Spin-offs and Start-ups in The Netherlands

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ABSTRACT
After a decade of widespread attention for the entrepreneurial efforts of individuals, the focus seems to partly shift to companies and their contribution to new firm formation. Splitting new firm formation in a birth rate for spin-offs and one for start-ups, allows a structural and comparative analysis of regions and their spin-off activities. In the Netherlands, the Chamber of Commerce has developed an indicator, which distinguishes between individual start-ups and 'other foundings'. The latter group has been designed to cover spin-off activities. Figures are published from 1995 onwards. Much in line with common studies of regional variance in entrepreneurial activity, this paper presents an explanatory model for the spatial differences in occurrence of spin-offs, based on the data from the CoC's business register. A model is defined on the one hand to explain regional differences in spin-offs, which provides a basis for structural research on cluster formation and the role of spin-offs in this process. On the other hand, it shows the differences between individual based start-ups and company driven endeavours. It is argued that these two groups of new firms are essentially distinct, and therefore cannot be explained by one and the same model.

1. Introduction

New firm formation is a complex process that is characterised by the interaction of individuals, existing organisations, and external forces. Every new firm is based on a specific blending of these factors, and, consequently, the constitution of firms differs considerably. Several studies have tried to find patterns in the constitution of organisations, focussing on different actors in the gestation process. McMillan (1986), for example, regarded the influence of individuals on new firm formation. He has developed an important distinction between entrepreneurs, discerning between entrepreneurs with previous entrepreneurial experience, and entrepreneurs without any. He named the experienced group *habitual entrepreneurs,* and in his later research he has proven that companies of habitual entrepreneurs differ from firms of their inexperienced counterparts (see also Rosa, 1998; Rosa & Scott, 1999). A second branch of research describes the influence of external forces, such as the general economic climate. Several studies have shown a relation between GPD-growth during the founding period of a new firm and higher chances of success (Schutjens & Wever, 2000e.g.). Unemployment is another economic indicator that has been shown to influence the characteristics of new firms and their chances of survival (Pfeiffer & Reize, 2000).

This leaves the third group of actors, existing organisations. The influence of existing firms on new firm formation has been, at best, underrepresented in the field of firm demography for many years. Garofoli (1994) even implies that incumbent firms do not initiate new firms. Only in the last couple of years have several studies emerged focussing on entrepreneurial capacities of incumbents. Especially the efforts of universities to create and stimulate new firm formations have been well documented (Pace, 2002; Alferink & Wijk, 2001). Parhankangas and Arenius (2003) propose a comprehensive taxonomy of firm influence one new firm formation. From the scarce research that has been conducted hitherto, it appears that the process of firm-influenced new firm formation has its own particularities that sets it apart from individual start-ups; new firms that emerge from incumbents are different from individually based entries. They seem to be less innovative, to have higher survival rates, and they are, on average, larger. Consequently, the impact of spin-offs on a regional economy is likely to differ from individual entries as well. However, it is still difficult to support this claims, as the distinction between the two start-up types is not usually made in official statistics. It is therefore difficult to model economic impact of the two types. Evidence on spin-offs and other forms of firm-influenced entry is therefore mostly anecdotic and based on case studies. Benefiting from the efforts of the Dutch Chambers of Commerce to discern between start-ups and spin-offs, this paper maps the occurrence of firm-influenced new foundings in The Netherlands. Moreover, a model is defined

to explain the variance of occurrence between the regions of both firm-influenced entry and individual entry. The model is based on well-known predictors of start-up rates from previous research. It is argued that the outcome for the two types differs, because two distinct processes are mapped.

2. Definitions

Estimation models of a region's capability to foster entrepreneurship are typically based on the assumption that new firms are a homogenous group, based on entrepreneurial efforts of individuals. The relative occurrence of entrepreneurship can be mapped by means of the birth rate. A birth rate is defined as the number of occurrences in a specific period divided by the average risk population in the same period. In the case of new firm formation, two definitions of the risk population are commonly used for calculating birth rates. Both the labour force and the existing stock of firms in a region can serve as relevant reference group. The "labour market approach" favours birth rates calculated from the perspective of the individual, and considers the labour market as the relevant reference group. Implicitly, this approach assumes all firms to stem from individual action. In contrast to this approach does the 'ecological approach' assume firm action responsible for new firm formation. The reference group is now the existing stock of firms in a region. In agreement with Garofoli (1994) most researchers prefer the "labour market" approach and focus on individual action. This is in accordance with the focus of policy. Most policy instruments apply on individuals and therefore require research at the micro level.

Audretsch and Fritsch (1994) have shown that the choice for either one of the two approaches can bias the study at hand profoundly. They compared correlations between unemployment and start-up rates for the same database using both the ecological and the labour market approach. Unemployment figures turned out negatively correlated with labour market based birth rates, whereas unemployment had a positive impact on 'ecological' birth rates. This example indicates pollution in the estimation models for regional variances in birth rates. Making a division between corporate-influenced firm formation and entrepreneurship may improve the explanation power of such estimation models.

Two problems prevent a clear-cut distinction between firm-related start-ups and individual start-ups. First of all, there is a fair share of confusion about the terms used for firm-related start-ups. The best-known term for a firm-influenced new founding is probably spin-off. The term is used in many contexts with different connotations. In this paper a spin-off is defined as *"an individual or a group of individuals leaving a 'parent' firm to start up a new, independent business. The start-up occurs on the basis of specific knowledge and competences built up within*

the parent firm. The parent firm supports the spin-off by allowing the transfer of knowledge, competences, and/or direct means" (Bernardt et al., 2002p. 13). Klepper (2001) uses the term spin-off for all new firms that are based on specific knowledge and competences built up within the parent firm. Support in the gestation process is not required. Following Agarwal et al. (2003), in this paper the term spin-out is reserved for this kind of entry. Not only word games complicate the establishment of a clear definition of firm-related new firm formation. There is considerable variation in the degree of firm influence. Koster and Van Wissen (2003) propose a taxonomy of new firm formation into four different founding types (start-ups, spin-outs, spin-offs, corporate spin-offs), based on the influence of firms on the collection of resources used for the gestation of a new firm. Existing firms influence the gestation process of these groups to various degrees and the constitution of these firms is likely to differ accordingly. Unfortunately, a distinction in four groups cannot be translated to birthrates, because there are only two suitable risk populations. This makes it problematic to describe the regional variation of the four founding groups. To fit in the methodological framework of firm demography, only two groups can be in focus, firm-related founding[1] and individual founding[2].

This brings a second, more fundamental problem to the fore. Where should the boundary between spin-offs and individual start-ups be drawn? There is a certain point at which the gestation process of a new firm is so strongly influenced by an incumbent firm that it can no longer be regarded an individual effort, but rather a firm-driven entry. The position of this cut-off point is based on a certain degree of discretion, because a clear theoretical framework is absent. The practical way to handle this problem, especially when using secondary data, is to follow the distinction made in the available data. However, a theoretical framework related to this decision should be developed.

The analysis in this paper is based on a division in two start-up groups, made by the Dutch Chambers of Commerce. The first group is the individual start-up, or just start-up. In the gestation process of this type of new firm no influence of existing firms has been noticed. The new firm is the outcome of the entrepreneurial efforts of an individual or a group of individuals. The second group consists of spin-offs and is defined as follows by the Chambers of Commerce (1995): *"The start of a new economic activity by an existing company"*. The definition is rather narrow in the sense that it emphasises the influence of the incumbent. The existing firm itself is accountable for initiating the new firm. This means that spin-outs are left out of consideration. Hence, spin-outs are supposed to be individual efforts. On the other hand, the level of data

[1] Spin-offs and firm-related founding are used interchangeably from hereon
[2] (Individual) Start-up and individual founding are used interchangeably from hereon

collection is rather comprehensive, because the database relates to establishments rather than to firms. Every new outlet of a trade corporation is considered a spin-off.

3. Explaining entrepreneurship

Regional variance in birth rates has been the main subject of a host of studies (for an overview, see Casson, 1997). From these studies a fairly consistent conceptual model has been developed in which most important factors influencing entrepreneurship are described. Sutaria (2001) and Reynold et al. (1994) give excellent overviews of the relevant variables. Two main streams can be identified. The first road towards an explanation or estimation of entrepreneurship lies at the micro-level. With help of personal characteristics, such as age, education, level of risk aversion, and previous employment, the individual propensity of entrepreneurship is approximated. The second road focuses on aspects on a higher level, like economic growth, unemployment and regional milieu.

Micro-level studies have been of particular interest in relation to the development of policy. In The Netherlands, stimulating entrepreneurship has been an explicit policy goal from the 1990s on. In order to construct a background for policy, many studies have been conducted with the individual characteristics of entrepreneurs as main subject. In the Netherlands, EIM[3] has conducted this mostly descriptive kind of research. This institute follows panels of young firms from the early nineties on. The result is a quite complete and still growing body of empirical data about many aspects of young firms and their entrepreneurs. Van Gelderen et al. (2001) give a nice overview of important data features, such as age of the entrepreneur, gender, education, sources of finance, ambition, and student status (yes/no). Storey (1994)provides an international example.

Estimation models of entrepreneurship usually draw on the same type of variables as explanatory variables. On the basis of personal characteristics, the propensity of an individual to turn to entrepreneurship is estimated. A recent study on nascent entrepreneurs in Germany (Liñán Alcalde et al., 2002) s a classic example. The propensity of entrepreneurship is measured by means of the personal characteristics gender, nationality (German/foreign), handicapped (yes/no), education, labor category, size of employing enterprise, and finally experience with entrepreneurship. All mentioned variables seem to have a significant influence on the decision to become an entrepreneur.

[3] Economisch Instituut voor het Midden- en Kleinbedrijf, Economic Institute for Small and Medium sized enterprises

Micro-level studies focus on the propensity of individuals to become an entrepreneur. Macro-level studies, however, try to explain regional variance in new firm formation rates. A bunch of studies come up with satisfying explanatory results, using a whole range of explaining variables. Nevertheless, sometimes there is hardly any consensus, whether a factor is positively, negatively or at all related to regional disparities. Unemployment rates are a notorious example of 'changing signs' ((Audretsch & Fritsch, 1994; Sutaria, 2001). The number of variables with a proven effect on new firm formation seems almost inexhaustible. New firm formation is such a complex and multileveled process, that dissection in variables is deemed impossible. Sutaria and Hicks (2002) find regions to be the best estimates of new firm formation. The regions are the best indicators and *"these conclusions point us in a new direction, one which highlights the importance of understanding the role of contextual factors in the processes of economic growth and development."* The key for explaining regional disparities in new firm formation could be found in vague notions such as regional milieu and entrepreneurial climate that can hardly be represented by known measures such as unemployment and GDP-growth.

Nonetheless, some of the models, based on rather straightforward variables, are quite robust in their predictions of regional differences in entrepreneurship.

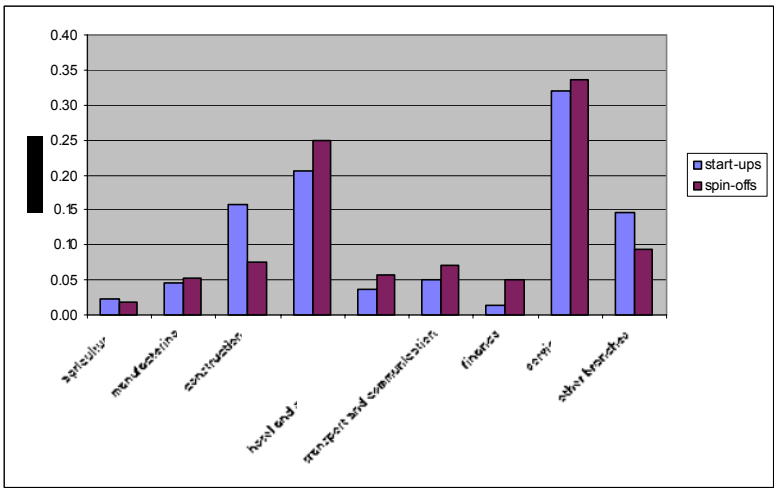

Figure 1: Branch influence 2001.

4. Descriptives

Figure 1 gives a first overview of the differences between the two founding types. The figure shows the distribution of the founding types over nine branches in the Dutch economy. It clearly shows that most new firms are either active in the service industry or in trade. These sectors have the lowest barriers to start a new firm. Besides, these are the two largest industries of the Dutch economy. Looking at the distribution over the sectors for the two distinguished founding types,

the best conclusion seems to be that the distributions are virtually equal. Important start-up branches, such as services and trade also appear to be important spin-off branches. Only in construction work, start-ups outnumber spin-offs. From the figure it can be deducted that the sector structure of a region probably has little influence on regional differences in the occurrence of start-ups and spin-offs.

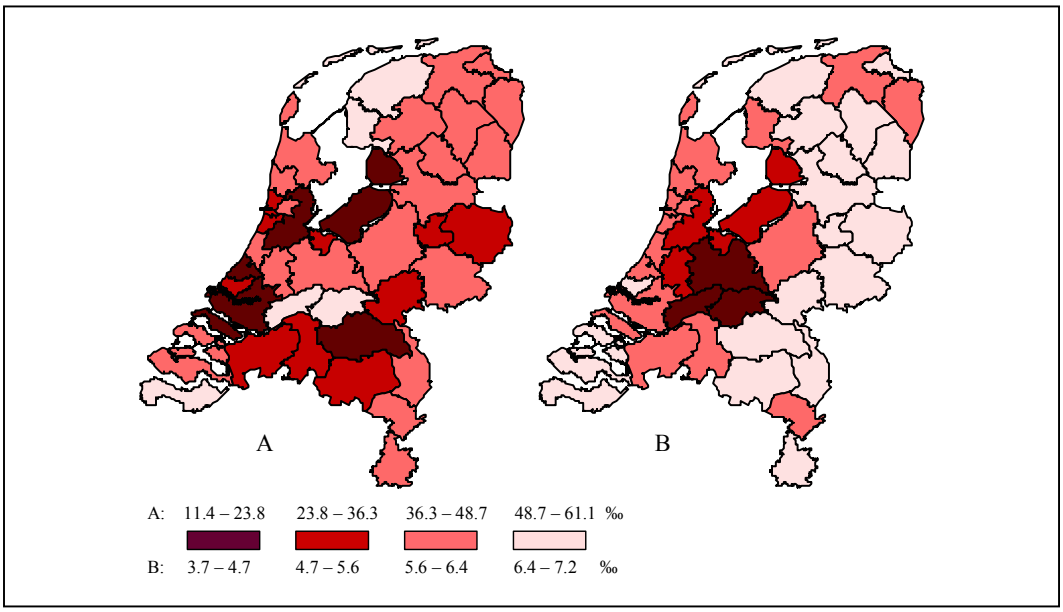

Figure 2: Birth rates in The Netherlands, 1996-2001
A: Spin-off birth rate (number of spin-offs / stock of firms)
B: Start-up birth rate (number of start-ups / population 15 – 65 year)

Figure 2 shows the regional distribution of start-up and spin-off birth rates as an average of the years 1996 through 2001 to level out yearly fluctuations. As expected, the start-up birth rate reaches its peak in the economically most active regions of The Netherlands, the centre of the country. The rates decline when moving towards the periphery. Most economic processes in The Netherlands take this regional distribution. The birth rates of spin-offs show a somewhat more differentiated picture. The centre of the country is hardly a hotspot as most spin-off activity takes place in the direct surroundings of the Randstad. There seems to be a spillover effect towards those areas that are adjacent to the economic core. Firms apparently favour those areas for investment which do not experience the negative effects related to the flourishing economy of the Randstad. The differences between the two start-up patterns add to the argument of the incubation theory. This theory expects new firms to be born and raised in economic active environments which are characterised by a dense network of potential entrepreneurs. Large cities offer all necessary requisites for such an entrepreneurial environment to develop. Start-up rates are therefore high in large cities. When firms reach the stage of maturity, they seek new places for

expansion that are typically situated outside the core area of an economy. Negative effects of agglomeration advantages, such as congestion and high land prices, push the entrepreneurs outwards. Expansion of a firm is often realised by opening an extra office, outlet, or production site. These particular examples of new firm formation are all registered as a spin-off, resulting in a high spin-off rate for areas bordering the economic heartland.

5. Model description

The next sections present a model that explains the regional variance of new firm formation rates in The Netherlands. The previous sections have shown that there is a theoretical reason to calculate two separate birth rates (the birth rate of spin-offs, and the birth rate of start-ups). Figure two shows that the regional pattern differs, and this supports the assumption that the two birth rates describe two fundamentally different processes. This should also be reflected in econometrical estimation models of the two rates. To test this, the same model is applied to the rates, expecting to differ in its results, depending of the rate at hand. Both the explanation power of the model, and its variables are expected to vary. The model has been constructed to point the differences between the spin-off and start-up processes. The variables included are expected to show this distinction. The description of the model draws heavily on the work of Storey (1994) and some of the variables used have been directly incorporated from his work.

The first factor influencing regional new firm formation rates is the age structure. People in the age category of 25-45 are most likely to start new firms (1999). Regions with an overrepresentation of this group may experience more new firm formation than a comparable region with a different age-structure of its population. This relation seems to apply for both spin-offs and start-ups, because both forms of entry can be related to entrepreneurial action of individuals.

The industrial structure of an economy also influences new firm formation. The average size of firms is correlated negatively with start-up rates (Storey, 1982; Storey, 1994; Guesnier, 1994). Small firms form a better route towards entrepreneurship than larger ones, because employers learn about every aspect of management in small firms. Entrepreneurs involved in spin-offs and start-ups benefit from backgrounds in small firms. However, small firms could be less inclined to help the gestation of a new (spin-off) company, because they lack the scope of operation that is necessary to make the proper investments. Next to the average size of firms, the distribution over the sectors is also important. Most new firm formation is situated in the spheres of service industries. An elaborate regional network in this field of economy is likely to boost

new firm formation. Trade has stronger ties with spin-offs in this dataset, because many new establishments are of large trade organisations.

Unemployment figures are a notorious predictor of new firm formation rates. Both theoretically and empirically the influence of unemployment rates has been shown ambivalent. On the one hand, rates may be enhanced because entrepreneurship forms an alternative for unemployment. On the other hand, high unemployment rates can also indicate a weak entrepreneurial climate, and a stagnating economy with little opportunities for new firms to grow and survive. Although exceptions exist, most empirical research has shown a positive relation between unemployment and new firm formation.

Economic opportunities can also be measured in the averaged income. There is a twofold relation between high incomes and entrepreneurship. A relatively high average income gives better chances on a flourishing market; there is demand basis. On top of this, income is a main source for capital, necessary for new firm formation. A region with high averaged income levels offers more opportunities for entrepreneurs, either involved with start-ups or spin-offs. On both the supply-, and demand side income positively influences new firm formation. The positive effect on spin-offs may be mitigated by capital provision of the mother company.

Universities and other research institutes have their own distinct influence on new firm formation. These organizations produce knowledge without the intention of marketing it. Quite commonly, third parties eventually market the innovations. Developed knowledge is spilled to the economic environment. In recent years, universities have taken measures into their own hands and started acting as incubators (Pace, 2002). With the help of the research institute, new firms are created around an innovation done within the mother organisation. The established new firms typically locate near the institute. Regions with a university are therefore expected to have higher spin-off rates.

The final variable included is the establishment rate, which represents the number of establishments per capita. A high establishment rate indicates a region with a relatively good service base. The market is supposed to be well served and, consequently, there is little room for new firm formation. The rate can also indicate a favourable entrepreneurial climate in a region. A high rate means that the acceptance of entrepreneurship is probably high. From these notions spin-off rates are supposed to correlate negatively with the establishment rate, because investments of existing companies are likely to be clustered in those regions with the most opportunity for development. In contrast to start-ups, spin-offs firms have the means to investigate the best places to start. The mother company is likely to place their investment in the best places, and the gestation process will be more structured on average than individual start-ups.

Especially new outlets will be opened in areas with the lowest relative service density after a careful market analysis. Places with the best market opportunities have higher propensities to be the founding site of a spin-off. Start-up rates, on the other hand, are influenced in a positive way, because a high acceptance of entrepreneurship leads to more entry. Carrol and Hannan (1999) call this phenomenon the legitimation of entrepreneurship. Individual entrepreneurs usually start their new firm close to their place of residence (Hayter, 1997), which keeps the effects form spilling over to adjacent regions. Table 1 summarises the expected relations.

Variable	Spin-off birth rate	Start-up birth rate
% Inhabitants 25-45	+	+
% Firms <10 employees	+	+
% Firms in service industry	+	+
% Firms in manufacturing	+	0/-
% Firms in trade	+	0/-
Unemployment rate	0	+/-
Average income	0	+
University in region (yes/no)	+	0
Establishment rate	-	+

Table 1: expected relations

6. Modelling techniques and data

The estimations have been made in the form of a logit regression model, because the birth rates vary between 0 and 1. Two statistical packages have been used to solve the models. First, models have been calculated with the standard logistical regression function in SPSS with a correction term for the distribution which takes the form of a *sigmoid curve*. Second, the GLMLAB-package has been used. This statistical program allows a regression to be calculated with a binomial distribution for the error term of the *y*-values, hereby eliminating the distribution problem. This suits the purpose of the model best and the results from this approach are presented in the paper. Additional results from the logit regression have been included in appendix A.

The data used for the explaining variables are all derived from general economic overviews of the Dutch statistics office. The variables have been collected on the level of COROP-regions, a particular regional division based on functional regions. The internal economic interdependence of the regions mitigates the problem of distortion due to spatial autocorrelation effects. The Netherlands include 40 COROP-regions.

7. Results

Two kinds of analyses have been conducted. First of all, the internal consistency is tested by comparing two years independently. The second analysis aims at describing the differences

between the 'new' and 'traditional' birth rates, which include all new firm formation; these figures do not discriminate between founding types. This analysis uses the pooled models for both years.

Variable	Spin-off 2000	Spin-off 2001	Start-up 2000	Start-up 2001
C	-20.31	-24.02	-5.445	-0.1795
% Inhabitants 25-45	7.742**	10.09**	2.328**	1.483**
% Firms <10 employees	14.11**	19.80**	-0.184	-7.194**
% Firms in service industry	-1.073**	3.537**	3.882**	2.664**
% Firms in manufacturing	7.583**	6.366**	-2.488**	-2.163**
% Firms in trade	1.773**	1.632**	-1.652**	0.022
Unemployment rate	11.89**	1.161*	-11.79**	0.591
Average income	0.148**	-0.1662**	-0.059**	0.012*
University in region (yes/no)	0.077**	0.022*	-0.041**	-0.115**
Establishment rate	-22.32**	-7.441**	8.979**	10.82**
Deviance change[4]	0.57	0.66	0.69	0.81

Table 2: Results
** significant at 5% * significant at 10% (two tailed)

Table 2 shows the results for spin-off rates and start-up rates in the years 2000 and 2001. The last row shows the overall performance of the models, expressed in the deviance rate, which conveys the relative reduction of the total variance. This measure is roughly comparable to R^2-values, the usual measure of the performance of regression models. The explained variance is considerable, ranging from 57% to 81%. These levels are similar to R^2-values found in other studies on regional variation in start-up figures (e.g. Storey, 1994). The internal consistency over the years looks decent, but irregularities do exist. Especially the unemployment rate appears to be a confusing variable, underlining once more its unclear influence on new firm formation. In the year 2000 its influence on the spin-off rate is large, in 2001 the positive influence has declined considerably. Unemployment is strongly, negatively associated with start-up rates in 2000, whereas it has a non-significant positive influence in 2001. The influence of income seems unclear as well, as the sign changes for both rates. The overall effects however seems to be rather small, although significant in all cases.

Most interesting however, are the differences between the spin-off models and the start-up models. It seems clear that the effects of the explaining variables differ indeed, even though not always as expected. The share of small firms deviates most notably from the theoretical paths, as its effect on the start-up birth rate is negative in 2001. The establishment rate proves its merit for both models quite convincingly. There is a strong correlation with both the spin-off rate and the start-up rate, but with opposite signs. This result adds to the idea that spin-offs occur in a

[4] Relative share of the explained variance compared to the initial variance of the dependant variable

more programmed fashion than start-ups, which are strongly influenced by the entrepreneurial milieu in a specific region. Universities too have an effect consistent with the theoretical expectations, although the impact seems rather weak. Start-ups are even slightly, but significantly, negatively correlated with the presence of a university. Bais (1999) shows that the inclination to start a new firm is relatively low for individuals that have attained the highest level of education. This effect could slightly reduce the birth rates in university regions. The influence of the sector structure once again shows the positive influence of the service industry on birth rates. It is easiest to start a new firm in this specific sector. Industry and trade, however, do offer sufficient possibilities for spin-offs to start in.

Table 3 shows the 2-year-pooled model for the spin-off birth rate, the start-up birth rate, the overall founding rate based on the stock of firms, and overall founding rate based on the labour market population.

Variable	**SO00-01**	**St00-01**	**FRst00-01**	**FRlm00-01**
C	-24.68**	3.663	-6.020**	-10.74**
% Inhabitants 25-45	7.802**	2.001	4.644**	4.777**
% Firms <10 employees	20.29**	-6.974**	2.833**	4.070**
% Firms in service industry	2.137	3.009**	2.839**	2.553**
% Firms in manufacturing	4.929	-1.758	0.597	0.767**
% Firms in trade	1.723	-0.3458	0.5159**	-0.58**
Unemployment rate	1.947	-4.666*	-2.143**	-1.761**
Average income	-0.04796	-0.04172	-0.045**	0.0159**
University in region (yes/no)	0.03881	-0.0894*	-0.054**	-0.045**
Establishment rate	-10.25**	-5.220**	-7.227	4.343**
Year correction dummy	0.1483*	-0.0659	0.010**	-0.0896**
Deviance change	53.7%	56.0%	74.8%	86.0%

Table 3: Comparing birth rates

It is striking to see that the pooled models perform worse in terms of deviance change than either of the single-year-models of spin-off rates and start-up rates. Most importantly however does Table 3 show that the model best fits the overall birth rates. From a theoretical point of view this result is rather awkward. It was expected that leaving out the spin-offs would result in a pure individual start-up rate which is better connected to the explaining variables, being based on considerations related to the individual decision to start a new firm. Note that the influence of some variables varies, depending on the kind of overall founding rate that has been calculated. This is in accordance with Storey (1994), who points out the inconsistency of both rates.

8. Conclusion

New firm formation is normally regarded as a uniform process. This is reflected in the use of one birth rate in the description of regional variance in new firm formation. Several studies have already shown that new firms come about in many ways and that it may be oversimplified to regards all new firms as the outcome of the same process. This paper gives a first overview of the possibilities a distinction between birth rates can offer. On the basis of the influence of existing firms on the gestation of new ones, a two-fold distinction is proposed. The distinction has been made explicit in two different birth rates, the first based on individual firm formation, and the other on firm influence firm formation. The birth rates show very particular patterns in The Netherlands; Individual entrepreneurship is concentrated in the economic heartland of the country, whereas firm influenced new firm formation has its peak in the bordering regions. This specific pattern may indicate that spin-offs are the carriages of spill-over effects.

The regional dispersion patterns observed give additional proof to the assumption that the birth rates indeed describe two distinct processes. This is also featured in the estimation models ran in the paper. The influence of the same variables on the two birth rates differs remarkably. Unfortunately, the models show too little internal consistency to draw robust conclusions about the impact on both figures. Further research should focus on the question which variables should be used to estimate the regional occurrence of spin-offs, much like the theoretical framework that has already been built for individual entrepreneurship. Firm influence new firm formation seems to be different from individual new firm formation, but to what extent and in which factors this is shown is still rather unclear.

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Appendix A

Results from logit regression analysis in SPSS, using a weighing term for the error terms.

Variable	Spin-off 2000	Spin-off 2001	Start-up 2000	Start-up 2001
C	-15.291	-18.513	-7.825	-1.097
% Inhabitants 25-45	8.616**	8.442**	2.358	2.149*
% Firms <10 employees	7.586	15.597**	2.493	-6.510**
% Firms in service industry	-4.007	.518	3.871**	2.622**
% Firms in manufacturing	5.868	1.999	2.121	-2.386
% Firms in trade	2.030	-1.219	-1.279	0.693
Unemployment rate	19.865**	3.743	-12.321**	0.847
Average income	0.259**	-1.42*	-0.007	0.0053
University in region (yes/no)	0.134	0.08	-0.003	-0.124**
Establishment rate	-23.797**	-5.885	7.122	11.068**
R^2	0.388	.425	0.546	.745