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THE OLD AND THE STUBBORN? FIRM CHARACTERISTICS AND RELOCATION IN THE NETHERLANDS

Abstract: This study gives some insight into the relationships between the spatial environment, firm characteristics and long term existence of firms in the Netherlands. A logit model is employed to investigate the locational difference of firms, considering firm characteristics such as age, size, region and network. The main findings are that (long-term) continuation of the location and firm size are positively associated with long-term existence of firms.

Key words: the Netherlands, firm location.

1. INTRODUCTION

Not much is known in the literature about the spatial dynamics of firms over longer time periods. When studied, mostly the viewpoint of growth of the firm in size, or product in output is taken (Audretch *et al.*, 1998; Agarwal, 1997). This paper takes a spatial perspective on firms' long-term existence. Does location play a role for long-term continuation of firms? Research indicates that location influences the overall probability of survival. Researching location behaviour of very old firms can provide more insight into the role of spatial dynamics in long-term existence of firms, even though studied in combination with factors such as size and ownership. The research into the spatial context of older firms can give a better perception of the importance of embeddedness for firm performance. Embeddedness of firms seems to indicate that social relationships restrict behav-

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ious and institutions and in this way embed the behaviour of economic actors. Economic action is determined by the local network of relations (Granovetter, 1993). None of the existing theories expands upon the fact that very old firms (age in years) outlast the effective industrial period of the (successful) entrepreneur considerably. With this, the characteristics of the firm itself and the characteristics of the firm's environment become of greater relevance.

This study focuses on the location of firms of all ages, with special attention to old firms (founded before 1851 and still existing today). The main research question is whether location behaviour of firms is different when firms get older. In this way, the paper investigates the relationship between spatially inert behaviour (less relocation tendencies) and the age of firms. A telephone survey among the population of old Dutch firms and a written survey among old and younger firms in 2003 provide evidence.

The next section gives explanation of the relevance of this study, followed by a section on the theoretical background of the current investigation which ends with some hypotheses. Section 4 will discuss the research sample and the population of old firms in the Netherlands. The analysis is presented in section 5 and the final section gives conclusions.

2. RELEVANCE

In the view of Vaessen (1993) the success of individual firms is a function of both the way they behave and the economic environment in which they exist. Thus, e.g. a firm might choose a location more or less by chance but economic conditions could favour it and the environment would adopt the firm. This would improve the firm's chances of survival in a path dependent mechanism. Firms benefit from localised ties with buyers and suppliers (Oerlemans *et. al.*, 2001; Agrawal *et.al.*, 2006). In this view, the interaction between the firm and its local environment is a determinant of firm behaviour. Explanations of these phenomena have focused on the concepts of history dependence, chance and learning region (van Wissen, 2002). The events firms live through and the actions firms take in reaction to these events will influence the firms' survival chances. The perspective of spatial history can indicate the different changes per firm, such as relocations, and advocate their importance (van Geenhuizen, 1993). Thus far, studies concerning spatial aspects of the older part of the firm population as a whole are very rare, due to data shortage.

Older firms are argued to be much more attached to their location (Brouwer *et al.*, 2004). This attachment or embeddedness creates specific implications for migration activities and locational preferences of firms. Older firms in the Netherlands are relatively often located on isolated spots, instead of on collective firm

sites (Pellenbarg and van Steen, 2003). These spots are frequently in or on the edge of the inner city, which currently causes planning problems. 'Land for economic activities has always been at the sidelines in planning debates' (Louw and Bontekoe, 2007, p. 121). Relocation of these firms is at the moment a policy debate in the Netherlands, as for example in the 'spatial bill' (VROM, 2004). The current Dutch policy does not offer them any options close to their present location (mostly inner cities and residential areas) and offers them location space on special firm sites outside of the town or city. However, embedded (older) firms consider relocation to be synonymous to discontinuity and social disruption. In forced relocation these firms face the risk of losing their strength by disrupting their connectivity with their local surroundings (Bellandi, 2001). Since the Second World War, the Dutch government created new firm-sites to meet the growing demand for new and suitable firm locations, in order to minimise the negative consequences (such as noise pollution) of firms for other spatial uses (such as residential areas) (VROM, 2004; EZ, 2004). Older firms are more likely to be located in residential neighbourhoods or the city centre due to historical reasons. Currently, these locations are under pressure, there is a tension between on the one side the spatial needs of firms on their present locations and the supply of locations that the government offers for business purposes (Gijzen and Brouwer, 2006). When discussing this, one should consider the possibility of towns growing around firms as was seen in the mid-nineteenth century with textile firms in the United Kingdom and France. Those firms were the engine behind processes of urbanisation (Moch and Tilly, 1985). However, with the exception of a few textile firms in Enschede and Tilburg in the Netherlands, such processes were not that apparent in the Netherlands (Kooij, 1988) and only a few old firms that might have caused similar processes were detected in the database used in this research. The majority of old firms that still exist today never had such large groups of employees and spillover effects that could start urbanisation processes, as will be further elaborated below.

3. LOCATIONAL INERTIA AND HYPOTHESES

The study of firm location aims to contribute to regional science. This paper focuses on traditional location factors but adds a focus on other factors as well, such as spatial inertia and adaptation. In the literature the main three factors influencing firm migration are: internal factors (e.g., size); external factors (e.g., market relationships) and location factors (e.g., region) (Brouwer *et al.*, 2004). The major forces driving firm relocation are expansion and the need for more suitable premises (Pellenbarg *et al.*, 2002). The NEAA (2007) finds that 75% of

all Dutch firm relocations take place within the municipality. There is no reason to assume the numbers were smaller in the past, rather the contrary.

The behaviourist approach tries to understand actual behaviour of entrepreneurs and focuses on the decisions leading to relocation and acknowledges path-dependency and relocation costs. Relocation costs, together with bounded rationality, decrease the relocation probability. When they have to move, mostly they will choose nearer places because they are more familiar (Meester and Pellenbarg, 2006). This also connects strongly with views from locality studies, where it is underlined that the particularity of places creates specific relationships and establishes long-term causalities at that particular place which are hard to reproduce elsewhere (Cox and Mair, 1989). These forces of locational inertia are strengthened by sunk costs as argued by Rosenbaum and Lamort (1992) and Kessides (1990). The institutionalist approach assumes that economic activity is socially and institutionally situated and therefore shaped by the cultural institutions of society (Thrift and Olds, 1996). Here, the firm's investment strategy determines location behaviour. Both, 'external' or 'institutional' factors (e.g., spatial adjustments such as expansion, merger, acquisition and take-over, but also trust, reciprocity, cooperation and convention) are key players from the structure and functions of the firm, through the operation of markets, to the form of state intervention (see among others, Hayter, 1997; Oerlemans *et al.*, 2001).

An additional framework for this investigation comes from the 'demography of firms' and 'organisational ecology' approaches. According to theory, firms need to be reliable and deliver reproducible goods in order to survive. This reliability and irreproachability can only remain constant at high levels when a firm has fixed routines, which come forward from inert behaviour. Inertia is, next to being a condition, also a consequence of the selection process. Firms need inertia to bind its suppliers, capital suppliers and customers to them (embed themselves), to create the necessary legitimation and trust. This does not mean that successful firms never change. Firms need to be able to change to adapt to the new demands of time, but need a certain amount of inertia in order to keep running; it is a fragile balance and large numbers of firm exits indicate that the balance often fails (van Witteloostuijn, 1998; Carroll *et al.*, 2001). Sunk costs, locality, spatial fix of workers and pathdependent mechanisms strengthen a lock-in of firms in specific places (Cox and Mair, 1989). The longer the firm has been in this particular place, the harder it is to relocate out of this place without experiencing negative effects (e.g. Kessides, 1990; Cox and Mair, 1989; Herod, 1997). This 'spatial fix' strengthens forces of inertia.

The chance of firm dissolution is connected to characteristics of the firms, such as sector, size, and age: the 'liability of age and size' (Strotmann, 2007; Schutjens and Wever, 2000). Younger firms have a higher chance for dissolution in their respect (Hannan *et al.*, 1998; Carroll and Hannan, 2000). Older firms had, in comparison with younger firms, more time to create adequate routines

and did survive earlier selection mechanisms (Boschma and Frenken, 2006). New firms still need to build these company routines and have to develop specific skills, knowledge and experience. Therefore, the chance of dissolution decreases when firms are active on the market for a longer time, and locked-in in that particular region because of particular events characterising the area (Cressy, 2006; Hannan and Freeman, 1984; Liebowitz and Margolis, 1990). Most resources tend to concentrate geographically as well, creating strong ties at the local level, due to arm-length market relationships (Easterly and Levine, 2002; Porter, 1996). It can be argued that older firms have reached this old age because of adequate routines, which are hard to change when they have been successful for a long time. This in itself generates inert behaviour (Hannan and Freeman, 1984). Older firms often have a more secure market position due to their increased capacities. The inertia of firms is also generated by sunk costs, existing networks and investments in location and durable goods (Ranger-Moore, 1997; Rosenbaum and Lamort, 1992). Furthermore, firms invested over time in visual reliability, such as location and premises: changes in these can undermine the legitimization of a firm (Delacroix and Swaminathan, 1991). Therefore, it is expected that the spatial environment (or surroundings) of the firm partly determines the survival (getting older) of firms. As firms are located on the same spot longer, they create close ties with local suppliers, capital suppliers and customers (Hoogstra and van Dijk, 2004), also seen as spatial fix (Herod, 1997) and lock-in effects (Gulati *et al.*, 2000). Creating these ties takes time and to break down these ties can be disastrous for the effectiveness of firms (Brouwer, 2005). Therefore it can be argued that survival in the long-run has greater chances when the firm 'sticks' to one well-known and familiar location. Therefore, the first hypothesis can be formulated:

H1: Firms that did not relocate have a higher probability of being older.

Legitimation can be argued to explain the increasing embeddedness of firms in a specific location in the long term (Stam, 2005). The more relations a firm has with suppliers, customers and other institutions in their local environment, the more natural it is that that is exactly where the firm is supposed to be. Gulati *et al.* (2000, p. 211) identify this process as 'lock-in' specific areas. The 'lock-in [...] results from networks evolving over time' and can have significant effects on the profits of specific firms. When this 'lock-in' or 'embeddedness' increases, with and because of legitimization at a specific location, it creates inert behaviour of the firm at the location, which could be at the local scale, but even at specific sites (Vaessen, 1993). Easterley and Levine (2002) argue that the competitive core of firms lies in the local, network due to the proximity of resources. Porter (1996) claims the same as a basis for (inter)national competitiveness. When local networks have a chance to establish trust and routines over time, they get locked-in and can be very successful (Gulati *et al.*, 2000). Peneder (2001) argues that irreversible choices from the past explain the differences in spatial variabil-

ity of firms (path dependency). A choice once made and approved becomes a routine (Boschma and Frenken, 2006). In spatial terms, a once chosen location is not easily left, a tendency that gets stronger as a firm gets older and is at the same location for a longer period. Therefore it can be assumed that older firms are more secured in their locations by formalised relationships and are therefore less inclined to change these. Due to their old age, these firms established their networks long ago and it can be argued that these are mostly local networks, due to higher costs of communication over long distance and less means of transportation and mobility in the early nineteenth century (Pellenbarg and van Steen, 2003). A relocation decision is costly, the possible loss of capital, fixed in location – factory, machinery, personnel, and network relationships – play a role as well (Romo and Schwartz, 1995; Meijboom and Voordijk, 2003). If the location does not fulfil the needs of the firm any longer, firms will prefer spatial adaptation of the site to relocation (Vaessen, 1993). Therefore the following hypotheses are proposed:

H2: Firms that did not relocate have a higher probability of more locally situated networks.

H3: Firms that did not relocate have a higher probability of adaptations on site.

When firms get older, they often also get a bit larger. The common reasoning is that smaller firms have a larger probability of failure in comparison with their larger opponents, since they have less ‘fat to survive the winter’ (van Wissen, 2002). To summarise, the chance for dissolution for firms is the largest when they are young and/or small. This seems to suggest that age is the explaining variable for firms’ survival; however that is not the case as such. Age is related to both the capacities of the firm and to the way the firm handles its assets. These capacities change with the increase of firms’ age and are the underlying explanations for long term survival. Consequently, the first hypothesis can be formulated as follows:

H4: Firms that did not relocate have a higher probability of being larger.

4. RESEARCH SAMPLE

In this study there is a focus on firm age measured in years since founding. To define firms just by age in years can be arguable because then little attention is given to the stage of development of a firm (Littunen *et al.*, 1998). The development of the firm can also be determined by looking at the ‘age’ of a firm according to the product life-cycle, where it is not mature until it reaches the fourth stage of this cycle. This view is less useful for the current investigation, since practice shows that some firms are in different stages of the product life-cycle at the same time, some

firms stay at the same phase constantly or some firms start their cycle in a different phase than the first (van Geenhuizen, 1993), while we specifically want to investigate the age-effect. Furthermore, Audretsch and Feldman (1996) argue that some firms get locked-in into a 'routinised technology regime', especially firms more mature industries. Once firms are in this stage, it is very common they stay in this particular regime for long periods. Research shows that once firms have reached the mature stage of a stabilised industry and have 'decided on firm leadership', not much will change in population dynamics. For old firms in the Netherlands, these arguments are often true. But the core of the argument in this paper is on 'long-term' continuity, in which age measured in years – and hence ageing is much more appropriate as a measure than stage of development. In this paper, firm age is a measure of the progression time between two existential events; birth and death, age and ageing are therefore important. Studies in firm demography focus on the effects of ageing on firm performance. Firms learn from their behaviour over time. More mature and older firms are therefore better equipped than young firms, who still have to learn how to behave in the market (van Wissen, 2002; Strotmann, 2007). 'Old' firms are in this investigation defined as those firms that were founded before 1851 and still exist today. A firm continues to be the same firm when the name has not been altered since founding and that the basic product or activity has remained the same. The age of the firm is measured as the number of years since founding. The legal status, location, size (in number of employees) may have changed. Also alterations in management, corporate governance and/or ownership are not taken into this definition. The course of the investigated time frame is so long that changes of these natures are unavoidable and will not affect the firm as such. Very much the same is valid for changes in planning policies, national as well as international. Since all firms are located in one small country we put aside possible effects on location that might have come forward from policies in the past. Since all subjects have been subjugated to the same historical events, we consider this to be even among all cases (cf. de Geus, 1997; van Geenhuizen, 1993; Enriques and Volpin, 2007).

The data used in this analysis are the results of a telephone survey and a written survey. The telephone survey targeted the population of old firms in the Netherlands. The contacted firms were founded before 1851 and still exist today operating under the same name and within the same sub-sector since founding (February–April 2003). The year 1851 was chosen because it effectively separates a distinct group of very old firms from a larger group of surviving old firms that were established in the period of industrial revolution in the Netherlands. Agricultural firms, hotel and catering, and retail firms were omitted from the original data source (the REACH database) because their founding dates proved to be less reliable. In retail and the hotel and catering business very often firms were registered as founded in 1001, when checking this was proven never true and the true founding date was 2001, most probably caused by data-entry mistakes. Furthermore, very often firms

in these sectors that were indeed founded before 1851 were taken over by larger chains and therefore did not fit our definition. Agricultural firms have a very static nature if it comes to firm location and have very low mobility propensities. In the Netherlands it occasionally happened that an agricultural firm relocated to new captured land from the sea – however, this is not the kind of locational dynamics this paper searches for. After screening the data, 362 old firms remain. Due to less than perfect registration before 1900 it is impossible to use a cohort approach to study these firms. Since only data is available for firms that are present nowadays, only retrospective research is allowed.

In the telephone survey questions were asked concerning the year of founding, legal status, present location, past (re)location activities, family involvement and product / activity (see table 1 for the main results).

Table 1. Summarised results from the telephone survey, characteristics of old firms

| Number of full time employees | % old firms | % all firms* |
|-------------------------------|-------------|---------------|
| 1 to 9 | 45.9 | 91.2 |
| 10 to 99 | 43.6 | 8.2 |
| 100 or more | 10.5 | 0.6 |
| Firm relocation | % old firms | |
| Unknown | 1.9 | |
| Never relocated | 52.9 | |
| Relocated at least once | 45.2 | |
| Sectoral division | % old firms | % old firms** |
| Manufacturing | 40.1 | 9.7 |
| Onstruction | 29.2 | 11.9 |
| Wholesale | 17.9 | 20.6 |
| Financial services | 4.7 | 32.4 |
| Transportation | 3.9 | 10.9 |
| Other services | 3.5 | 14.4 |
| Business services | 0.8 | 0.1 |
| Adaptation current location | % old firms | |
| Yes | 56.4 | |
| No | 43.7 | |

* The percentages for the total firm population in the Netherlands are based on all Dutch firms with up to 250 employees. Firms with more than 250 employees were not taken into consideration.

** Percentages of firms in likewise sectors where the primary sector, retail and hotel & catering business were not taken into consideration. The sectors in this table count as 100%.

Source: Chambers of Commerce (2004).

Table 2. Summarised results of the written survey

| Contentment location (mark 1 to 10) | All respondents | Old firms | Younger firms |
|--|-----------------|-----------|---------------|
| Location | 7.7 | 7.4 | 7.8 |
| Type of location | | | |
| Inner city | 11.2% | 16.7% | 4.2% |
| Edge inner city | 17.9% | 41.7% | 11.9% |
| Residential | 7.8% | 8.3% | 7.7% |
| Office park | 3.9% | 2.8% | 4.2% |
| Transportation hub | 6.7% | 2.8% | 7.7% |
| Heavy industry site | 6.7% | 2.8% | 7.7% |
| Manufacturing site | 40.2% | 25.0% | 44.1% |
| Rural area | 5.6% | 0.0% | 7.0% |
| Proprietorship | | | |
| Owner | 50.8% | 72.2% | 45.5% |
| Rent | 45.3% | 25.0% | 1.4% |
| Lease | 1.1% | 2.8% | 50.3% |
| Spatial adaptation | | | |
| Yes | 55.3% | 69.4% | 48.3% |
| No | 44.7% | 30.6% | 51.7% |
| Network of relationships | | | |
| Local | 6.1% | 8.3% | 5.6% |
| Regional | 34.1% | 25.0% | 36.6% |
| National | 26.8% | 25.0% | 27.5% |
| International | 32.4% | 41.7% | 30.3% |
| Size | | | |
| 2–9 employees | 15.6% | 33.3% | 11.2% |
| 10–25 employees | 44.7% | 25.0% | 49.7% |
| 26–50 employees | 18.4% | 8.3% | 21.0% |
| 51–100 employees | 9.5% | 11.1% | 9.1% |
| 101 + employees | 11.7% | 22.2% | 9.1% |
| Relocation | | | |
| Relocated at least once | 69.3% | 61.1% | 71.3% |
| Still at initial location | 30.7% | 38.9% | 28.7% |

The response rate of the telephone survey is 71%; 257 cases. These respondents were also contacted for a written survey to investigate certain characteristics more in depth; unfortunately – even after contacting the firms several

times – only 37 written surveys were returned by the old firms. An investigation of old firms can only be of use when of course also younger firms are incorporated into the investigation in order to provide comparative data material. Therefore, the written survey was also directed to younger firms (founded after 1850) and 144 younger firms filled out the questionnaire. The written survey was directed to younger firms, with a selection made on sector, to match the division of firms over particular sectors matching the sample of old firms. In table 2 the results of the written survey can be found. The most interesting results from the written survey are that younger firms had more relocation activities than older firms, 71.3% versus 61.1%. Old firms are larger than younger firms (in terms of employees), old firms did have more spatial adaptations to their current site than younger firms and old firms more often have ownership of their site than younger firms. These first descriptive results seem to confirm our expectations.

The number of old firms in total in the Netherlands is not very impressive: with 0.1% of the number of all Dutch establishments they are just a very small part of the total firm populations, however, they generate over 4% of the Dutch national employment which makes them an economically relevant group. The old firms are mainly active in the manufacturing, construction and wholesale sectors. Partly, old firms are active in the now more traditional activities, such as the production of sweets, beer or spirits, bookbinding, import of colonial goods, mills and smithies. However, some of the old firms operating in activities such as construction, real estate, metalwork, printing and financial services. A classical problem in studies on the survival rate is the so-called survivor problem (Santerelli and Vivarelli, 2007). Information about survivors in specific sectors gets more value when the number of firms created in different time periods and the number remaining as part of the sample is known. Unfortunately, such entry and exit rates per sector are not available over the period under study in this paper. Some information about firm distribution per sector could be retrieved from several historical archives as can be seen in tables 3 and 4. In table 3, one can see that manufacturing was a major part – around 30% – of Dutch commercial life in the entire period. That many old firms survived in this sector is therefore not unexpected. In the same period, the part of firms engaged in trade & transport increased over 200%, which could explain the relatively low number of old firm survivors with these activities, while they are overrepresented in the total firm distribution (see table 2). In table 4, more detailed information about the firm distribution within manufacturing over time is given. In table 4, one can see that in the ‘founding period’ of the old firms, those groups that were large in that period have relatively many survivors (such as foodstuffs and beverages) and those groups that gained tremendously in importance over the period (such as construction and book printing) are represented in the group of old survivors.

Table 3. Percentage of firms in four sectors from 1899 to 2001 in the Netherlands

| Sector | Percentage of firms in four sectors | | | | | | |
|-------------------|-------------------------------------|------|------|------|------|------|------|
| | 1899 | 1909 | 1920 | 1930 | 1950 | 1978 | 2001 |
| Agriculture | 29.6 | 27.3 | 22.9 | 20.1 | 11.4 | 1.2 | 0.7 |
| Manufacturing | 33.8 | 35.2 | 37.8 | 38.8 | 24.9 | 20.3 | 27.5 |
| Trade & transport | 16.8 | 18.4 | 19.6 | 21.8 | 51.2 | 47.8 | 44.1 |
| Other | 19.8 | 19.1 | 19.8 | 19.3 | 11.9 | 26.3 | 27.7 |

Source: Brouwer (2005).

Because the old firms exist longer than several generations of entrepreneurs it is important for the firm's persistence that the take-over is secured and therefore more than 90% of the firms are family owned. A strive for profit maximisation in family firms is subordinate to the economic and social consequences of the family involved. More important are matters of succession and getting involved in the stock market for the continuation of the firm (Santarelli and Lotti, 2005). As for the size-distribution of the old firms, measured in number of full time employees, most of the old firms are in the larger categories, 10–99 and 100 or more employees. When compared with the size distribution for the total firm population it is clear that the category of one employee is considerably smaller for old firms than for the total firm population. Furthermore, the larger categories are for the old firms considerably larger than for the entire firm population. On average older firms are larger.

Table 4. Percentage of firms per manufacturing sub-sector in the period 1820–2001

| Sub-Sector | Percentage of firms in manufacturing groups | | | | | | | |
|--|---|------|------|------|------|------|------|------|
| | 1820 | 1858 | 1890 | 1930 | 1950 | 1963 | 1978 | 2001 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Ceramics, glass, lime and stone | 1.3 | 1.8 | 11.6 | 1.4 | 1.5 | 1.8 | 2.6 | 1.7 |
| Diamond and other gemstones | 0.03 | 4.7 | – | 0.01 | 0.6 | – | – | – |
| Book printing, lithography and photography | 0.8 | 1.3 | 7.3 | 1.9 | 2.1 | 2.5 | 7.0 | 7.4 |
| Construction | 6.5 | 0.7 | 2.0 | 18.5 | 31.9 | 33.9 | 41.6 | 54.4 |
| Quarrying | – | 3.4 | – | 0.3 | 0.2 | – | 0.2 | – |
| Chemical industry | 4.7 | 5.6 | 2.0 | 1.1 | 0.8 | 0.9 | 1.4 | 1.3 |
| Wood, straw works and cork | 14.2 | 9.6 | 10.0 | 7.9 | 1.9 | 5.3 | 3.3 | 1.8 |

Table 4 (cont.)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|-----------|-----------|----------|------------|------------|------------|-----------|------------|
| Clothing and (dry) cleaners | 8.6 | 7.9 | 7.0 | 9.7 | 17.9 | 11.1 | 2.8 | 1.6 |
| Crafts | – | – | 0.3 | 0.3 | – | 0.2 | – | – |
| Leather, oilcloth and caoutchouc (rubber) | 11.7 | 5.3 | 1.2 | 5.7 | 1.1 | 0.8 | 2.2 | 1.6 |
| Bog ore, coals and peat extraction (mining) | 4.5 | – | 1.0 | 0.2 | 0.4 | 0.3 | 0.2 | 0.5 |
| Metal construction | 10.0 | 7.7 | 6.0 | 7.1 | 6.2 | 7.1 | 9.1 | 6.5 |
| Paper | 0.6 | 1.4 | 2.1 | 0.9 | 0.3 | 0.4 | 0.5 | 0.5 |
| Shipbuilding and vehicles | 1.0 | 8.3 | 2.5 | 2.1 | 9.8 | 11.4 | 2.8 | 2.6 |
| Steam – and other engines | – | 0.1 | 4.1 | 7.9 | 1.5 | 2.1 | 4.0 | 4.2 |
| Manufacture of textile | 10.4 | 8.4 | 12.7 | 2.1 | 1.4 | 1.0 | 1.8 | 1.2 |
| Lighting, oil, varnish and fat | – | 4.3 | 4.4 | – | – | – | – | – |
| Gas, electricity and water | 2.8 | 1.1 | – | 0.4 | 0.8 | 1.9 | 0.5 | 0.5 |
| Foodstuffs and beverages | 22.8 | 25.9 | 25.8 | 30.1 | 15.4 | 12.3 | 12.4 | 4.2 |
| (Electric) machinery and apparatus | – | 0.6 | – | – | 0.4 | 1.6 | 1.6 | 1.7 |
| Clocks and instruments | – | 0.8 | – | – | 3.0 | 0.2 | 1.2 | 2.0 |
| Furniture | – | 0.9 | – | – | 2.7 | 1.7 | 3.3 | 6.4 |
| Other | 0.3 | 0.1 | – | 1.6 | 0.2 | 3.6 | 0.5 | – |
| Totals | N= 50,925 | N= 11,566 | N= 3,339 | N= 130,207 | N= 150,756 | N= 127,967 | N= 68,837 | N= 199,838 |

Source: Brouwer (2005).

A bit over half of the old firms did expansion on the current site. From the question on relocation, the following resulted: 1.9% of the old firms did not know (memory gap), 52.9% never relocated, 45.2% relocated at least once (see also table 1). When the answer to the relocation question was positive, the succeeding question was whether these relocations did occur within the same region (the Dutch ‘gemeente’ – municipality) or over longer distances. Of the relocated old firms, 60% moved within their region of original location. In the population of old firms 44.9% relocated at least once. When compared to the relocation numbers of all firms in the Netherlands, where 60–65 % of firms aged 25 years or older (including the oldest age groups from 70 to 100 years) have relocated (Pellenbarg and van Steen, 2003), this is substantially less. Considering the high number of short distance relocations, it can be argued that old firms display a high attachment to their home region. The reason for low mobility of older firms can be size-related. According to the Chambers of Commerce (2004) relocation in the home region is more usual among older firms since a movement over a shorter distance has less influence on the current employees, who will not have to be replaced (Hoogstra and van Dijk, 2004; NEAA, 2007). Since older firms tend to have more employees and more specifically trained employees they tend to stay in the home region. This would mean that larger ‘older’ firms would have moved relatively less; the results from the survey, however, give a somewhat different picture. The percentages of relocation exceed the percentage of no-relocation after the number of 10 employees. This might be caused by the fact that the relocation might have taken place in the early years of the existence of the firms when the firms could have been much smaller in terms of the number of employees. Or that past relocations did encourage the firms to grow following the relocation (Brouwer *et al.*, 2004).

5. LOGIT ANALYSIS

A possible explanation for spatially inert behaviour can be found in firm characteristics. The spatial inertia of firms is tested here with a logit model. In the model the relocation history (relocated at least once) is the explanatory variable. This is defined by the probability to relocate by a set of dependent variables. The probability to relocate is $F(x_i, \beta)$ where $F(.) = \exp(.) / [1 + \exp(.)]$, and β is the vector of the coefficients (Greene, 2003). The dependent variables¹ all have been regrouped into ordinal variables; *age* in years since founding; *size*

¹ Most variables have only a few missing observations. The missing values are modelled in the reference groups. In earlier versions of the model the missing values were explicitly taken into account, but the results are almost identical.

in numbers of employees; *network* of relationships; *innovation*; the *region* of residence; *property* (rent, lease or ownership); and *adaptation* of premises or grounds.

Table 5. Results of logit-analysis

| All observations | <i>B</i> | <i>t</i> -value |
|--|----------|-----------------|
| Constant | 2.564 | |
| <i>Size</i> (in numbers of fulltime employees) | | |
| 1–5 | | |
| 6–9 | 1.709 | 2.71*** |
| 10–25 | 1.000 | 1.39* |
| 26–50 | –0.015 | 0.02 |
| 51 or more | 0.934 | 1.20 |
| <i>Age</i> (in years since founding) | | |
| 6–10 | | |
| 0–5 | –2.847 | 2.70*** |
| 11–25 | –1.426 | 1.47* |
| 26–50 | –0.909 | 0.93 |
| 51–100 | –0.942 | 0.93 |
| 101–200 | –1.436 | 1.99* |
| 201 or older | 0.310 | 0.26 |
| <i>Network</i> (of market relationships) | | |
| International | | |
| National | 0.452 | 0.89 |
| Regional | 0.916 | 1.74* |
| Local | –1.333 | 1.49* |
| <i>Spatial adaptations</i> | | |
| No | | |
| Yes | –0.449 | 0.97 |
| <i>Region</i> | | |
| West Netherlands | | |
| South Netherlands | –0.407 | 0.73 |
| East Netherlands | –0.877 | 1.63* |
| North Netherlands | –0.846 | 1.19 |
| <i>Proprietorship</i> | | |
| Rent / lease | | |
| Ownership | –1.558 | 3.43*** |

Explanation: * = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level. N : 179. Overall percentage: 74.7%.

In table 5 every first mentioned group within the variables is the reference group, which is the group expected to have most relocations. The reference groups are chosen based on the results of cross tabulations on the data and supplemented with literature. The *B*-value represents the probability that the tested group behaves in the same way as the reference group – high probability of relocation. Therefore, the reference groups have no value.

One would expect the model to also run *sector* as a control variable – considering the specific sector distribution of old firms which was kept in the written survey to younger firms. In earlier versions of the model *sector* was specifically taken into account, however – unexpectedly did not have any significant influence and was omitted from the final version. The same is valid for the variable *legal structure*; also this variable did not have any effects and therefore is not incorporated in the final version. Omitting the variables without significant effects did improve the internal fit of the model.

Table 5 gives the results of the analysis.

Theory suggests that spatial inertia increases when age increases. The probability of relocation shall therefore be smaller when the firm is older, considering that here past relocation behaviour is tested. The first five years of firm existence are called the incubator period, in which firms mostly focus on initial survival and therefore are not likely to move (Stam, 2005). The results for the parameter *age* show that older firms and the youngest firms are least mobile. The latter group even has a significantly lower mobility. The oldest age group had on average more movements in the past, which is contradictory to the expectations, even though the result is not significant. Considering the relatively lower response in this oldest age group in the written survey, this group might not be representative for this category. The evidence, however modest, is mostly corresponding to the expectations; thus far, the relation is not linear, but shows that older firms had less relocation behaviour in the past. Also the higher percentage of old firms that relocated over the short distance as found in the telephone survey underlines an increased attachment of old firms with their location. We tend to accept the first hypothesis.

It was expected was that firms with a larger (international) *network* of market relationships had a lower chance of relocating, since they are not tied to one region due to suppliers and customers. The survey results, however give a dual picture. It is clear that firms that participate in a local network relocated significantly less than those firms that participate in an international network. Nevertheless, firms that participate in a regional network have a higher probability of relocation than firms that participate in an international network. Agrawal *et. al.* (2006) claim that social (trust) relationships are highly past-dependent – even if the market relationships are extensive and even cross-border. De Bruijn (2004) argues along the same lines. International relation-

ships do not hold back an embeddedness within a specific region. However, within specific regions firms can move short distance (Stam, 2005, p. 123): 'young firms in general hardly move out of their region of origin'. Old firms (see table 2) participate much more in larger networks and relocate less, corresponding with theory. Based on these results the tendency exists to partly accept the second hypothesis.

The variable *adaptation*, such as expansion of the premises and grounds, does not provide convincing evidence (see also section 2). Firms that did adapt their current location seem to have less relocation behaviour than firms that did not adapt their current location. It can be expected that firms that spent money on adapting their current location would be less inclined to move. Firms that have more attachment to their location might be inclined to spend more money on the current site to enable them to stay there instead of searching for another, maybe cheaper, location. The results are not significant and therefore the third hypothesis cannot be accepted.

Discussing the relationship between firm *size* and relocation, the literature suggests that smaller firms have higher probabilities of relocations (among others Pellenbarg and van Steen, 2003). However, the obtained results show the opposite. The categories with 6–10 and 11–25 employees have a higher probability of relocating. Larger firms have a significantly higher probability of having moved in the past. This means that spatial inertia does not directly increase with the size of the firm. Nevertheless, it can be argued that because the need for space is an important initiator for movement (Hoogstra and van Dijk, 2004), growing firms could have moved in the past to create this space. This could explain the higher mobility in the past of the currently larger firms; table 2 displays that especially the need for more space is the main reason for firm relocation. Concerning embeddedness and size Oerleman *et al.* (2001, p. 72) find that 'regional economic embeddedness seems to be a strong driver for localised ties, but these are generally not effected by size'. These results lead to partly accepting the last hypothesis.

Let us continue with the control variables. The variable *region* shows that movement is highest in the region of the West of the Netherlands. So, firms that are now located in the West of the Netherlands, have relocated more in the past. Since this is the region that holds the four largest urban areas of the Netherlands and has a very dynamic economy, the high probability of relocation in this region is not unexpected. The results obtained for the variable *property* correspond to the expectations. Firms that rent or lease premises or grounds have significantly more relocations than firms that have ownership of their premises. The premises and ground can be seen as an investment and therefore an explanation of spatial inertia.

6. CONCLUSION

The current paper investigated the interaction between the age of firms and their environment. It aimed at investigating whether embeddedness is positively associated with long-term existence. The results indicate that in general older firms relocate less than younger firms and that spatial inertia increases when firms get older. The age dependent spatial inertia relationship – however modest – is proven for the different firm characteristics. The results indicate an indirect relationship between age and the different characteristics and spatial inertia, mostly caused by ‘rent displacement’. Older firms want to remain on their current location to avoid loss of income. The higher investments in location, premises and personnel and long term network relations confirm the attachment to the location. Summarising, old firms are for the larger part firms that have been on the same location for many decades. Hence, they created very stable supply and consumer relationships, which root these old firms securely into the local and regional economy. The older the firm gets, the more ‘stubborn’ it gets about leaving their location.

The current Dutch spatial planning policy aims to concentrate activities in specific designated areas (firm sites). This investigation, however, indicates that relocation of firms cannot always guarantee positive performance results for the involved firms – especially if these firms have been in the same location for a longer period. Therefore, it is of utmost importance to incorporate this possible impact when making such policies.

Of course the study is far from perfect. First of all it takes the retrospective approach – due to data availability it can only consider whether a firm relocated in the past or not, but passes by on all sorts of aspects considering the reason or the direction of the relocation. Second, some of the choices could have arguably been different, for example the founding year of old firms, however, since firms of all ages are considered in the logit, the age-bias effect might not be so dramatic. Considering all its flaws, the study nevertheless gives some insights in a field of study which has been little explored so far.

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