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Start-up activity in Groningen and the Northern Netherlands: Evolution, job creation potential, and founders' socio-economic background

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Managementsamenvatting

Het rapport 'Start-ups in Groningen en Noord-Nederland' bevat een breed scala aan gegevens en analyses die richting kunnen geven aan het beleid rondom start-ups en ondernemerschap in bredere zin. Het rapport gaat in op het toenemend belang van ondernemerschap voor het welzijn en de economische ontwikkeling van regio's op verschillende geografische niveaus.

Het aantal start-ups, dat wil zeggen nieuw opgerichte bedrijven die hun oorsprong vinden in de eigen regio, is de afgelopen jaren toegenomen. Alleen tijdens de economische crisis stagneerde deze groei tijdelijk. Onze studie laat zien dat de groei in het aantal start-up activiteiten ongelijk verdeeld is over de drie noordelijke provincies. In de provincie Groningen was er een opvallende toename van het aantal start-up activiteiten, ondanks een lichte daling van de werkzame beroepsbevolking.

Wanneer we verder inzoomen, worden er ook lokale verschillen zichtbaar. De stad Groningen blijkt, zowel in relatieve als in absolute zin, een verzamelpunt van start-ups binnen de noordelijke provincies. Ook in vergelijking met steden van vergelijkbare grootte en met een vergelijkbare regionale functie elders in het land, vindt in Groningen een bovengemiddeld aantal start-up activiteiten plaats. In de grote steden in de randstadregio zijn er gemiddeld nog meer start-up activiteiten.

De verschillen tussen steden en dorpen in Noord-Nederland blijven relatief constant door de jaren heen. Gemeenten die eerder uitblonken met een groot aantal start-ups, blijven in de loop der jaren bovengemiddeld presteren. Deze constante patronen duiden erop dat beleid om start-ups te stimuleren pas op de lange termijn vruchten af zal werpen.

Verder laat het rapport zien dat er veelal een geruime tijd overheen gaat voordat een start-up nieuwe banen genereert en dus bijdraagt aan de werkgelegenheid. Het potentieel wordt pas benut als de onderneming de start-up fase al voorbij is. Het aantal nieuwe banen is daarnaast geconcentreerd binnen een klein aantal bedrijven. In andere woorden: slechts een klein deel van de start-ups genereert het grootste deel van de latere toename in werkgelegenheid. Daarbij moet opgemerkt worden dat in absolute zin juist de kleine start-ups, zo genaamde zelfstandige zonder personeel (ZZP-ers), het meeste bijdragen aan de groei in werkgelegenheid. Door hun kleine aantal is het absolute aantal banen dat gegeneerd wordt door snel groeiende start-ups beperkt. Analyses van de gemeente Groningen laten zien dat gedurende het afgelopen decennium werkgelegenheid verschoven is van grotere bedrijven naar micro bedrijven. De beperkte groei van start-ups in combinatie met het grote aantal dat er niet in slaagt het hoofd boven water te houden zou op een draaideur-mechanisme kunnen wijzen, waarbij een groot aantal start-up activiteiten nauwelijks

bijdraagt aan de economische ontwikkeling. Bij het maken van beleidskeuzes lijkt een focus op kwalitatief hoogwaardige start-ups op basis van bovenstaande gegevens het meest efficiënt om werkgelegenheid te bevorderen.

Gelet op toename in werkgelegenheid dat gegenereerd wordt door lokale start-up activiteiten, zien we dat start-ups in de provincies Groningen en Drenthe gemiddeld minder nieuwe banen creëren dan hun evenknieën elders in het land. Friesland verschilt op dit punt niet met de rest van Nederland. Onze resultaten wijzen erop dat de lagere toename in endogene werkgelegenheid in Groningen en Drenthe te wijten is aan de specifieke industrieën waarbinnen de start-ups ontstaan. De resultaten laten zien dat in deze twee provincies in sectoren met de meeste mogelijkheden om werkgelegenheid te creëren het aantal start-ups juist achter blijft. Een belangrijk resultaat is dat het aantal start-ups in de maakindustrie in de provincie Groningen laag is. Dit zou een punt van aandacht kunnen zijn, omdat aangetoond is dat regio's met een gediversifieerde economie beter in staat zijn economische schommelingen op te vangen.

Analyses van ondernemerschap in de gemeente Groningen laten zien dat het steeds moeilijker wordt het groeiende potentieel aan ondernemerschap te vertalen in start-ups die daadwerkelijk bijdragen aan lokale economische ontwikkeling. Bovendien, groeien de overlevingskansen van start-ups die langer bestaan niet. Het is daarom raadzaam om de overlevingskansen van start-ups nauwgezet te monitoren en verder onderzoek te doen naar mogelijke barrières voor hun verdere groei. Daarnaast vertrekt een aanzienlijk deel van de start-ups uit de gemeente Groningen. Deze verhuizingen zouden gemonitord kunnen worden om te zien of dit een trend in ontwikkeling is.

Ook laat dit rapport zien dat vooral start-ups die zijn opgezet door hoogopgeleide ondernemers bijdragen aan de werkgelegenheid. Beleid zou zich kunnen richten om dit potentieel verder te benutten. Verder krijgt vrouwelijk ondernemerschap onvoldoende ruimte om zich te ontwikkelen. In de drie provincies is dan ook een duidelijk gender-kloof waarneembaar. Net als in de rest van het land is deze kloof juist het grootst in de bedrijfstakken met het grootste groeipotentieel. Nog zorgelijker is het feit dat de relatie tussen opleidingsniveau en toegenomen werkgelegenheid alleen onder mannen en niet onder vrouwen gevonden is. Hoogopgeleide vrouwen als doelgroep lijkt een nog niet aangeboorde bron van ondernemerstalent die toekomstige start-up activiteiten zou kunnen stimuleren.

Ten slotte clusteren start-up activiteiten zich, dit blijft niet beperkt tot de gemeente- of provinciegrenzen. In die zin kan het beleid van verschillende verantwoordelijke overheden complementair aan elkaar zijn, mits dit goed wordt afgestemd. Gezamenlijke coördinatie is daarom aan te raden. Daarnaast kan door nauwgezette monitoring van bestaande initiatieven, programma's

en instrumenten overlap worden voorkomen. Terwijl de gemeente Groningen een voortrekkersrol speelt in de ontwikkeling van start-up activiteiten in aangrenzende gebieden in het zuiden, is de stad tot nu toe niet in staat gebleken een dergelijke rol op zich te nemen voor gebieden ten noorden en noordoosten van de stad.

Management summary

Start-ups in Groningen and the Northern Netherlands contains a wide range of data and analysis designed to inform policy on start-ups and entrepreneurship in a wider sense. This report reflects on the ever increasing importance of entrepreneurial activities for the wellbeing and economic development of regions at various levels.

Start-up activities, defined as new business formation activities that originate endogenously from within the region, have been increasing over time only discontinued by the economic crisis. Our study reveals that growth in start-up activities differ between the three Northern provinces, with the province of Groningen exhibiting a major increase in start-up activities despite a modest decrease in economically active population.

At a smaller geographic level we identify pronounced local differences. The city of Groningen turns out to be the center of start-up activity within the Northern provinces, both in absolute and relative terms. Interestingly, also in comparison with cities of similar size and function in other parts of the country, the city of Groningen performs well in a relative comparison. At the same time, the large cities in urbanized areas tend exhibit much higher levels of start-up activities.

Among the cities and towns of the Northern provinces, the observed differences are especially persistent over time. Municipalities that performed well in terms of start-up activities in the past are likely to perform well in the future. The strong levels of persistency and underlying path-dependencies suggest that policy-induced changes are likely to be only visible in the long run.

Similarly, this report documents that it requires, on average, a substantial amount of time for start-ups to create jobs. Much of the job creation potential of start-ups is only realized at times at which one would not consider a firm to be a start-up anymore. In addition, job creation among new businesses is highly concentrated – only a small share of newly created businesses is responsible for most of subsequent employment contribution. However, in absolute terms most new jobs are generated in micro start-ups which themselves do not tend to create additional employment over time, and the employment contribution of high growth businesses is limited due to the small number of firms that fall into this category. We document in a separate analysis for the municipality of Groningen that much of the employment shifted from larger companies to micro enterprises over the last decade. Low growth and high-failure rates among the micro-enterprises combined with high number of entries within this firm size category may suggest a revolving door regime in which a lot of entry activities occur that have only little impact on economic growth. With an increasing number of

start-ups and limited availability of public resources a focus on high-quality start-ups seems legitimate.

With respect to the endogenous job creation, we document that entrepreneurs in Groningen and Drenthe create, on average, less jobs than their counterparts in the other provinces. For Friesland we do not find such a differences vis-à-vis the rest of the country. Our results suggest that the lower endogenous job creation in the province of Groningen and Drenthe can be attributed to a different industry composition with respect to the entrepreneurial activities. The findings indicate that entrepreneurial activities in sectors that promise high levels of job creation are underdeveloped in these two provinces. An especially noteworthy finding is that start-up activities in the manufacturing sector are very low within the municipality of Groningen. This may be worrying since a diverse economic structure has been proven to be beneficial to deal with economic shocks.

Separate analyses for the municipality of Groningen indicate that it becomes increasingly difficult to translate the increasing entrepreneurial potential into start-up activities that are especially beneficial to support regional development. In addition, survival chances tend not to increase when new start-ups mature. Close monitoring of the future development of survival chances of start-ups and further investigations into potential barriers is advisable. In addition, a significant share of start-up relocates and leaves the municipality of Groningen. Monitoring the relocations over time is suggested to figure out if this issue becomes increasingly important.

This report also documents that especially firms started by highly educated founders exhibit above average job creation potential. Tailored policies to utilize this potential may be of special importance. Next, the data provides strong evidence that the potential of women entrepreneurs is not fully exploited. The three provinces exhibit a pronounced gender gap, which tends to be stronger among businesses with pronounced employment growth (as does the rest of the country). Even more worrying is that the association between education and job creation of entrepreneurs is only found for male but not female run businesses. This target group, female and highly educated, seems to be an especially promising source of entrepreneurial talent for stimulating future start-up activities.

Finally, clustering of start-up activities, for example in the Assen-Groningen area, does not adhere to boundaries of municipalities or provinces. The existence of complementarities between responsible authorities and complementarities between policy instruments calls for increasing coordination. In turn, close monitoring of existing initiatives, programs, and instruments may allow avoiding duplicate efforts. Interestingly, while the municipality of Groningen acts as a driving force for bordering areas especially in south to the city borders, it is not sufficiently taking on such a role for the areas to the north and the north-east.

1. Introduction¹

The aim of this report is to provide an overview and analysis of data related to start-up activity and the broader entrepreneurial phenomenon in the municipality of Groningen and the Northern Netherlands. Public support of entrepreneurship is found at various levels of which the regional level may be an especially relevant one because of the proximity and manifold interrelations between the different actors. The existence of public support of entrepreneurship is owed to perceived market failures and the promise of favorable regional economic development. This report contains a collection of analysis that should help to put start-up activities in the Northern provinces into perspective and help to identify trends, developments, and maybe bottlenecks that may require the attention of stakeholders.

1.1 Scope of this work

The definition of start-ups is not straight forward. A standard dictionary like Merriam Webster suggests that a start-up is simply 'a new business' – this definition is also commonly applied in the academic literature in which a start-up refers to a company in the first stage of the life cycle (Hamilton, 2012). Policy makers, international organizations like the OECD, and academics often refer to such a definition of start-ups when they talk about new business foundations. However, the term 'start-up' is also frequently used in a more specific manner. For example, especially in technology media, the term start-ups tend to be used to describe small technology oriented companies determined to grow fast (cf. Lapowsky, 2014). Similarly, investors tend to refer to companies originating from entrepreneurial founders that are in their first stages of operations. Yet other academics and venture capitalists highlight that the term should be limited to new ventures that experienced a certain growth. Next, there are some that use the term in very specific manner linked to employment, revenue and company value figures. Finally, some connect start-ups to innovativeness and novel technologies or other aspects like scalability (of production). However, especially the last aspect, scalability, is commonly considered to be only a characteristic that a startup may have or not have (e.g. a scalable start-up refers to a new venture that employs a scalable business model) while the innovativeness aspect is by some considered to be a precondition for an organization to be considered a start-up. From this short overview it becomes easily visible that there is not the one, agreed-on, definition of start-ups. In fact, it seems that the definition of a start-up varies according to the context in which it is used. The relevant question for this overview is consequently, which is the best working-definition in the context of this work. In this respect the

¹ We gratefully acknowledge the input and support of Karel Bolt, Saskia Bosch, Ferdi Hendriks, Yvonne Hage, Jeanine Vosselman, and Frits Wijbenga.

more generic literature on entrepreneurship can provide a first attempt to learn about the aspects that relevant to the context of regional growth.

Literature on entrepreneurship in economics and related social sciences tends to differentiate types of entrepreneurship according to (i) the relevance of innovation, (ii) the impact of entrepreneurship, the phase in the start-up process, (iii) the organizational form, and (iv) earlier experiences and the number of founders (cf. Baumol, 2004, Parker, 2009, Wennekers and Thurik, 1999). The overlap regarding the dimensions of entrepreneurship that have been used to classify types of entrepreneurs with the contemporary uses of the term “start-ups” is evident. However, in the context of economic growth some attributes seem to be especially relevant: innovativeness and the impact of entrepreneurship. These two dimensions of entrepreneurship tend to be discussed in the literature with one common denominator, which is the underlying (radical) change. This process comprises a high level of novelty, is equilibria disturbing, and is often accompanied by a process of Schumpeterian creative destruction in which incumbent businesses make place for new ones (cf. Noseleit, 2013).

In essence this work aims to capture this phenomena of new business foundation that has the potential to positively influence local economic development. To achieve this we employ a holistic perspective that aims to look at various facets of start-ups: the dynamics of start-ups over time, the potential of job creation by entrepreneurial activities in an interregional comparison, and the underlying individuals and their characteristics.

With respect to the geographic focus, this works attempts to pay attention to the three Northern provinces of the Netherlands and especially to the city of Groningen – which is commonly considered to be the economic center regarding a variety of factors.

1.2 An attempt to define start-up activity

As noted above, for statistical purposes, start-ups are commonly defined as newly founded businesses. Since national statistical offices apply different definitions regarding what is a newly founded business, inter-regional comparisons of start-up rates tend to be difficult (Vale, 2006). Next, in other contexts start-ups refer only to a small group of newly founded businesses, i.e. commonly those that experienced certain growth. Off course it would be ideal to be able to identify these newly founded, high-growth businesses for statistical benchmarking purposes; however, this is a highly problematic endeavor. Since economists and business scholars have been notoriously bad at predicting growth in newly founded businesses, it is basically impossible to identify the high-growth start-up at the time of its foundation. Approaches to define start-up activities based on past growth

or survival, are – by definition- *ex post*. This is problematic since comparative numbers based on such *ex post* figures may rather represent differences in overall regional economic trends, differences in the size of the home market, inter-regional sectoral difference, or inter-regional differences in labor costs causing heterogeneity in capital-labor ratios. Next, due to broad availability by statistical offices, employment based approaches to identify high-growth start-ups are more common than, for example, revenue based approaches. Among newly founded start-ups, so called “Gazelles”, young high-growth firms in terms of employment, are often used to provide comparative data on high-growth start-ups. However, in the last decades scale-disadvantages are becoming of less concern due to new technologies in many sectors and more and more business models are scalable with modest increase in labor inputs. Similarly, the traditional boundaries of the firm seem to be under pressure: collaborations among independent economic agents are becoming increasingly important, increasing and wide availability of specialized business services provide ample substitutes to in-house provision, and quickly changing, often project based team compositions often replace traditional, long-run labor market relationships.

Because (i) *ex ante* identification of new businesses that impact regional development is hardly possible, and because (ii) employment-growth based *ex post* figures may not allow for an insightful interregional comparison and (iii) are not reflective of technology-induced changes of the minimum efficient scale of many businesses accompanied with an erosion of the traditional boundaries of the firm, we employ a rather broad definition of start-ups. However, instead of covering all newly founded businesses, our definition emphasizes the endogenous entrepreneurial potential. This means, that economic independence is the crucial common denominator which is applied in throughout this report. A start-up is consequently a newly founded business which is a result of the endogenous entrepreneurial potential of a region and we disregard new economic entities as, for example, subsidiaries and branches. We believe that this approach is most insightful since policies to support start-ups are most likely targeting this basic population of new businesses. When useful, we also apply more restrictive definitions and focus for example on definitions using *ex post* criteria, like survival, since these criteria are less sensitive to the issues described above when relying on employment growth. Instead of using past employment growth as a restriction criteria for defining start-ups we rather try to explain differences in employment creation among start-ups and across regions. This approach aims to provide a more holistic perspective on “Start-up activity in Groningen and the Northern Netherlands”.

Box 1.1: Defining start-ups

For statistical purposes start-ups commonly refer to newly founded businesses and official data from the OECD or EUROSTAT rely on data provided from national statistical offices which in turn use own definitions of what comprises a newly founded business. Often start-up rates derived from national data sources are hard to compare (cf. Vale, 2006). However, especially in technology media, when referring to start-ups one often has in mind a young, high-growth firm. Such a definition can convincingly only be applied in an ex post setting, i.e. after some years when a firm is not that young anymore we finally have evidence that this firm indeed used to be a start-up. Such ex post definitions are difficult to compare across regions and are likely to be not very informative and reflective of a regions start-up activities. Furthermore, ex post definitions of start-ups that use previous employment growth tend to be unreflective of technological change that crumbles scale advantages and an erosion of the traditional boundaries of the firm. Since it is often unknown which firms provide essential contributions to regional development, a broader definition of start-ups seems to be adequate. However, it is not useful to consider all newly founded businesses when comparing start-up activities across time and space. Since start-up activities are commonly supposed to reflect the local entrepreneurial potential it is crucial to capture this 'endogenous' potential by focusing on the new independent economic actors and exclude new market entrants as branches and subsidiaries.

1.3 Structure of this report

This report is structured as follows. Section two will shortly discuss recent developments regarding start-up activities in the three Northern provinces over time and the spatial distribution at the level of municipalities. In this section we also look at the job creation potential of start-ups over time and the regional persistence of start-up activities. In section three we analyze the endogenous job creation potential in the North, i.e. originating from the own entrepreneurial potential of the Northern provinces, and compare it to the rest of the country.

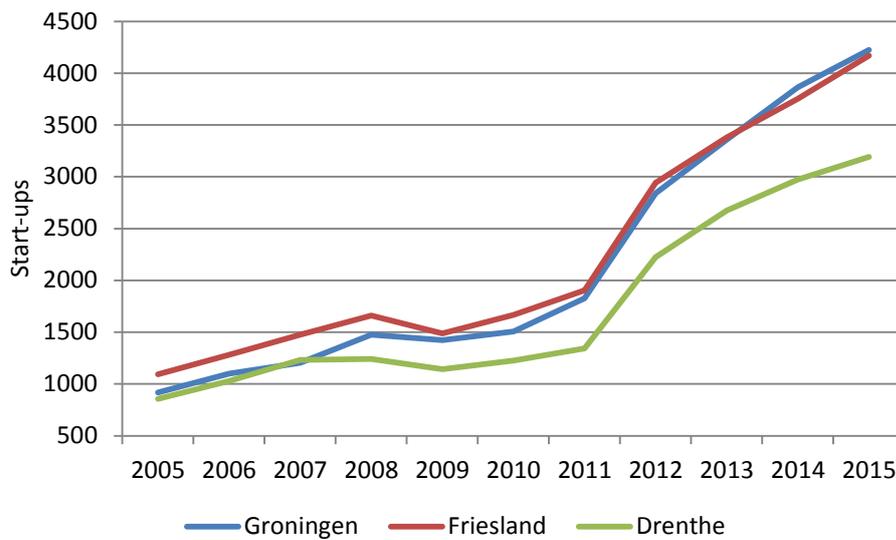
2. Recent developments in start-up activities

From a methodological perspective we define start-ups as all newly founded businesses excluding foreign companies, public and non-profit and branch organizations, organization for which the legal form was unknown, subsidiaries and businesses directly and indirectly majority owned by other companies. Next, we limited the sample of firms to those for which information was provided about employment – this may also contain estimates. This leaves us only with a portion of all new businesses that are registered – but it better reflects the growth relevant, endogenous new business formation activities. Table A1 in the appendix provides an overview of the single restriction criteria. The data that is used for this section, with the exception of section 2.5, is based on the Orbis database. We have to assume that exclusion criteria do not structurally differ across one of the relevant dimensions of our analysis. This assumption could be violated, for example, if information about the legal form is structurally more often missing in one province than another one. However, to the best of our knowledge we do not have any reason to believe that there are major structural differences that would cause a strong bias.

2.1 Start-up activities over time

While interregional comparisons are often difficult – especially across country borders – due to different national classifications, studying the changes of start-up activities over time within a certain area for which similar definitions can be applied is often a very insightful exercise. This section displays the evolution of start-up activities in the three Northern provinces throughout the time period 2005 to 2015. In Figure 2.1.1 we document the absolute number of start-ups founded each year for Groningen, Friesland, and Drenthe. We find that the three provinces experience a positive trend that is only discontinued in between 2008 and 2011. It is likely that this effect is caused by the economic crisis. Another interesting insight from Figure 2.1.1 is that all provinces exhibit high similarities regarding the evolution of start-up activities over time. There are some notable differences in the levels of start-up activity. Until 2012 Friesland exhibits the most start-ups in absolute terms. The other two provinces, Groningen and Drenthe, have relatively fewer start-ups in the years 2005 to 2007. From 2007 onwards the province of Groningen experiences a pronounced increase in start-ups and catches up to Friesland quickly. In the years 2014 and 2015 there are more start-ups in Groningen than in Friesland in absolute terms.

Figure 2.1.1.: Start-ups in the Northern provinces, 2005 to 2015



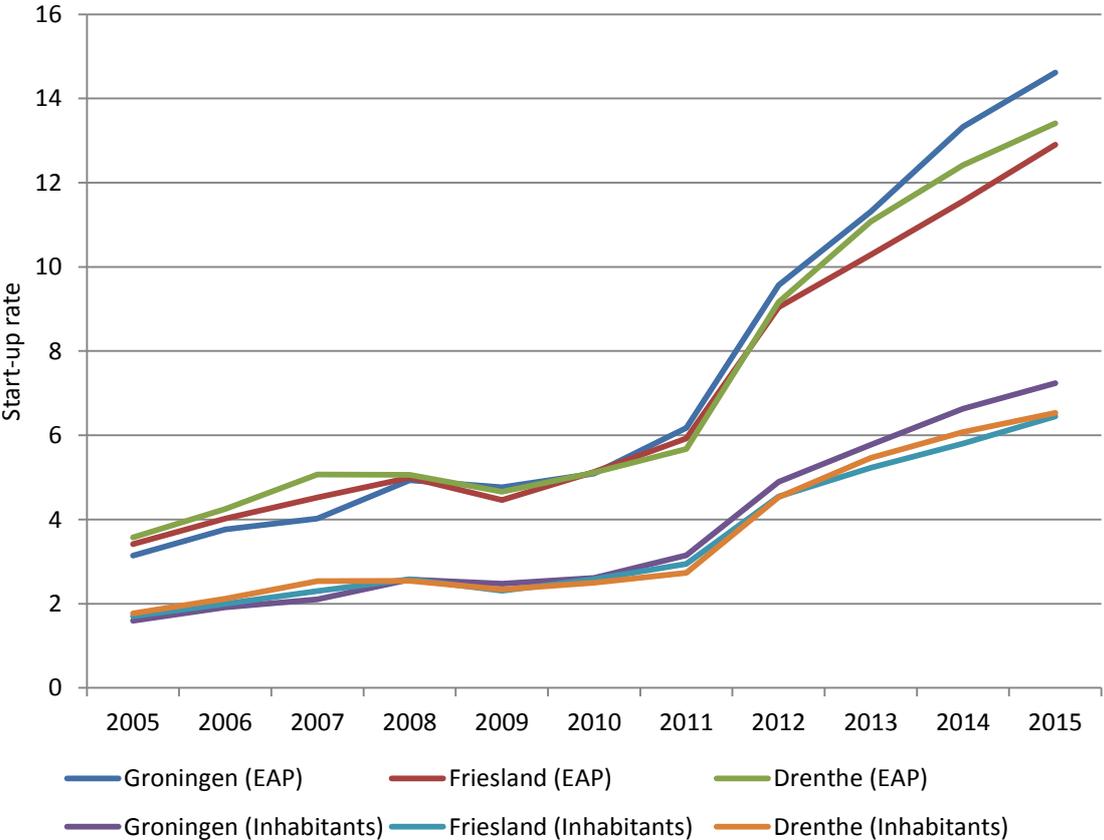
Box 2.1 Start-up rates - the labor market and the business population approach

Comparing absolute numbers of start-ups across regions would be highly misleading. Start-up rates are commonly used to make start-up activities comparable across different regions.

There are two different approaches that are commonly used to calculate such start-up rates. The labor market approach examines the number of start-ups relative to the population active in the labor market (often employment is used as a proxy). The business population approach puts the number of start-ups in relation to the existing number of existing businesses. This model is also termed ‘ecological approach’ since it considers newly started firms relative to the existing population of firms. The labor market approach is especially interesting from a start-up perspective, since every newly founded venture is started by someone. In the labor market approach this ‘someone’ is commonly assumed to be an individual from the same spatial entity, i.e. a start-up in Friesland is founded by individuals located in Friesland, and individual entrepreneurs in Drenthe are assumed to start their firm in the province of Drenthe. When calculating start-up rates using the labor market approach, the underlying spatial entities need to be sufficiently large to make this assumption reasonable.

Since the provinces differ considerably in terms of number of inhabitants, absolute numbers might be misleading. For comparison purposes it is common to calculate start-up rates, either based on the *labor market approach* or the *business population model*. For this report we apply the *labor market approach*, i.e. we divide the number of start-ups by the economically active population (in 1000) and – alternatively – by the number of inhabitants. Figure 2.1.2 shows the development of start-up rates between 2005 and 2015. It becomes visible that Drenthe, which is the lowest populated among the three Northern provinces, has the highest start-up rates until 2008, followed by Friesland and Groningen. The crisis effect – causing the previous growth in start-up rates to drop significantly - is more visible when referencing start-ups relative to the economically active population. While start-up rates turn out to be rather similar during the economic crisis, Groningen experiences significant growth in the start-up rates in the aftermath of the economic crisis. This finding is independent to the normalization that we use. However, one of the reasons that Groningen is doing especially well in terms of start-up rates that are calculated according to the labor market approach is a somewhat stronger decrease in economically active population since 2013 relative to Drenthe and Friesland.

Figure 2.1.2.: Start-up rates in the Northern provinces, 2005 to 2015

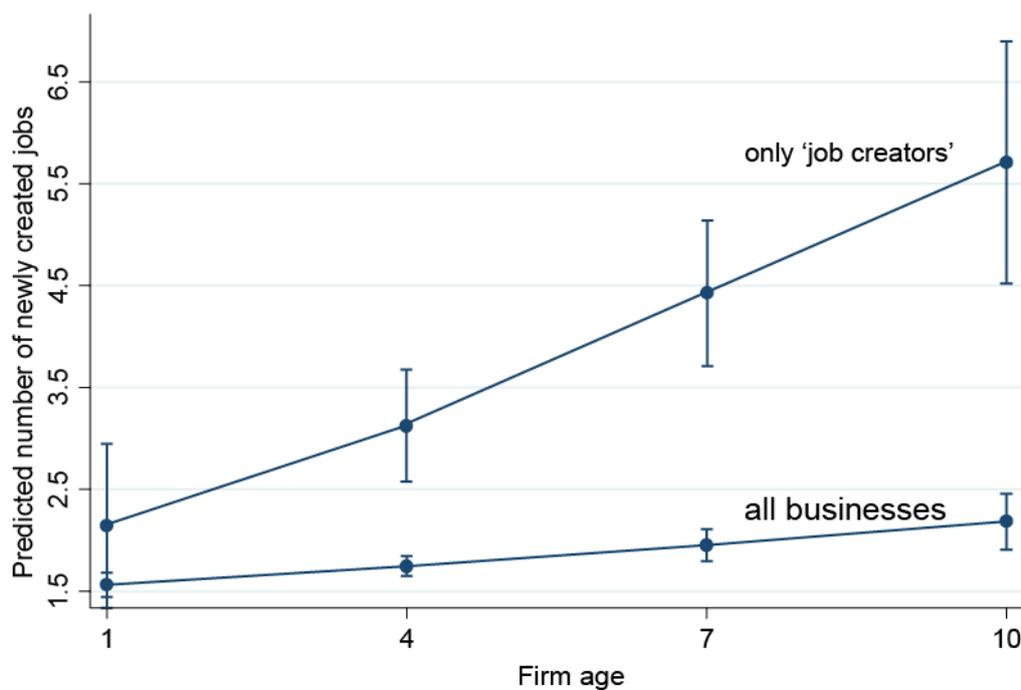


Note: “EAP” indicates that start-up rates normalize the number of start-ups per province relative to the “Economically Active Population” (in 1000) and “Inhabitants” indicates normalization over the number of inhabitants (in 1000) .

2.2 Firm age and job creation

Start-ups require time to unfold their potential in terms of job creation. Based on the employment information and the time that has passed after the first year of incorporation, we provide estimates on how many jobs are created after a certain period of time. In figure 2.2.1 we report estimates based on a Poisson regression. The dependent variable is the number of employees and the central variable of interest is the firm age. The predicted number of jobs increases almost proportionally with the number of years after start-up. We ran separate estimations for the whole sample (all businesses) and a subsample in which we consider only the job creators, that means only firms that hire additional employees.

Figure 2.2.1: Job creation in start-ups over time



Note: Prediction based on a Poisson regression. Central variable of interest is firm age. Whiskers represent 95% confidence intervals.

With increasing firm age we observe also increasing heterogeneity across firms in terms of employment generation. It is likely that there are two mechanisms at place. First, market selection that follows a survival of the fittest trajectory makes is very likely that firms with higher growth chances are staying in the market. Second, newly founded firms may require some time to establish themselves in the market and learn about their minimum efficient scale and consequently create jobs only sometime after they formally started their operations. This observation is itself not very surprising, but in the context of policy instruments that are targeted at start-ups it signals that a

substantial amount of time may be required to accompany a new firm until the time is reached when its full job creation potential unfolds. Here, it can be problematic that start-ups are commonly only considered start-ups when as long as they did not exceed a certain age. This aspect is also relevant when it comes to quantifying the employment effects of start-ups. In fact, earlier research suggests that much of the impact of start-ups on regional employment growth occurs only after a significant amount of time (cf. Fritsch & Noseleit, 2013a)

We also observe significant heterogeneity across firms. The average job creation across all firms is relatively low – and this result is mainly driven by solo-self-employed that do not create any additional jobs. In fact, when considering all businesses we observe that average number of newly created jobs increases from about 1.6 to around 2.2 over the time span of one decade. We also observe that few companies generate most of the new jobs. If we look at the job creation of firms that hire at least one additional employee, we observe that these firms create on average 5.6 jobs over a decade. Also in this case we observe that job creation requires time. Finally, we also observe pronounced industry heterogeneity in additional analysis that are not reported here for brevity. Over time, job growth is especially pronounced in the transport, telecommunications, and manufacturing sector – and to a lower degree also in trade and some other service sectors like hotels and restaurants.

2.3 Regional distribution of start-up activities

In this section we provide a more detailed picture of start-up activities across space. We do so by displaying spatial differences at a more disaggregate level. We first focus on the spatial distribution of start-ups in the three Northern provinces at the level of cities. We focus on cities² since this spatial level seems to be most adequate to provide an overview of start-up activities at a small scale level that is still meaningful. In a national comparison big cities are a rare phenomenon within the Northern provinces of the Netherlands. Among the largest 80 municipalities only three are located in the North (Emmen, Leeuwarden, and Groningen). With Groningen being the only city in the Northern provinces that finds a place in the top ten of Dutch cities in terms of population. Also independently of administrative borders, the Northern provinces are – in a relative perspective - not very densely populated. However, entrepreneurship is often considered to be a phenomenon of agglomerated areas (Bresnahan, Gambardella and Saxenian, 2001; Acs and Varga, 2006). While the three Northern provinces are not densely populated areas especially in comparison to the Western part of the country, they – as well – exhibit a very pronounced skewed distribution of the population.

² For simplicity we also include towns that do not fall under the common classification of cities in the Netherlands. In this case this refers to Drachten.

In order to identify the local ‘hot-spots’ of start-up activity table 2.3.1 displays overall start-up activities in 2015 and start-up rates for each city. Please note that start-up rates are calculated relative to the number of inhabitants and not the economically active population. Next, at such a small geographical level, it is more likely that the denominator used for start-up rates is more likely to be flawed, since it may happen more often that individuals that, for example, do not live in the city of Groningen may very well decide to start their venture in this particular city.

Table 2.3.1: Regional distribution of start-up activities (2015)

Rank	City	Freq.	Percent	Inhabitants	Start-ups per 1000 inhabitants
1	GRONINGEN	2,021	16.7	200,997	10.05
2	LEEWARDEN	793	6.55	107,902	7.35
3	ASSEN	474	3.92	67,073	7.07
4	EMMEN	347	2.87	107,620	3.22
5	DRACHTEN	280	2.31	45,068	6.21
6	HEERENVEEN	254	2.1	50,273	5.05
7	SNEEK	246	2.03	33,700	7.30
8	HOOGEVEEN	237	1.96	55224	4.29
9	MEPPEL	201	1.66	32791	6.13
10	HAREN GN	127	1.05	19089	6.65
Total		4980	41.15	719,737	6.92

We observe that Groningen and Leeuwarden exhibit the most start-ups in 2015, both, in absolute numbers as well as in relative terms. Assen follows on place three. Place four in terms of absolute start-up activities is occupied by the city of Emmen, although the population of Emmen much higher than Assen. When we look at the number of start-ups relative to the population, we find two notable things. First, Groningen exhibits a relatively high start-up rate which differs significantly from that of other cities and towns in the Northern Netherlands. Second, Emmen and - to a smaller degree - Hogeveen and Heerenveen have start-up rates that are not even half the size observed in Groningen. As a robustness check we also looked at the absolute cumulative numbers of start-ups during the 2005 to 2015 period only focusing on private & public limited companies. The rank order based on the absolute number is very similar to the rank order displayed above. We report a more extensive list of these start-ups, covering the top 30 cities and towns, in Appendix in Table A2.3.

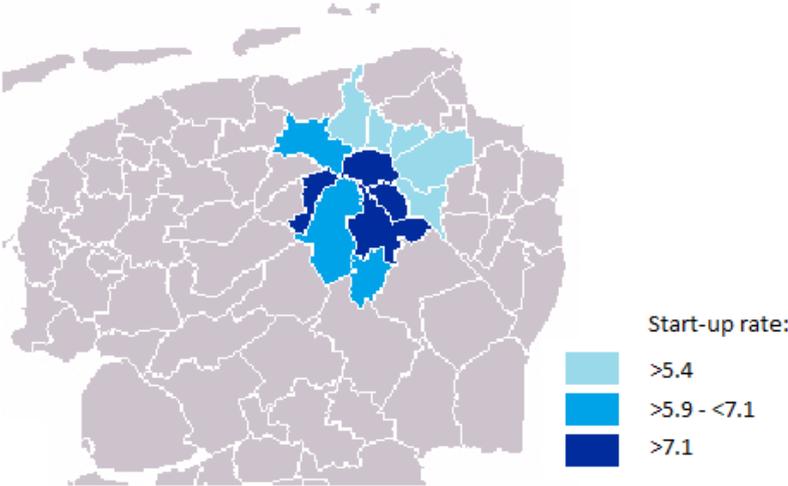
Interestingly, while the top ten in absolute terms covers around 41 percent of all start-up in the Northern provinces, in relative terms the average start-up performance is on average relatively low with around 6.92 endogenous start-ups per 1000 inhabitants (this is somewhat lower – but not significantly different – to the average of the three provinces which is around 7 start-ups per 1000 inhabitants). In fact, we observe that other areas tend to perform much better in terms of relative start-up activities. One interesting comparison in this respect is the Groningen-Assen region, which covers areas in the province of Drenthe and Groningen. In this area the average start-up rate is 8.1,

which means that we almost observe around one more start-ups per 1000 inhabitants when compared to the average start-up rate of cities that are leading in terms of absolute number of start-ups. Figure 2.3.1 displays this geographic area and the associated start-up rates. While the cities with the most start-ups in absolute terms account for almost as many start-ups as population in the Northern Netherlands (around 42 percent of the population contribute 41 percent of the start-ups), the Groningen-Assen region contributes around 31 % of all start-up in the three Northern provinces with only 27 percent of the population (compare Table 2.3.2).

Table 2.3.2: Groningen-Assen – a comparative view on start-up rates, share of start-ups, and share of population

	Start-up rate	Percentage of start-ups within the Northern Netherlands	Percent of population within the Northern Netherlands
Top ten in absolute terms (see Table 2.2.1)	6.92	41 %	42 %
Groningen-Assen region	8.1	31 %	27 %

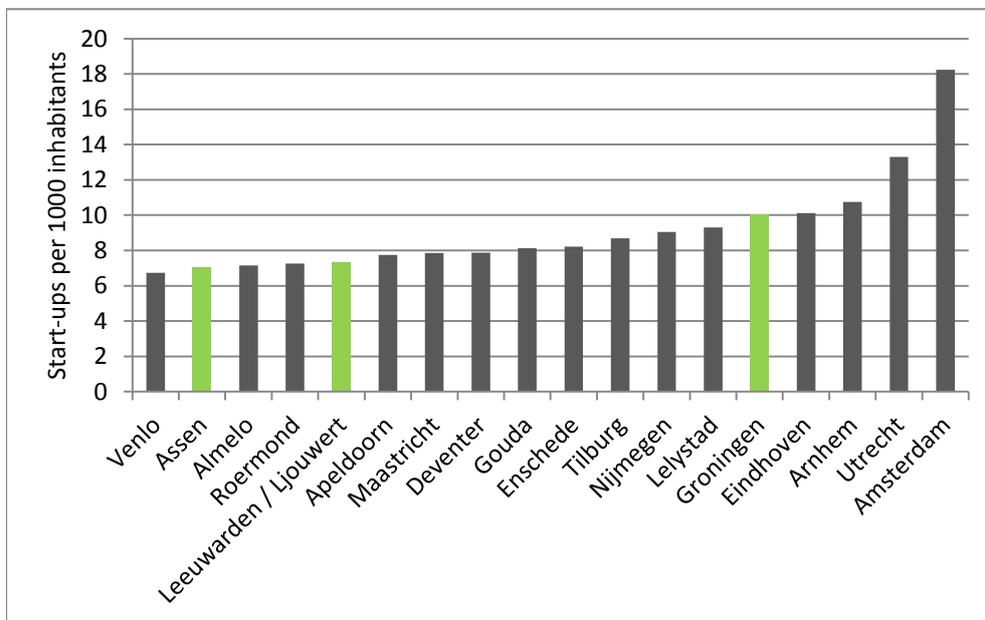
Figure 2.3.1: Start-up rates in the Groningen-Assen region



Finally, we observe that within the Groningen-Assen region, it is especially the Groningen, Leek, Haaren, and Tynalo which contribute disproportionately to the relatively high start-up rate of this area. In fact, the municipalities of Winsum, Ten Boer, Hoogezand-Sappemeer, Bedum and Slochteren exhibit below average start-up activities. Of special interest is in this respect the spatial borders of provinces. The well performing municipalities south to Groningen tend to be part of the province of Drenthe which may indicate the necessity of higher level cross-province coordination.

Box 2.1 Start-up rates in the cities of Groningen, Leeuwarden, and Assen – a comparison with down-south

A comparison between major cities in the Northern provinces with entrepreneurial hotspots across the county may not seem to be feasible since one may easily compare apples with peers. However, such a comparison – when interpreted with care – can provide some useful insights regarding the overall position of (the relatively small) cities of the North and the potential gap in entrepreneurial activities. Please note that we only compare and benchmark the municipalities themselves, disregarding the greater labor-market areas. Such a comparison emphasizes entrepreneurial activities as an urban phenomena. We also do not aim to provide a complete ranking as we focus only on selected cities.



We compare each municipality with a set of comparable cities in terms of size, presence/no-presence of institutions of higher education, and – in some cases – location in the periphery. For Groningen we introduce a set of university towns into our comparison: Eindhoven and Tilburg – which are somewhat larger in terms of inhabitants, Nijmegen- which is somewhat smaller -, and Enschede and Maastricht – the latter one which is considerably smaller than Groningen. For Leeuwarden we chose Apeldoorn, Arnhem, Venlo, and Deventer as a comparison group. Apeldoorn and Arnhem larger in terms of population size while Venlo and Deventer are somewhat smaller. The last benchmark group contrasts Assen to the somewhat larger municipalities of Lelystad, Almelo, and Gouda and the somewhat smaller municipality of Roermond. Finally, we also consider Amsterdam and Utrecht ...

Box 2.1 ... continued

which we introduce to have an upper-level benchmark. All figures display start-up rates per 1000 inhabitants for the year 2015. Overall we observe a strong correlation between size in term of inhabitants and start-up rates. Figure A2.4 in the Appendix documents this relationship.

Amsterdam shows the highest start-up activities per capita followed with some distance by Utrecht. We observe that Arnhem – which a priori was considered to be a comparison for Leeuwarden – performs rather well. Groningen exhibits a similar rate than Eindhoven and displays somewhat more start-up activities than Tilburg and Nijmegen.

In comparison with Leeuwarden, Apeldoorn and Deventer show somewhat higher levels of start-up activities per 1000 inhabitants. However, as already highlighted above Arnhem has around 3 more start-ups per 100 inhabitants than Leeuwarden. Venlo has slightly less start-up activities relative to its population than Leeuwarden. Maastricht, performs similar to this group of cities – this may suggest that the presence of a University cannot simply be translated into entrepreneurial activities. For example, it could be that the highly international focus makes it more difficult to nurture local entrepreneurial activities out of the University.

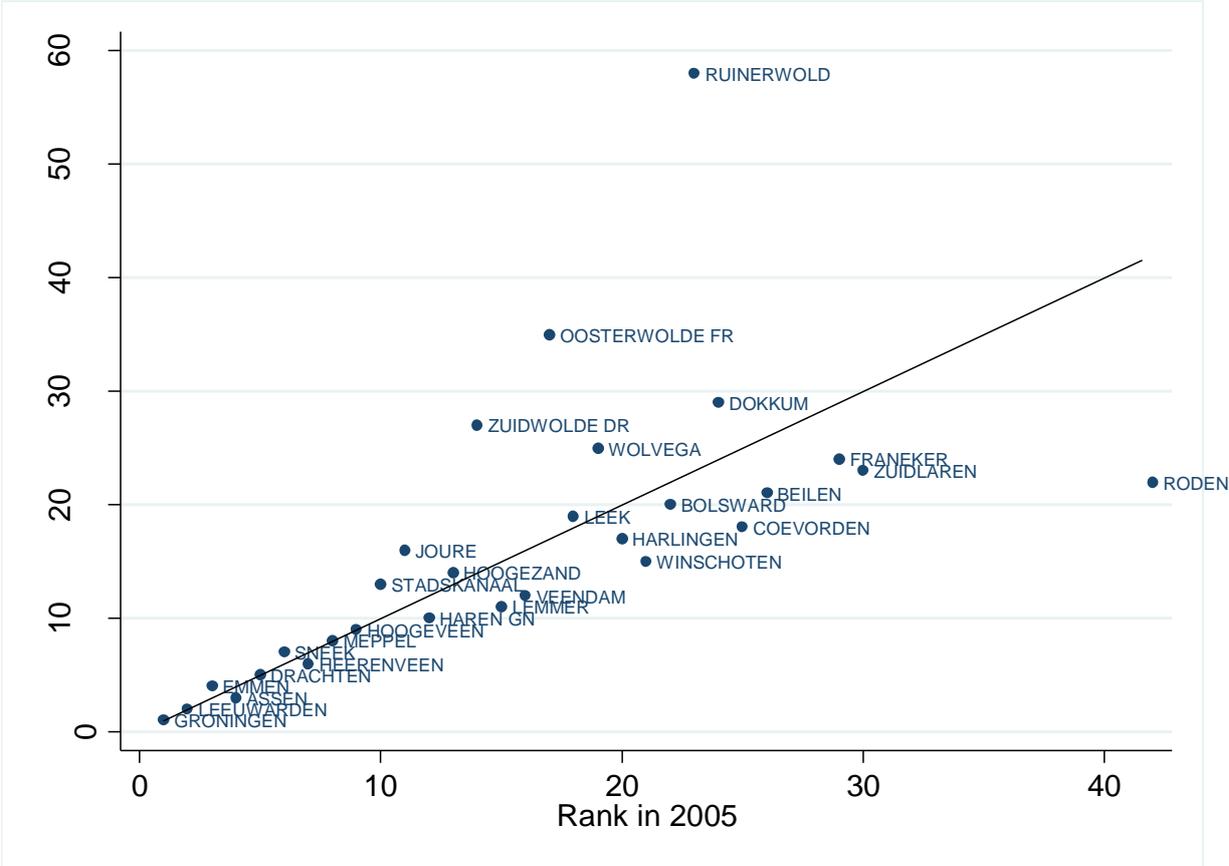
In a relative perspective Leeuwarden does not perform explicitly well when compared to cities that exhibit similarities in terms of size and presence of institutions of higher education. In fact the Frisian capital is not that distant from Assen and its benchmarking peers. Finally we observe that Assen, Almelo and Roermond exhibit rather similar start-up rates. In contrast, Lelystad- our second positive surprise - had around two more start-ups per 1000 inhabitants and Gouda one more relative to this prior group. To provide a clearer picture on how Assen and Leeuwarden rank relative to the comparison group that we have chosen, we report two separate figures in the Appendix (Figure A2.3.1 and A2.3.2)

2.4 Persistence of local start-up activity

While the sections above document pronounced differences in start-up activity across space, it is unclear to which degree these regional differences persist over time. In this section we therefore

study the persistence of start-up in space over time. Figure 2.4.1 we plot the rank in terms of absolute number of start-ups in the year 2005 in a city or town against the rank holds 2010. The sample is limited to cities and towns that were either in the top 25 in 2005 or 2010 in order to allow and adequate and clear arrangement of the data. We do observe a very strong persistence over the time period studied. Especially in the top ten there is hardly any change in rank. However we do observe some changes in smaller cities and towns, for example Roden (now municipality of Noordenveld) displays an exceptional increase in the number of ranks while Ruinerwold loses significantly. Interestingly, the astonishing increase in the rank for Roden may be due to the closure of the Dutch subsidiary Cordis (as of 2015 Cardinal Health). It is likely that in the aftermath of the closure many high qualified former employees started new businesses. This process may also partially explain inter-industry employment shifts that have been observed elsewhere in the Netherlands (Morkutè et al, 2016). However, such changes in ranks appear to be outliers relative to the otherwise strong level of persistency. A more detailed discussion on the sources of persistency can be found in Andersson and Koster (2011).

Figure 2.4.1: Persistence of local start-up activity in cities and towns of the three Northern provinces



This finding of relative strong persistency can have two major reasons. First, it may be that the determinants of local start-up activity hardly change over time. Second, this could imply strong and persistent differences in the local affinities and predispositions towards starting an own company. In any case it becomes evident that policies aiming to cause changes in local start-up activities are likely to be only successful in the long run and attempts to achieve positive changes in the short run are likely to be unreasonable.

2.5 Start-ups in the municipality of Groningen

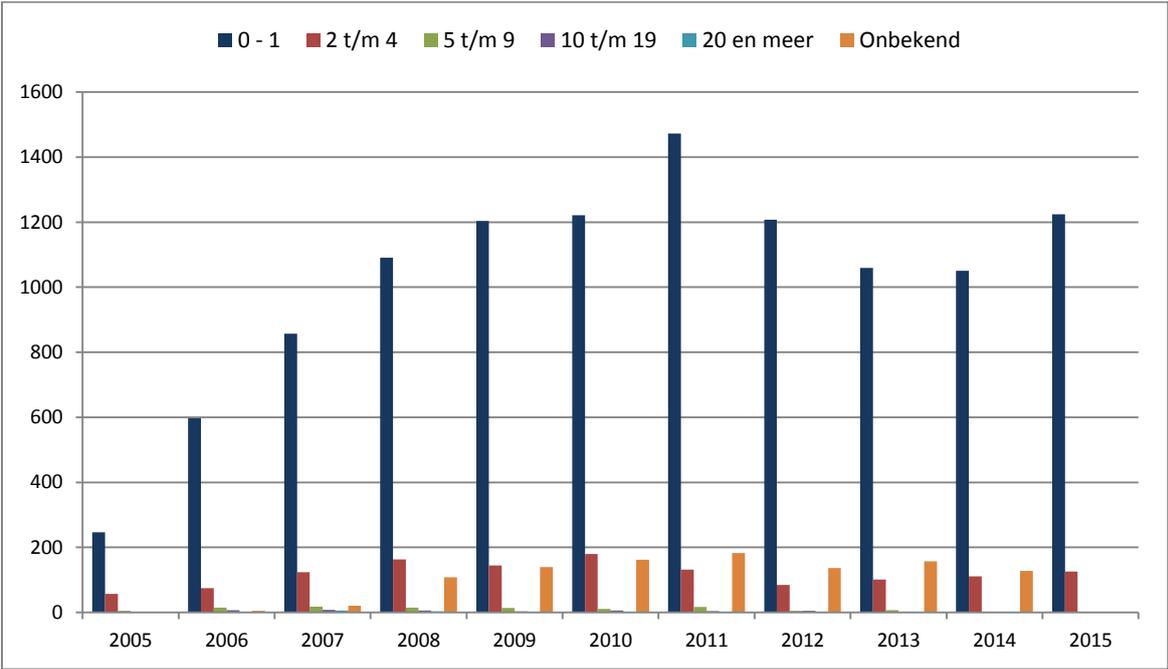
Next, we provide a more in-depth analysis of start-up activities in the municipality of Groningen. Within the Northern provinces the city of Groningen has a special position. It is not only by far the largest city and economic center of the North, but our analysis of start-up activities in the Northern provinces revealed that it is also the center of start-up activities in these three provinces. Therefore, we will provide a more detailed account of start-up activities in city of Groningen in this section. In contrast to the previous sections we rely on a survey based data set collected by the municipalities' statistical office. This data set allows for a more detailed account of start-ups in this entrepreneurial 'hot-spot' of the North. However, there are two important shortcomings related to this data. First, the underlying data is only available for the municipality of Groningen which implies that we cannot provide a comparison with other municipalities. Second, since this data is based on a survey and is accompanied with common issues. In this case the average response rate is around 70 percent which can be relatively high; however, in more recent years the response rate is decreasing substantially. As a consequence especially solo-self-employed are less often represented.

This also implies that this data provides structurally different numbers on start-up activities as compared to other data sources. Consequently, also a comparison across municipalities is not possible. However, in this section we focus on the evolution over time and aim to provide deeper insights based on ex post development of start-ups which is the strength of this data set. Reliable data can be provided for 2005 onwards. We report data until 2015 and in case of survival and growth related information until 2012 since some year are required to measure ex-post performance.

In Figure 2.5.1 we report the evolution of start-up activities across firms of different size categories (measured using the employment at the time of starting the company officially). We observe a strong increase in the number of new firms run by solo self-employed with a peak in the number of new firms started in 2011. However, also other size-categories become more frequent with a peak of newly started firms with 2 to 4 employees in 2010 and 5 to 9 employees in 2011. New firms that start with ten employees or more (10-19 and >20) tend to be a rather rare events and - with the exception of 2007 – on a yearly basis less than ten firms fall into these size categories. After 2011 we observe a

drop in the number of new business formation activities until 2015 where we observe a recovery. Interestingly we did not find this pattern in the Orbis data which we used earlier in this study. Finally, the decreasing pattern until 2015 can be also observed in the 2 to 4 size category. However this does not suggest similar meso-level economics dynamics regarding local start-up activities across size categories since all size categories with 5 employees and more do not exhibit a similar recovery in 2015. Unfortunately we do not know if this is a result of the increasing non-response rate in the latter years. In the appendix we report also data on the distribution across industries of start-ups for the 2005 to 2015 time period (Figure A.2.5.2). The dominant sectors are “consultancy and specialized business services” (24.6 %), “wholesale, trade, and repair of motor vehicles” (14.5 %), information and communication” (10.9 %), “health and social work” (10.1 %), as well as “culture, sports and recreation” (9.8%). Together with a variety of other service industries and construction the aforementioned industries account for 98 percent of all start-ups - only 2 percent of start-ups are in manufacturing.

Figure 2.5.1. New firms according to employment size categories (at start)



Some interesting insights can also be derived from the evolution of the generic start-up rate and the long-term survivor start-up rate displayed in Table 2.5.1. The generic start-up rate refers to all newly founded business in the municipalities while the long-term survivor start-up rate refers only to those businesses that survive for at least three years. These long-term survivors have been shown to be especially important for regional development (Fritsch and Noseleit, 2013b). The table below

contrasts the evolution of the generic start-up rate with that of the long-term survivors. The reported start-up rates use the labor market approach (workforce between 18 to 65) and report numbers until the year 2012 since we calculate survival over a three year period.

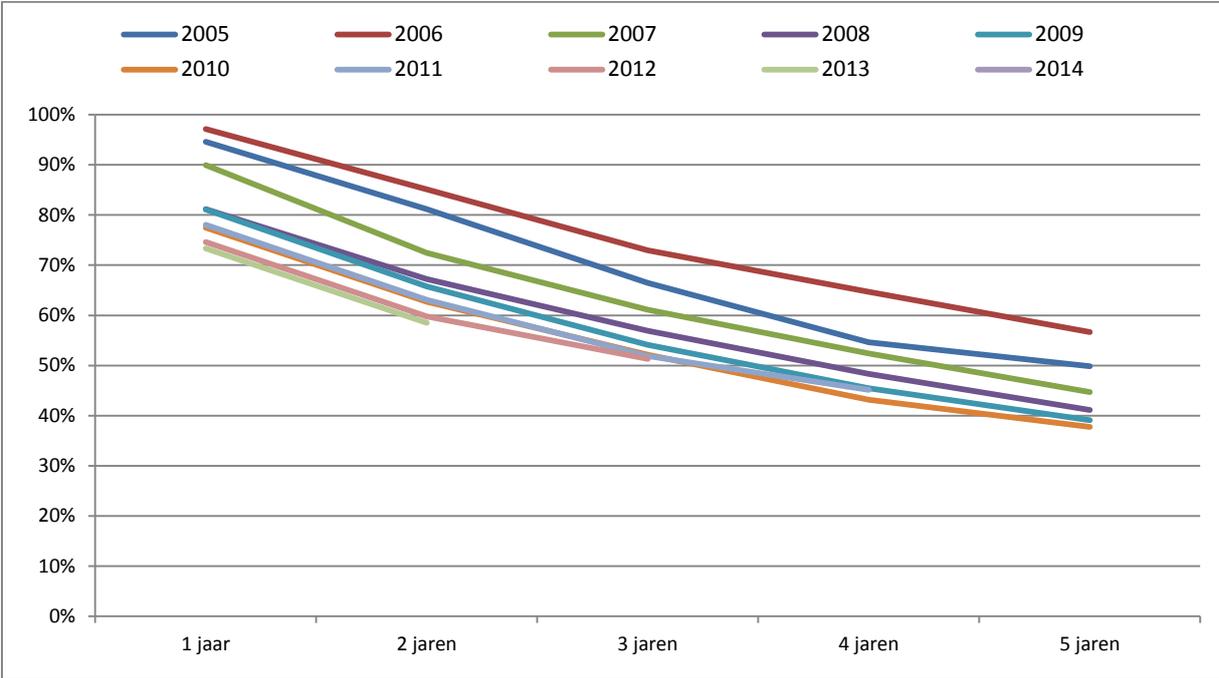
Table 2.5.1: Evolution of start-up rates in the municipality of Groningen, 2005-2012

Year	Start-up rate	Long term survivor start-up – rate (3 yr survival)	Ratio: Long term survivor start-up rate over start-up rate
2005	3.1	2.1	0.68
2006	7.1	5.2	0.73
2007	10	6.1	0.61
2008	13.3	7.6	0.57
2009	14.5	7.8	0.54
2010	14.6	7.6	0.52
2011	16.5	8.5	0.52
2012	13.2	6.8	0.52

The start-up rate that is calculated using survival data is based on ex post information. This implies that both start-up rates provide very different insights. While the development of generic start-up activity should be interpreted as the more general evolution entrepreneurial potential in the municipality, the long term survivor based start-up rate highlights how successful start-ups are in dealing with the market selection process. It is especially these start-ups that directly and indirectly contribute to regional employment growth. The long term survivor start-up rate is therefore especially well-suited to track how successful new start-ups are. From 2005 onwards we observe a strong increase in the start-up rates. Both indicators peak in 2011 but show a decline in 2012. On average, it can be said that the municipality did not only increase its own endogenous entrepreneurial potential, but that the Groningen is able to utilize this potential much better since its entrepreneurial potential is increasingly translated into growth-relevant new economic activity. However, the increase of long term survivors is not proportional: the ratio of the long term survivor start-up rate and the generic start-up rate decreases from 0.72 in the year 2006 to 0.52 in the years 2010 to 2012.

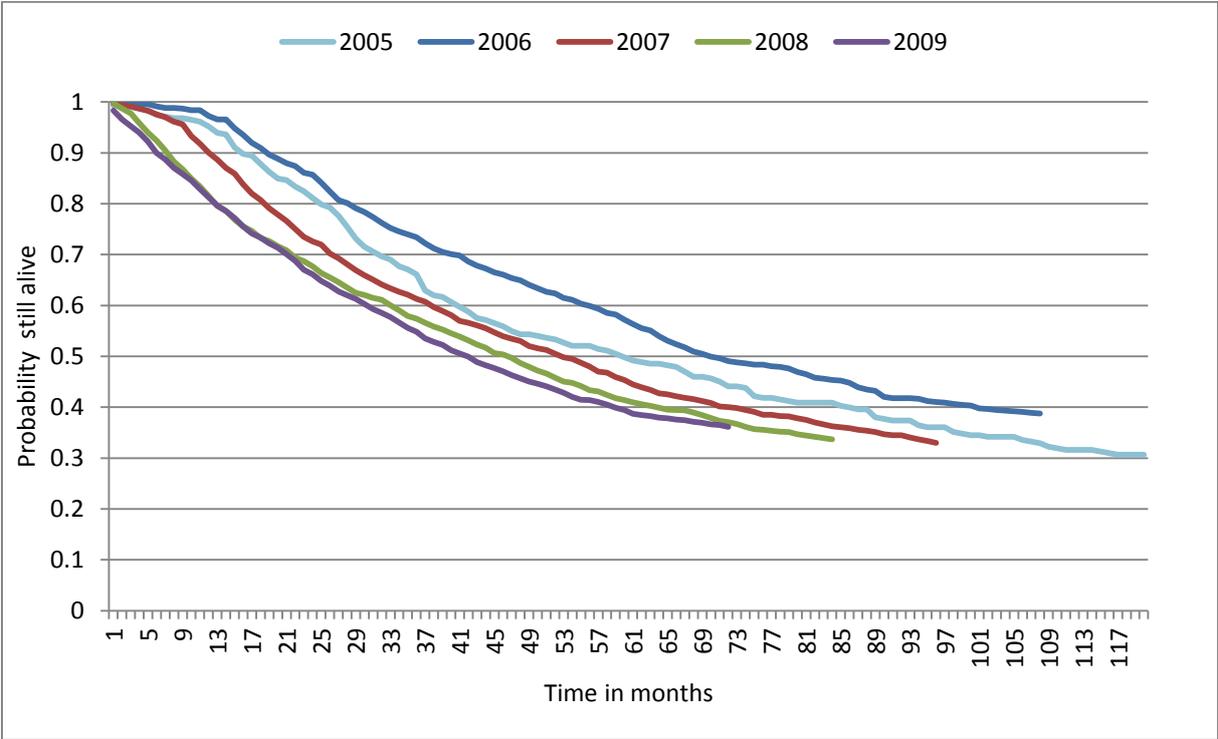
Because both start-up rates do not evolve proportional we take a closer look at the survival rates across different start-up cohorts. The survival rates are reported in Figure 2.5.2. Indeed, we observe that younger cohorts tend to have lower survival. For example, while 66 percent of businesses that started in the year 2005 were still active three years later, this figure dropped to 51 percent for firms that started in the year 2012. The OECD reports that for the Netherlands survival rates over a five year period are about 50 percent. In the municipality of Groningen this number is on average somewhat lower (Criscuolo et al., 2014).

Figure 2.5.2: Survival rates (Municipality of Groningen)



Since the survival curve presented above allow only some basic insights we also look at the survival probabilities at monthly intervals in figure 2.5.3. This figure captures the likelihood that a newly started venture in the municipality will survive beyond a specified time. We report this survival probability for the cohorts 2005 until 2009. We can observe that the probability of a start-up to survive any specific period of time was lower for firms founded in between 2007 to 2009 relative to the survival probabilities of the cohorts 2005 and 2006. Next, we find that the decrease in the likelihood to survive beyond specified time becomes less pronounced over time. Especially for the more recent cohorts (2008 and 2009) survival probabilities drop in the first couple of months considerably. If this pattern continues for more recent years this can be problematic and indicate that only a (decreasing) portion of the (increasing) entrepreneurial potential is effectively utilized to support regional development. More specific measures to help start-up increasing their survival chances may be appropriate.

Figure 2.5.3: Survival probabilities (Municipality of Groningen)



With respect to the link between firm size and survival we observe that survival likelihood is significantly higher in firm size categories with 5 or more employees. Figure 2.5.4 displays that throughout the 2005 to 2012 time period on average 60 percent of all businesses in the firm size category with four or less employees survived for at least three years. For businesses that were founded during this time period that belong to one of the size categories with five or more employees the share of firms surviving for at least three years lies between 75 to 82 percentage points. Also the estimated survival probabilities indicate that there seems to be a tendency that new businesses that enter with larger firm size have higher survival probability as compared to small enterprises with less than five employees (cf. Figure 2.5.5). One exception is the size category of 20 and more employees where we observe that initial survival probability is somewhat lower, then survival likelihood among firms in this size category becomes higher relative to the micro firms in the sample, and finally survival probabilities are estimated to be the lowest across all size categories. However, estimates for the largest size category should be interpreted with care since the underlying sample is rather small.

Figure 2.5.4: Share of long term survivors across firm size categories

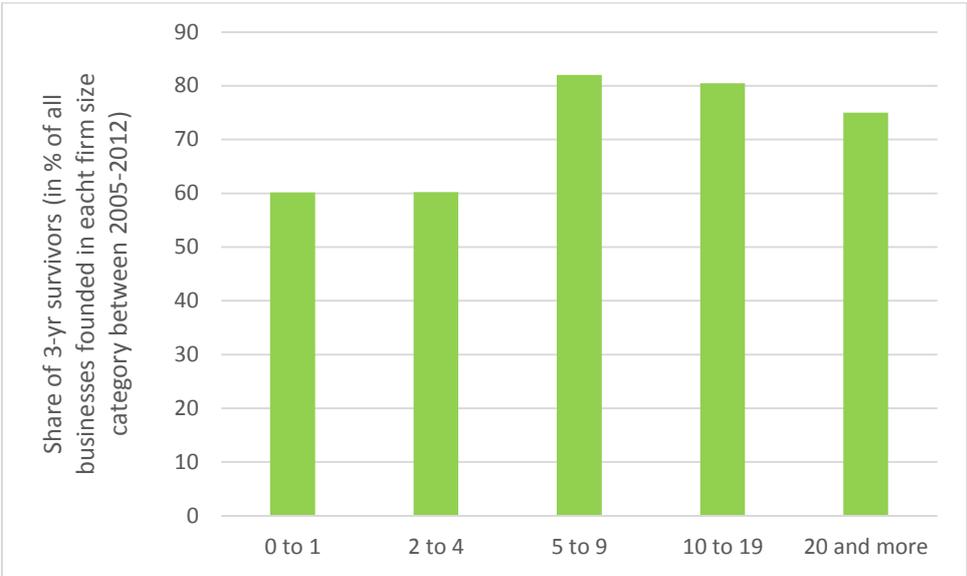
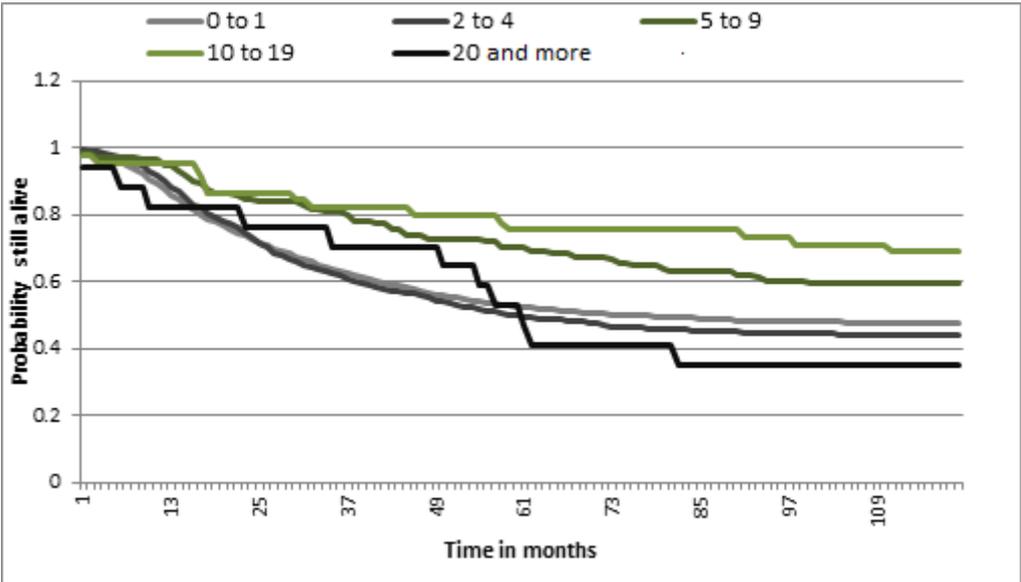


Figure 2.5.5: Survival probabilities across firm size categories



With respect to job generation we find that the small businesses (0 to 1 and 2 to 4) provide most of the newly generated jobs at the time when the business was started. Figure 2.5.6 displays the share of initial employment in start-ups of different size categories relative to all initial personnel active in these businesses. In fact, during the time period 2005 to 2012 around 80 percent of all jobs are created from these micro firms. This finding is not very surprising given that the vast majority of new businesses falls within this size category. All other size categories contribute around 6 to 7 percent each. Overall we observe a strong shift from larger enterprises towards smaller micro-businesses.

Figure A.2.5.1 in the Appendix documents this shift, showing that the percentage of jobs in enterprises with not more than one employee increased substantially while especially the number of jobs in businesses with more than 20 employees decreased.

Figure 2.5.6: Share of initial employment in start-ups of different size categories (2005 to 2012)

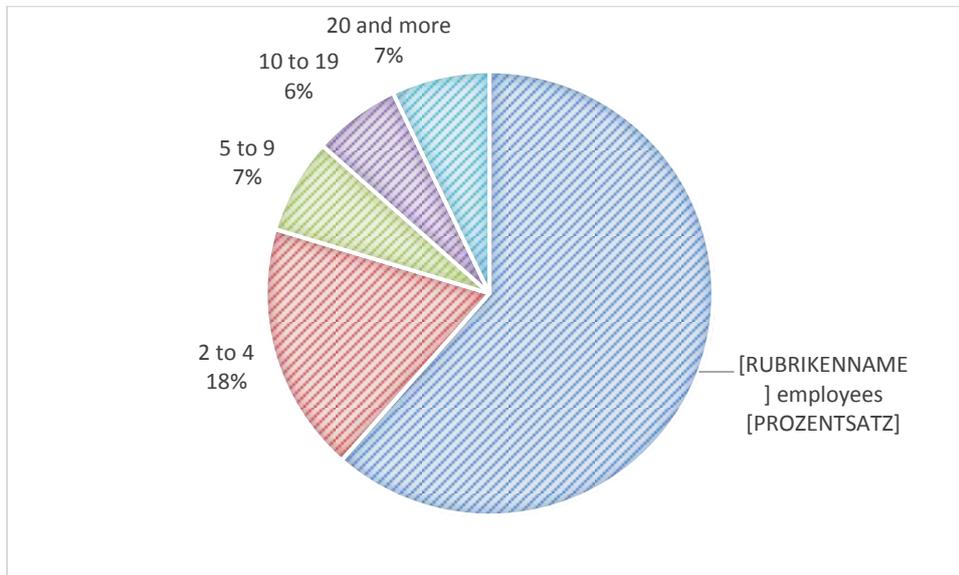
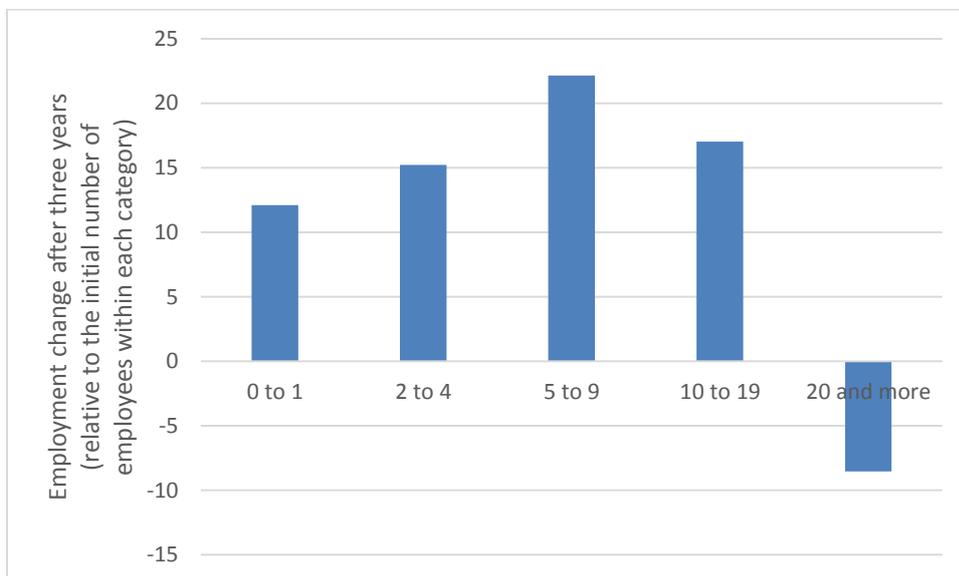


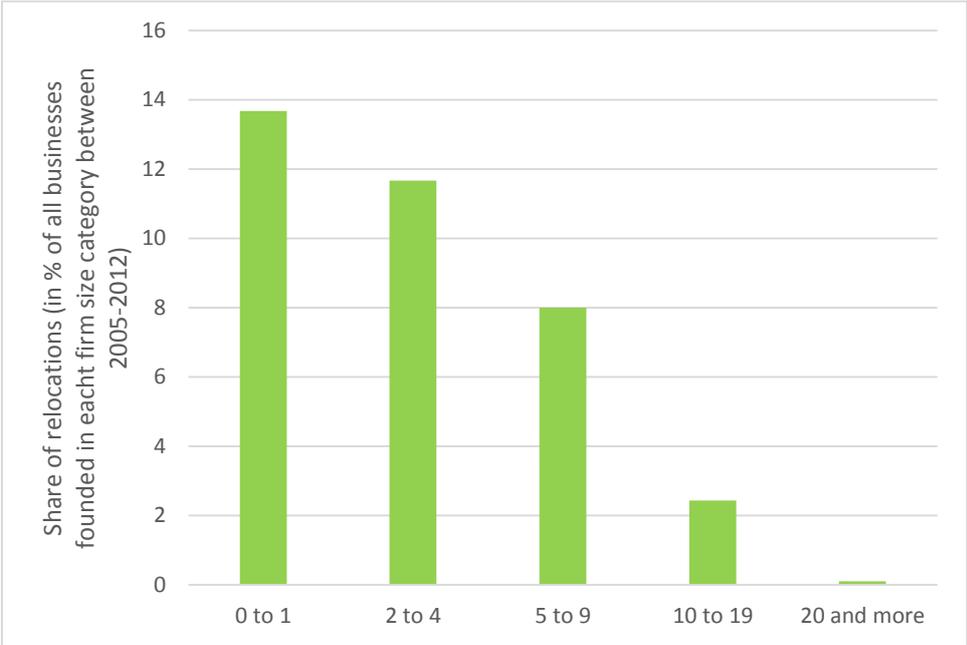
Figure 2.5.7: Growth relative to initial employment in different size categories



More interesting is the relative growth that occurs within the start-ups. We estimated the average employment change over a period of three years relative to the initial employment within a size category for start-ups founded between 2005 and 2012. Figure 2.5.7 summarizes our findings. For example, within the size category of 2 to 4 employees we observe that initial employment of businesses within this size category increased their employment by 15 percentage points. Overall, we

observe that in almost all categories initial employment increased substantially with the only exception of relatively large entrants (20 and more employees). In this size category employment decreased by 8 percent – probably because many of the firms in this size category had difficulties to survive (compare figure 2.5.5). On average, start-ups within the size category of 5 to 9 employees experienced – relative to their initial employment – the highest growth.

Figure 2.5.6: Share of relocations (leaving the municipality borders of Groningen)



Next, a common concern among more peripheral regions is that successful start-up may move to other regions. This can be a critical issue since many start-ups benefited from regional support which may imply that such regions may suffer from negative externalities. In Figure 2.5.6 we display the share of businesses founded between 2005 and 2012 that relocated their economic activities across municipality borders. We find that almost 14 percent of one-(wo)man businesses relocate their business outside the municipality borders. With increasing firm size category a lower percentage relocates. For example, in the size category 5 to 9 employees it is only around 8 percent leave the municipality and in the size category 20 or more no firm leaves the municipality. Since we do not have comparable figures from other municipalities it is difficult to make a final assessment if this number is relatively low or high. Nevertheless, it can be said that a substantial amount of businesses leaves the municipality – and with it the city may experience some negative externalities. However, in order to give more detailed insights in the quantity of negative externalities and adequate recommendations about possible internalization strategies further research is necessary. For example, if businesses frequently relocate to bordering municipalities within the same province, joint policy instruments at the province level help to internalize the negative externalities. However, if

new businesses that benefited from local subsidies move, for example, to the Randstad it might be difficult to convince municipalities from the Randstad to contribute to the policy programs in Groningen.

Finally, we take a closer look at the spatial distribution of start-up activities within the municipality of Groningen. While Groningen turned out to be the start-up center of the Northern provinces this exercise may allow us to identify entrepreneurial hotspots within the boundaries of the city. In Figure 2.5.7 we display the local long-term survivors differentiating between the function of the address as it is designated by the municipality (residential or commercial). New business formation activities at addresses with a designated business function are limited to the city center and industrial and commercial estate areas. Figure 2.5.8 shows the distribution of long-term survivors along the different size categories in terms of initial employment. Surviving start-ups in relatively larger size categories turn out to be commonly present in the center and designated industrial and commercial estate areas. Overall, at this fine grained level of spatial analysis we hardly find any dominating areas in which start-up activities tend to be concentrated. From this observation we cannot derive that policy support within the municipality should focus on certain neighborhoods, for example, in order to be geographically close to the targeted group. This might be also a consequence of the limited geographic area that is subject to this analysis.

Figure 2.5.7: Spatial distribution of long-term survivors in the municipality of Groningen

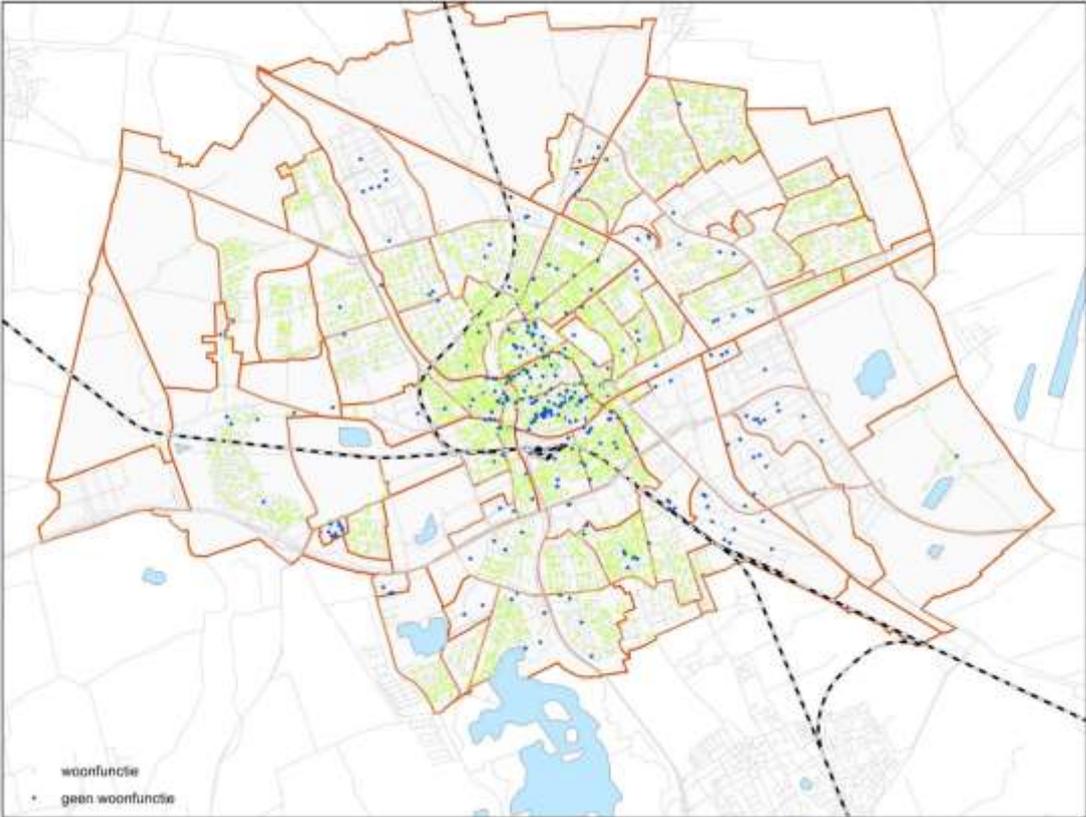


Figure 2.5.8: Spatial distributions of long-term survivors according to size categories



3. Endogenous job creation – an interregional comparison

This section is concerned with the endogenous job creation potential of the three Northern provinces in comparison with the rest of the country. For this purpose we want to estimate if entrepreneurs in the Northern provinces create – on average – more or less jobs than their country(wo)men in the other provinces. We only study job creation within the businesses of local entrepreneurs and neglecting the interregional size distribution of other businesses (e.g. business units of [publicly traded] firms). This allows us to derive implications regarding potential differences of the endogenous job creation potential across provinces.

We base our analysis on data from the European Social Survey (ESS) covering the time period 2002 to 2012. This dataset provides representative survey data of the Dutch population. We limit our sample to self-employed. The dependent variable of our estimation is the total number of employees. In the first model we only include dummy variables for the three Northern provinces. In model two we account for a number of socio-economic control variables that account for differences in type of entrepreneur. For example entrepreneurs in one of the Northern provinces may have lower levels of education or be of younger age which may explain differences in the number of jobs that are created. Finally in model three we account for potential differences in the sectors in which jobs are created. This may be also an important source for interregional differences since, for example, there may be especially many entrepreneurial activities in sectors with lower or higher average firm size in one specific province but not in others. The results are documented in table 3.1.

Table 3.1: Endogenous employment creation

	Model 1	Model 2	Model 3
Groningen	-1.030** (0.441)	-0.734* (0.394)	-0.322 (0.472)
Friesland	0.472 (0.711)	0.251 (0.569)	0.472 (0.618)
Drenthe	-0.722* (0.388)	-0.689* (0.380)	0.213 (0.517)
Lower secondary education (1=Yes)		-0.0410 (0.257)	-0.387 (0.322)
Upper secondary education (1=Yes)		0.930*** (0.336)	0.250 (0.355)
Post-secondary non- tertiary (1=Yes)		0.737* (0.405)	0.484 (0.473)
Tertiary education (1=Yes)		0.607* (0.310)	0.185 (0.350)

Gender (1=female)		-1.042*** (0.228)	-1.115*** (0.223)
Age		0.120*** (0.0353)	0.0746*** (0.0284)
Age squared		-0.000943*** (0.000316)	-0.000571** (0.000249)
Industry dummies	No	No	Yes
Observations	1,193	1,193	1,193
AIC	4363.106	4309.724	4112.799

Notes: Negative binominal regression; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Model three includes a full set of 2-digit NACE industry codes which are not reported for brevity.

Table 3.2: Predicted number of created jobs (next to the founder / founding team)

Region	Predicted jobs (all businesses)	Predicted jobs (without ZZPers)
Groningen	1.6 (0.3 – 2.9)	5.4 (2.2 – 8.7)
Drenthe	2.2 (0.6 – 3.8)	6 (3 – 9)
Friesland	(no deviation from other provinces)	(no deviation from other provinces)
Other provinces (incl. Friesland)	4.5 (3.2 – 5.9)	11.8 (8.4 – 15.1)

Note (95% Conf. Interval in parentheses). Predictions based on model 1 and in Table 3.1 and model 1 in Table A3.1 in the Appendix.

We find that entrepreneurs in Groningen found ventures that employ, on average, significantly less employees than entrepreneurs in other provinces of the Netherlands. For Drenthe we find weak evidence that businesses founded in this province also tend to create somewhat fewer jobs than in the rest of the country. For Friesland we cannot find any significant difference regarding the endogenous job creation potential. The differences regarding Groningen and Drenthe are, although somewhat less pronounced, still present when we control for socio-economic characteristics of the founder. We find that higher educated, male, middle-aged entrepreneurs tend to create more jobs. Interestingly, the province-differences disappear once we control for industry affiliation (Model 3) – this is in line with previous insights that highlight that region specific differences in the existing knowledge base and related differences in the sectoral composition of start-ups can explain important differences in regional development (Noseleit, 2015).

We also estimated additional models in which we consider the impact of education separately for men and women (results available on request). The findings indicate that higher levels of education are associated with more job creation among male entrepreneurs but not among female entrepreneurs. This may imply that the job creation potential of highly educated females engaging in start-up activities is not fully exploited. In table 3.2 we translate the regression results into jobs that are, on average, created by businesses in Groningen, Drenthe, and the rest of the country. The differences in the endogenous growth potential between Groningen and Drenthe in comparison to the rest of the country are substantial. While the estimated number of jobs that are created in

businesses founded in Groningen and Drenthe is 1.6 and 2.2 respectively, the average across all other provinces is 4.5. When we exclude solo self-employed (ZZPers) and re-estimate model 1 (cf. Table A3.1 in the Appendix) the differences are outspoken as well. The average jobs created in Groningen amount to 5.4 and in Drenthe to 6 while the average across the other provinces is 11.8 jobs.

Box 3.1 Estimated job creation of new and young businesses in the city of Groningen

Reliable data on the total employment creation of start-ups and young businesses is not available. However, existing data sources can be used to make some predictions regarding the overall employment contribution. Based on the available data from ORBIS we estimated lower and upper bound of the employment contribution of new and young businesses in percent of overall employment.

Job creation of new and you businesses in Groningen (2005 - 2015):

	Percent of employment (lower bound)	Percent of employment (upper bound)
Total number of jobs	15.8 %	19.1%
Of which ... jobs created by newcomers that are not solo self- employed (percent of total)	29.7%	
Of which ... jobs created by newcomers with 10 or more employees	17.8	

We estimated that, on average, between 15.8 % and 19.1 % of all employment is in new and young businesses (underlying time period 2005-2015). Around 30 % of these jobs are created by businesses that hire additional employees and around 18 % is created by businesses that hire ten employees and more. Due to data limitations we cannot estimate the employment share of new and young businesses for each year separately. The OECD “DynEmp” project reports that for the whole of the Netherlands the share of employment in young SMEs is around 18.9 % (cf. Criscuolo et al., 2014).

4. Socio-economic characteristics of entrepreneurs in the Northern Netherlands

This section is concerned with the individuals behind the businesses. The aim of this exercise is to provide some insights regarding potential differences regarding (self-)selection into entrepreneurial activities across space. This is important since the relative worse performance in job creation in the some Northern provinces can be explained by differences in the individual characteristics of entrepreneurs in the North vis-à-vis entrepreneurs in the rest of the country (cf. Table 3.1 in the previous section).

4.1 Socio-economic profiles of business owners and differences in comparison to other provinces

In order to figure out if there individuals that select into entrepreneurial activities differ between the three Northern provinces and the rest of the country we compared the socio-economic profiles using mean-comparison tests. The underlying data is again the ESS dataset which is also used in chapter 3. The sample is restricted to business owners only. We rely on this data set since reliable information is not present in the *Entrepreneurship Survey* of the Statistical Office of the Municipality of Groningen. This data provides representative data for the Netherlands. The results documented below are based on pooled data across the 2002 to 2014 time period.

Table 4.1: Socio economic comparison of entrepreneurs in the Northern provinces and the rest of the Netherlands

Socio-economic characteristics	Northern provinces (Groningen, Friesland, Drenthe)	Other provinces	Difference (***) p<0.01, ** p<0.05, * p<0.1 indicate if the difference is significant)
Education (in years of full time education)	12.4 (12.3)	13.4 (12.8)	1 ** (0.5)
Share of females	39 % (26 %)	39 % (25 %)	0.0 (0.1)
Age	53.1 (52.4)	53 (54.6)	-1 (-2.2)
Share that lives with partner	67 % (77 %)	65 % (80 %)	-2 (-3)
Share that has children living at home	29 % (40 %)	37 % (42 %)	8* (2)

Note: Numbers in parentheses refer to entrepreneurs that engage in job creation.

Table 4.1 refers to all individuals that are self-employed, including solo-self-employed as well results only based on self-employed that created additional jobs (in parentheses). This means that we analyze business owners – including those which may have started their business years ago. Off

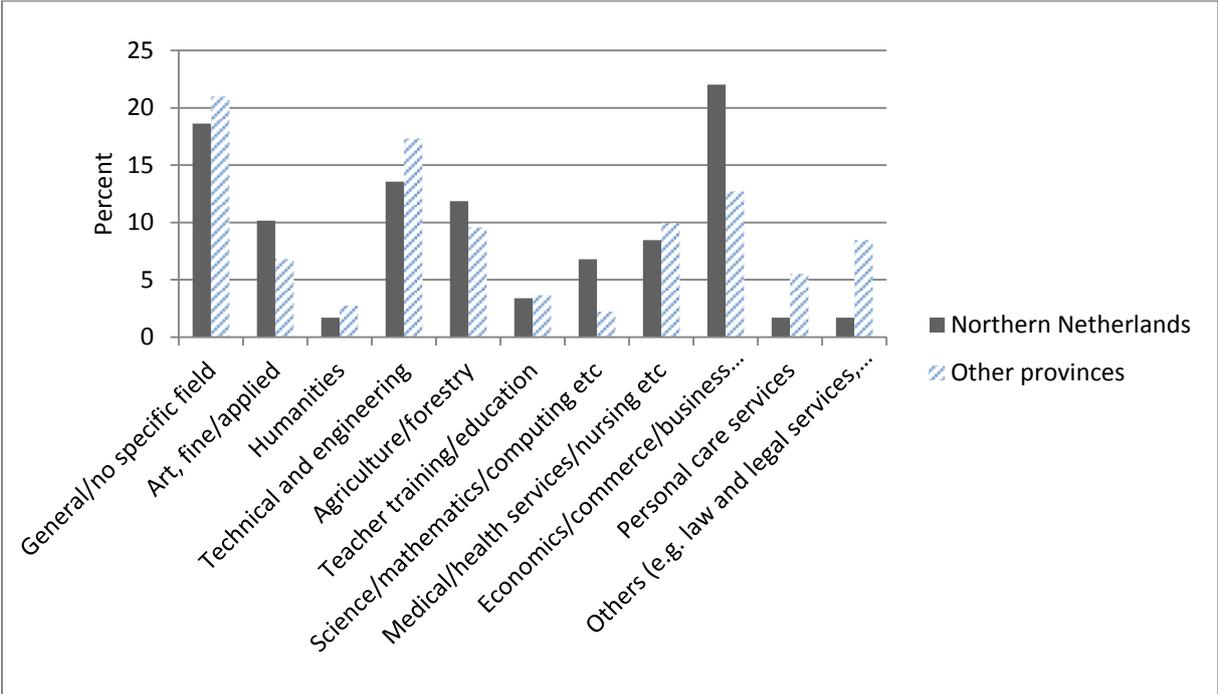
course it is likely that the socio-economic composition is subject to changes over time as well – a limitation that we cannot address here. For example, the average age among founders in the year of the new business foundation will be younger than the age that we observe which refers to the average age among business owners.

Among entrepreneurs that create jobs we do not find any significant differences regarding a variety of socio-economic characteristics. However, among the self-employed as such we observe that, on average the education level tends to be somewhat lower in the Northern provinces. In addition, fewer self-employed in the North live at home with children in comparison to self-employed in other provinces.

4.2 Occupational profiles of self-employed

Next, we also document the difference in occupational profiles. We observe that “Economics, commerce, business administration” as an occupational profile occurs especially often among entrepreneurs in the Northern Netherlands relative their country(wo)men in other provinces. There also tend to be somewhat more individuals with a background in agriculture, and the arts. These differences are likely the result of the relative higher importance of agriculture in the Northern provinces in more general terms, and a University-push effect. The table below refers to all individuals that engage in some kind of entrepreneurial activities. Since the numbers can get relatively small for some categories they should be interpreted with care.

Table 4.2: Occupational background of self-employed



5. Findings and implications

Start-up activities in the three Northern provinces are increasing throughout the last decade. This indicates the increasing importance of start-ups for the overall economic activities. Nurturing this endogenous potential for regional economic development can be considered an especially fruitful investment for the future wellbeing of the Northern provinces. This report provides evidence that is suggestive of an increasing importance of economic chances that are developed from within the provinces.

Nurturing this entrepreneurial potential takes time. Our analysis documents that for start-ups to generate new jobs it takes a long time. Much of the job creation potential of start-ups unfolds after some years when a firm is hardly considered to be a start-up anymore. Based on our findings we observe employment growth at least for one decade, suggesting that shorter evaluation periods only reflect a part of the employment contribution of successful new ventures. In addition, we suggest doing additional research that aims to figure out if start-ups require support over longer periods of time.

Start-up activities are strongly persistent over time. This study highlights that cities that had relatively higher level of start-up activities in the past also tend to have higher levels today. Changes in relative positions occur only slowly and aiming to capture higher positions in terms of start-up activities is time consuming.

Both insights, the time it takes to translate entrepreneurial potential into economic growth and the strong persistence in local start-up activities indicates that policy makers need to subscribe to long-term instruments. This is an extremely difficult task given that policy makers tend to be responsible for relatively short periods of time. However, a reliable institutional environment with policy instruments that entrepreneurs can expect to continue even after elections take place is required to nurture local entrepreneurial talent and increase the likelihood to convert start-up activities into regional growth. Also policy needs to be persistent when it comes to developing an entrepreneurial society.

Grasping the full entrepreneurial potential requires innovative policy approaches. Highly educated founders tend to create more jobs. At the same time institutions of higher education have experienced a strong increase of female graduates during the last decades. But still, men are more often found among the founders of start-ups and businesses owned by men tend to create more jobs on average – especially because men also tend to set up businesses in different sectors than women. It is obvious that the talent of a huge pool of highly educated individuals is not efficiently utilized to

spur the entrepreneurial potential. A stronger focus and specific instruments for groups that are currently underrepresented among entrepreneurs may help to better use the endogenous potential of a region. One key recommendation is to activate the entrepreneurial potential among women and design actions that allow responding to the special hurdles they may face.

Coordination among actors and balanced adjustments of instruments at different levels are essential. Boundaries of municipalities and provinces tend to be not in line with geographical clustering of start-up activities. While start-up activities tend to be especially high in and around the municipality of Groningen, this geographic area host several municipalities and is even shared by two provinces. Vertical complementarities are likely to emerge and careful coordination can allow for mutual benefits. Existing initiatives like the city network ‘Regio Groningen-Assen’ may provide a useful platform. At the same time careful monitoring of existing policy instruments is advised to avoid duplication of instruments. Finally, close alignment across instruments can increase their joint effectiveness. Learning from experiences build-up in previous initiatives that aimed to spur cross-municipality collaboration (like Plusregio, Samenwerkingsverband Regio Eindhoven) and current initiatives (Samenwerkingsverband Nord-Nedderland) may prove to be beneficial.

Box 5.1: Horizontal and vertical policy mix

The rationale for mixing various policies are potential complementarities at the policy instrument level (horizontal complementarities) or potential synergies at the level of responsible authority (vertical complementarities). If complementarities are present at the instrument level a strategy which comprises several instruments tends to be more successful. For example, the overall benefits of policy instruments targeting nascent entrepreneurs may be larger when interrelated policies for start-ups are in place. Vertical complementarities exist when it is beneficial that higher levels of authority implement certain instruments (for example due to high or duplicate administrative costs, harmonization of instruments, or cross-border spillovers). For example, several municipalities may join forces and jointly implement an instrument which will be more successful vis-à-vis separate implementation.

Geographical spillovers of an entrepreneurial culture are not fully exploited. The city of Groningen, center of start-up activities in the Northern provinces, does not uniformly act as a driving force for all neighboring municipalities. Especially municipalities in the North and East do not benefit from

geographic proximity to the city of Groningen in terms of start-up activities. We suggest elaborating on potential instruments to export the entrepreneurial climate of Groningen across city borders and develop a more integrative entrepreneurship ecosystem.

Few start-ups account for much of the subsequent employment growth. Among newly founded businesses micro firms are the largest contributor to employment at the time of market entry. But when it comes to subsequent growth in terms of employment only few firms contribute the majority of newly created jobs. Our findings imply that these companies deserve special attention to make sure that start-up activities are effectively translated into local economic growth. Currently, the number of start-ups that continue to grow and create additional jobs is simply too limited in absolute terms to make a significant employment contribution.

Increasing entrepreneurial potential does not equal increasing regional development. While start-up activities in the municipality of Groningen have been increasing, the survival chances of younger entry cohorts decreased. At the moment this is not problematic since in absolute numbers the quantity of long-term survivors' increases. These long-term survivors are start-ups that are especially beneficial and contribute, directly and indirectly, most among the newly founded businesses to regional development. However, the decreasing survival chances among start-ups that have been founded in more recent years should be closely monitored as it may indicate an increasing difficulty to transform entrepreneurial potential into start-up activities that spur regional development. It becomes clear that quantity does not come with similar levels of quality. At a given level of resources available to support start-ups it may be necessary to focus resources and stimulate high quality start-ups.

A significant share of start-ups relocates across municipality borders. For the case of the city of Groningen we observe that many firms leave the city and locate elsewhere. This is not an issue as such as firms may find more suitable locations elsewhere which benefits overall economic growth. At the same time it may imply that costly policy instruments that support local start-ups may ultimately benefit other regions that did not have to bear these costs. Additional research is required to learn about such relocation patterns of subsidized new ventures and figure out if potential negative externalities can be internalized by locating certain policy instruments at higher levels of authority.

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Appendix

Table A1.1: Sample selection

Drenthe, Friesland, Groningen	382,234
Year of incorporation >2005 <=2015	17,965
Employment data available (including estimates)	14,087
No shareholder with more than 25% of direct or total ownership (= "Independent companies")	12,069
No shareholder recorded with more than 50% of direct, indirect or total ownership	
One or more shareholders recorded with more than 25% of direct or total ownership	
Companies for which all shareholders belong to categories "one or more individuals or families" or "Employees/Managers/Directors" as well as companies for which all shareholders with a stake greater than 25% belong to categories "one or more individuals or families" or "Employees/Managers/Directors"	
Public limited (NVs), Private limited (BVs), Partnerships, Sole proprietorships	

Table A2.3: Regional distribution of cumulative start-up activities limited to private & public limited companies (2005-2015)

Rank	City	Freq.	Percent (Share within North NL)
1	GRONINGEN	1,175	13.17
2	LEEUWARDEN	432	4.84
3	EMMEN	377	4.23
4	ASSEN	326	3.65
5	HEERENVEEN	264	2.96
6	DRACHTEN	253	2.84
7	SNEEK	201	2.25
8	HOOGEVEEN	186	2.09
9	MEPPEL	153	1.72
10	HAREN GN	126	1.41
11	STADSKANAAL	122	1.37
12	LEMMER	102	1.14
13	WINSCHOTEN	101	1.13
14	JOURE	96	1.08
15	VEENDAM	95	1.07
16	RODEN	91	1.02
17	LEEK	77	0.86
18	HARLINGEN	70	0.78
19	COEVORDEN	68	0.76
20	BEILEN	65	0.73
21	HOOGEZAND	65	0.73
22	FRANEKER	58	0.65
23	BOLSWARD	55	0.62
24	KLAZIENAVEEN	55	0.62
25	ZUIDLAREN	55	0.62
26	GROU	52	0.58
27	ZUIDWOLDE DR	52	0.58
28	MARUM	51	0.57
29	WOLVEGA	51	0.57
30	DOKKUM	46	0.52

Table A2.4: Correlation between inhabitants and start-up rate

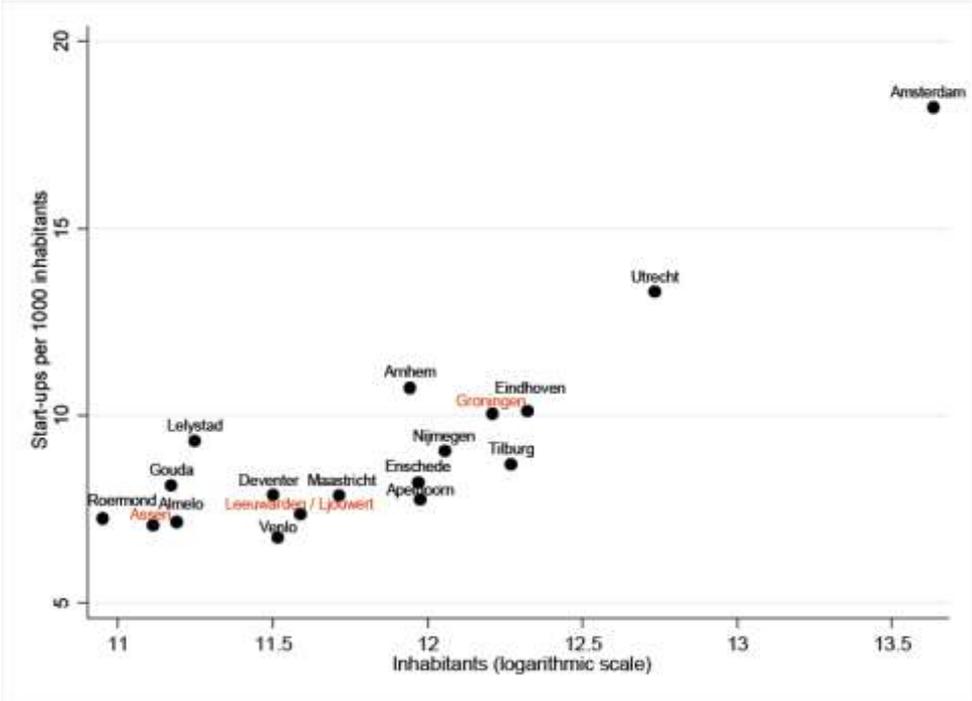


Figure A2.3.1: Benchmarking ... Assen - Start-ups per 1000 inhabitants

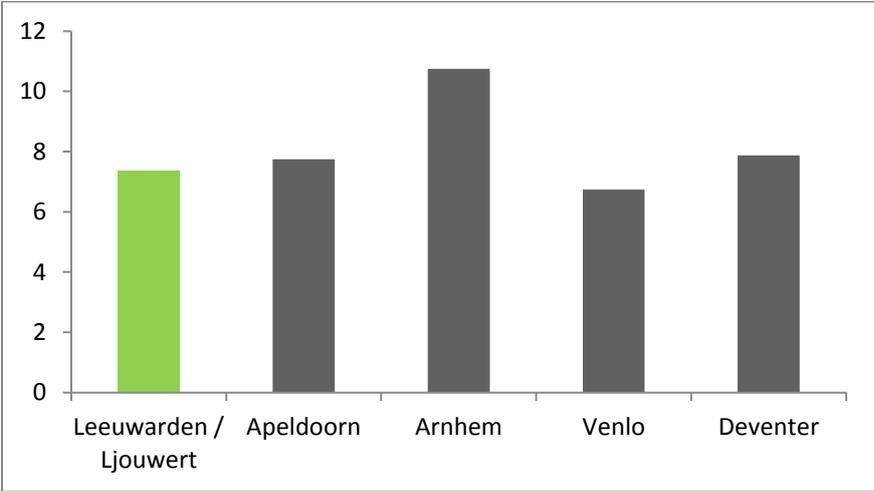


Figure A2.3.2: Benchmarking ... Leeuwarden - Start-ups per 1000 inhabitants

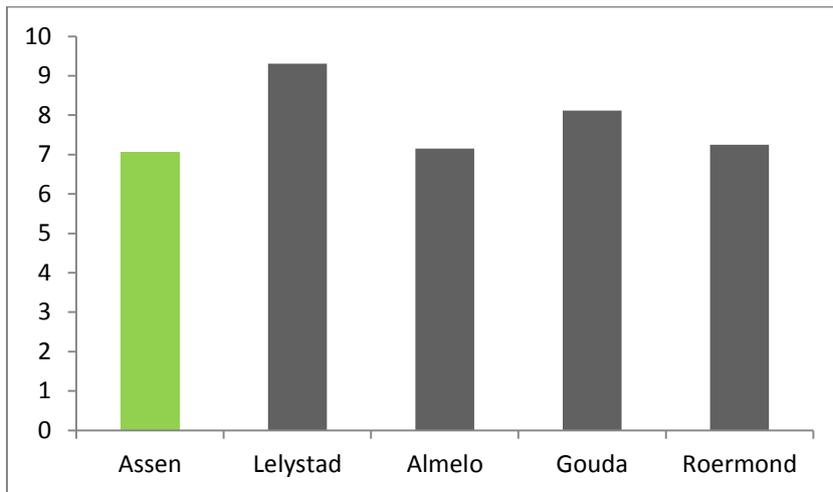


Figure A.2.5.1: Share of employees in businesses with different size (2006-2015)

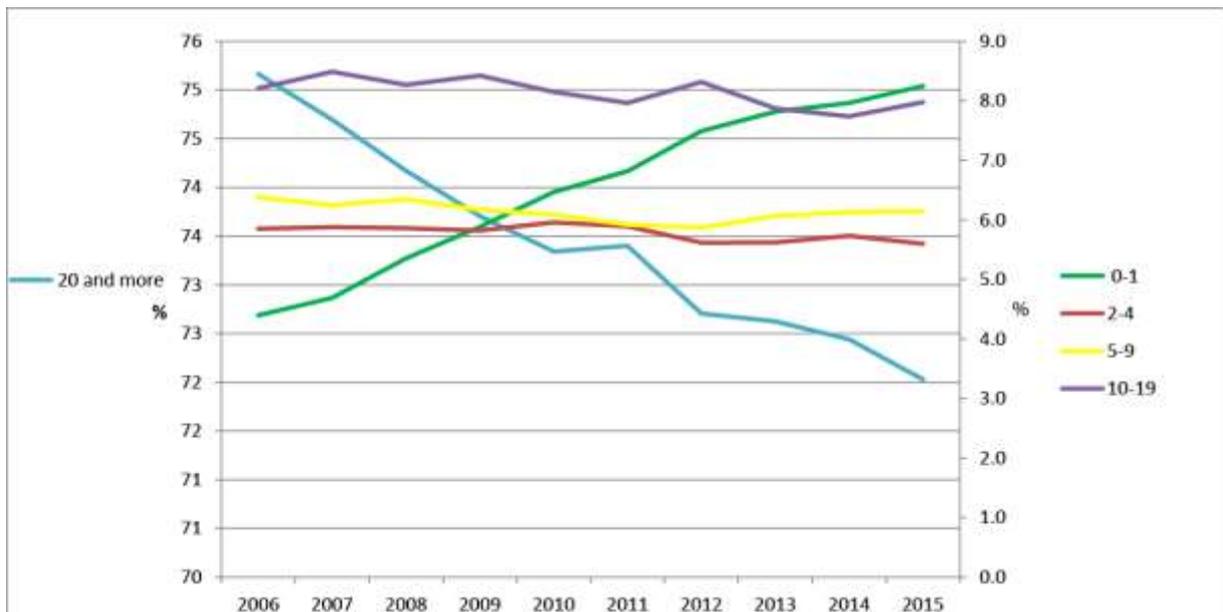


Figure A.2.5.2: Distribution of start-ups in the municipality of Groningen across sectors (2005-2015)

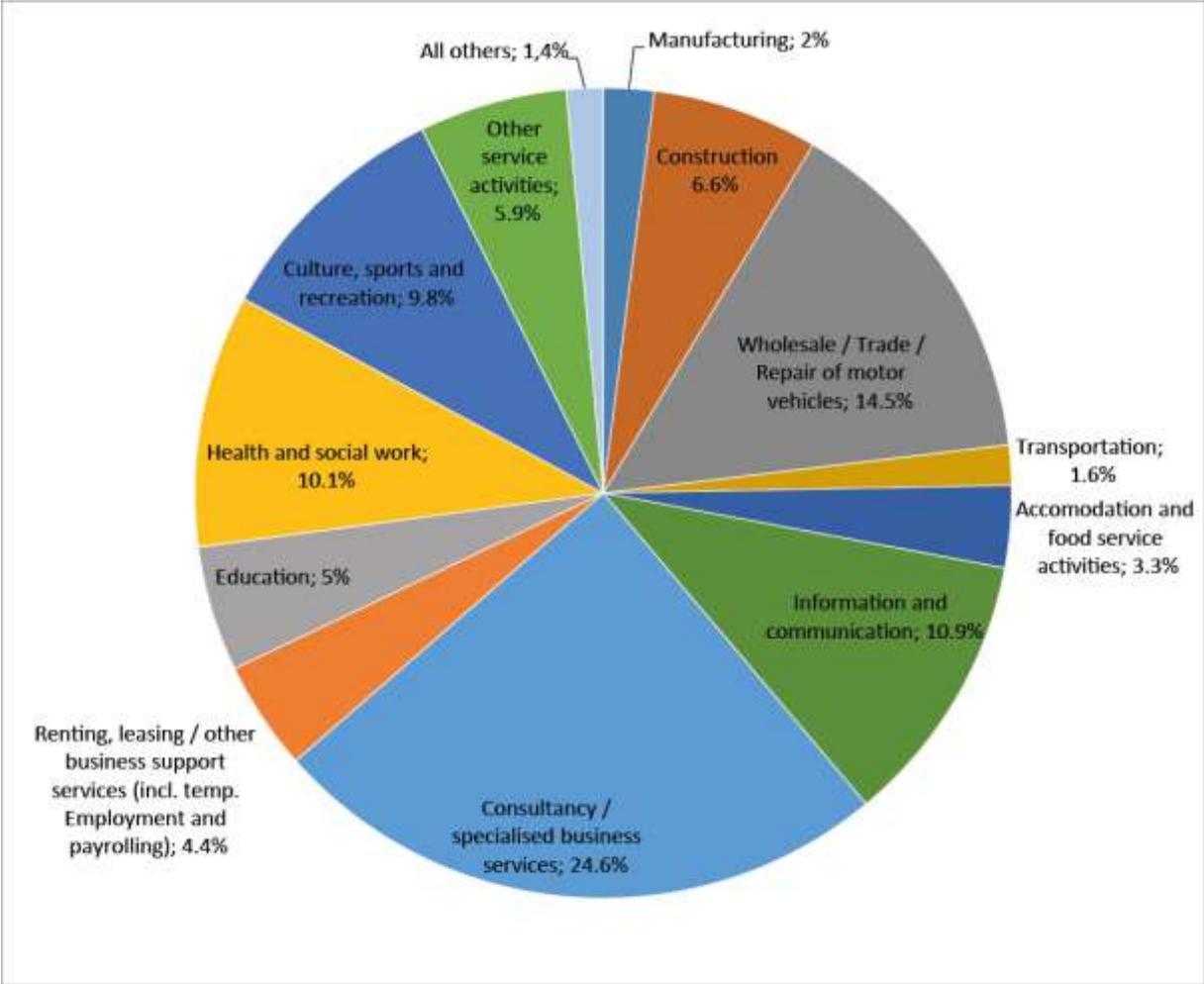


Table A3.1:

VARIABLES	Dependent variable: Job creation
Groningen	-0.772** (0.340)
Friesland	0.417 (0.684)
Drenthe	-0.675** (0.293)
Constant	2.467*** (0.146)
Observations	461
AIC	3132.37

Notes: Negative binominal regression; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.