relocation possibilities. Our data set contains a lot of relevant variables, but due to the panel character of the data where during time firms may withdraw from the sample and new firms are coming in, some variables are only available subsets of the data. For the empirical analysis in this paper we restrict ourselves to the variables which were available for a large part of the sample. This implies that we only make a limited use of background variables from previous panel waves. If information is lacking for only a limited number of cases we introduced a dummy variable representing the group 'unknown' for that particular variable. For some cases information is not available due to the fact that the firm is not in the panel wave, but due to the fact that the firm did not answer a particular question. Therefore, we had to remove some cases from the sample and ended up with 1338 cases. In future papers we intend to analyse subsets of the data with more detailed explanatory variables, but with less observations. Descriptive statistics of the variables can be found in Appendix A.

### ***The dependent variable***

From the survey we know the actual behaviour of firms for each year from 1980 and also the propensity to move within the next two years. We have detailed information about the present location characteristics of firms and this information can be used to explain future migration. If firms moved in previous years the present location is the result. In this paper we will focus on the stated preference of the firms with regard to migration. Firms were asked to indicate the probability of moving (PMOVE) in 1996 or 1997. They could choose from the following categories: 0%, 0-10%, 10-25%, 25-50%, 50-75%, 75-90%, 90-100% and 100%. This implies that the respondent expresses a preference with an ordinal ranking. There is no significance to the unit distance between

the set of observed values. With this eight categories the dependent variable  $y = \text{PMOVE}$  can take values between 0 and 7. For this type of dependent variable the ordered probability model is a suitable tool of analyses (see paragraph 4.3 for more details about this model). The distribution of the propensity to move is shown in Table 3. From this it is clear that almost 60% of the firms in the sample will not move. Almost a quarter shows a propensity to move of less than 10% and about 10% indicate that there is a chance of more than 25% that they will move to another location.

**Table 3: Frequency of the propensity to move (PMOVE) in 1996 or 1997.**

PMOVE	Frequency	Percent	Cumulative Percent
0%	763	57.0	57.0
0-10%	315	23.5	80.6
10-25%	102	7.6	88.2
25-50%	40	3.0	91.2
50-75%	26	1.9	93.1
75-90%	23	1.7	94.8
90-100%	24	1.8	96.6
100%	45	3.4	100.0
Total	1338	100.0	100.0

### *The explanatory variables*

The goal of the present paper is to find the explanatory variables that determine the stated probability of firm migration. According to economic theory a firm will move if the benefits of moving to another location exceed the costs in a certain period of time. This is true for both the neo-classical type of model of Nakosteen and Zimmer (1987) and for the behavioural theory of the firm according to the ideas of Simon (1959). Although the assumptions and goals (optimising versus satisfying) of both approaches differs substantially, we will use an eclectic approach for the operationalization of the empirical model and the interpretation of the results. It implies that both variables reflecting the costs of moving as well variables that reflect the benefits should be taken into account. As mentioned in section 2 the decision process with regard to a change of location is a very complicated process in which several stages can be distinguished. In each stage another set of variables can be the most important factor. In this first approach we do not account for the different stages in the decision process, but we only look at the outcome of this process: the stated preference to move to another location. As mentioned before in principal there are three categories of explanatory variables:

- firm internal factors
- location factors (site and situation)
- firm external factors

Below these factors will be discussed in more detail:

#### *Firm internal factors*

In this category we use three variables: economic sector, firm size (number of employees) and previous migration behaviour. The data contain information about the *economic sector* on a three digit level (classification according to SBI, Standaard BedrijfsIndeling, 1974). We distinguished only

seven large sectors at the one-digit level: manufacturing industrial sector (INDU), construction (CONS), wholesale (WHOLE), retail and horeca (hotels/ restaurants/cafes) (RETHOR), transport (TRANS), commercial services (COMSERV) and non-commercial services (NCSERV). The industrial sector is the reference group. Based on Table 1 we expect that the industrial sector will have a lower probability of moving than the service sectors. The costs of moving are generally higher for the industrial sector, because the investment in capital stock and the capital intensity is higher. This implies that these firms will only move when the expected profits of moving are rather high. Theoretically, we expect the mobility of the construction, wholesale and transport sector somewhere in between the industrial and the service sector. The value added produced in these sectors is much less tied to the location of the firm and the investments on the location are smaller than in the industrial sector. Therefore, the costs of moving will be less in these sectors than in the industrial sector. For the firms in the sector retail and horeca we expect that they are most of the time sticking to the present location because they are tied to the local market. When they are moving it is probably to another building close by and not to another part of the city or to another city. If they have a problem with the present location an upgrading of the environment of the present building can probably more easily solve this problem than moving to another location. Although the costs of moving for this sector are expected to be lower than for the industrial sector, the expected gains are probably far lower. As a result the propensity to move is expected to be lower for retail and horeca than for the industrial sector.

With regard to the *size of the firm* we expect that small firms can move more easily to another location than large firms. For the empirical analysis we used the number of employees as indicator for firm size. The costs of moving and the organisational problems for small firms are much less than for large firms. Furthermore, an increase in activities for small firms may lead much earlier to problems with the present location than for big firms, who probably have more flexibility to find solutions at the present location. The results of Van Steen (1998a, p.22) for observed migration behaviour of firms do not fully support this view: he finds that firms with a size between 10 and 250 show higher spatial mobility rates than firms with less than 10 and more than 250 employees. However, in this study size is measured at the moment of the interview and migration has taken place somewhere in the past. This implies that firms may have grown to medium sized firms after the move, while they were small before the move.

We expect the need to move to another location to be related to the growth pattern of the firm over time. When a firm moves to a new location they will choose a location which permits them to adjust to changes in activities in the near future. Therefore, firms who moved in the recent past will less likely feel the need to move to another location. Therefore, we included the variable *previous migration* in the model. We distinguished between firms who moved in the period 1991-1995 (M9195), the period 1986-1990 (M8690), the period 1981-1995 (M8185) and firms who moved before 1980 (M80). We expect that the longer a firm is at the present location the higher the need to move. However, there may be a difference between firms with a stable size and firms who are growing or shrinking. Rapidly growing firms may need repeated changes of location. Therefore, it is possible that growing firms who have been for only five years at the present location may show a higher propensity to move (again) than stable firms who are already 15 years or more at the same location. Van Steen (1997, p.40) concludes that firms who did not move in the first 20 years after their establishment will most probably never move to another location

*Location factors (site and situation)*



As shown in section 2 this type of variables are most important for the location decision process. Therefore, and because the data permit this, in this paper we will pay a lot of attention to this type of variables. We distinguish between five categories of variables:

1. *Type of area*: innercity (BINNEN) cityborder (RAND), residential area (WOON) or in the countryside (BUITEN). The first three categories probably have the largest problems with regard to accessibility and the possibility of expansion at the present location. However, a substantial part of the firms in the inner city are engaged in activities (retail, horeca) that can hardly be profitable outside a city centre. Therefore, we expect that firms at the city border and in residential areas will show the highest propensity to move.
2. *Type of enterprise zone/industrial site*: site with mainly offices (KANTOOR), site for mainly transport activities (TRANSPORT), site for heavy industry (BDZWAAR) and site for light industry (BDLICHT). We expect that firms located at site specifically designed for this type of activity will be less inclined to move than firms at other locations. Of all firms in the sample 66% was situated at one of the before mentioned sites.
3. *Infrastructural facilities*: location close to main road to city centre (INVAL), close to motorway (HOOFDWEG), close to highway (AUTOWEG), close to railway station (NSSTAT) or close to public transport hub (OVKNOOP). Of all firms 64% is located near to at least one of these facilities. From the empirical studies cited before, we know that accessibility is for most firms very important. Therefore, we expect that firms located close to a public transport facility will be less likely to move. This is even truer for firms close to a motorway or even better a highway.
4. *Ownership of the building*:  
We expect that owners of the building (TYPEPAND, 68% owns the building) are less likely to move to another location than firms who rent the building, because the cost of getting rid of the present building are much higher for owners. We also know whether or not the firm is the only user of the building (ONLYGEB, 78% is only user) of the building. We expect that when a firm has to share the building with other users they are more likely to move, because firms prefer a building for them alone.
5. *Opinion about the present location*

- Location tension

In the questionnaire the firms were asked to indicate to what extent they are likely to move to another location if certain changes will occur. Based on about 20 questions a composite variable is constructed which serves as a proxy for the possibility to adjust to changes at the present location. The composite variable can be labelled 'stress tolerance threshold' or 'location tension'. Possible changes which are suggested that they might affect the suitability of the present location are: growth of the number of employees, the accessibility, increasing criminality, government policy with regard to the environment and spatial planning and finally, investment premiums and lower rents at another location. Based on a weighting scheme an indicator LOCTEN was created which ranges from 0 to 100 with mean 17 (for details see Van Steen, 1998a, p.106). We estimated the model with this continuous variable and also with a breakdown in only three categories. The reference group (LOCTENLow) has a score on LOCTEN below 10. Firms with a value of LOCTEN between 10 and 20 have a medium location tension (LOCTENMedium). Finally, when LOCTEN is between 20 and 100 firms have a high location stress at the present location (LOCTENHigh). Of course we expect that firms with high location stress will be more likely to move to another location.

- Need for revitalisation

Firms are also asked whether or not a revitalisation of the direct environment is needed. They could choose from four categories: not necessary (reference category), not really necessary (REVI2), necessary (REVI3) and really necessary (REVI4). When firms state that revitalisation is really necessary this may also increase the likelihood of moving. However, for some firms revitalisation can act as a substitute for relocation, especially when there are hardly alternative locations and the costs of revitalisation are merely paid by the government and not by the firm itself.

The shares of the variables mentioned under 1., 2., and 3. do not sum to 100%. In contrast, the various variables show a substantial overlap. Therefore, we have to take into account the problem of multicollinearity. This problem can be even more serious when we also include the variables LOCTEN and REVI, because some types of areas are more likely to have location stress and the need for revitalisation than other areas.

### *Firm external factors*

With regard to these factors we will take into account differences in economic performance and the regional labour market situation by means of a set of *regional dummies* and *the opinion of firms about government policy*.

The data contain information about the location in one of the 40 Dutch COROP-regions, which can be aggregated to the 12 Dutch provinces. For the empirical analyses we tried several regional subdivisions. The best results were obtained by subdivision in *five groups of provinces*. The three northern provinces Groningen, Friesland and Drenthe (GRFRDR), the eastern provinces Overijssel, Gelderland together with the new province of Flevoland (OVGEFL), the central provinces Noord-Holland and Utrecht (NHUT, reference category), the province of Zuid-Holland and the southern provinces Noord-Brabant, Limburg en Zeeland (NBLIZE). We expect that the need for relocation will be lower in the peripheral areas, because in these provinces there is generally plenty of room for expansion. However, a counter argument is that firms move from the periphery to the central part of the country because they need to move to a location closer to the market or to facilities like a major international airport or harbour. Based on section 3 we may conclude that the former argument is more likely in The Netherlands.

Another important external factor is *the opinion of firms about government policy* (Van Steen, 1998b). In The Netherlands government policy can make rather strict rules in spatial planning and with regard to for instance environmental limits for pollution and noise. On the one hand we expect that firms who have a positive opinion about government policy will be less inclined to move to another location. On the other hand firms may be stimulated to move to another location when government policy creates attractive locations to move to. In the questionnaire firms are asked to give their opinion on a scale from 1 to 10 about, respectively, the EU-policy, the national policy and about the policy at the regional (province) and the local (municipality) level. Because only for the local level some significant results are found we decided to include only this variable in the final model. Based on the results on the 10-point scale three groups can be distinguished: insufficient (score  $\leq 5$ ; OORGEM1, reference group), sufficient (score between 5 and 7; OORGEM2) and good (score 7 to 10; OORGEM3) good. Because about 15% did not answer the question about local policy we created a separate group with opinion unknown (OORGEM4).

### 4.3 Model estimation

In this paper we will estimate an explanatory model for the stated preference of the firms with regard to migration. Firms were asked to indicate the probability of moving in 1996 or 1997 as an ordinal ranking in eight categories. There is no significance to the unit distance between the set of observed values. With this seven categories the dependent variable  $y$  (PMOVE) can take values between 0 and 7. For this type of data the ordered probability model is a suitable tool of analyses (see Greene, 1995, p. 469-481). From the two alternative model types, the ordered logit and the ordered probit, we choose to present the results of the ordered logit model because the results for the ordered probit model were only slightly different. This is to be expected, because according to Greene the probit specification is only a trivial modification and appears to make virtually no difference in practice (Greene, 1997, p. 673).

The ordered logit model is based on the following specification:

$$y_i^* = \mathbf{b}' \mathbf{x}_i + \varepsilon_i, \quad \text{where } \mathbf{x}_i \text{ is the set of explanatory variables} \\ \text{and } \varepsilon_i \text{ is the disturbance term.}$$

As usual  $y_i^*$  is unobserved. What we do observe is

$$y_i = 0 \quad \text{if } y_i^* \leq \mu_0, \\ = 1 \quad \text{if } \mu_0 < y_i^* \leq \mu_1, \\ = 2 \quad \text{if } \mu_1 < y_i^* \leq \mu_2, \\ \dots\dots\dots \\ = 7 \quad \text{if } y_i^* > \mu_6.$$

This is a form of censoring. The  $\mu$ 's are unknown parameters to be estimated with  $\mathbf{b}$ . The respondents have their own intensity of feelings, which depends on certain measurable factors,  $\mathbf{x}$ , and certain unobservable factors,  $\varepsilon$ . In principle, they could respond to the questionnaire with their own  $y_i^*$  if asked to do so. Given only eight possible answers, they choose the category that most closely represents their own feelings on the question.

In the ordered logit model  $\varepsilon_i$  has a standard logistic distribution, whereas in the ordered probit specification  $\varepsilon_i$  has a standard normal distribution. The explanatory variables are nearly all categorical (dummy) variables. To avoid identification problems for each variable one level has to be omitted from the set of explanatory variables reflecting the various levels. The combination of omitted levels gives the characteristics of the reference group and the estimate for this group is reflected by the coefficient for the constant. Each of the other coefficients reflects the difference in the probability of moving for a firm with a characteristic that differs from the reference group. Estimation of the ordered logit model has been done with LIMDEP version 7. In the discussion about the results we will use three conventional levels of significance: if  $t > 1.66$ , 1.96 or 2.33 the coefficients are significant at, respectively, the 10%, 5% or 1% level. For details about the

estimation procedure and the interpretation of the results see Greene (1995, p. 469-481 and 1997, p.672-676).

The model estimation started with the full set of variables described above. To avoid that we assume a linear relation for certain variables (e.g. the number of employees and LOCTEN) we replaced the continuous variables by a set of dummies. Because no differences were obtained for various levels of several variables we reduced the number of estimated parameters by combining various levels. Because most coefficients were far from significance at conventional levels, the number of variables reflecting the opinion about the government policy was reduced to only one, the judgment of local policy. Especially for the location factors a lot of insignificant coefficients were found. As mentioned above, for these variables the problem of multicollinearity may occur. Therefore, we re-estimated the model twice: with only those variables who obtained in the model with all variables at least a t-value of 1.3 and also for the variables with at least a t-value of 1.6. Location stress (LOCTEN) at the present location and to a lesser extent the need for revitalization turned out to be very significant explanatory variables. To test whether multicollinearity is a problem we estimated the full model also without LOCTEN and/or REVI and we regressed all other variables in models with LOCTEN and REVI as dependent variables. Omitting LOCTEN from the model affected some of the parameter estimates, especially the location factors. Omitting REVI hardly changed the results. In Table 4 the results are presented for the full model, the reduced model with only the variables that obtained t-values of at least 1.3 or 1.6 and finally the full model without the variable LOCTEN. Based on the Chi-square statistic for the decrease of the LogLikelihood the overall fit of the model is significant at the 1% level. When variables with low t-values are omitted from the model the overall fit decreases only slightly. However, when LOCTEN is omitted from the model the decrease in the overall fit of the model is quite substantial. This indicates that removing this variable from the equation this effect is only for a small part covered by the other locational variables

#### **4.4 Empirical results**

Next we will discuss the estimation results for the three previously distinguished categories of variables.

##### ***Firm internal factors***

With regard to the statistical significance of the individual coefficients the results for the four specifications presented in Table 4 do not lead to different conclusions. The industrial sector turned out to be not a significant determinant of the propensity to move with the exception of the retail and horeca sector. In accordance with the expectations this sector shows a very low propensity to move. Although the service sector shows positive coefficients which indicates a higher propensity to move than the industrial sector, only for non-commercial services the difference comes only close to significance at the 10% level in the full model.

For firm size we estimated the model with a set of dummies for size categories. We started with seven categories, but on the basis of the empirical outcome three categories are enough: small firms with less than ten employees (EMPLSMA, reference category), medium sized firms with 10 – 250 employees (EMPLMED) and large firms with over 250 employees (EMPLBIG). Firm size turns out to be significant at the 1% level in all for models. In accordance with our expectations

small firms with less than ten employees are much more likely to move than medium and large firms. There is no statistically significant difference between EMPLMED and EMPLBIG.

Previous migration turns out to be significant for firms who moved during the last ten years. Firms who moved to another location between 1986 and 1990 are now considering a new relocation much more often than firms who did not move before, whereas firms who moved after 1990 show a much low propensity to move (coefficient significant at the 1% level). A possible explanation is that expanding/dynamic firms need a change of location after about five years to fulfill their new needs with regard to location.

### **Location factors (site and situation)**

With regard to the type of area we found that firms located at the city border have a strong interest in moving to another location in all models compared to firms in the inner-city or in the countryside. For firms located in residential areas we do not find a significant effect when LOCTEN is included in the model. However, if LOCTEN is left out of the model the variable WOON becomes significant at the 5% level. In a model with LOCTEN as the dependent variable WOON turns out to be one of the variables with a very high t-value.

This implies that firms located in residential areas are often confronted with a high location stress and this increases their propensity to move. The coefficient for the innercity variable (BINNEN) is negative but not significant. A lot of firms in retail and horeca, which are often located in the inner city, show a very low mobility as expressed by the negative coefficient for the sector RETHOR.

**Table 4 Ordered logit results**

Variable	Full model		Only T > 1.3		Only T > 1.6		Without LOCTEN	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	-0.03	-0.09	-0.04	-0.17	-0.31	-1.24	0.54	1.61
<i>Firm internal factors</i>								
CONS	0.04	0.15					-0.12	-0.50
WHOLE	-0.06	-0.32					-0.07	-0.35
RETHOR	-0.68	-3.34	-0.75	-4.52	-0.74	-4.53	-0.71	-3.60
TRANS	0.08	0.30					0.07	0.27
COMSERV	0.19	1.08					0.01	0.04
NCSERV	0.47	1.58	0.38	1.38	0.34	1.22	0.41	1.40
EMPLMED	-0.48	-2.37	-0.50	-2.52	-0.51	-2.56	-0.48	-2.34
EMPLBIG	-0.75	-2.50	-0.78	-2.72	-0.75	-2.64	-0.95	-3.20
M80	-0.04	-0.30					0.09	0.64
M8185	-0.28	-1.47	-0.26	-1.39			-0.23	-1.17
M8690	0.31	1.78	0.36	2.13	0.37	2.17	0.32	1.87
M9195	-0.43	-2.44	-0.40	-2.33	-0.38	-2.21	-0.38	-2.16
<i>Location factors</i>								
BINNEN	-0.12	-0.68					-0.02	-0.11
RAND	0.30	2.06	0.35	2.63	0.39	2.94	0.27	1.91
WOON	0.21	1.13					0.40	2.23
BUITEN	-0.26	-1.33	-0.26	-1.40			-0.29	-1.49
KANTOOR	0.27	1.16					0.47	2.00
BDTRANS	-0.11	-0.62					-0.15	-0.85
BDZWAAR	-0.43	-1.65	-0.49	-2.00	-0.47	-1.91	-0.54	-2.15
BDLICHT	0.08	0.59					0.10	0.68
INVAL	-0.05	-0.34					-0.06	-0.44
AUTOWEG	-0.12	-0.83					-0.13	-0.89
HOOFDWEG	-0.25	-1.47	-0.26	-1.59			-0.23	-1.32
NSSTAT	0.04	0.19					-0.02	-0.07
OVKNOOP	-0.19	-0.86					-0.15	-0.66
TYPEPAND	-0.35	-2.53	-0.39	-2.97	-0.46	-3.74	-0.43	-3.16
ONLYGEB	-0.21	-1.34	-0.23	-1.56			-0.16	-1.09
LOCTENM	0.81	4.99	0.80	5.03	0.81	5.10		
LOCTENH	1.46	10.61	1.46	10.88	1.46	10.95		
REVI2	0.39	2.64	0.36	2.54	0.36	2.56	0.53	3.62
REVI3	0.42	2.48	0.38	2.37	0.40	2.48	0.69	4.23
REVI4	0.96	4.09	0.94	4.19	0.96	4.27	1.30	5.55
<i>Firm external factors</i>								
FRGRDR	-0.30	-1.63	-0.19	-1.32	-0.19	-1.31	-0.26	-1.45
OVGEFL	-0.17	-0.95					-0.22	-1.24
ZH	-0.13	-0.70					-0.12	-0.63
NBLIZE	-0.32	-1.81	-0.25	-1.72	-0.26	-1.78	-0.34	-1.94
OORGEM2	0.08	0.51					0.03	0.18
OORGEM3	-0.08	-0.52					-0.13	-0.88
OORGEM4	-0.26	-1.36	-0.24	-1.44			-0.36	-1.86
LogLikelihood		1598		1603		1609		1661
Restricted LL		1732		1732		1732		1732
Degr. Freedom		39		21		16		37

For the type of enterprise zone only significant (negative) results are found for firms located at a site for heavy industry (BDZWAAR). Firms at this type of location often are rather capital intensive and this implies high cost of moving. Furthermore, for this type of firm the availability of alternative location is often limited. Just as for residential areas in the previous paragraph we found that firms on office locations (KANTOOR) show a significant (positive) coefficient when LOCTEN is left out of the model. In a model with LOCTEN as the dependent variable KANTOOR turns out to be one of the important explanatory variables. This implies that firms located at office locations are often facing a high location stress and this increases their propensity to move.

None of the infrastructure variables, which reflect the nearness to roads and public transport, are significant at conventional levels. Also in the model without LOCTEN the coefficients remain insignificant. Even in the case that the infrastructure variables are the only variables in the model none of the coefficients turned out to be significant. This is surprising because accessibility is considered to be an important location characteristic in many studies.

In accordance with our expectations we found that firms who are owner of the building show a lower propensity to relocate than firms who rent it do. Although the coefficient for only users of the building show the right sign (multi-users are more likely to move), the coefficient is not significant in either of the specifications.

The results for LOCTEN and REVI are all significant at the 1% level and this implies that location stress and a strong plea for revitalisation of the direct environment are the most important determinants of the propensity to move. As mentioned before, we also tried specifications of the model without LOCTEN and/or REVI. The results indicated that only the omission of LOCTEN affected some of the other coefficients. We can conclude that at certain types of locations LOCTEN occurs more frequently than on other types. However, without LOCTEN the overall performance of the model strongly decreases and this implies that LOCTEN itself is a very important determinant of the propensity to move. Because LOCTEN is a composite variable, in a later study we will try to include more disaggregated variables for location stress to unravel which stress factors are most important.

### **Firm external factors**

Compared to the reference group consisting of firms located in Utrecht and Noord-Holland we find that firms in the southern provinces (significant at the 10% level) are less likely to move to another location. This is in accordance with our expectations. For the northern provinces this effect is less outspoken (coefficient almost significant at the 10% level in the full model only). Given that in the northern provinces plenty of space is available, the larger distance to the central part of the country might be a reason to consider relocation. This is in line with the finding in table 2 that the province of Groningen shows a negative net migration balance. More generally we find that firms located in provinces with a negative net migration balance in the central part of the country show the highest propensity to move. When we combine the southern and northern provinces in one category and use all other provinces as the reference category we find a significant (at almost the 5% level) negative effect on the propensity to move for the northern and southern provinces compared to the rest of the country.

With regard to the opinion of firms about government policy no significant results are obtained. Only the group of firms who did not answer the question about government policy shows a significant (at the 10% level) negative coefficient in the model without LOCTEN. In the regression with LOCTEN as dependent variable the same results is found with a higher level of significance (1% level). This

probably implies that these firms are quite happy at their present location and, therefore, are not very much interested in government policy or not affected by it.

With regard to the firm external factors we can conclude that the variables we used for the operationalisation are not very important for the decision to relocate. We hesitate to conclude that external factors are not important at all, because we did not include variables that reflect more specific factors like the labour market situation for certain skills, distance to subcontractor's etc.

## 5. CONCLUSIONS

The main aim of this paper is to get insight in the process of firm migration and the explanatory variables determining this decision. This is not only of scientific interest, but also from policy point of view. To avoid congestion problems a more equal spread of economic activities over space may lead to economic growth at lower cost (Sijtsma c.s., 1996). Furthermore, to avoid environmental pollution and conflicting use of land for residential, recreational and economic purposes relocation of existing firms is often required. Given the high cost of firm migration this may lead to conflicting goals of firms and society in general. From the viewpoint of an individual firm relocation may not really be necessary because they see alternative (cheaper) solutions. However, at a macro level relocation of firms can be profitable and, therefore, individual firms may be encouraged to move by government policy. In order to get insight in these problems a more careful analysis of the factors which influence the firm migration decision is needed.

Migration of a firm can be seen as a step in the lifecycle of a firm. For the analysis of the lifecycle of a firm a theoretical concept can be used based on the analogy with population demography: the demography of firms. In section 2 the analogy between firm demography and population demography is dealt with. Furthermore, the possibilities are explored to what extent the demography of firms is a useful theoretical concept for the analyses of the various stages a firm goes through in the lifecycle. From section 2 it can be concluded that the demography of firms approach is a useful conceptual framework. Figure 2 gives an overview of the complex relations between firm internal, firm external and location factors that together determine the demographic events during the life cycle of a firm. Because firm migration is one of these demographic events, this also holds for the analysis of firm migration. Before we turn to the empirical model for the analysis of migration behaviour, section 3 gives an overview of the development of firm migration over time, space and by economic sector based on aggregated data of firm migration. A first problem is that drawing conclusions from these data has to be done with care, because the data shows various flaws. Taking this into account, we can conclude that in terms of numbers firm migration is more or less of equal importance than the much more debated issue of new firm formation (firm birth). Migration of firms increases over time: during the last decade the number of firm moves almost doubled. Firms in the wholesale and commercial services are much more mobile than firms in the retail sector. Firms in manufacturing and construction are somewhat in between. With regard to the spatial pattern of migration we conclude that the periphery of the Netherlands becomes more and more involved in the overflow of economic activity of the national core region, the Randstad. Only the most distant province in the Northeast, Groningen, is not (yet?) taking part in this process of national economic redistribution. Although most migrant firms are rather small and move over short distances, also in terms of redistribution of employment firm migration can not be neglected. In the period 1994/1995 a yearly total of 180,000 jobs were involved in the firm migration process.



In section 3 an explanatory model for firm migration is estimated on micro data for about 1300 Dutch firms. The stated propensity to move is related to a set of explanatory variables by means of an ordered logit model. The results show that with regard to the firm internal factors small firms show a much higher propensity to migrate than firms with 10 or more employees. Firms in the retail and horeca sector show a very low interest in moving, but for the other economic sectors no significant differences are found. Previous migration turns out to be a very important variable. Firms who moved between 5 and 10 years ago show a very high interest in moving whereas firms who moved more recently show a very low propensity to move. Most likely expanding/dynamic firms need a change of location after about five years.

With regard to the location factors we can conclude that the propensity to migrate is hardly significantly related to a specific type of locations. Significant effects are only found for firms located at the border of a city (high wish to migrate) and for firms on a site for heavy industry (low wish to move). By far the most important explanatory variable is 'location stress'. This is a composite variable reflecting the relocation sensitivity of a firm to various types of possible changes at the present location. The significance of this variable only partly affects the results for the other location factors. When location stress is left out of the model, the results show significant positive coefficients for firms located in residential areas and office sites indicating that location stress is leading to a higher propensity to move at these locations. Besides location stress the opinion that the environment of the present location needs (urgent) revitalisation is one of the most significant variables in the model. A very surprising result is that factors related to accessibility are insignificant in all specifications of the model. In accordance with our expectations the results show a strong significant negative effect on the propensity to move when the firm is the owner of the building compared to firms who rent. Given the magnitude of the coefficients we may conclude that location stress at the present location and the feeling that the environment of the present building needs to be upgraded are the most important determinants of firm migration, followed by the ownership situation. The effects of specific types of location factors in a more general sense are less important.

With regard to the firm external factors our results indicate a clear partition of the country in two parts. The wish to move to another location is significantly less in the three northern and the three southern provinces than in the rest of the country. This implies in general that the business environment in the periphery is such that relocation is often not necessary. The opinion of a firm about the government policy ranging from EU-policy till the policy of the municipality turns out not at all to affect the propensity to move.

Although on the basis of the present analysis we can only draw tentative conclusions we have the idea that the migration decision of a firm is mainly determined by firm internal factors and to a lesser extend by site related factors. The importance of the variables firm size, retail and horeca and previous migration support this view. The results that the location stress indicator and the need for revitalisation are very important factors seem to contradict with this outcome. However, in the composite variable location stress, questions related to internal factors play prominent roles. The location factor ownership of the building can also be seen as a firm internal factor when it is interpreted as an investment in fixed capital.

When firm migration is indeed mainly determined by firm internal factors this implies that the translation to policy might be much more difficult than when the main determinants should be related to specific types of locations or firm external factors. However, before we can draw this conclusion a more in depth analysis is necessary.

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**Appendix A. Descriptive statistics (1338 cases)**

Variable	Mean	Std. Dev.	Skew.	Kurt.	Min.	Max.
PMOVE	0.98	1.70	2.3	7.6	0	7
INDU	0.28	0.45	1.0	1.9	0	1
CONS	0.08	0.27	3.1	10.5	0	1
WHOLE	0.15	0.35	2.0	5.0	0	1
RETHOR	0.15	0.36	2.0	4.9	0	1
TRANS	0.06	0.25	3.6	13.6	0	1
COMSERV	0.23	0.42	1.3	2.6	0	1
NCSERV	0.04	0.20	4.5	21.5	0	1
EMPLSMA	0.08	0.27	3.1	10.5	0	1
EMPLBIG	0.08	0.27	3.1	10.8	0	1
EMPLMED	0.84	0.37	-1.8	4.3	0	1
M80	0.23	0.42	1.3	2.7	0	1
M8185	0.09	0.28	3.0	9.7	0	1
M8690	0.12	0.32	2.4	6.7	0	1
M9195	0.14	0.34	2.1	5.4	0	1
BINNEN	0.16	0.37	1.8	4.4	0	1
RAND	0.22	0.41	1.4	2.9	0	1
INVAL	0.26	0.44	1.1	2.2	0	1
WOON	0.11	0.32	2.4	6.9	0	1
KANTOOR	0.07	0.25	3.4	12.5	0	1
BDTRANS	0.16	0.37	1.8	4.4	0	1
BDZWAAR	0.08	0.27	3.2	10.9	0	1
BDLICHT	0.35	0.48	0.6	1.4	0	1
AUTOWEG	0.29	0.46	0.9	1.8	0	1
HOOFDWEG	0.14	0.34	2.1	5.5	0	1
NSSTAT	0.11	0.32	2.4	6.9	0	1
OVKNOOP	0.10	0.29	2.7	8.6	0	1
BUITEN	0.11	0.32	2.4	6.9	0	1
ONLYGEB	0.78	0.42	-1.3	2.8	0	1
TYPEPAND	0.68	0.47	-0.8	1.6	0	1
REVI1	0.30	0.46	0.9	1.8	0	1
REVI2	0.41	0.49	0.4	1.1	0	1
REVI3	0.22	0.42	1.3	2.8	0	1
REVI4	0.07	0.25	3.4	12.8	0	1
LOCTEN	16.61	17.02	1.4	5.3	0	100
LOCTENL	0.47	0.50	0.1	1.0	0	1
LOCTENM	0.18	0.39	1.6	3.7	0	1
LOCTENH	0.34	0.47	0.7	1.4	0	1
FRGRDR	0.22	0.42	1.3	2.7	0	1
OVGEFL	0.21	0.41	1.4	3.0	0	1
UTNH	0.19	0.40	1.5	3.4	0	1
ZH	0.15	0.36	1.9	4.6	0	1
NBLIZE	0.22	0.41	1.4	2.9	0	1
OORGEM1	0.28	0.45	1.0	2.0	0	1
OORGEM2	0.27	0.44	1.0	2.1	0	1
OORGEM3	0.31	0.46	0.8	1.7	0	1
OORGEM4	0.14	0.35	2.0	5.1	0	1