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Against all odds: where do people start firms?

Investigating less tangible determinants of new firm formation in the Netherlands

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Preface

The thesis that is in your hands now, marks the end of the Master Programme in Economic Geography (EG) and, as such, the end of a very exciting, informative and enriching period of my life. This master programme in particular and the entire period of studying at the Faculty of Spatial Sciences and the University of Groningen in general shaped my personality. My studies and all side-activities I did in this period helped me discovering my passion to contribute to a better and more sustainable world. In other words; it provided me with a new perspective on the world.

It goes without saying that this document (and the process that established it) could never have been written and done all by myself. Hence, I would like to make use of this opportunity to thank all those people who assisted me while finishing this thesis:

First, I would like to thank all the interview respondents, for making time in their busy agendas to conduct the interviews and for sharing their experiences and interesting, valuable and relevant information on the fields of economic policy and entrepreneurship in the Metropolitan Region of Amsterdam (MRA). This input is the backbone of the multiple case study analysis that constitutes the second part of this research. Second, I also would like to thank my family and all of my friends for the constant and unconditional support they gave me during my time as a student in Groningen. Their support was much appreciated from time to time, especially during the intense period in which I completed two master theses, which was not always easy and sometimes even stressful. Without their support, I probably would not be able to keep up the motivation while working on this.

Last but not least, I would like to give a special word of thank to dr. Sierdjan Koster for being a helpful and professional supervisor, as well as to dr. Viktor Venhorst for his help with the construction of the regression model.

A new step in my life is ahead of me, in which I am going to use the new perspective I described above in professional practice as a consultant at Royal HaskoningDHV. I am looking forward to this new phase and all the new opportunities that are ahead of me, but I am sure that I will occasionally melancholically look back to the great time I had as student at the Faculty of Spatial Sciences.

I hope you enjoy reading this research report,

Dion (D.Y.) Glastra
Groningen, January 22nd, 2019

Abstract

Entrepreneurship is often regarded to be crucial to the development of the regional economy, as it drives innovation, creates employment and clusters economic activities. Entrepreneurship dynamics can be measured by using regional new firm formation rates. Regional differences in new firm formation are prevalent and are argued to be caused by a wide range of demand and supply determinants, the institutional context and culture. The regional patterns of new firm formation tend to be quite persistent over time both between and within regions. Over the years, academics have tried to identify the determinants of these new firm formation rates. However, some regions seem not to follow the general patterns outlined in theories on economics and geography.

The aim of this research is threefold. First, this research determines to what extent the new firm formation determinants abstracted from literature on the field or new firm formation fit to the actual situation in the Netherlands, on a municipal level. A longitudinal panel data regression model is used to determine the degree to which municipalities show unexplained variation between the observed new firm formation rate and the estimates calculated by the model and thus to identify the municipalities that show significantly higher levels of unexplained variation. Generally speaking, these municipalities are subject to effects of borrowed urbanisation and neither urban nor rorual.

Second, this research aims to identify the possible socio-economic regional characteristics that contribute to the unexplained variation found in the quantitative analysis. The latter is executed within a multiple case study analysis using document analysis and semi-structured interviews as tools to analyse the regional context-specific characteristics of four municipalities in the Metropolitan Region of Amsterdam (MRA). This region appeared to be a cluster of municipalities with persistently high levels of unexplained variation between observed and estimated new firm formation rates. The main findings are that the regional spatial structure of the MRA causes strong, dependent relationships between Amsterdam and the surrounding regions and that Amsterdam, in economic terms, is hard to compare with other municipalities in the Netherlands. This results in effects of borrowed urbanisation in the Gooi & Vechtstreek region. These effects are stronger in this region due to a highly-valued living environment, a historical entrepreneurial culture and a high degree of connectivity (both physically and socially) to relevant markets. In line with existing literature, entrepreneurship policy is not perceived to have a major impact on entrepreneurial activity.

Third, some practical implications of this research include that new firm formation rates are expected to be a product of the interdependencies between many characteristics of the regional context of the entrepreneur. The findings of this research imply that in order to stimulate entrepreneurship, municipal authorities should focus on creating the right preconditions which nascent entrepreneurs consider to be important for new firm formation, rather than to actively try to attract new firms. More importantly however, this is only meaningful in the case a municipality is attractive in terms of living environment and well-connected to major urban centre anyway.

Keywords: new firm formation, entrepreneurship, persistence, mixed methods research, entrepreneurial ecosystems, panel data, Metropolitan Region of Amsterdam (MRA)

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List of abbreviations

CBS Centraal Bureau voor de Statistiek (English: Dutch Statistics): the official Dutch statistical agency. Most data for the indicators of new firm formation in the panel regression model are obtained from CBS.

COROP Regional classification of the Netherlands drawn up by the **Co**ördinatie Commissie **R**egionaal **O**nderzoeks**P**rogramma in 1971 that is based on the nodal principle: a city and its surrounding catchment area. Some indicators for new firm formation used in the panel regression model are based on COROP level data.

G4/G3 Umbrella term for the four biggest municipalities in the Netherlands in terms of population. These are Amsterdam, Rotterdam, The Hague and Utrecht. In this research, the abbreviation *G3* refers to the G4 excluding Amsterdam and is used to position and compare Amsterdam with the other three cities.

KvK Kamer van Koophandel (English: Dutch Chamber of Commerce): the official institution in the Netherlands in which each new firm is obliged to register itself. The data on observed new firm formation rates are obtained from KvK (2014a).

MRA Metropoolregio Amsterdam (English: Metropolitan Region of Amsterdam): an administrative partnership between 2 provinces, 37 (now 33) municipalities and the Amsterdam Transport Authority around Amsterdam. The municipalities investigated in the multiple case study analysis of this research are located here.

Glossary

Entrepreneurial ecosystem	Theoretical approach that is applied by academics and policy makers who argue that the interrelatedness and interdependence of the elements in the (regional) context is more important than the sum of these individual elements (after Neck et al., 2004; Isenberg, 2011; Spigel, 2015; Stam et al., 2014). Neither a single definition nor a scale level on which such an ecosystem is prevalent are universally agreed upon, but in this research the entrepreneurial ecosystems approach is used to analyse unexplained variation on the municipal and regional scale level.
Entrepreneurship	*'The process of designing and launching of a new business in which the entrepreneur offers a product [...] or service [...] order to make a profit'* (after Schumpeter (1912), in Swedberg (2000).
Estimated (average) new firm formation rate	The new firm formation rate (or the yearly average thereof for the time span indicated) as it has been calculated by the regression model that is applied in this research, based on the indicators that are formulated in Chapters 2 and 3 of this research.
New firm formation	New firm formation (also: nascent entrepreneurship or start-up activity) is the outcome of localised individual entrepreneurial actions in response to perceived economic opportunities by establishing a new firm (also called a nascent firm or start-up). New firm formation is therefore the result of entrepreneurship (after Armington & Acs, 2000; Verheul et al, 2001).
New firm formation rate	The new firm formation rate (also: start-up rate) is a unit to measure entrepreneurial activity in a region. There are two commonly used methods to calculate the new firm formation rate: the labour market approach and the ecological approach (Audretsch & Fritsch, 1994). The labour market approach new firm formation rate is calculated by dividing the amount of newly established firms in a year by the labour market population in the region for that year. For practial reasons, this number is often multiplied by 1000. The ecological approach new firm formation rate is calculated by dividing the amount of newly established firms in a year by the total amount of firms in the region for that year. This research uses the labour market approach new firm formation rate.
Observed (average) new firm formation rate	The new firm formation rate (or the yearly average thereof for the time span indicated) that has been observed in the data from the Dutch Chamber of Commerce (KvK, 2014b).

Panel data	Statistical term to describe a dataset that include multiple observations for multiple cases over time (longitudinal data). Such a dataset is used for the municipal unexplained variation analysis part of this research.
Persistence	Persistent phenomena are phenomena that barely change over time. New firm formation rates are considered to be persistent (Andersson & Koster, 2011), because their determinants also are persistent.
Regional context	In this research, the regional context refers to all factors that affect an individual's decision to start a new firm that are not directly attributable to the entrepreneur himself. The research aims to identify characteristics in the regional context that are present but difficult to measure.
Triple Helix	A term frequently used in management studies, public administration and business studies to describe networks in which entrepreneurs, knowledge institutions and public authorities jointly operate and consult each other (Etzkowitz & Leydesdorff, 2000).
Unexplained variation	The difference between the observed and estimated new firm formation rates, which is used to determine which characteristics of the regional context of the entrepreneur might affect the new firm formation rate in municipality. In this research, it equals the fixed effect of the panel data regression with fixed effects.
Urbanisation	Urbanisation is a term to describe the density of population or addresses in a certain region (what exactly is meant is specified per case). Urbanisation is argued to have significant impact on new firm formation.

1. Introduction

1.1. Research background

Entrepreneurship is often seen as the engine for economic growth. Hence, entrepreneurship has been a hot topic on the agenda for economic policy makers on all administrative levels for a long period of time. Virtually every municipal is therefore promoting itself in some way as a hotbed for entrepreneurs, using expressions like being a '*breeding ground for start-ups* (Gemeente Amsterdam, 2018a)', having '*the most favourable entrepreneurial climate* (Gemeente Son en Breugel, 2018)' or '*having an ideal location (…) without connectivity problems* (Gemeente Achtkarspelen, 2018)'. Many Dutch municipalities embed entrepreneurship into their economic policies and visions (e.g. Gemeente Hilversum, 2007; Gemeente Dordrecht, 2018) or have initiatives to do so (e.g. ChristenUnie Nunspeet, 2018).

The impact of entrepreneurship on the regional economy is indeed significant: entrepreneurship is a key mechanism to obtain regional economic prosperity (Audretsch & Fritsch, 2002; Koster & Van Stel, 2014): it drives innovation (Schumpeter, 1912), creates employment (Birch, 1979) and it clusters economic activities (Glaeser, 1992; Klepper, 2001) and, as such, it creates economic growth and rejuvenation (Stam, 2014; Koster & Hans, 2017). Regional variation in entrepreneurial activity is prevalent, however (Armington & Acs, 2000). Indeed, among regions this variation is often even bigger than among countries (Fritsch & Müller, 2007; Koster & Van Stel, 2014). For example, urban regions tend to show higher new firm formation rates than rural areas (Audretsch & Fritsch, 1994; Bosma et al., 2008; Audretsch, 2011) and attitudes towards entrepreneurship differ significantly among regions (Wennekers et al., 2010; Feld, 2012).

However, it is questionable to what extent municipal policies and strategies towards entrepreneurship are effective. It is unlikely that municipal policies have a significant effect on new firm formation (Fritsch & Müller, 2007) and policies on entrepreneurship should have a long-term focus (Koster & Hans, 2017): new firm formation rates are determined by a wide range of determinants which are usually changing only very slowly and gradually over time (Audretsch & Fritsch, 2002; Bosma et al., 2008; Andersson & Koster, 2011). This persistence implies that the resulting entrepreneurial activity itself should also be quite persistent, which has also been empirically proven to be true for the case of Sweden (Andersson & Koster, 2011) and the Netherlands (Koster & Hans, 2017),. Figure 1.1 shows that the general pattern of new firm formation in the Netherlands is quite persistent over an eighteen-year time span.

Additionally, Isenberg (2011) found that entrepreneurship is often also a self-reinforcing phenomenon: entrepreneurship often leads to spill-over effects which cause more entrepreneurial activity in the regions where it is already prevalent and in regions where the level of entrepreneurial activity is low, it is unlikely that new entrepreneurial activity suddenly significantly increases.

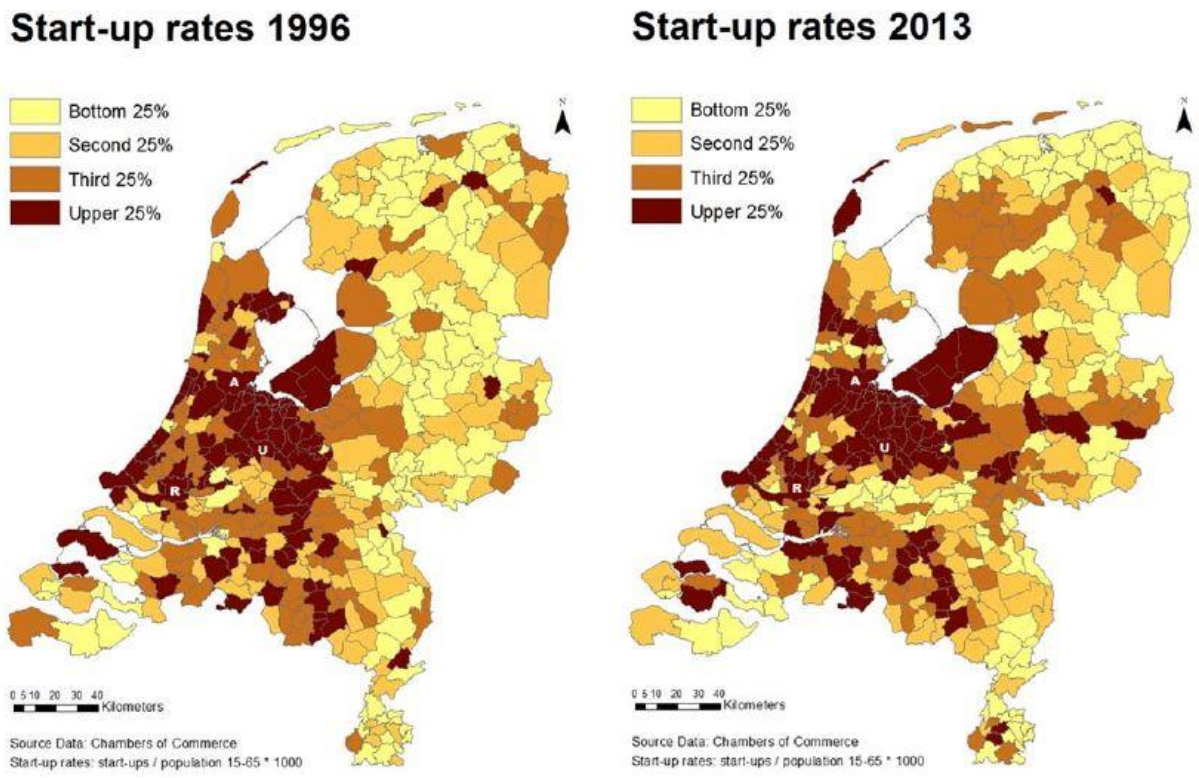

Figure 1.1: Persistence of new firm formation rates in the Netherlands: comparison between 1996 and 2013. (Koster & Hans (2017)).

1.2. Problem definition

A wide range of literature on the determinants of new firm formation exists (see, e.g. Audretsch & Fritsch, 1994; Verheul et al., 2001; Armington & Acs, 2000; Sternberg, 2011). While these determinants certainly help us understanding regional variation in new firm formation, it raises the question if regional variation in new firm formation rates and its apparent persistence could be fully understood using these determinants rooted in theory. Some academics argue (e.g. Mason & Brown, 2014) that it is not so much the determinants themselves that determine new firm formation activity, but the complex environment in which they are interrelated (Spigel, 2015; Stam, 2015). They try to theorise this using the concept of entrepreneurial ecosystems. According to Bosma et al. (2008), such an approach might especially be important on a lower scale level. This is an important notion, because new firm formation should be regarded a local phenomenon (Schutjens & Stam, 2003; Sternberg, 2011).

The relevance of the discussion outlined above is evident from the observations that some regions show significantly higher or lower new firm formation rates than what would be expected (e.g. Armington & Acs, 2000; Koster & Hans, 2017), or that the hypothesised effects of determinants of new firm formation sometimes prove to be more complex, ambiguous or even contradictory in empirical reseach (e.g. Armington & Acs, 2000; Delfmann et al., 2014). For example, most studies argue that population density has a positive effect on new firm formation (Audretsch & Fritsch, 1994; Armington & Acs, 2000; Bosma et al., 2008), while some empirical studies (e.g. Van Stel & Suddle, 2008, Pettersson et al., 2010; Delfmann et al., 2014) observe a negative effect, especially when executed for lower-level administrative units. These results are rather interesting, as they imply some regional characteristics that are relevant for new firm formation rate determination are not yet theorised or even impossible to theorise (Mason & Brown, 2014).

In addition, the spatial regional structure is regarded to affect regional new firm formation rates due to the effects of borrowed urbanisation (Hans & Koster, 2018): places which are not urban themselves could profit from spill-overs from nearby urban centres, while places that are urban but with limited hinterland effects might experience less entrepreneurial activity (after Partridge et al., 2007; Shearmur, 2011; Meijers et al., 2016). These effects have been empirically tested in preceding studies, but not by applying a qualitative approach on such a low aggregation level.

The entrepreneurial ecosystems metaphor as used by e.g. Isenberg (2011) and Mason & Brown (2014) offers a relevant perspective on the hiatuses in the knowledge we have on regional determinants of new firm formation: the synergy of the interrelated elements in the social and economic environments that surround the individual entrepreneur, tends to affect the levels of new firm formation (Stam, 2015). To be able to extend the knowledge on regional differences in new firm formation as well as to contribute to the theories on entrepreneurial ecosystems, getting deeper insights in these less tangible determinants of new firm formation is scientifically relevant. It is also societally relevant, because a better understanding of regional variation in new firm formation could enable policy makers to establish more effective policies aimed at facilitating entrepreneurship.

To meaningfully address this issue, this research focuses on identifying and exploring possible context-specific regional characteristics for unexplained variation between the observed and estimated new firm formation rates by looking at the new firm formation rates of Dutch municipalities for the period 2005-2013. By applying a low level of aggregation, more meaningful results may be expected because new firm formation should be regarded a local phenomenon (e.g. Stam & Schutjens, 2009). Therefore, the municipality level (Dutch: *gemeente*; NUTS-4 on a European scale level) will be used. The identified municipalities that show the highest levels of unexplained variation will be used as case studies for empirical, qualitative research to identify possible context-specific characteristics that could possibly contribute to the unexplained variation.

1.3. Research objectives

The aim of this research is threefold. First, this research aims to identify the municipalities in the Netherlands that show the persistently highest levels of unexplained variation between the observed and estimated new firm formation rates for the time span of 2005-2013. Second, this research tries to identify context-specific characteristics present in the regional and local context that possibly contribute to the unexplained variation in these municipalities. Third, this research tries to formulate conclusions on and possible implications of these context-specific characteristics. As such, this research aims at expanding the knowledge on determinants of new firm formation activity and the understanding of how these are interrelated.

1.4. Research questions

To fulfil the research objectives outlined in the previous section, they are translated into research questions, which will be answered in the following chapters of this research. The main research question connected to this research is as follows:

Which context-specific characteristics possibly contribute to unexplained variation in new firm formation rates among Dutch municipalities during the 2005-2013 time span?

Three sub-questions have been drawn up, which are each contributing to the formulation of an answer to the main research question.

- Which municipalities in the Netherlands show persistently high levels of unexplained variation between observed and estimated new firm formation rates?
- To what extent are high levels of unexplained variation between observed and estimated new firm formation rates related to the regional spatial structure?
- To what extent are non-measured, context-specific characteristics present inside these municipalities, and how could they contribute to explain the observed differences between observed and estimated new firm formation rates?

1.5. Research approach

Answering this research question and its three sub-questions necessitates applying a research strategy that fits with the research objectives (Clifford et al, 2010). For the first sub-question, this is done by building a statistical model *a priori* to estimate the new firm formation rates that includes a wide range of demand and supply factors for entrepreneurship, based on the eclectic entrepreneurship theory applied by Verheul et al. (2001) and a wide range of literature in which determinants of new firm formation are outlined (e.g. Audretsch & Fritsch, 1994; Armington & Acs, 2000; Sternberg, 2011). This model is able to adequately estimate new firm formation rates for all Dutch municipalities, including determinants of new firm formation that are strongly based in theory. For this model, secondary longitudinal data on municipal level obtained from the Dutch Chamber of Commerce and the Dutch Statistics Agency will be used. These estimated new firm formation rates are subsequently compared with actual observed new firm formation rates from the Dutch Chamber of Commerce. Box 1 defines new firm formation rates and explains how they are calculated.

The municipalities that show the highest levels of unexplained variation between estimated and observed new firm formation rates are the proposed results of the first sub-question. These are consequently being used as case studies for the second sub-question. This question applies empirical research with qualitative research methods in order to obtain deeper understanding of context-specific characteristics that are present in these municipalities. Depending on the outcomes of the first sub-question, interviews will be held with relevant stakeholders in these municipalities. Hence, this research is an example of mixed methods research (Creswell & Clark, 2017).

Eventually, conclusions will be drawn from the results of both sub-questions. These conclusions will be connected to each other and connected to the theoretical framework, which consequently answers the main research question.

Box 1: How to define and measure new firm formation?

For this research, new firm formation is measured by using the labour market approach new firm formation rate (the amount of newly established firms per 1000 people of the labour market population in a region for the period of 1 year). Each new firm is started by an individual person (Audretsch & Fritsch, 1994). This is supported by the findings of Stam (2009): most new firms are situated at or in the close proximity of the entrepreneur's home. This is important, as it is an implicit implication of the labour market approach that entrepreneurs are in the same labour market as the one in which the new firm is operating, thus a entrepreneurship is a local phenomenon.

1.6. Research report outline

This research report is structured in the following way: after a brief background and introduction to the phenomenon under research and an overview of the research problem in this Chapter (1), Chapter 2 provides an extensive overview of literature which is currently available on theories and models on spatial distribution and both supply and demand factors of new firm formation activity. In Chapter 3, the theoretical concepts are being translated into the variables used for the model that is used to identify the municipalities with high levels of unexplained variation between observed and estimated new firm formation rates. Chapter 4 is then about the methodological steps that have been taken in order to conduct this research. It elaborates on both the quantitative and qualitative research methods that are used to answer the research question and its sub-questions. After that, the results of the (quantitative) regression model that is used to execute the municipal unexplained variation analysis are being addressed in Chapter 5. Chapter 6 presents and discusses the results of a multiple case study analysis that is executed to identifyossible non-measured, context-specific characteristics of municipalities that show persistently high levels of unexplained variation. Chapter 7 includes the conclusions and the consequent implications of this research for academia and society. Chapter 8 then finally comprises a reflection on the research strategy and recommendations for further research.

2. Theoretical framework

2.1. Entrepreneurship and new firm formation

New firm formation (also: nascent entrepreneurship or start-up activity) is the outcome of localised individual entrepreneurial actions in response to perceived economic opportunities by establishing a new firm (also: nascent firm or start-up). New firm formation is therefore the result of entrepreneurship, which can be defined as *'the process of designing and launching of a new business in which the entrepreneur offers a product […] or service […] in order to make a profit'* (Schumpeter (1912), in Swedberg (2000)). For a more comprehensive overview of theoretical perspectives on entrepreneurship, also see Audretsch et al. (2011).

Like what has been argued already in Section **1.1**, entrepreneurship has traditionally been seen as a driver of economic growth because of three major reasons. First, it is widely argued that entrepreneurship creates employment, and as such, entrepreneurship functions as a mechanism to compensate for economic fluctuations by offering employment opportunities. Successful new firms create jobs and during periods of economic decline in which existing firms face employment decline, self-employment (entrepreneurship) is a way to compensate for employment decline. (Marschak & Nelson, 1962; Birch, 1979; Audretsch & Acs, 1994; Andersson & Koster, 2011). Second, entrepreneurship enhances innovation (Schumpeter, 1950). According to this way of reasoning, entrepreneurship is a cyclical phenomenon in which nascent firms are the result of a novel, often innovative, combination of resources in order to produce a new product or service. Third, entrepreneurship is seen as a mechanism that clusters economic activities (Marshall, 1920; Porter, 1990; Klepper, 2001). The clustering of economic activities implies that there is spatial variation in the distribution of entrepreneurship, and confims the idea that the spatial context is crucial to better understand entrepreneurship.

Traditionally, most emphasis in research on entrepreneurship has been on the individual characteristics of entrepreneurs and not so much on the context in which entrepreneurship takes place. Eliasson & Westlund (2013) argue that this context is however as much important as the individual characteristics of entrepreneurs, because these individuals are highly dependent on both the (perceived) entrepreneurial opportunities and their ability to effectively respond to them. New firm formation therefore is the result of the individual's action and their context. It is thus very likely that new firm formation differs in various contexts (Delfmann et al., 2014). As such, it can be argued that entrepreneurs themselves are therefore of great importance for the economic performance of a region; entrepreneurship enhances economic growth and economic growth creates welfare (Bosma et al. 2012; Fritsch & Müller, 2007; Stam & Van Stel 2011; Stam, 2014).

In line with this way of reasoning, it should be argued that there is no fixed stock of entrepreneurial opportunities: entrepreneurial opportunities are created by supply, demand and available resources in a constantly changing context, and therefore infinite. In recent studies on entrepreneurship this idea has been explored further with authors stating that the creation of new enterprises would lead to new entrepreneurial opportunities due to the fact that supply and demand of resources and the possibilities for the allocation of these resources change with the existing stock of enterprises (Holocombe, 2003;, 2004; Fritsch & Müller; 2007; Andersson & Koster, 2011). In other words, entrepreneurship forms the basis for new entrepreneurship (Isenberg, 2011).

It is important to notice that entrepreneurship does not always have the same effect for every new firm. Both the background and impact entrepreneurs and their new firms have varies greatly (Thurik et al., 2010; Stam & Van Stel, 2011).

2.2. Regional determinants of supply and demand for new firm formation

The question then is what context-specific characteristics in the regional context explain regional variation in new firm formation rates. To structure and categorise these determinants and their theoretical foundations, the framework of the eclectical theory on entrepreneurship applied by Verheul et al. (2001) is used. This perspective on entrepreneurship integrates supply side factors, demand side factors, individual decision-making factors, government intervention and cultural factors (the last two shape the institutional context) of entrepreneurship (Verheul et al., 2001; Wennekers et al., 2005). The level of entrepreneurship in a particular region can be explained making a distinction between the supply side (labour market perspective) and the demand side (product market perspective; carrying capacity of the market) of entrepreneurship (Bosma et al., 1999). The demand side of new firm formation is about entrepreneurial opportunities, while the supply side concerns the resources and abilities of potential entrepreneurs (people) and their attitudes towards entrepreneurship (Verheul et al., 2001; Bosma et al., 2008). The institutional environment, then, shapes the context in which the interplay of supply and demand takes place. In the next subsections, the main demand side and supply side factors related to the regional context will be shortly addressed and outlined.

This section only elaborates on the supply side and the demand side of the eclectical theory by Verheul et al. (2001), as this research is explicitly focused on the regional context of the entrepreneur.

2.2.1. Demand-side determinants of new firm formation

The demand side of entrepreneurship corresponds with the opportunities for entrepreneurship, both from a consumers' and a firms' perspective. Within the first perspective, diversity of consumer demand is important. The bigger the diversity, the more room is created for (potential) entrepreneurs. Within the second perspective, focus is on the industrial structure. The opportunities are influenced strongly by technological developments and government regulation (Verheul et al., 2001). Although a distinction between demand and supply side determinants is made in this research, this distinction is often somewhat ambiguous for individual determinants. This will be explained in the next sub-sections.

2.2.1.1. Economic and technological development

Economic development has a strong indirect impact on new firm formation, as it influences most other determinants on the demand side as well as on the supply side (Verheul et al., 2001). The impact of economic development on new firm formation is ambiguous, however. Economic development can have either positive or negative impact on new firm formation activity, depending on the stage of economic development and on the determinants through which economic development exerts influence on entrepreneurship (see e.g. GERA, 2018). In the Netherlands, regional differences in economic development are relatively low, however. Several academics have argued a negative impact of economic development on the level of new firm formation (Audretsch et al., 2011). Economic development is accompanied by an increase in wage rates and often by improved social welfare, which make new firm formation by individuals less attractive.

On the other hand, since the 1970s economic development has had a positive impact on new firm formation rates in developed, Western countries (Storey, 1999; Audretsch et al., 2011). This is thought to be the result of the emergence of new industries, in which small firms have a relative innovative advantage (Armington & Acs, 2000). Increasing prosperity consequently leads to higher and more diverse consumer needs, in which these new, innovative firms might fulfil. It is empirically supported that economic development increases the employment share in the service sector, which creates opportunities for entrepreneurship (Fritsch, 1997). Economic and technological development go hand in hand: technological developments create a supply in new goods and services and the joint effect of the supply and the demand for these new products leads to more entrepreneurship. The increasing wealth and the demand of people for new goods provides incentives for businesses to fill these market niches. According to Armington & Acs (2002), technological developments enable small business owners to react to the newly created consumer demands.

2.2.1.2. Industrial structure, specialisation and diversification

New firm formation resonates the regional industrial structure of a region (Glaeser et al., 1992). Firms tend to locate themselves near other firms. This effect is called agglomeration economies and it is enhanced by location-specific economies of scale (Marshall, 1920). These agglomeration economies are external economic advantages that are independent of one specific business but have an impact on the total amount of businesses in a certain area. There are three types of mechanisms underlying these agglomeration effects: 1) knowledge spill-overs, 2) local non-tradable inputs and 3) a locally skilled labour pool (McCann, 2013). These strongly relate to population density and therefore urbanisation as described in Section **2.2.2.2.** Frenken et al. (2007) distinguish four different kinds of agglomeration effects:

1) Internal increasing returns to scale (agglomeration effects within one company due to efficient, large-scale production).;
2) Localisation economies (externalities available for all local businesses in one sector);
3) Urbanisation economies (externalities available for all local businesses regardless of the sector)
4) Jacobs' externalities (externalities available for all local businesses because of a large variety of sectors).

Externalities are unintentional, non-monetary and non-tradeable effects that are the result of economic activities that have an impact on other economic activities (Beaudry & Schiffauerova, 2009). Glaeser et al. (1992) distinguishes between two types externalities that are important for entrepreneurship. These are (1) *specialisation externalities* and (2) *diversity externalities*. It depends on the regional economic structure which of these two is dominant.

The rationale behind specialisation externalities is that industries tend to specialise geographically because of the proximity that stimulates intra-industrial knowledge transfer, reduces transportation costs and provides a stable, big and locally skilled labour pool (Marshall, 1890; Glaeser et al, 1992; Beaudry & Schiffauerova, 2009). They argue that the clustering of businesses in a specific sector in a specific region will create knowledge spill-overs (both codified and tacit) and innovation. Because of this, specialisation externalities should be considered an effect of economies of localisation. The exchange of such externalities only takes place between similar sectors, in which externalities can only be stimulated by regional concentrations of businesses active in the same sector. In relation to start-up activity, specialisation externalities enable local nascent entrepreneurs in the sector to innovate within the sector. For nascent start-up entrepreneurs, however, it is not very likely that this will

happen, as most businesses will try to keep specialisation externalities within the firm (Glaeser et al., 1992).

Diversification externalities are externalities that are a result of the variety and diversity of geographically clustered industries, as argued by Jacobs (1969). She argues that diversity is the main engine of the economy (and especially in cities, which have the most varied knowledge), as it is simulating innovation between different sectors, which creates growth and innovation (Glaeser et al., 1992). These processes of growth and innovation are caused by the exchange of knowledge and different ideas between different sectors. The most important knowledge transfers are coming from outside the main sector. As many businesses from different sectors cluster together there are opportunities for imitating, sharing and recombining ideas and practices between these different sectors. Therefore, a diversified local production structure leads to the emergence of urbanisation and Jacobs' externalities (Frenken et al., 2007; Beaudry & Schiffauerova, 2009), which can be considered urbanisation economies. In an environment with many different economic sectors that generate spill-over effects between different sectors, there is a bigger chance that new sectors will emerge. Such an environment is somewhat more open to nascent entrepreneurs, as it welcomes new entries to the market that come up with new ideas and (re)combinations to exploit. It is therefore likely that regions with more diverse economy show higher new firm formation rates (Verheul et al., 2001; Bosma et al., 2008). Due to lower opportunity costs, a high proportion of firms in the tertiary (commercial service) sector is expected to positively affect new firm, while a high proportion of firms in the secondary sector tends to negatively affect new firm formation rates in particular (Fritsch, 1997), also see Section **2.2.1.1.**

2.2.2. Supply-side determinants of new firm formation

The supply side of entrepreneurship is dominated by the demographical and spatial characteristics of the region, as well as the resources and abilities of individuals and their attitudes towards entrepreneurship. The cultural and institutional context within regions as well influences the supply side of entrepreneurship (Verheul et al., 2001). Again, many supply-side determinants of entrepreneurship are strongly influenced by demand-side determinants and vice versa.

2.2.2.1. Regional demographics

The demographical development and composition of a region strongly affects new firm formation rates (Verheul et al., 2001; Armington & Acs, 2000).

A lot of research has been done on the effects of population change on entrepreneurship demand, especially on the effect of positive population change (Audretsch & Fritsch, 1994; Armington & Acs, 2000; Frenken & Boschma, 2007). The argument is that population change positively affects entrepreneurship demand, because population growth creates bigger consumer potential (Armington & Acs, 2000; Wennekers et al., 2005). Entrepreneurship can in such situations provide opportunities for new firms (Reynolds et al., 1995). A positive correlation between population change and new firm formation rates is however not universally agreed upon; many studies confirm such a correlation (Armington & Acs, 2000; Bosma et al., 2008; Delfmann et al., 2014), while others have not found such a correlation (Audretsch & Fritsch, 1994). The effects of population decline on new firm formation are significantly less studied and have ambiguous results (Frenken & Boschma, 2007; Delfmann et al., 2014).

The regional age distribution is important to identify the supply and demand for entrepreneurship, as some age cohorts are more likely to become entrepreneurs than others and different age groups have different needs (Delfmann et al., 2014). Although research on the relation between entrepreneurship and family is rather limited, it is argued that this is mostly related to the risk perceptions related to entrepreneurship in different stages of life (Acs et al., 1994) potential entrepreneurs who have (young) children are less likely to take the risk of starting a new firm, especially if these people are single parents. Apart from obvious age cohorts (youngsters under 15 and the elderly) that tend to negatively affect new firm formation rates, young people are also less likely to start a new firm on average (Peters et al. 1999) and, consequently, the likelihood of starting a new firm increases with age (Acs et al., 1994). They argue that people between 25 and 40 years are most likely to become nascent entrepreneurs. However, Van Gelderen (1999) empirically found that nascent entrepreneurs are usually within the 25-35 year cohort. These conclusions should be treated with a high amount of caution, however, as it is unknown whether they indicate an age effect or a generation effect. Indirectly, age structure influences the level of entrepreneurship through different intermediary factors, such as psychological and social characteristics of the entrepreneur, financial resources, behaviour and networks or contacts. These factors all depend on the age of the entrepreneur and co-determine entrepreneurship (Peters et al., 1999).

2.2.2.2. Immigration

Immigration is supposed to positively affect new firm formation, because of its contribution to population growth but also because immigrants are on average less risk-averse; moving to a different country namely is a symptom of taking a risk (Verheul et al., 2001; Wennekers et al., 2005; Fairlie & Lofstrom, 2015). Even though immigrants often have a socially backward position in society and often do not have the necessary knowledge on procedures (Clark & Drinkwater, 2000; Fairlie & Lofstrom, 2015), there is empirical evidence that immigrants are more likely to become entrepreneurs. They serve the needs of ethnic minorities that native entrepreneurs are not able to fulfil (Veciana, 2007; Fairlie & Lofstrom, 2015).

2.2.2.3. Urbanisation

Population density, when controlled for other determinants, is argued to have a positive effect on the rate of new firm formation (Audretsch & Fritsch, 1994; Wagner & Sternberg, 2004; Bosma et al., 2008). Because densely populated regions correspond with urban regions (Van Oort & Atzema, 2004; Partridge et al., 2007), population density will be referred to as urbanisation. Urban regions offer agglomeration advantages that result in higher new firm formation rates and provide both supply and demand for entrepreneurship (Verheul et al., 2001; Acs & Armington, 2004; Bosma et al., 2008). In general, effects of urbanisation economies offer larger and more diverse markets, whereby the increasing returns are an incentive to start a new firm. Another result is that access to the inputs required to produce goods or services is easily provided (Stam, 2009; Bosma & Sternberg, 2014; Audretsch et al., 2015). Additionally, the risk of establishing a new firm in a city is considered relatively low as cities provide plenty of employment opportunities in the case the new firm fails to be successful (Stam, 2009). Moreover, urban areas offer a rather large and heterogeneous labour potential. Due to low distance (both geographical and social), the costs of information distribution are also rather low, which results in greater knowledge spill-overs whereby tacit knowledge is more easily transferred (Baptista et al., 2008; Delfmann et al., 2014; Bosma & Sternberg, 2014). Due to the higher concentration of people, densely populated areas generally provide more opportunities for knowledge exchange that forms the basis for entrepreneurial success (Andersson & Karlsson, 2007; Shearmur, 2011). As urban areas also tend to have a more

diverse sectoral mix, these areas are also prone to more opportunities for recombination of ideas between different sectors, which contributes to create more opportunities for classical Schumpeterian entrepreneurship (Frenken & Boschma, 2007; Schumpeter, 1912). When assuming that more opportunities for recombination are reflected in higher start-up rates, this implies a positive relationship between urbanisation and new firm formation. Frenken & Boschma (2007) even argue that, based on the principle of 'recombinant growth', the probability of innovation within a region increases more than proportional with the number of routines available for recombination, and thus concluding that there is an exponential relationship between urbanisation and new firm formation.

However, empirical evidence for this is ambiguous and sometimes even contradictory (Pettersson et al., 2010; Delfmann et al., 2014). The relationship between urbanisation and new firm formation seems to be a lot more complex. Bosma et al. (2008) argue that there are also disadvantages to high population densities. High concentrations of jobs and people in densely populated areas are vulnerable to traffic congestion, increased land prices and labour shortage in situations of severe competition (Bosma et al., 2008; Meijers et al., 2016). Frenken & Boschma (2007) also remark themselves that the relationship between urbanisation and innovation is not endlessly positive: at a certain moment, a 'ceiling' will be reached when the positive feedback processes are offset by the negative feedback processes outlined above. This may explain the negative impact of urbanisation on new firm formation in the Netherlands (Van Stel & Suddle, 2008; Delfmann et al., 2014): it could be the case that regions with intermediate urbanisation levels now experience similar or higher new firm formation levels relative to the most urbanised areas in the Netherlands. Surrounding intermediate areas can benefit from the 'crowding out' processes, as these processes cause firms that are sensitive to wage and land costs to locate in the less densely populated areas (Burger et al., 2015).

2.2.2.4. Regional spatial configuration and accessibility as mediating effects

Partridge et al. (2007) argue that the effects of these urban spill-overs are strongly mitigated by the location and distance of a region with respect to other urban areas. For example, a sparsely populated area located near a major urbanised area may experience relatively high start-up rates, while a city located in a peripheral region far away from and/or badly connected with other major urban areas can show relatively low new firm formation rates. Consequently, Shearmur (2011) argues that some locations are more sensitive to new firm formation than others not because of their local characteristics, but because they provide better access to major population concentrations. Rural areas within a reasonable distance from population concentrations can benefit from their proximity when urban growth spreads to the hinterlands (Partridge et al., 2007). This concept of "borrowed size" as proposed by Alonso (1973) suggests that areas with lower population densities can 'borrow' some of the agglomeration and localisation benefits of their larger neighbours, while they are able to avoid the negative effects of urbanisation (Meijers et al., 2016). When the threshold (which is also mentioned by Frenken & Boschma, 2007) of growth in the city is reached, well-connected less urbanised areas may profit as firms are attracted to the lower land and labour costs in these regions while still retaining access to the densely populated urban centres (Partridge et al., 2007; Hans & Koster, 2018).

Even though rural areas that are well-connected to urban areas can face reciprocal competition (Meijers et al., 2016), they simultaneously gain access to the urbanisation benefits of that urban area which can lead to faster growth and therefore are able to overcome these spatial competition effects (Partridge et al., 2009). Moreover, even as firms choose to locate in more

sparsely populated areas, which will limit the physical distances of their location choices (Partridge et al., 2007). In other words, it can be hypothesised that the borrowed urbanisation effects only extend to the maximum daily commuting distance from the urban area; beyond that limits the basic theories on location choice will prevail (Polèse & Shearmur, 2004). In terms of entrepreneurship, better accessibility offers more possibilities for new Schumpeterian combinations, resulting in more opportunities for innovation in that region. So, the location of a region relative to other concentrations of people is likely to have an important mediating impact on the general relationship between population density and start-up activity. This observation results in the possibility that rural areas located in an otherwise urban region may have higher new firm formation rates than a more urbanised area located in a more peripheral region. Therefore, Partridge et al. (2007) argue that in countries with a high population density in general (like the Netherlands), entrepreneurs are more likely than in other countries to start up a firm in more rural areas, because agglomeration advantages are often within closer reach. These ideas have been confirmed in a study by Hans & Koster (2018).

2.2.2.5. Income

Income is largely a result of economic growth (see Section **2.2.1.1**.), and therefore creates both demand and supply for entrepreneurship. The effects are rather ambiguous, however. (Jayawarna et al., 2014). Verheul et al. (2001) argue that income growth increases entrepreneurship demand (bigger markets, diverse demand), but also increases access to the necessary funds for nascent entrepreneurs and, consequently, supply. They discussed a range of often conflicting hypotheses on the effects of income growth on new firm formation rates. First, increasing wage rates result in high opportunity costs for entrepreneurship, which make employment more attractive and therefore mediate new firm formation rates. Fewer people are willing to leave 'secure' jobs as wages increase with economic development. One could also argue that high wages provide more capital and less risk for establishing a new firm (Halvarsson et al., 2018). Additionally, Bosma et al. (2008) argue that high income results in higher costs for hiring employees and therefore has a mediating effect on new firm formation rates.

2.2.2.6. Unemployment

Unemployment rates are strongly related with economic development as well. At the individual level, (the risk of) unemployment is likely to have a positive effect on the level of entrepreneurship through the reduction of the opportunity costs of nascent entrepreneurship. When there is little chance of finding other sources of income, unemployed people have no other option then becoming self-employed (Verheul et al., 2001). Moreover, the duration of unemployment impacts the need for business ownership. The probability of becoming self-employed increases with the duration of unemployment (Storey, 1994; Audretsch & Thurik, 2000). On the other hand, high unemployment rates may indicate a lack of entrepreneurial opportunities and therefore inhibit new firm formation rates (Verheul et al., 2001). Dvoulety and Lukes (2016) executed an empirical study in Germany with positive results on proposing entrepreneurship as a way to get out of unemployment, although many businesses that were started out unemployment do not perform as well as others (Dvoulety & Lukes, 2016). There is evidence for a two-way causation of the relationship between unemployment and self-employment. On the one hand, high new firm formation rates can lead to a high growth level of the economy as a whole and to subsequent low levels of unemployment. On the other hand, Audretsch and Thurik (1998) argue that a low level of unemployment can stimulate entrepreneurship because it is an indicator of a thriving economy that offers opportunities for entrepreneurship.

2.2.2.7. Education level

Audretsch & Fritsch (1994) argue that education level of the population is positively related with new firm formation. Higher educated people tend to have more entrepreneurial skills and are therefore more likely to start a new firm. This is empirically reflected in the fact that regions with more college graduates show higher new firm formation rates in a study executed in the USA (Armington & Acs, 2000).

2.2.2.8. Institutional environment

The institutional context is related to cultural and legal aspects, like fiscal environments, interest rates, labour market regulations and intellectual property rights, but also less tangible factors as entrepreneurial attitudes, trust, social networks and even religious beliefs (Wennekers et al., 2010). Policy measures can have an impact on new firm formation, although the extent to which is subject to discussion (Storey, 1994; Audretsch & Thurik, 2001). As this research only focuses on the Netherlands, most formal institutional context-specific characteristics are the same in each regional context. Culture and other non-formalised institutions, however, differ greatly among both European and Dutch regions (Wagner & Sternberg, 2004; Bosma & Schutjens, 2009). The difficulty with the institutional determinants of entrepreneurship is that they are almost always hard to measure (Aidis et al., 2012). Concluding, it can be argued that most unexpected regional differences in new firm formation could be found in the institutional context of the entrepreneur.

2.3. Persistence and path dependence of new firm formation

The previous sections suggest that regional variation in new firm formation is very much embedded in the local context. As stated in Section **1.1**, variation in entrepreneurship in different regions often exceeds differences between countries (Verheul, et al., 2001; Wagner & Sternberg, 2002; Fritsch & Müller, 2007; Bosma & Schutjens, 2011; Andersson & Koster, 2011). Andersson & Koster (2011) also argue that these rather large regional differences should be explained by using the concepts of persistence and path dependence.

First, persistence in new firm formation rates means that because the demand and supply determinants outlined in Section **2.2** change only very slowly over time (Verheul et al., 2001; Audretsch & Fritsch, 2002; Bosma et al., 2008), new firm formation rates themselves also change only very slowly and gradually over time (Andersson & Koster, 2011). Additionally, Isenberg (2011) found that entrepreneurship is often also a self-reinforcing phenomenon: entrepreneurship often leads to spill-over effects which cause more entrepreneurial activity in the regions where it is already prevalent and in regions where the level of entrepreneurial activity is low, there is a rather low chance that entrepreneurial activity levels will suddenly increase. Several empirical studies have been done already on the persistence of new firm formation rates in the Netherlands on the municipal level; Koster & Van Stel (2014) and Koster & Hans (2017) found that, while new firm formation rates in general were increasing during the 2005-2013 time cohort, are also very persistent. As may be expected, the highest new firm formation rates were found in urban areas and the lowest in more rural areas.

Second, this persistence implies that the determinants of demand and supply for new firm formation are strongly embedded in the historical development of the region. In other words, path dependence is rather important to explain regional variation in new firm formation rates. Martin & Sunley (2006) define a path-dependent system or process *"whose outcome evolves as a consequence of the process's or system's own history"*. The broad implications of path-dependency are that historic characteristics and events in the region's history are likely to affect

future characteristics and events. Research from an evolutionary economic perspective into path dependence and entrepreneurship has at the same time provided evidence that regional variation in entrepreneurship is both persistent and significant, often exceeding national differences (Verheul, et al., 2001; Wagner & Sternberg, 2002; Fritsch & Müller, 2007; Bosma & Schutjens, 2011; Andersson & Koster, 2011). Entrepreneurship here has a certain stickiness to it. Entrepreneurship in one period can thus largely be explained by previous entrepreneurship, as is also confirmed by Isenberg's study (2011).

One reason for this is that a large population of small and young enterprises can positively influence the amount of future entrepreneurs (Fritsch & Müller, 2007). A reason for this is postulated by Fritsch and Müller (2007) that it is more likely in a small enterprise that employees come into direct contact with the business' founder who can act as a role model. This can be related to the previously made opportunities and resource allocation argument. In a locality with a large group of small and young enterprises it is likely that supply and demand determinants are continually changing thus creating opportunities for possible entrepreneurs. The recognition and use of these opportunities by potential entrepreneurs and the personal preferences of these potential entrepreneurs are thus possibly influenced by the entrepreneurial environment of the locality in which the potential entrepreneur is located (Verheul et al., 2001; Andersson & Koster, 2011). Following the main argument of path-dependency, successful regional entrepreneurship can lead to better institutions, which in turn may lead to a better entrepreneurial environment sparking a cycle of economic and entrepreneurial growth. Concluding, it should be argued that there is probably more that underlies regional variation in new firm formation than just the determinants outlined in Section **2.2.**

2.4. A holistic approach: entrepreneurial ecosystems

An approach that acknowledges the impact and relevance of persistence and path dependence with regard to regional differences in new firm formation rates, is the entrepreneurial ecosystems approach. This metaphor for a holistic perspective on the interactions between elements and actors with regard to entrepreneurship was first used by Neck et al. (2004) and ever since, the concept gained mainstream academic attention.

2.4.1. The ecosystem metaphor as a relevant tool to analyse the regional context

The entrepreneurial ecosystem in a region can be described as the interdependent and interrelated combination of social, political, economic and cultural context-specific characteristics related to the regional context that influences the development and growth of entrepreneurial activity in that region (after Spigel, 2015). An entrepreneurial ecosystem consists of mutually interdependent actors and factors that could jointly facilitate successful entrepreneurship (Stam, 2015), in which the relationship between entrepreneur is context is in itself also mutually dependent. During the last years, this approach got the attention of many academics and policy-makers. However, a clear definition of what exactly constitutes an entrepreneurial ecosystem is still lacking. To illustrate this, some academics argue that the entrepreneurial ecosystem approach enables policy-makers to create step-by-step approaches for creating favourable conditions for entrepreneurs (Isenberg, 2010), while others use the approach more as a theoretical concept in which conditions are interlinked.

What is crucial for the entrepreneurial ecosystems approach is the fact that in this approach, entrepreneurs themselves are the key focus point rather than the conditions in which they

operate (Neck et al., 2004) and the notion that the focus is on the interrelationships rather the elements themselves (Motoyama & Watskins, 2014). The basic argumentation of the entrepreneurial ecosystems approach is that the local context is very important for (or even determines) the chance of successful entrepreneurship, but also the opposite: successful entrepreneurship paves the way for a better local context for other entrepreneurs and a better local economy in general (Iansiti & Levien, 2004; Stam, 2014). Another characteristic behind the way of reasoning in this approach is that each entrepreneurial ecosystem is unique, because the ecosystem always is the result of the interconnection and interdependencies of many elements, which creates unique comparative advantages and risks for each ecosystem (Nadgrodkiewicz, 2013).

Entrepreneurs themselves are of crucial importance in the development of an ecosystem, since they provide the co-creation that is a key component of entrepreneurship (Pitelis, 2012). Entrepreneurs, together with the other actors, direct the development and maintenance of the entrepreneurial ecosystem (Isenberg, 2014). For example, if entrepreneurs are successful, this encourages more entrepreneurship. There are several actors that control the ecosystem and when the elements within the ecosystem function properly, the ecosystem will strengthen itself through the mutual interaction between the elements (Isenberg, 2011). The entrepreneurial ecosystem is ultimately self-sufficient and self-regulating due to the different interactions between the actors.

The entrepreneurial ecosystems approach is to some extent related to other theories on how local contexts influence entrepreneurs, like innovation systems (Fritsch, 2001), network theory (Sorenson & Stuart, 2001) and cluster theory (Porter, 1990). All these concepts and theories acknowledge the importance of external factors with regard to new firm formation (Spigel, 2015).

2.4.2. Geographical scale of entrepreneurial ecosystems

The geographical scale of entrepreneurial ecosystems can vary considerably. For example, an ecosystem can comprise a campus, city, region or even a country (Mason & Brown, 2014). An ecosystem does not even necessarily have to be strictly delineated by spatial characteristics, as an entrepreneurial ecosystem can also function for a specific sector, such as the pharmaceutical industry in Copenhagen or the cluster around Nokia in Finland (Mason & Brown, 2014; Stam, 2014). Identifying the right level for analysis can be challenging due to unclear delineation of the system. It is not clear how such a system arises and develops (Feldman, 2012). Each system develops around unique circumstances, which makes creating a general model for the development of such ecosystems impossible. Within the entrepreneurial ecosystem there is no clear cause-and-effect reasoning between the various elements (Stam, 2014). The elements are identified, except in this approach it is not explained how these elements together form the entrepreneurial ecosystem. The origin of an entrepreneurial ecosystem can therefore be seen as unclear, but this does not have to exclude the identification of such a system; the different characteristics can be identified where the initial development cannot always be specifically traced back. Isenberg (2010) also emphasises that identifying the underlying origin of an entrepreneurial ecosystem is of limited value, because there are many variables that work together in the development of the system.

2.4.3. The whole is more than the sum of the parts: interrelatedness of elements

Within the literature on entrepreneurial ecosystems, great diversity can be found about the different elements that are distinguished. Isenberg (2011) developed a framework of understanding in order to make meaningful analysis on entrepreneurial ecosystems, in which he distinguishes 6 domains. These domains may then consist of many elements, of which their mutual interdependence ultimately results in the entrepreneurial ecosystem of the region. Thereby he explicitly emphasises that it is the complex interplay that really defines that specific entrepreneurial ecosystem and that all of these are unique. Other academics and institutions sometimes distinguish more domains in which the elements could be placed. This research will use a combination of Isenberg's and World Economic Forum's divisions, in which the 2 extra elements of World Economic Forum are placed in Isenberg's spectrum (Isenberg, 2011; World Economic Forum, 2013).

2.4.3.1. Culture and history

Culture is considered to be a major element that distinguishes entrepreneurial ecosystems from each other. The underlying attitudes and values people have towards entrepreneurship have an impact on their likelihood to establish a new firm (Aoyama, 2009). Andersson & Koster (2011) hypothesised culture to be an important element of the regional context that causes regional differences in new firm formation, amongst others. Successful entrepreneurs can function as role models and have a key position in enabling positive attitudes and values towards entrepreneurship; they have been proven to take away the fear towards risk and failure from potential entrepreneurs (Mason & Brown, 2014). Amongst others, Wagner & Sternberg (2004) acknowledge the importance of these role models in an empirical study on German regions. These role models are especially important for innovative entrepreneurship. Entrepreneurs involved in innovative entrepreneurship are more likely to have higher growth expectations, with subjective values playing a direct and indirect role in the entrepreneurs' expectation levels of growth (Poblete, 2018). In less successful and more rural regions, role models have been found to be crucial factors in enhancing entrepreneurial successes, too (Benneworth & Charles, 2005). Evidence for this way of reasoning has been found in several regions of Spain by Lafuente et al. (2007) and Garcia-Rodriguez et al. (2017). According to Isenberg (2009), the social position of entrepreneurs is rather important with regard to the likelihood of establishing a new firm. The relationship also tends to be true in the reverse (negative) way: if people have a fear towards failure and risks, they might not consider to establish a new firm until they get unemployed (Spigel, 2015). The region's history with regard to entrepreneurship is important as well. If a region has a strong entrepreneurial tradition, potential entrepreneurs are likely to have stronger connections with successful fellow entrepreneurs, which might inspire them to establish a new firm too (Feld, 2012). This might also contribute to the extent people are willing to take risks (Isenberg, 2011). Regions with a less strong entrepreneurial history are less likely to participate in entrepreneurial activity

2.4.3.2. Policy and government

Policy can have significant impact on the entrepreneurial activity in a region. Entrepreneurial-friendly regulations and guidelines, like tax benefits, investments in public funds and removal of restrictive regulations could stimulate entrepreneurship: tax benefits, investments in public funds and removal of bureaucracy (Choi & Phan, 2006; Huggins & Williams, 2011). An entrepreneur-friendly political environment can also effectively contribute to a well-functioning entrepreneurial environment. The role of politics and government should not be overestimated, however; political momentum is rather unstable and subject to sharp changes.

Governmental organisations should therefore take a facilitating rather than a steering position (Feld, 2012)

2.4.3.3. Access to finance opportunities

The availability of funding options for nascent entrepreneurs, like angel investors, seed capital and other funds is important to increase their chances of success (Cohen, 2006; Isenberg, 2010; Feld, 2012; Spigel 2015). Without investment capital from either banks or social networks, potential entrepreneurs are unable to establish new firms (Malecki, 2011). Investments for nascent firms are often done by people or firms who are already in the social network of the entrepreneur. (Shane & Cable, 2002; Spigel, 2015). This enables nascent entrepreneurs to exploit the networks of their investors (Mason & Brown, 2014).

2.4.3.4. Human capital & education

Talented and educated people are necessary for an entrepreneurial ecosystem to function. Human capital is regarded to be a prerequisite to success, as the knowledge-based economy as it exists in highly-developed countries like the Netherlands needs highly-skilled people for economic growth (Baptista & Mendonça, 2010; Spigel, 2015). Additionally, universities and other knowledge-driven institutions are seen as important contributors to well-functioning entrepreneurial ecosystems, even if they are not physically located in the region (Mason & Brown, 2014). They create new knowledge with market opportunities (Cohen, 2006). Entrepreneurs can use this knowledge to start successful new firm firms (Shane, 2014). They also deliver highly-skilled people for the labour market, and as such they contribute to increase the level of human capital. For the ecosystem, the presence of successful entrepreneurs is also beneficial for universities as they can inspire students to become entrepreneurs (Wolfe, 2005; World Economic Forum, 2013). Good connections between entrepreneurs and knowledge institutions are essential to ensure a stable exchange of knowledge (Feld, 2012; World Economic Forum, 2013).

2.4.3.5. Access to relevant markets

Entrepreneurial ecosystems are highly dependent on market conditions (Mason & Brown, 2014). A strong local market basis is beneficiary in a well-developed entrepreneurial ecosystem, as local clients with specific desires are more easily being catered for because of the tacit knowledge an entrepreneur has. It also encourages the emergence of branch-offs (Spilling, 1996). Adding to that, easy access to (inter)national markets is also beneficiary for an entrepreneurial ecosystem (Isenberg, 2010; World Economic Forum, 2013).

2.4.3.6. Supporting conditions

Within entrepreneurial ecosystem theory, a wide range of supporting facilities could be distinguished. Their main shared characteristic is that these regional attributes are not beneficiary for entrepreneurship themselves, but that they are essential to create a rich entrepreneurial ecosystem. Some of these include:

- Infrastructure (Isenberg, 2010; World Economic Forum, 2013). Digital and physical transportation networks ensure good accessibility, which is necessary for market access.
- An attractive living environment (Mason & Brown, 2014). Environments in which it is attractive to become an entrepreneur are often attractive to live in as well. This is reflected in the lines of reasoning by Jacobs (1961, in Hospers & Van Dalm, 2005) and Florida (2002); the most entrepreneurial places are those where the creative class is present. Evidence for this, however, is limited (Boschma & Fritsch, 2009)

- Specialised supporting services (e.g. accountancy, consultancy and legal services) are beneficiary to sustainably emerge and sustain entrepreneurship and provide access entrepreneurs to services that are not internally available (Cohen, 2006, Isenberg, 2010, Mason & Brown, 2014; Spigel, 2015). Incubators, accelarators and flexible workspaces are also often considered to belong to this category (Mason & Brown, 2014)
- Successful entrepreneurs themselves and their enterprises can also function as a supporting condition for an entrepreneurial ecosystem. They tend to attract talented, highly-skilled employees, which leads to increasing presence of human capital (Feldman et al., 2005; Mason & Brown, 2014). They also tend to generate spin-offs and more start-ups (Marshall, 1920; Neck et al., 2004; Feld, 2012).
- Social networks and social capital (Cohen, 2006; Feld, 2012; Mason & Brown, 2014). Formal and informal, horizontal and vertical, and digital and face-to-face networks support entrepreneurship. The presence of entrepreneurial organisations can function as a catalysing factor for this (Isenberg, 2010; Suresh & Ramraj, 2012), as well as role models. They allow for knowledge spill-overs, the exchange of tacit knowledge, trustful contacts with fellow entrepreneurs and better market knowledge (Verheul et al., 2001; Schutjens & Völker, 2010).

In an entrepreneurial ecosystem formal and informal interactions both contribute to the exchange of knowledge, in which informal interactions are particularly important for the exchange of tacit knowledge (Stam, 2014). Collaboration between different actors facilitates the exchange of knowledge and ultimately leads to innovations.

2.4.4. Critiques to the entrepreneurial ecosystems approach

Although the entrepreneurial ecosystems approach became rather popular over the last years, there is a lot of criticism to it as well. There is no consensus on which elements should be regarded as constituent to the entrepreneurial ecosystem (Cohen, 2006; Feld, 2012; Isenberg, 2010). Additionally, the way entrepreneurial ecosystems emerge is subject to intensive discussions (Stam, 2013; Spigel, 2015), as well as the scale level on which entrepreneurial ecosystems are studied (Mason & Brown, 2014).

A weakness of the entrepreneurial ecosystems approach within specific regard to this reserach, is that most literature on entrepreneurial ecosystems focuses on specific entrepreneurs, which are not necessarily new firms and which might exclude significant shares of new firms.

The critiques notwithstanding, the concept of entrepreneurial ecosystems is highly relevant for this research because it assumes that the whole of all characteristics combined that have an impact on the level of new firm formation in a region could create conditions that are more favourable than the sum of the separate indicators. Such an holistic approach might contribute to our understanding of regional differences in entrepreneurial activity, as well as to establish effective policies to enhance entrepreneurial activity (Mason & Brown, 2014).

2.5. Expected sources of persistent unexplained variation in new firm formation

The literature discussed in the previous sections provides useful insights on why and where new firm formation rates might show persistent unexplained variation. In this section, general expectations are formulated for each of the three sub-questions as presented in Section **1.4**. Hypotheses on the impact of the individual demand and supply determinants of new firm formation on new firm formation rates, as included in the model, are discussed in Section **3.2.**

Sub-question 1: Which municipalities in the Netherlands do show persistently high levels of unexplained variation between estimated and observed new firm formation rates for this time span?

Most persistent unexplained variation in new firm formation rates is to be found in municipalities that are neither urban nor rural and are not too far from an urban centre. Municipalities which are subject to the effects of the determinants described in Section **2.2** are less likely to show big persistent unexplained variation between estimated and observed new firm formation rates, as unexplained variation in these areas is overshadowed by these strong effects. Intermediate regions have less strong influence from these effects and, as such, are more likely to show impact of other, non-measured determinants. This has also been suggested by Andersson & Koster (2011) and Koster & Hans (2017).

Sub-question 2: To what extent are high levels of unexplained variation between observed and estimated new firm formation rates related to the regional spatial structure?

The spatial structure of the regional context, especially regarding the spatial relationship with urban centres, is likely to affect new firm formation rates and therefore results in unexplained variation between observed and estimated new firm formation rate. The spatial configuration of the wider context is expected to have significant impact on the extent to which new firm formation rates are expected to be adequately predicted, especially on the low scale-level of a municipality. MAUP issues are to be expected in such analyses (following Partridge et al. (2007) and Meijers et al. (2016)).

Sub-question 3: To what extent are non-measured, context-specific characteristics present inside these municipalities, and how could they contribute to explain the observed differences between observed and estimated new firm formation rates?

Most persistent unexplained variation between observed and estimated new firm formation rates are related to interdependencies of different characteristics in the wide (non-formal) institutional, social and cultural context. Institutions, social capital and culture are difficult to quantify in a meaningful way, let alone the mutual interdependencies between these characteristics. This is reflected and acknowledged in the entrepreneurial ecosystems approach (Isenberg, 2011; Mason & Brown, 2014). Therefore, it is likely for these determinants of new firm formation that modelling them results in larger error margins. These error margins are the persistent unexplained variation in new firm formation rates.

3. Data and empirical strategy

In order to answer the first sub-question, a statistical analysis on the unexplained variation in municipal new firm formation rates and their longitudinal persistence in the Netherlands is required in order to identify the municipalities with the highest levels of persistent unexplained variation (Armington & Acs, 2000; Delfmann et al., 2014). A linear panel regression with fixed effects is a suitable way to address such a research problem (Frees, 2004). This regression examines statistical data on regional determinants of new firm formation activity to estimate new firm formation rates for each municipality and each year of the time period. These determinants of supply and demand as theoretically founded in the previous chapter are being translated into variables that are quantifiable and verifiable.

Like what is theoreized in the entrepreneurial ecosystems approach (discussed extensively inn Section **2.4)**, not all of the variance among regions in new firm formation rates can be estimated correctly by these variables, however. As the actual new firm formation rates of all municipalities in the Netherlands are known over the 2005-203 time span, the unexplained variation can be calculated and used to identify the municipalities that do not fit to the model by subtracting the estimated new firm formation rates from the observed new firm formation rate. The results of this research step are presented in **Chapter 5.**

The data for all variables have been retrieved and edited from Statistics Netherlands (CBS, 2018b-j). Data on new firm formation rates per municipality are attained from the Dutch Chamber of Commerce (KvK, 2014a). The data obtained from the Dutch Chamber of Commerce provide yearly information about new firm formation activity on a municipality level in the period 1996-2013.

A low level of aggregation, such as the municipality, is needed in order to understand specific local issues in the Netherlands, such as identifying urban and rural regions (OECD, 2008) and to acknowledge the importance of the local context of new firm formation (Audretsch & Stam, 2003; Sternberg, 2011). Therefore, the analyses were performed on all municipalities, which were aggregated to match the number of municipalities in 2013 (408) in order to facilitate comparisons between several years. By using this method, persistence of new firm formation can be taken into account. A possible consequence of using such a low aggregation level is the probability that municipalities are spatially dependent, which needs to be compensated for in the model. This will be done by including a variable that indicates spatial configuration with respect to other municipalities.

3.1. New firm formation rate determination

The new firm formation rate is the dependent variable for this linear panel regression with fixed effects. For this research, the new firm formation rate based upon both independent and related start-ups is used. Related start-ups, namely, are also a symptom of nascent entrepreneurship by an individual. Following out of this way of reasoning, for this research it is important to make a choice on which type of new firm formation rate is chosen. There are two possible ways of calculating new firm formation rates.

The first one is the labour market approach, which is calculated by dividing the total amount of new establishments by the total amount of people in the labour market population (in this case, the population aged 15-64 years) in a region (Audretsch & Fritsch, 1994). The second is the ecological approach. The ecological approach calculates the new firm formation rate by dividing the total amount of new establishments by the total amount of firm establishments in

a region. This approach implies that new firms emerge from existing firms rather than individuals (Van Stel & Suddle, 2008). Research performed in Germany by Audretsch and Fritsch (2002) reveals that the choice of which new firm formation rate is used to perform analyses, could lead to significantly different outcomes; for the labour market approach, a positive relationship between unemployment and the likelihood of establishing a new firm exists, while for the ecological approach there appears to be a negative relationship between those variables. Therefore, it is important to make a deliberate choice for one of the two approaches.

For this research the labour market approach is used, as it is based on the theory of entrepreneurial choice; each new firm is started by an individual person (Audretsch & Fritsch, 1994). This is supported by the findings of Stam (2009): most new firms are situated at or in the close proximity of the entrepreneur's home. This is important, as it is an implicit implication of the labour market approach that entrepreneurs are in the same labour market as the one in which the new firm is operating. In the case of the Netherlands, Schutjens and Stam (2003) show that almost 90% of all new-firms are home-based. Figure 3.1 shows an overview of the development of the labour market new firm formation rate in the Netherlands during the period 2005-2013. It also shows the extent to which municipalities differ from the average new firm formation rate for the Netherlands.

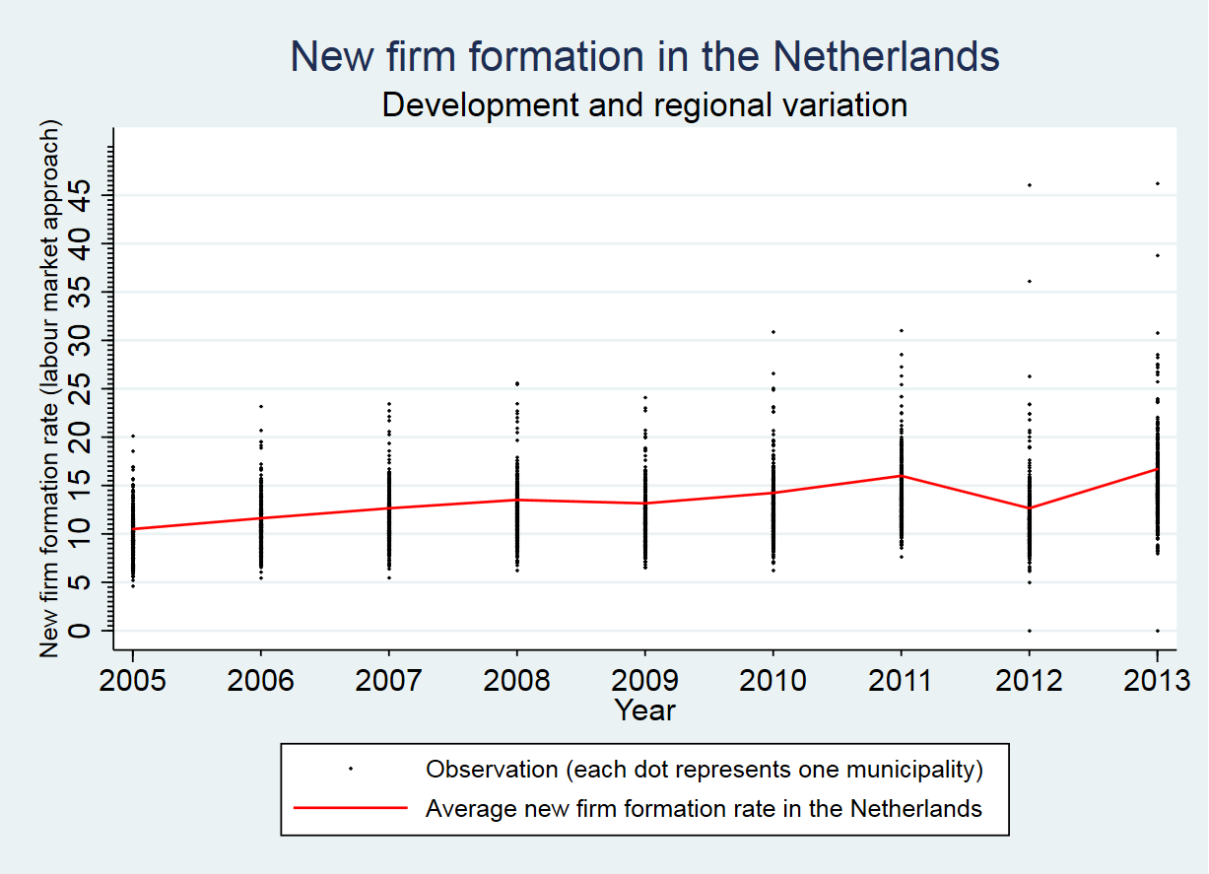

Figure 3.1: General overview of the yearly development and regional variation of new firm formation rates in the Netherlands. The Dutch average is calculated by dividing the total number of new firms per year by the total labour market population of that year.

3.2. Independent variables

Section 2.2 discussed the regional determinants of the demand and supply side of new firm formation activity. (Verheul et al., 2001; Bosma et al., 2008). The combined effects of these determinants, determine the new firm formation rate level of a region. These determinants are being translated into quantitative variables, which can be included in the linear panel data regression with fixed effects (Frees, 2004). In the next subsections, the supply- and demand side determinants of new firm formation are being translated into quantifiable variables in a academically and statistically responsible way.

3.2.1. Demand-side indicators

Economic development (see Section **2.2.1.1**) is incorporated in the regression in terms of both wage rate changes and as changes in added value of regional production. Wage rates have mixed effects on new firm formation rates, as higher wages may reduce the incentive to become self-employed due to higher opportunity costs. Lower wage rates, however, may reduce the level of capital that is involved with becoming self-employed. (Dvoulety & Lukes, 2016). Positive changes in added value are positively influencing new firm formation rates, as growing economies provide more opportunities for new entrepreneurs (Verheul et al., 2001).

Industrial structure could be measured in terms of firm population. The localisation degree is a simple measurement to indicate how many firms there are relative to the amount of people. This indicator is easy to use for this model as the data are available and, additionally, this indicator has been used in earlier research about this topic by Bosma et al., 2008. In line with the arguments made by Glaeser (1992) and Fritsch (1997), a high proportion of firms in the secondary (industrial) sector is expected to have a mediating effect on regional firm formation rates. A variable has therefore been added to the model that indicates the share of the secondary sector in the municipal firm population.

Table 3.1: Overview of demand-side indicators incorporated in the regression model and hypothesised effects.

Demand-side indicators		
Variable	*Indicator*	*Hypothesised effect*
PERC_ADDEDVALUE_COROP	Percentage of value added (prices of produced goods minus intermediate consumption), based on COROP-level data relative to previous year	Positive
PERC_WAGERATE_CHANGE_COROP	Relative change of wage rate, based on COROP-level data relative to previous year	Mixed
LOCALIZATION_DEGREE	Amount of firms per inhabitant	Positive
PERC_SECONDARY	Share of firms in secondary sector	Negative

3.2.2. Supply-side indicators

As entrepreneurs are people, it is important to incorporate some demographic indicators in the model. As the model aims at correcting for size differences, only relative indicators for demographical phenomena are being included. Section **2.2.2.1** suggests that the most likely age for a person to establish a new firm is in the period from the 35th and 50th year of age, which is confirmed by the explanation on the data on entrepreneurship by the Dutch Chamber of Commerce (KvK, 2014b; Kösters, 2009), it is hypothesised that a higher share of people in this age cohort leads to a higher amount of start-ups. Following from Section **2.2.2.1,** population change is also affecting the regional level of new firm formation; areas affected by population decline are hypothesised to negatively affect new firm formation rates and areas affected by population growth are hypothesised to positively affect new firm formation rates (Armington & Acs, 2000). Immigration (taken into the model as the amount of immigrants per inhabitant) is also expected to have a positive impact on new firm formation (Verheul et al., 2001; Fairlie & Lofstrom, 2015).

The literature suggests that urban areas are more likely to have higher new firm formation rates compared to rural areas. An important note has to be made however, in the context of this research. According to international definitions, rural areas have less than 150 inhabitants per km² (OECD, 2008). When those definitions would be applied on the Netherlands, there are no predominantly rural areas in the Netherlands. In the perception of people (and also, although less so, in economic terms) however, rural areas do exist in the Netherlands. Therefore urban and rural areas are defined in terms of address densities, for this research. This approach is frequently used in Dutch policy and in scientific literature on the Netherlands (e.g. Van Stel & Suddle, 2008). Urban areas are considered to be areas with address densities higher than 1500 per km², while rural areas are considered to be areas with address densities lower than 500 per km². Areas with address densities between these numbers are considered to be intermediately urban.

Regions (and therefore municipalities) are strongly interrelated to each other in a spatial way (Elhorst, 2010). Therefore, it is important to add some kind of spatial dimension in the model that indicates how a certain municipality is linked to other municipalities (Lesage & Pace, 2009; Elhorst, 2010). This is also one of the main expected determinants of unexplained variation in new firm formation rates following the literature (e.g. Partridge et al, 2007; Hans & Koster, 2018). The effects of spatial correlation are partly reflected in the fixed effects, as they are unlikely to change over time. Variables that do not change over time are part of the fixed effect (Frees, 2004). A relatively simple variables that may explain something about the spatial configuration of municipalities amongst each other has been included, however. This is a dummy variable for the presence of a crossable border point with a municipality that has a residential centre with at least 100,000 inhabitants. Although this is are simple indicator, it might explain some of the urbanisation and borrowed size effects of entrepreneurship theory as theorised by Partridge et al. (2007), Shearmur (2011) and Meijers et al. (2016), amongst others. In the analysis of the results of this research, it is important to acknowledge that some of these are possibly caused by spatial correlation effects which can not be identified by the model.

Income is, practically seen, both a demand side and a supply side indicator and is incorporated as average standardised income. This is the average disposable income of an individual corrected for differences in size and composition of households (CBS, 2018i). While the empirical results are ambiguous, for this research income is regarded to have a positive impact

on new firm formation rates. The higher the income, the more likely it is that an individual establishes a firm (Halvarsson et al., 2018), as more capital is available and more financial risks could be taken.

Unemployment is measured and incorporated in the model in terms of the percentage of the labour population that receives unemployment benefits: these are the people that are actively looking for jobs and fit for work (CBS, 2018a). In a labour market approach framework, unemployment is seen as having a positive relationship with the new firm formation rate: somebody who is willing to work but is not able to find a job is more likely to establish a new firm.

Dutch Statistics has no data on the education level of the entire population on the scale level of municipalities. Therefore, it is not possible to incorporate accurate information on the share of higher-educated people in a municipality. Higher educated persons are thought to be more likely to establish new firms (Audretsch & Fritsch, 1994; Armington & Acs, 2000). In order to be able to include this finding from literature, the choice has been made to include a dummy variable on the presence of a university. The assumption is that there is a significantly higher share of highly skilled people in municipalities that have universities.

The institutional and cultural context, which is an important supply side determinant of new firm formation (e.g. Benneworth & Charles, 2005; Wennekers et al., 2010), is practically impossible to measure. The formal institutional context, however, is more or less equal for all municipalities in the Netherlands, and as such, is not particularly relevant for this research. For this research, income, employment and education level are incorporated to explain variance in personal factors between municipalities over time. These are quantifiable indicators of individual personal supply and demand for entrepreneurship.

Table 3.2: Overview of supply-side indicators incorporated in the regression model and hypothesised effects.

Supply side indicators		
Variable	*Indicator*	*Hypothesised effect*
PERC_3550	Relative amount of people aged 35-49	Positive
PERC_POPCHANGE	Relative change of population to previous year	Positive
IMMIGRANTS_PER_INHABITANT	Amount of immigrants per inhabitant	Positive
PERC_URB_URBAN'	Relative amount of people living in areas with address densities >1500	Positive
ADJACENT_TO_CITY'	Presence of a border crossable by road, rail or mass rapid transit with a municipality with a residential centre with >100,000 inhabitants (0 = no, 1 = yes)	Positive
AVERAGE_STANDARDISED_ INCOME	Average standardised income per inhabitant	Positive
PERC_UNEMPLOYMENT	Percentage of labour market population receiving unemployment benefits	Positive
UNIVERSITY	Presence of a university (0 = no, 1 = yes)	Positive

3.3. Data availability and descriptive statistics

An overview of data availability and descriptive statistics for all these variables is provided in Table 3.3 below.

Table 3.3: Overview of all independent variables, descriptive statistics and data sources incorporated in the regression model.

Overview of independent variables and descriptive statistics, entire period					
Variable name	**Mean**	**Standard deviation**	**Min**	**Max**	**Data source**
Demand side indicators					
PERC_ADDEDVALUE_COROP	1.18	3.39	-16.50	12.50	CBS, 2018b
PERC_WAGERATE_COROP	0.02	0.03	-0.08	0.11	CBS, 2018c
LOCALIZATION_DEGREE	0.10	0.04	0.03	0.28	CBS, 2018d; KvK, 2014a
PERC_SECONDARY	17.43	4.22	0.00	40.98	CBS, 2018e
Supply side indicators					
PERC_3550	22.80	1.57	17.641	29.02	CBS, 2018d
PERC_POPCHANGE	0.17	0.78	-4.39	5.78	CBS, 2018f
IMMIGRANTS_PER_INHABITANT	0.005	0.005	0.00	0.10	CBS, 2018g, CBS, 2018d
PERC_URB_URBAN	19.93	27.82	0.00	97.40	CBS, 2018h
ADJACENT_TO_CITY	0.40	0.49	0	1	CBS, 2018d, own observation
AVERAGE_STANDARDISED_INCOME	24161.29	2891.74	17000	41700	CBS, 2018i
PERC_UNEMPLOYMENT	4.51	1.22	2.50	12.30	CBS, 2018j
UNIVERSITY	0.03	0.17	0	1	own observation

4. Methodology

This chapter covers the methodology behind the research that is executed for this research. The chapter starts with a paragraph on considerations underlying the general research strategy and the corresponding research methods used for this research. This section also elaborates on the considerations that are taken into account for the selection procedure of the case studies. It is followed by an explanation on how data are collected in order to perform this research. The next paragraph elaborates on the data that were analysed and which data editing mechanisms were needed in order to so. Consequently, the final paragraph outlines the ethical considerations linked to the research.

4.1. Research strategy

The research strategy for this research consists of two distinct parts. The first part of this research comprises a municipal unexplained variation analysis based on a panel database by applying a statistical model. This research step is aimed at formulating an answer to the first sub-question of the research. The results are being presented in **Chapter 5**. The second part of this research comprises a multiple case study analysis based on a document analysis and a series of semi-structured interviews with municipal officials on entrepreneurial policy and representatives of entrepreneurial organisations in the selected municipalities. This research step is aimed at formulating answers to the second and third sub-questions. The results of this research part are presented in **Chapter 6**. As such, this research is an example of mixed methods research, which is a suitable method to position complex phenomena in their specific context in a wider framework of understanding (Creswell & Clark, 2017). Each of the steps is further explained in the sub-sections below.

4.1.1. Municipal unexplained variation analysis

At the base of this research is a model that is able to estimate new firm formation rates in Dutch municipalities for each year of the period from 2005 to 2013. The statistical method to establish a model to identify the cases under study is a linear panel regression with fixed effects. Such a model is able to analyse multiple characteristics of multiple cases, for multiple observations by making use of the internal variation of each case of time. This model has been constructed with the help of *Stata*, an advanced statistical analysis software programme.

After the construction and execution of the panel data regression, the estimated (fitted) values are being visualised in *ArcGIS* (Geographical Information System software) and compared with the observed values using the Combined Residual Prediction function in *Stata*. The observed combined residuals are summed and their averages constitute the fixed effect, which is the value that is used to identify whether a municipality has consistently high levels of unexplained variation. These values are used as the starting point of the multiple case study analysis. The results of this analysis are presented and discussed in Section **5.1.** A list of municipalities with consistently high levels of unexplained variation, for both the negative and positive ends of the spectrum, is also included in this section.

More details on the included variables are provided in **Chapter 3**, and the theoretical concepts they are rooted in can be found in **Chapter 2**.

4.1.2. Multiple case study analysis

The results of the municipal unexplained variation analysis provide a quantitative overview of the unexplained variation in new firm formation rates for each municipality. The unexplained variation comprises the effects of the spatial structure of the surrounding region (which is not controlled for in the model, sub-question 2) and the municipal context-specific characteristics that set them aside from municipalities that fit with the model and which are not included in this model (sub-question 3).

To identify these characteristics, an approach that incorporates the opportunity to investigate complex phenomena in their context is needed. A qualitative case study approach is a suitable method to investigate such complex phenomena in their context; it is better capable of describing the complexities of human experiences, interactions and complex systems than quantitative methods (Yin, 2003; Baxter & Jack, 2008). The discipline of human geography therefore often uses qualitative research methods (Philip, 1998). It is important to understand that qualitative research (like the case study approach used for this research) is a non-value-free approach; this allows the inclusion of values and expectations to compare the roles of (groups) of actors in the study. Of course, it is also important to select case studies that fit with the research (Yin, 2003).

For this part of the study, a multiple case study approach fits well with the research objectives outlined in Section **1.4**. The main research question (*Which context-specific characteristics possibly contribute to unexplained variation in new firm formation rates among Dutch municipalities during the 2005-2013 time span?)* is a good example of a research question that justifies a multiple case study approach, as it explicitly requires to study the phenomena in their context. Case studies are examples from practice and therefore these are best suitable for acquiring the in-depth knowledge required to answer the research questions. Hence, this research will be conducted on the basis of interviews with actors related to entrepreneurship policy of multiple municipalities that are positively or negatively deviant from the models estimated new firm formation rates. More precisely, the research will be designed as a multiple case study. This means that the research focuses on a small number of cases that are selected from a bigger population (Lieberman, 2005).

Such an approach also adds something new to the already existing research regarding regional differences in new firm formation rates. Therefore, the multiple case study approach on the results of the municipal unexplained variation analysis is an appropriate approach to the research problem.

4.1.3. Case study selection

The results of the municipal unexplained variation analysis are used as the starting point for the multiple case study analysis, as mentioned before. Because of limitations in terms of available time and money for this research, a rather arbitrary choice has to be made. The exploration of the results is limited to the 10 municipalities with consistently high levels of positive unexplained variation and the 10 municipalities with consistently high levels of negative variation. These twenty municipalities are then consequently used as input for a consultation session with the supervisor of this research, in order to make deliberate choices on both the most interesting way to approach the results and the questions that raise from the results, considering the research questions and theory outlined in **Chapters 1** and **2.**

The second sub-question involves the investigation of the spatial structure of the chosen case studies.

- Spatial structure and the resulting relationships between municipalities (non-measured because of a lack of spatial correlation indicators in the model)

In order to answer the third sub-question of this research, the entrepreneurial ecosystems approach (extensively discussed in Section **2.4**) is used as a tool to structure the context-specific characteristics that could help to explain some of the unexplained variation found in the municipal unexplained variation analysis (based on Isenberg (2011) and World Economic Forum (2013)). This choice has been purposefully made, because this holistic approach acknowledges that not all determinants of new firm formation could be easily measured.

- Culture;
- Policy and government;
- Finance possibilities;
- Human capital and education;
- Access to (potential) markets;
- Supporting conditions and services.

These themes broad issues above are first investigated by a document analysis. In this research step, policy documents, reports on economic performance and entrepreneurship will be analysed to find context-specific characteristics that relate to these issues. They also are the starting point for the formulation of the interview guide that is used for the semi-structured interviews. More details on the data collection for the multiple case study analysis will be provided in the following sections.

4.2. Data collection

The sub-sections below elaborate on the methods of data collection that are applied in this research.

4.2.1. Municipal unexplained variation analysis

The data for the model were mostly obtained from high-profile statistical and governmental institutions. Table 4.1 shows the sources for all variable data in more detail.

Table 4.1: Overview of data sources of the variables included in the regression model.

Overview of data sources for all variables	
Variable name	**Data source**
Dependent variable	
TOTNEW_LM1	KvK, 2014a
Independent variables	
Demand-side indicators	
PERC_ADDEDVALUE_COROP	CBS, 2018b
PERC_WAGERATE_COROP	CBS, 2018c
LOCALIZATION_DEGREE	CBS, 2018d; KvK, 2014a
PERC_SECONDARY	CBS, 2018e
Supply-side indicators	
PERC_3550	CBS, 2018d
PERC_POPCHANGE	CBS, 2018f
IMMIGRANTS_PER_INHABITANT	CBS, 2018g
PERC_URB_URBAN	CBS, 2018h
ADJACENT_TO_CITY	CBS, 2018d; own observation
AVERAGE_STANDARDISED_INCOME	CBS, 2018i
PERC_UNEMPLOYMENT	CBS, 2018j
UNIVERSITY	own observation

4.2.2. Multiple case study analysis

Document analysis

After the consultation with the research supervisor and the selection of the municipalities for the multiple case study analysis, a document analysis in which documents on entrepreneurship on the municipal scale level for each of the selected municipalities were analysed. Such documents include policies, reports and studies on entrepreneurship and the municipal economic structure in the selected municipalities. These documents were found by contacting each of the municipalities by e-mail or phone with the question if the documents could be sent to the researcher and by looking around the internet. An overview of the selected documents is provided in Table 4.2.

Table 4.2: Overview of policy and visionary documents analysed for this research.

No.	Municipality/region	Title	Author	Year
1	**MRA**	Economische Verkenningen Metropoolregio Amsterdam 2018	Stuurgroep Economische Verkenningen Metropoolregio Amsterdam	2018
2	**Amsterdam**	Ruimte voor de Economie van Morgen	Gemeente Amsterdam	2017
3	**Amsterdam**	StartUp Amsterdam	Gemeente Amsterdam	2014
4	**Amsterdam**	Amsterdams Ondernemers Programma	Gemeente Amsterdam	2015
5	**Amsterdam**	Blauwdruk voor de Derde Gouden Eeuw van Amsterdam	ORAM	2017
6	**Bussum** *(+ Naarden and Muiden)*	Ruimte voor Ondernemerschap: Economische visie Gooise Meren	Gemeente Gooise Meren	2017
7	**Blaricum**	Strategische Visie	Gemeente Blaricum	2010
8	**Bloemendaal**	Bloemendaals Ondernemen	Gemeente Bloemendaal	2016
9	**Hilversum**	Economische Visie 2007-2020	Gemeente Hilversum	2007
10	**Laren**	Strategische Visie	Gemeente Laren	2015

There is a significant limitation to the documents above; all policies described in the documents were made after the time span covered by the municipal unexplained variation analysis. Therefore, it is impossible to directly and unambiguously connect the policy documents to the results of this analysis. However, according to (amongst others) Koster & Hans (2017), it is unlikely that policies have such short-term effects on new firm formation activity and effective policies have a clear long-term focus. It is also the case that radical policy changes on entrepreneurship are rare, and therefore the documents still provide a useful starting point to base interview questions upon (Lundström & Stevenson, 2005).

Semi-structured interviews

According to Longhurst (2003) in Clifford et al. (2010), it is important to carefully think about the participants for semi-structured interviews. The participants are usually chosen based on their experience regarding the subject, which is also the case for this research. The types of respondents interviewed for this research are selected with the help of the supervisor of this research and, consequently, the respondents themselves have been selected by e-mailing and calling the selected stakeholders. The goal is to achieve in-depth knowledge on mechanisms that possibly have an impact on new firm formation rates which are not already incorporated in the model, and consequently the participants of the interviews should have experience with these topics. Therefore, the participants should be either involved in municipal policy making on entrepreneurship or have experience with the entrepreneurial climate in the municipality. This could be all entrepreneurs, but since it is not practically feasible to interview all entrepreneurs in a municipality, the choice was made to select representatives of municipal entrepreneurial organisations. They represent the interests of entrepreneurs in all official affairs and therefore it might be assumed that they know what entrepreneurial citizens find important and how they perceive the entrepreneurial climate in the municipality. For each of the four selected municipalities, the aim is to interview both a municipal policy officer and a representative of the entrepreneurial association.

The selected interview candidates have been approached using phone and e-mail to determine the right contact persons and to make an appointment for an interview. Table 4.3 includes all the respondents that have contributed to this research. All interviews were conducted face-to-face and took about one hour on average.

Table 4.3: Overview of interview respondents that were interviewed for this research.

No	Date	Respondent	Organisation	Position	Place
R1	November 6th, 2018	Dhr. H. Kuperus	Bijzonder Laren	Chair	Café 't Bonte Paard, Naarderstraat 1, Laren
R2	November 6th, 2018	Dhr. L. van der Pols	Bijzonder Laren	Aspirant chair	Café 't Bonte Paard, Naarderstraat 1, Laren
R3	November 6th, 2018	Dhr. mr. H.J.M. de Jong	BEL Combinatie	Policy officer	Gemeentehuis Laren, Eemnesserweg 6, Laren
R4	December 3rd, 2018	Dhr. dr. M. van Vliet	Gemeente Amsterdam	Policy officer	Jodenbreestraat 25, Amsterdam
R5	December 10th, 2018	Dhr. J. van den Eijkhof, MSc.	ORAM	Consultant	De Ruyterkade 7, Amsterdam
R6	December 14th, 2018	Mevr. B.M.C. Boonacker	Ondernemersvereniging Gooise Meren	Chair	Eendrachtskade 12-33, Groningen *Conducted by phone*
R7	December 18th, 2018	Dhr. ir. D. van Es	Blaricumse Ondernemers Vereniging	Chair	Eendrachtskade 12-33, Groningen *Conducted by phone*

Before the interviews are conducted, a short introduction to the research and the broad themes of the questions are sent to the respondent by e-mail. This has been done to provide the opportunity for the respondents to prepare the interview, which is supposed to result in the achievement of better answers. The invitation and interview guide can be found in **Appendix I**. One interview (with respondents 1 and 2) was held with two respondents, the others were held with one respondent.

4.3. Data analysis

4.3.1. Municipal unexplained variation analysis

In order to build the regression model, it is necessary to adjust all data to the same municipal division that is used for the dependent variable. This is the Dutch municipal division of 2013; during this year there were 408 municipalities. In total, the number of municipalities decreased from 467 in 2005 to 408 in 2013 (CBS, 2017). The reclassification is done based on the overview of municipal reclassifications provided by the Dutch Bureau of Statistics (CBS, 2017). In practice, these calculations proved to be not very accurate in some cases. This is caused by the fact that when municipalities get re-divided, they tend to not only be added to another municipality, but also to be split in smaller or larger pieces. These border changes are in itself traceable, but the data attributed to them are not (at least not for the years prior to the municipal reclassification). This problem may cause minor errors in the outcomes of the model, although the changes never exceed a few thousands of units (and usually not more than a few hundred) in populations. An overview of all municipal reclassifications is to be found in **Appendix III** (municipal reclassifications during the 2005-2013 time span) and **Appendix IV** (municipal reclassifications after 2013 which affected the data availability of the 2005-2013 time span).

For some variables, data were not available on the municipal level. These variables are all related to the larger, macro-economic context. These data tend to be quite stable over time and to be valid for larger areas. Therefore and for practical reasons (COROP regions are smaller than provinces and, therefore, the second-most accurate), for these variables the decision was made to use the data on the COROP region level. Although there is obviously a risk that this method affects the outcomes of this analysis, this is considered to be an acceptable risk. **Appendix V** provides an overview of COROP regions and the corresponding municipalities of the year 2013.

4.3.2. Multiple case study analysis

The policy documents summed up in Table 4.2 are being analysed by marking relevant passages in the documents in Adobe Acrobat Reader. These passages are referred to or quoted in this research whenever they are relevant.

All conducted interviews (see Table 4.3) are recorded for two reasons: 1) to be able to retrieve the data in case this is necessary for what reason whatsoever and 2) to be able to handle the output in a meaningful way. After each interview, the output was summarised in a short interview report that functions as the basis for the multiple case study part of this research (as will be further explained in Section **5.2**). **Appendix I** shows an overview of the interview procedures, interview questions and their connection to the study.

4.4. Ethics

Within scientific research, ethics is always an important factor to take notion of (Hay, 2010). For this research, it is most useful to discuss ethics separately for the quantitative part and the qualitative part.

4.4.1. Municipal unexplained variation analysis

As all the data used for the model to identify the municipalities that have persistently high levels of unexplained variation was originally collected from other sources, the ethical considerations on these data are limited. The sources that were used to find the data are respectable and trusted scientific agencies, so the quality of these data is not supposed to be doubted (White, 2010 in Clifford et al., 2012). For privacy reasons, Dutch Statistics sometimes rounded off variables values for some municipalities or turned them into missing values due to very low values. However, not all data could be freely accessed; the data from the Dutch Chamber of Commerce were provided by the research supervisor and the researcher was not allowed to use them for other purposes then this research. Of course, this agreement was adhered to and the data were not distributed or otherwise used for other purposes than this research. Altogether, ethics are not considered to be a major issue for the quantitative part of this research.

4.4.2. Multiple case study analysis

Ethics are an important issue to take into consideration when conducting interviews, because of the anonymity and confidentiality of the respondents (Longhurst, 2003). The privacy and level of willingness of all respondents have to be and are being respected. This research focuses on regional attributes of municipalities, of which some could be politically sensitive. This is true for the considerations that precede policy-making, for example. In the case respondents indicate that they are not willing to share all information this is being respected. Additionally, respondents are being asked if they want to remain anonymous. Any respondent who expressed a desire to remain anonymous is not being named in the analysis. However, none of the respondents expressed such a desire. All respondents stated that their names could be used for the research.

Furthermore, respondents were asked for approval for recording and hence no interviews without recording are included in the analysis. Respondents were given the possibility to to revise the summary that has been made of the interview after recording and to receive a version of the published research report after it is graded. All the respondents received an introduction to the focus points of the research, in order to provide opportunities for preparing the interview. The respondents all signed a form (**Appendix II**) that functions as a contract that the data will be kept in a secure, confidential environment.

5. Identification of municipalities with high levels of unexplained variation in new firm formation rates

This chapter presents and interprets the results of the regression model. Consequently, the resuts are being discussed in relation to the theoretical ideas outlined in **Chapter 2.** The chapter is being concluded with a theoretically supported selection of municipalities that are investigated in-depth in the multiple case study analysis, which is covered by **Chapter 6**.

5.1. Interpreting the results of the regression model

The linear panel data regression with fixed effects analysis is summarised in Table 5.1.

Table 5.1: Summary of linear panel data regression with fixed effects. A complete overview of the regression model can be found in Appendix VI.

Linear panel data regression, fixed effects		
Number of observations:	3650	
Number of groups:	406	
R^2: proportion of variance explained by the regression model	*within groups*: 0,39 *between groups:* 0,41 *overall*: 0,40	
F test: *all variance between groups = 0*	F= 206.44 p = 0.00	
Correlation between the regression line and the variance between groups	-0.08	
Varables		
Dependent variable:	TOTNEW_LM1	
Independent variables:	*Coefficient*	*P value*
PERC_ADDEDVALUE_COROP	0.07	0.00
PERC_WAGERATE_COROP	5.48	0.00
LOCALIZATION_DEGREE	18.14	0,00
PERC_SECONDARY	-0.14	0,00
PERC_3550	-0.32	0,00
PERC_POPCHANGE	0.05	0.42
IMMIGRANTS_PER_INHABITANT	4.14	0.76
PERC_URB_URBAN	0.01	0.45
ADJACENT_TO_CITY	0	omitted because of collinearity
AVERAGE_STANDARDISED_INCOME	0.0005	0.00
PERC_UNEMPLOYMENT	0.80	0.00
UNIVERSITY	0	omitted because of collinearity
Constant	2.56	0.28

Regarding the degree to which the model fits to the data, the F-test for this regression model has a P-value of 0,00, which indicates the null hypothesis that all independent variable intercepts are equal to 0 should be rejected and that the executed regression should be cnsidered significant. Second, the table reveals that this regression model sufficiently fits the data, both for measuring the within-groups variance and between-groups variance. Third, the correlation between the regression line and the within-groups variance is low, which is indicating that they are not influencing each other to an inappropriate extent.

With regard to the indepdendent variables, it is observed that the growth in wage rate appears to have a significant strongly positive effect on the new firm formation rate (which confirms the ideas of Storey (1999) and Audretsch et al. (2011), amongst others), as well as the localisation degree; a combination of wage rate growth and a high density of other firms seems to result in high new firm formation rates (which reflects the ideas of Armington & Acs (2000)). The percentage of added value to the BBP also has a significant but small effect. These findings correspond with the arguments of Verheul et al. (2001), Armington & Acs (2002) and Bosma et al. (2008). Also the arguments made by Glaeser et al. (1992) and Beaudry & Schiffauerova (2009) that a high share of the secondary sector in the regional economy has mediating effects on new firm formation, is confirmed in the regression model on the municipal scale level, albeit slightly.

Contrary to the findings of Van Gelderen (1999)j and the analysis by KvK (2014), the share of people aged 35-50 has a significant slightly negative effect on the new firm formation rate, contrary to the analyses of Van Gelderen (1999) and KvK (2014b). This could be due to the lack of incorporation of other age groups into the model that could more accurately indicate the structure of the population rather than the share of a single age group. Another reason for this inconsistence could be sought in the very limited levels of change that occurs in demographic variables over time. It is the level of change that affects the outcomes of a panel regression with fixed effects (Frees, 2004).

The effects of population change (*PERC_POPCHANGE*), the amount of immigrants per inhabitant (*IMMIGRANTS_PER_INHABITANT*) and the degree of people living in urban environments (*PERC_URB_URBAN*) are argued to have a slightly positive effect (see (e.g. Verheul et al., 2001; Delfmann et al., 2014), but these are not significant effect on the new firm formation rate (when using a P-value of 0,005).

The variables *UNIVERSITY* and *ADJACENT_TO_CITY* cannot provide meaningful results, because they do not vary over time. Therefore they are omitted due to collinearity in a linear panel data regression with fixed effects. They are not excluded from the model, however. That is because they influence the model's constant, and therefore, its standard deviations and variance. No meaningful conclusions on their effect on the dependent variable could be gained from this apart from the finding that there is a certain influence (Elhorst, 2003).

Two municipalities were excluded from the analysis, because the regression model could not properly analyse them due to a lack of data: Boarnsterhim (GM0055) and Maasdonk (GM1671). The reason for this is that the data for variable *PERC_UNEMPLOYMENT* were not available for these municipalities. It was impossible to reclassify the data for these municipalities, as the only available data for *PERC_UNEMPLOYMENT* were according to the municipal classification for 2016. These municipalities were not added to other municipalities, but divided among multiple other municipalities. Therefore, it is impossible to get reliable data for these municipalities and, as such, these municipalities are excluded from the research. For more information on the affected variables and municipalities, see **Appendices III** and **IV.**

5.2. Identifying municipalities with persistently high levels of unexplained variation

After the execution of the linear panel data regression with fixed effects, the estimated new firm formation rates for all 406 remaining municipalities are being calculated using the *Post-estimating → Predict → Fitted values* tool in *Stata*. These fitted values are the estimated new firm formation rates (the models' estimated values for TOTNEW_LM1). By comparing these estimated start-up and the actual values for TOTNEW_LM (the observed new firm formation rates), the residuals could retrieved. These residuals are the differences between the estimated and observed values for TOTNEW_LM1. The residuals provide a useful tool to get a quick overview of the municipalities that do not fit well with the model; an overview of the yearly fluctuations in the levels of unexplained variation for all municipalities can be found in **Appendix VII.**

In order to answer the main research question, however, it is more important to identify the municipalities with persistently high levels of unexplained variation. Observed new firm formation rates that are different from the estimated new n firm formation rates for only one or two years are possibly the result of coincidence or data deficiencies. Hence, the choice is made to calculate the mean residual for each municipality. Dividing the yearly residuals from each municipality by the amount of observations per municipality constitutes the average residual, which equals the municipal fixed effect for the panel regression (Hsiao, 2014), and excludes external determinants. This is the most well-founded and robust way to analyse the residuals for structural and consistent differences over time, which is not influenced by yearly variance. Figure 5.1 provides an overview of the differences between the observed and estimated new firm formation rates of all included municipalities, for the period 2005-2013 (fixed effects).

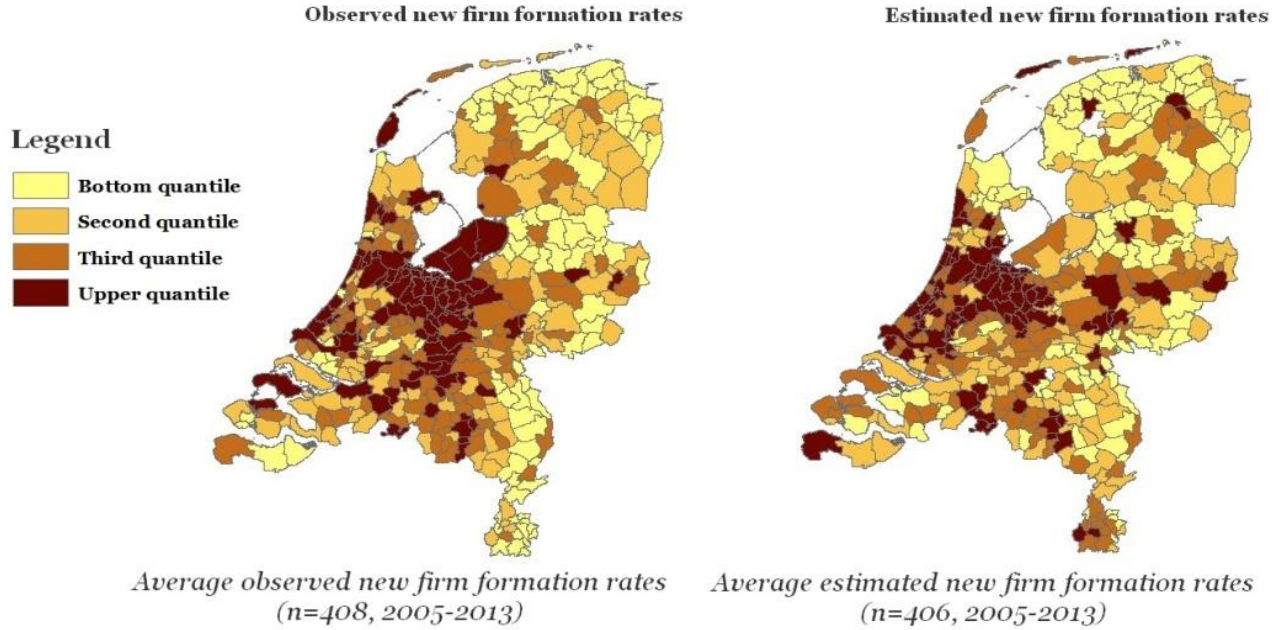

Figure 5.1: Average observed new firm formation rates compared with average estimated new firm formation rates (average for 2005-2013).

Some general observations that can be drawn from the results visualised in Figure 5.1 include:

1) The cities of Groningen and Leeuwarden and their surroundigns show lower observed new firm formation than expected. The relatively peripheral location (both on a national and an international scale level) could cause a lack of urban spill-over effects around these cities, which resonates well with the ideas of Partridge et al. (2007), Meijers et al. (2006) and Hans & Koster (2018).
2) In municipalities located on the axis Amsterdam – Utrecht – Eindhoven (corresponding with the Dutch A2 motorway), observed new firm formation rates are higher than expected. The urban spill-over effects, described above could result in borrowed size effects (e.g. Partridge et al., 2007) and, as such, could be an explaining factor for this situation.
3) Municipalities in the south of the province of Limburg seem not to fit with the model. Their observed new firm formation rates aer structurally lower than the estimated new firm formation rates. The possible explaining factor here is possibly the same as for Groningen and Leeuwarden (touched upon above), but there is a difference in their geographical situation which is not included in the model: contrary to Leeuwarden and Groningen, the south of Limburg is much less peripheral on an international scale. This region has strong connections with surrounding urban centres as Liège, Aachen and, further away, Cologne and Brussels. This makes their deviant position quite interesting.
4) The municipalities in the province of Flevoland has consistently higher observed new firm formation rates than expected. Their proximity to the Randstad (and Amsterdam in particular) could be an explaining factor for this observation. Another reason might be found in the fact that these municipalities have a fundamentally different history, as these municipalities did not exist until about 50 years ago. That might have resulted in a different age composition and a certain type of people that started to inhabit these groudns, that could not be controlled for in the model.
5) The Randstad area is clearly the region with the highest overall new firm formation activity, which resonates with the expectations set in Section **2.5**. However, there seems to be a distinction between the northern and southern wing of the Randstad; the Northern Wing (Amsterdam-Utrecht-Almere) in general shows higher new firm formation activity than the Southern Wing (Dordrecht-Rotterdam-The Hague), although the model does not estimate this difference.

With regard to the expectations that were formulated in Section 2.5, it can be concluded that they are loosely reflected in the results of the municipal unexplained variation analysis. In terms of urbanity, the observation that the highest levels of unexplained variation are to ein municipaliteis which are neither urban nor rural is rather weak. Although a majority of the municipalities in both lists is not predominantly urban nor predominantly rural, there are quite a lot of exceptions to this expectation. In terms of their location relative to an urban centre (municipalities including a residential core of with over 100,000 inhabitants), the results presented above largely seem to correspond with this expctation, albeit loosely.

Although the results loosely seem to follow the pattern sketched in the expectations (the highest levels of unexplained variation are expected to be present in municipaliteis that are neither urban nor rural and not too far away from cities (>100,000 inhabitants), the most remarkable observation abstracted from the results is that most municipalities with high levels of unexplained variation in new firm formation rates are clustered in smaller groups, whereby one group is to be found in the area around Amsterdam and another in the area around Leiden and The Hague. Therefore, it could be argued that these large urban centres have a certain effect on the surrounding municipalities regarding new firm formation levels that is not

incorporated in the model. These observations are very interesting with regard to the research questions, as they might contribute to a better understanding of what mechanisms and characteristics determine regional differences in new firm formation rates and are therefore used as the starting point for the multiple case study analysis.

When looking at the municipalities with the highest levels of unexplained variation, especiallly the latter of these conclusions is of interest. Table 5.2 shows the 10 municipalities with the highest levels of positive unexplained variation between observed and estimated new firm formation rates (from high to low) and the 10 municipalities with highest levels of negative unexplained variation between observed and estimated new firm formation rates (from low to high), it becomes clear that a large share of these municipalities is situated in the Randstad Area, whereby there seem to be quite large regional differences. The top 10s of municipalities with the highest persistent levels of unexplained variation are mapped and named in Figure 5.2.

As Figure 5.1 provides a generic overview by dividing the municipalities over 4 quantiles, it could be justified that the other gerneal observations are not as strongly present in as the latter one; Table 5.2 provides a quantitative overview of unexplained variation levels. Therefore, the choice is being made to further investigate a number of municipalities in the Randstad Area.

Table 5.2: Top 10s of municipalities with the highest levels of positive and negative unexplained variation between the observed and estimated new firm formation rates.

Top ten municipalities with highest levels of positive unexplained variation between observed and estimated new firm formation rates			**Top ten municipalities with highest levels of negative unexplained variation between observed and estimated new firm formation rates**		
	Municipality	**Unexplained variation** *(fixed effect)*		**Municipality**	**Unexplained variation** *(fixed effect)*
1	Woudenberg	12,52	1	Wassenaar	-6,31
2	Amsterdam	7,32	2	Oegstgeest	-4,75
3	Bodegraven-Reeuwijk	6,94	3	Rozendaal	-4,44
4	Zeewolde	6,17	4	Appingedam	-4,21
5	Vlieland	5,22	5	Bloemendaal	-4,03
6	Putten	5,19	6	Voorschoten	-3,72
7	Hilversum	4,77	7	Katwijk	-3,71
8	Bussum	4,57	8	Maassluis	-3,56
9	Laren	4,41	9	Blaricum	-3,55
10	Renswoude	4,21	10	Den Helder	-3,51

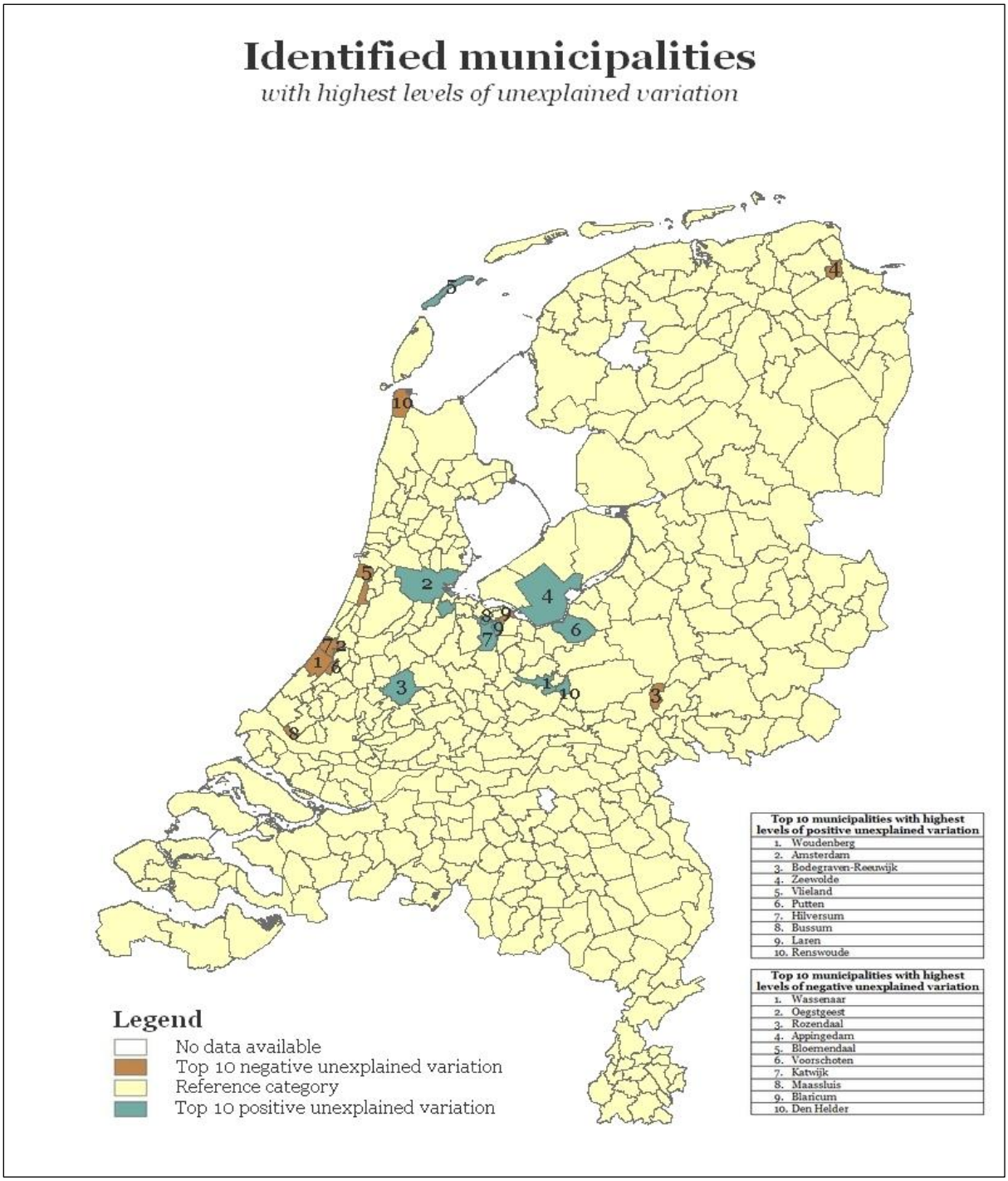

Figure 5.2: Map that identifies the top 10 municipalities with positive unexplained variation in new firm formation rates and the top 10 municipalities with negative unexplained variation in new firm formation rates.

5.3. The MRA as a suitable context for a multiple case study analysis

The last section identified the municipalities with persistently high levels of unexplained variation over the 2005-2013 time span and discussed the extent to which the results match the expectations and theory outlined in **Chapter 2.** This section emphasises on the selection procedure that is applied to select municipalities for in-depth investigation in the second part of the research. For more information on the procedure that has been followed to determine the selection criteria, also see Section **4.1.3**.

An overview of considerations and observations on the twenty municipalities with the persistently highest levels of unexplained variation is provided above. The clustering of such municipalities in different locations in and around the wider Randstad Area is remarkable and deserves further, in-depth analysis. Three different clusters could be distinguished: 1) the Metropolitan Region of Amsterdam (MRA, 6 municipalities), 2) the Agglomeration of The Hague-Leiden (4 municipalities) and 3) Woudenberg-Renswoude (2 municipalities). Additionally, Maassluis and Bodegraven-Reeuwijk are also located in this area and have significantly high levels of unexplained variation between observed and estimated new firm formation rates. A closer look to the top 10 lists reveals that out of the 20 identified municipalities, six are located in the Metropolitan Area of Amsterdam (Dutch: *Metropoolregio Amsterdam*, from now on: MRA). Four of these show consistently high levels of positive unexplained variation (including Amsterdam itself), while two of these show consistently high levels of negative unexplained variation. The MRA is a relatively small area in terms of geographical scale, but there are quite big differences between the municipalities that are located here in terms of new firm formation.

The MRA is the wider region around the Dutch capital city of Amsterdam and consists of 33 (in 2013: 37) municipalities in two provinces (North Holland and Flevoland). It is aimed to cover the entire Daily Urban System of Amsterdam (MRA, 2018). Figure 5.3 shows the municipal classification of the MRA and its location in the Netherlands. The MRA is further divided into 7 sub-regions, which are visualised in Figure 5.4. These sub-regions are important as they will be referred to in the next parts of the analysis.

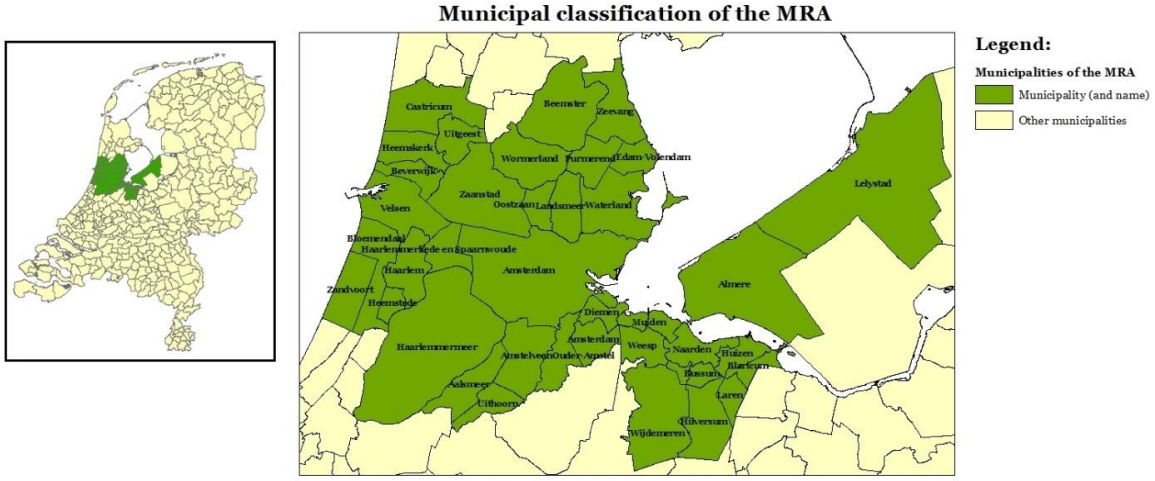

Figure 5.3: Location and municipal classification of the Metropolitan Region of Amsterdam (MRA) in the Netherlands.

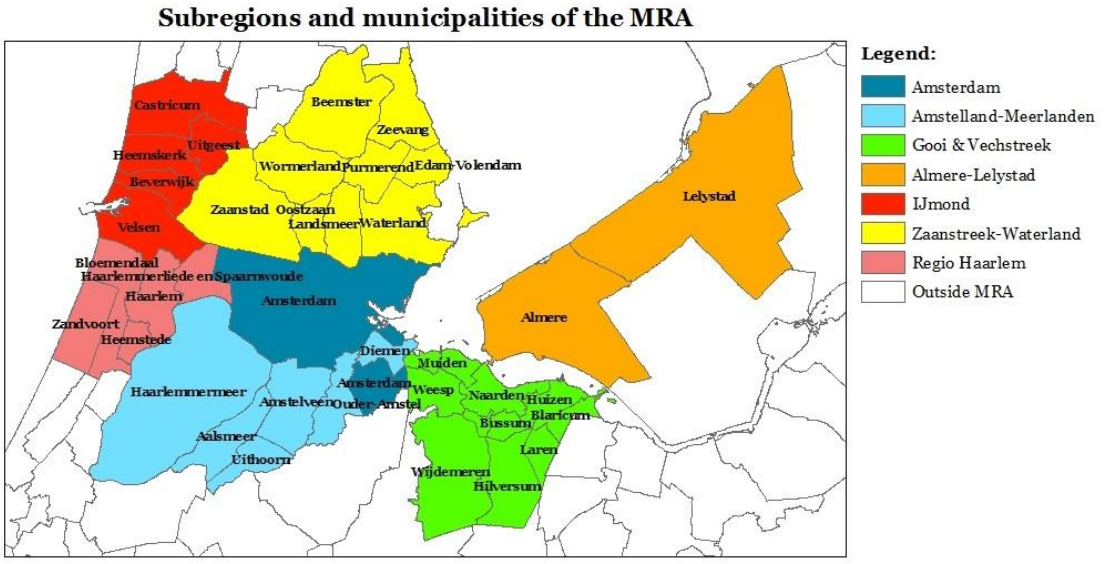

Figure 5.4: Map of the 7 different sub-regions of the MRA as distinguished by the Bureau voor de Metropoolregio Amsterdam (2018).

After a consultation with the research supervisor, the choice has been deliberately made to focus on the MRA region and its internal differences. Regarding the limits in terms of availability of time and resources to conduct the research, this region is thought to provide the most useful insights in context-specific determinants of new firm formation.

Therefore, the qualitative multiple case study approach that is executed for this research is focused on the municipalities in the MRA that are in one of the top 10 lists. These are Amsterdam, Bussum, Laren and Blaricum. Hilversum and Bloemendaal are also taken into consideration in the multiple case study analysis, but since no interviews with stakeholders from these municipalities have been conducted, only info based on documents is included.

A reflection on the applicability of this choice (in retrospect) is provided in Section **8.1.**

6. Identification of context-specific characteristics underlying unexplained variation in new firm formation levels

The municipalities in the MRA that have been identified and selected in **Chapter 5** are being investigated by applying a policy document analysis and conducting semi-structured interviews with policy offers and representatives of entrepreneurial associations in a multiple case study approach, as is explained in **Chapter 4.** The documents and interviews are referred to according to Box 2:

Box 2: Referring to documents and interviews

These subsections extensively refer to the results of the document analysis and the semi-structured interviews. As such, it is important to understand how these data sources will be referred to in the analysis.

- For the ***document analysis,*** documents were analysed and marked in Adobe Reader. In the next sections, the marked passages are mostly used as input and reference for the textual analysis. When direct quotations are included, these will be highlighted according to the following format: ''*Quote*" (document, year, page number). Both integrated fragments and quotations are referred to according to Table **4.2** on page 38.
- For the ***semi-structured interviews***, 7 people have been interviewed during 6 different interviews: 4 respondents were interviewed in interviews with a single respondent, while 1 interview was conducted with 2 respondents (also see Section **4.2.2**). The output of the interviews has been summarised after carefully replaying the recordings. **Appendix I** shows the guidelines for these interviews. In the next sections, these summaries will be extensively referred to. In case the statements of the respondents are integrated into the text, these will be referred to by concluding a sentence with (R#). When direct quotations are included, these are referred according to the following template: *'Quote'* (R#). The numbers of the respondents correspond with the numbers in Table **4.3** on page 39.

6.1. Regional spatial structure of the MRA: perceived borrowed urbanisation effects

The spatial structure of the region is likely to have significant impact on new firm formation rates: Partridge et al. (2007), Meijers et al. (2016) and Hans & Koster (2018), amongst others, suggest that such interrelationships might lead to borrowed urbanisation effects. Due to effects of borrowed urbanisation, it could be the case that the classical theory that new firm formation and urbanisation are related in a one-way relationship, is not valid for the MRA. (e.g. Partridge et al., 2007; Meijers et al., 2016; Hans & Koster, 2018; also see Section **2.2.2.4**). Spatial interdependencies and relationships, however, are hardly controlled for in the regression model. Therefore, it is likely that to some extent, unexplained variation between observed and estimated new firm formation rates in the MRA is related to the regional spatial structure of the MRA, which is questioned in the second sub-question of this research.

Figure 6.1 provides an overview of observed new firm formation rates and estimated new firm formation rates and Figure 6.2 visualises the levels of unexplained variation between observed and estimated new firm formation rates for all municipalities in the MRA. These figures show that especially areas to the southeast of Amsterdam itself are possibly subject to borrowed size effects; the Gooi & Vechtstreek region in general has higher new firm formation rates than expected.

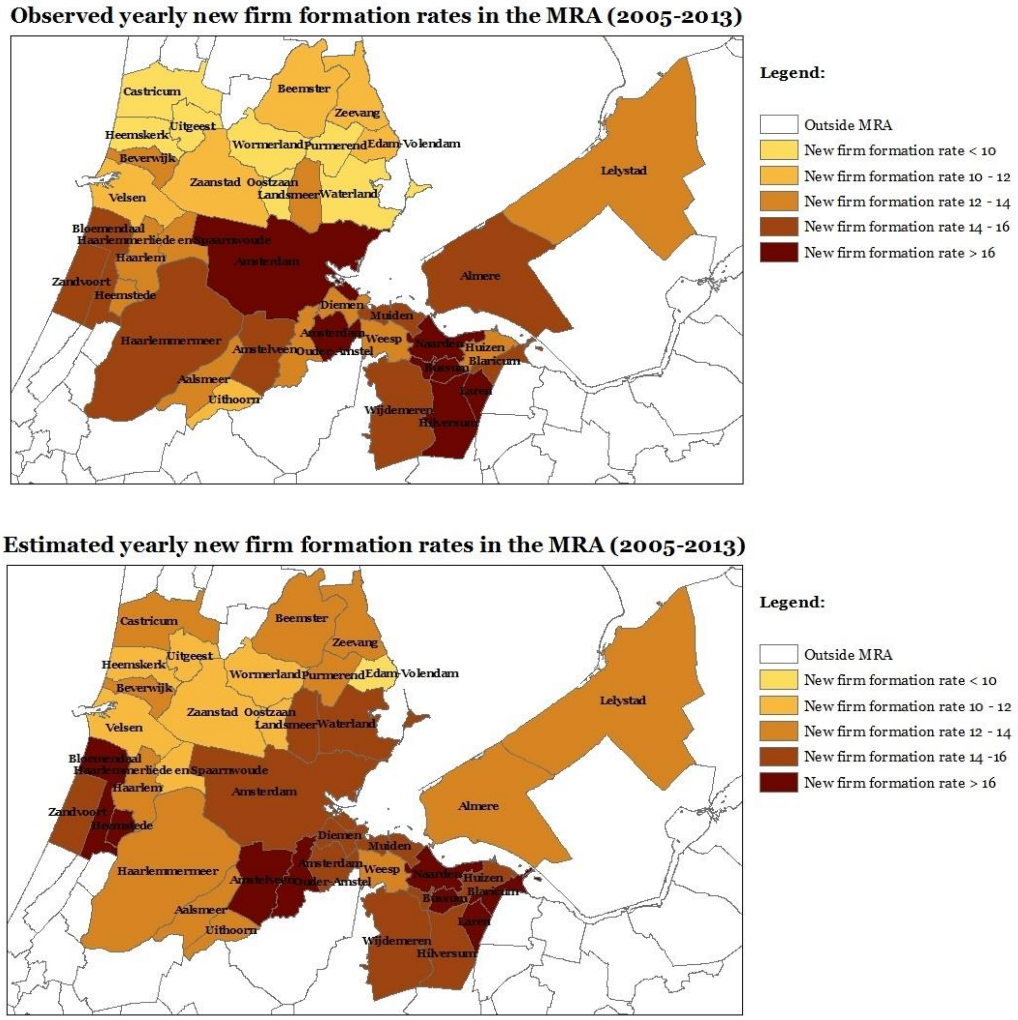

Figure 6.1: Observed and estimated new firm formation rates in the MRA, yearly average for 2005-2013.

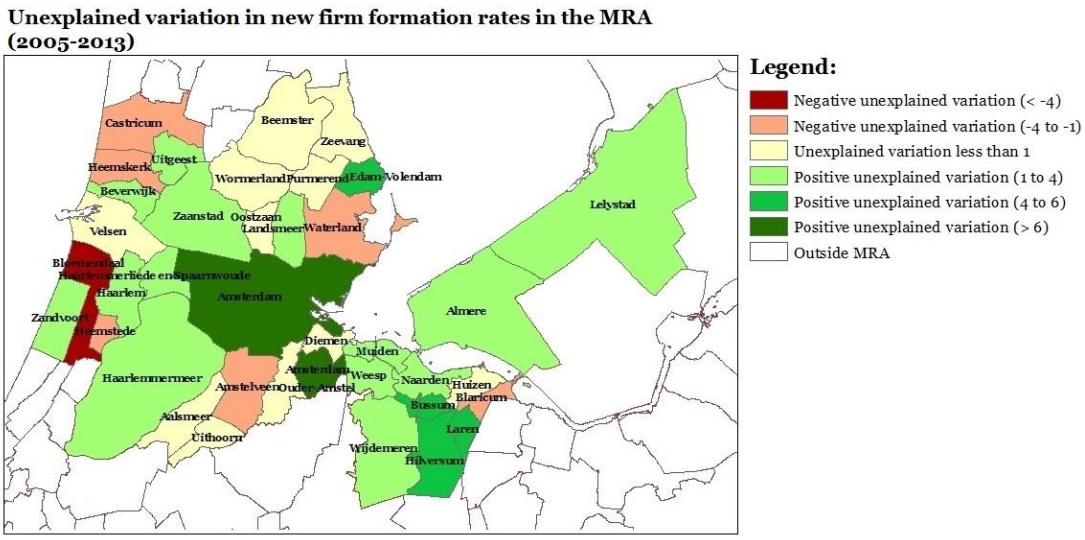

Figure 6.2: Average yearly unexplained variation between observed and estimated new firm formation rates in the municipalities of the MRA, yearly average for 2005-2013.

The MRA is argued to function as the main economic engine for the Netherlands (Gemeente Amsterdam, 2014; MRA, 2018; R4/5) and within the MRA, Amsterdam is undeniably the focal point, both physically and economically. According to the Municipality of Amsterdam (R4) and ORAM (R5), this extraordinary position of the MRA within the Netherlands might explain why the municipality of Amsterdam is subject to persistently high levels of unexplained variation. It is hypothesised that new firm formation rates in the surrounding region (the MRA) are strongly affected by the developments and the economic situation in Amsterdam itself. The yearly executed *Economische Verkenningen* (MRA, 2018) economic analysis confirms the validity of this hypothesis and provides an in-depth analysis on how the different sub-regions of the MRA are related to Amsterdam and to each other. This can be explained well by looking at the incoming and outgoing commuting flows (Figure 6.3).

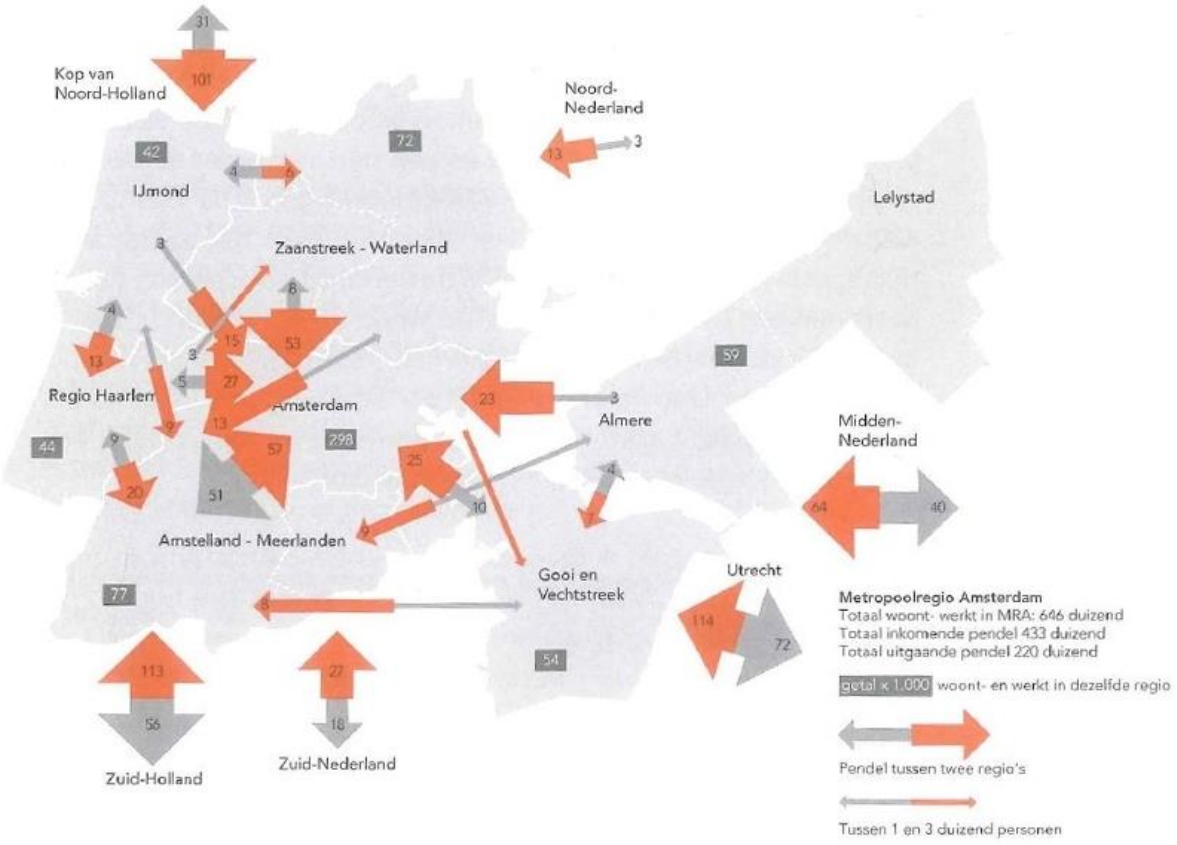

Figure 6.3: Overview of incoming and outgoing commuting flows between the different sub-regions of the MRA and other parts of the Netherlands. Source: scanned from MRA, 2018.

While looking at the commuting flows, it becomes clear that the net incoming commuting flow into the city of Amsterdam comprises 212.000 people, of which a large majority live elsewhere in the MRA. The commuting flows between the other sub-regions of the MRA are much smaller, which indicates that the surrounding areas are indeed economically dependent on Amsterdam as hypothesised. This then results in spill-over effects of the urbanisation externalities that are present here while not being subject to urbanisation disadvantages, as hypothesised by Partridge et al. (2007), Meijers et al. (2016) and Hans & Koster (2018). These ideas are confirmed by the interview respondents; the entrepreneurial associations in Laren (R1, R2) and Bussum (R6), as well as the municipality of Amsterdam (R4) argued that people from Amsterdam who can afford it, opt to move out to these municipalities in order to have more space and a more quiet living environment but keep doing their business there, at least

officially (R2, R6). These firms are small (usually self-employed directors-major shareholders) and located at the residential address: '*Those directors-major shareholders choose to live here, so they can bring their children to school in the morning, and drive to Amsterdam in 20 minutes (after rush hour) and come back late. All the benefits, but not the inconveniences*' (R1).

This phenomenon could contribute to explain the positive unexplained variation in the municipalities of Hilversum, Bussum and Laren and resonates with theoretical perspectives on spatial behaviour of entrepreneurs, but it fails to explain why Blaricum is subject to persistently high levels of negative unexplained variation. Located immediately adjacent to Laren, Blaricum is remarkable within this regard: these two municipalities are both small (about 10.000 inhabitants each), have a high average income and are similar in terms of culture (R1/2, R3, R6, R7). Neither the entrepreneurial associations of Laren and Blaricum (R1/2, R7) nor the municipal policy organisation responsible for policy making in both (R3) could offer an unambiguous explanation for the differences. Four possible explanations came up among the interview respondents: 1) a lack of secondary and higher education, which causes drop out effects of younger people (R7), 2) the fact that Laren has more of a trading centre function (most retail and office space is located in Laren (R1/R3/R7)), 3) a different path dependent development the two villages underwent ('*Laren got connected earlier with the tramway than Blaricum and started to develop as a location for artists and creative people, while Blaricum as a residential location for the rich and famous emerged much later*' (R3)) and 4) Blaricum has less of an entrepreneurial community feeling (R7)). It could also be the case that a coincidental location of the municipal border (which relates to MAUP, see Wong (2009)) causes the differences (R2;R4;R7). None of these suggestions could be controlled for or confirmed in this research, and therefore it remains unclear what exactly underlies the negative unexplained variation between observed and estimated new firm formation rates in Blaricum.

Regarding the negative unexplained variation in Bloemendaal, the Municipality of Amsterdam (R4) and the Entrepreneurial Association Gooise Meren (R6) provided a more substantial explanation: '*What sets Bloemendaal (and other municipalities in the Haarlem region) apart is the relatively more peripheral location. Yes, they are close to Amsterdam and Haarlem, but in Gooi & Vechtstreek you also are in Utrecht, Amersfoort and Almere within less than 30 minutes. That makes the Gooi & Vechtstreek region so unique [compared to other MRA regions]*' (R6). As such, the Haarlem region should be expected to have lower new firm formation rates than Gooi & Vechtstreek although they are culturally, demographically and socially comparable which is reflected in the data.

It was argued in Section **2.5** that the proximity of urban centres is likely to result in borrowed urbanisation effects. These affect new firm formation rates and therefore results in unexplained variation. These expectations are reflected in the results of the case study analysis; it is argued that the level of positive unexplained variation between observed and estimated new firm formation rates in Amsterdam is high because Amsterdam functions as the economic engine of the Netherlands like no other major urban area, which consequently results in spill-overs into surrounding region: the MRA. The MRA is strongly dependent on Amsterdam in terms of economic developments. Gooi & Vechtstreek are most heavily affected by these borrowed urbanisation effects, due the fact they are not only affected by the spill-overs of Amsterdam, but are also well-connected to the urban spill-over effects of Utrecht. These effects are less present in the Haarlem region, which lacks the central location although it similar in demographic and economic terms.

6.2. Context-specific characteristics affecting new firm formation rates in the MRA

Section **2.4** extensively discusses the entrepreneurial ecosystems approach, which could be used as a useful tool to analyse unexplained variation between observed and estimated new firm formation rates, which is purposefully chosen for in Section **4.1**. This approach functions as a guidebook to answer the third sub-question of this research: Isenberg (2011), Mason & Brown (2014) and the World Economic Forum (2013) (amongst others) hypothesise that the following six broad themes constitute the less easily quantifiable regional context of entrepreneurship and which could function as the constituting elements of an entrepreneurial ecosystem. The way these broad themes affect new firm formation rates is analysed according to Box 2 (p. 51).

- Culture and history;
- Policy and government;
- Access to finance possibilities;
- Human capital and education;
- Access to relevant markets;
- Supporting conditions and services.

The following sub-sections will each address one of these three broad themes by presenting the output of the interviews and documents and discussing them in relation to the theoretical framework of **Chapter 2.**

6.2.1. The role of culture and history

As Aoyama (2009) and Mason & Brown (2014) outlined, entrepreneurial culture and attitudes towards entrepreneurship often have deep historical roots. These cultural beliefs and attitudes are hard to measure in other units than the new firm formation rate itself, as was emphasised by the entrepreneurial association of ORAM in Amsterdam (R5) and could therefore possibly contribute to some of the unexplained variation in new firm formation rates among the municipalities of the MRA. the region of IJmond (which is the region with the lowest new firm formation rates) has a strong history in fishing and maritime activities, which are historically quite risky, and Amsterdam (which has been a diverse, mundane and outward looking city for centuries and having the highest new firm formation rates).

It is however hard to identify what exactly constitutes these positive beliefs and attitudes towards entrepreneurship. History often becomes a narrative and is being told to everyone who is willing to hear it (R5). Visionary and policy documents as *Ruimte voor de Economie van Morgen* (Gemeente Amsterdam, 2017) and *Blueprint for the Third Golden Age of Amsterdam* (ORAM, 2017)) are not able to describe the entrepreneurial and risk-seeking history of Amsterdam that is highly promoted in other terms than: '*Entrepreneurship and mercantilism are in the DNA of Amsterdam* (ORAM, 2017, p. 10)'. Although the interview respondents also admit that such statements are vague (R4, R5), they also underline that despite such beliefs are vague they could have effects, which is also reflected in the data. The main suggestions that were made to substantiate the positive cultural beliefs a bit more include *'a certain lack of fear towards taking risks'* (R4) and *'narratives at a certain moment become arguments; they might not necessarily be true but they are believed in anyway'* (R5). These are especially

important for Amsterdam, as contrary to the other municipalities that show positive unexplained variation, the average income of nascent entrepreneurs in Amsterdam are much lower than elsewhere (MRA, 2018; R1/2, R4). Gooi & Vechtstreek, where Bussum, Blaricum and Laren are situated, historically has high new firm formation rates, which is explained to be the result of high average incomes that result in certain types of entrepreneurship (mostly small holdings that have only one employee and whereof the income is earned elsewhere). Such entrepreneurship is argued to be the result of '*an extraordinary sense of community among those who are in the network*' (Gemeente Hilversum, 2007; R1; R2). Remarkably, the representative of the Blaricumse Ondernemers Vereniging argued that *'an entrepreneurial culture is certainly not present in Blaricum. Blaricum really is a commuting village'* (R7) while the same types of entrepreneurship are prevalent in Blaricum as in Laren (R1/R2; R3; R6; R7).

6.2.2. Policy and government: facilitating but not determining new firm formation

Huggins & Williams (2011) and Feld (2012), amongst others, argued that effective policies on entrepreneurship could have significant impact on the levels of entrepreneurial activity. Policy tools that could be applied to enhance entrepreneurship include taking away regulative barriers (such as simplification of tax and permit systems) and implementing financial stimulation mechanisms (such as subsidies for nascent entrepreneurship and tax benefits) (Choi & Phan, 2006).

The selected municipalities in the MRA appeared to have large differences in the extent to which entrepreneurship has a position in the municipal economic policies (e.g. Gemeente Laren, 2017; Gemeente Amsterdam, 2018). In Amsterdam, entrepreneurship has a prominent position in the extensive policy programmes on entrepreneurship and spatial economic policy. There is a visionary document on the spatial economic structure of the capital city (*Ruimte voor de Economie van Morgen* that aims at bulding a strategy to provide physical space towards different types of businesses (Gemeente Amsterdam 2017)), as well as specific policy to stimulate nascent entrepreneurship (*Amsterdams Ondernemers Programma* (Gemeente Amsterdam, 2015)) and a programme aiming at attracting new multinational establishments and foreign start-ups (*StartUpAmsterdam* (Gemeente Amsterdam, 2014)) However, these policies are argued to only aim at facilitating and creating the right conditions for entrepreneurs, according to the municipality (R4): *'entrepreneurship is very much an autonomous development, […] dependent on personality, motivation and the economic situation rather than something policy makes or breaks.'* According to the entrepreneurial associations, the municipality does not have a direct role in increasing the new firm formation in itself. However, intensive communication and an explorative attitude towards the desires of entrepreneurs by municipal boards could keep municipalities inside the municipalities' border (R6).

In the smaller municipalities that were investigated, there is generally less emphasis on entrepreneurship in municipal policies. R3: '*In Blaricum and Laren, there is no specific policy that is directly related to stimulating or facilitating entrepreneurship. Of course, entrepreneurs have close contacts with the municipality via the entrepreneurial associations and their visions are carefully listened to, but not translated into policy strategies in that sense*'. In Gooise Meren (the municipality into which Bussum merged in 2014) there is no substantial policy either, although the entrepreneurial association points out that '*the municipal authorities are in close contact with us and actively try to take into account our recommendations, which also have been incorporated in the visionary documents.*' (R6;

Gemeente Gooise Meren, 2017). Hilversum and Bloemendaal, the two other municipalities in the MRA with high levels of unexplained variation, both formulated an extensive economic analysis and consequent vision (Gemeente Hilversum, 2007; Gemeente Bloemendaal, 2016) in which is being stated that facilitating fits the role of the municipality: e.g.: *'[the municipality] will actively develop a facilitating online platform where entrepreneurs can put their questions.'* (Gemeente Bloemendaal, 2016, p. 28) and *'the regulatory pressure will be reduced, wherever possible'* (Gemeente Hilversum, 2007, p. 38). Policy on entrepreneurship is even argued to sometimes harm the development of entrepreneurship, as was illustrated by the Blaricumse Ondernemers Vereniging: *'When the municipality appointed the highly-needed business park, they decided what kind of firms needed to be located there. That does not work: those firms didn't come and the entrepreneurs who were looking for space were not allowed to settle there, and later they decided to use some of the business park to build extra homes. Exemplary for how NOT to do it.'* (R7).

However, a facilitative and willing approach of the municipality, translated in spatial policies and accessible information platforms, is strongly argued to benefit the entrepreneurial climate in the municipalities, and could prevent businesses to leave the municipality (R5, R6). This is especially important for companies which need physical space, as the municipality generally has the authority to make decisions on the distribution of land. For example, *'[ORAM] (is) in a constant discussion with the municipality to ensure they are allocating enough space for the large industrial companies in the port, as they are very important for the employment opportunities in the city and the supporting services they bring along.'* (R5).

This illustrates and confirms that the impact of policy on new firm formation seems to be rather limited, which has also has been suggested by the interview respondents; both the municipal policy officers and the representatives of entrepreneurial associations acknowledge that municipal policy does not have strong effects on the actual entrepreneurial activities of citizens (R2, R4, R6). However, the municipality of Amsterdam also argued that financial incentives or assistance offered by the municipal authorities could not have any impact at all; on the contrary, a guiding and facilitative attitude towards entrepreneurship is said to enhance the productivity of entrepreneurs (R4).

To conclude, the direct impact of policy on the actual levels of new firm formation rates is argued to be limited and could not be expected to be a major determinant of new firm formation. However, a well-structured vision on the spatial economic structure and a facilitative attitude towards entrepreneurship that is acknowledged by the municipality is found to be beneficial to the entrepreneurial climate. On the long term, this could lead to an increase in new firm formation. This therefore confirms the ideas of Fritsch & Müller (2007) and Koster & Hans (2017), who argue that policy on entrepreneurship should have a long term focus. A single of example of negative results of certain policies in Blaricum does illustrate that facilitating is the way to deal with entrepreneurship on a municipal level rather than deciding.

6.2.3. Access to funding options

Following Feld (2012), Mason & Brown (2014) and Spigel (2015), access to finance possibilities increases the chance of success for new entrepreneurs and is often found among informal networks and supporting institutions or authorities. The entrepreneurial associations were asked if there was sufficient access to finance and funding options. But although the importance of sufficient finance options for new entrepreneurs is acknowledged (R1, R2, R6), it is argued that finance is usually acquired from own resources and that they had no reliable

overview of the extent to which finance is acquired from entrepreneurial networks (R1, R7). The municipalities in their turn do not have funding options for new firm formation by themselves, but some municipalities provide useful recommendations and contacts for nascent entrepreneurs in their information documents and on their online entrepreneurial platforms (Gemeente Amsterdam, 2018b; Gemeente Hilversum, 2018). The extent to which this information is easily traceable differs widely among the municipalities of the MRA (R3, R6). Although this could have a small influence on the levels of unexplained variation, not enough reliable input has been provided by the respondents to confirm this idea.

6.2.4. Human capital and education as drivers of a knowledge-based MRA

As Shane (2014) and Spigel (2015) argued, in highly developed economies human capital and highly-skilled labour is necessary to create economic growth. Innovation is key to such economies and is induced by entrepreneurship (Schumpeter, 1950) and human capital is as such important for new firm formation in entrepreneurial ecosystems. Entrepreneurs get access to knowledge by education and by networks in which both entrepreneurs and knowledge institutions are represented. Such networks exist in the MRA, both on the scale level of the MRA as a whole (R5) and on the level of Amsterdam as a municipality (R4). In other municipalities, entrepreneurial associations and municipalities themselves have no representation in so-called Triple Helix networks (see e.g. Etzkowitz & Leydesdorff (2000)).

The accessibility to a high-skilled labour pool is partly included in the model (the variable *UNIVERSITY*) but the effect of it could not be controlled for (collinearity) and it also does not really grasp the availability of skilled labour, as was outlined by ORAM: *'highly-skilled labour does not mean that there are only highly-educated people, on the contrary. If there is only attention for these types of entrepreneurs, we will probably fall in decline as we need to take care that we will not face a lack of electricians, installers and construction workers for all new developments in our city. These are also skilled people!'* (R5). In the 2005-2013 time span, however, the availability of a diversely skilled labour pool was one of the strengths of the MRA (MRA, 2018).

6.2.5. Perceived access to market potential and market spill-overs

In Section **2.4.3.5** it was outlined that, according to Spilling (1996) and Mason & Brown (2014), access to thriving local and regional markets is beneficiary for the success of nascent entrepreneurs. Such market conditions are argued to be at the basis of entrepreneurial ecosystems (Isenberg, 2010). As argued and confirmed in Section **5.3,** the MRA functions as the main economic engine for the Netherlands (Gemeente Amsterdam, 2014; MRA, 2018; R4/5) and is centred around the city of Amsterdam. According to the Municipality of Amsterdam (R4) and ORAM (R5), this extraordinary position of the MRA within the Netherlands might explain why there are relatively many municipalities in the MRA that are subject to persistently high levels of unexplained variation.

It is argued that Amsterdam, in terms of socio-economic characteristics, is difficult to compare with the other big cities in the Netherlands (Rotterdam, The Hague and Utrecht, from now on the G3). Amsterdam, as they argue, is better comparable on an international scale level (e.g. London, Copenhagen and Berlin). International indicators and developments are not compensated for in the regression model, which might result in increased levels of unexplained variation for Amsterdam. These context-specific characteristics that could cause unexplained variation between observed and estimated new firm formation rates, then are argued to

indirectly affect new firm formation rates of surrounding municipalities in the MRA as well (R5, R6).

These findings are confirmed by in the yearly performed macro-economic analyses by the MRA (*Economische Verkenningen* (MRA, 2018), wherein it supported that the economy of the MRA performs better than the Dutch average on the long run (see Figure 6.4). What is remarkable here is that in times of economic prosperity, the MRA performs significantly better than the national average, while in times of economic decline, the MRA seems to more or lessequal the Dutch average. In general, the MRA thus is a particularly strong market area for more or less every service or product.

As such, it can be argued that the MRA is a favourable location for new firm formation, which might contribute to the high levels of positive unexplained variation in Amsterdam and the Gooi & Vechtstreek sub-region.

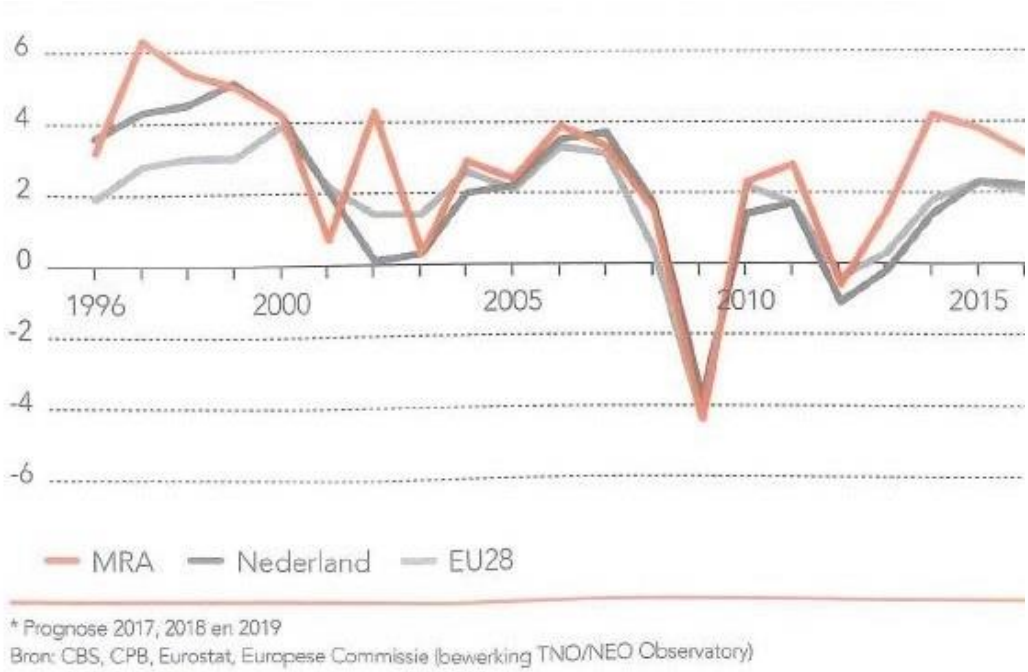

Figure 6.4: Comparison of economic growth development in the EU, the Netherlands and the MRA (in BBP, %) between 1996 and 2016. Source: scanned from MRA (2018)

Additionally, easy access to (inter)national markets is also beneficiary for an entrepreneurial ecosystem and the likelihood of new firm formation (Isenberg, 2010; World Economic Forum, 2013). Amsterdam and the MRA have a strong international position and profile with ample international market opportunities due to the position of Schiphol and the port of Amsterdam (R4, R5), which is much stronger than the ones of the other G3 (R4). The larger and more diverse the market that is accessible, the more opportunities nascent entrepreneurs have to exploit their business opportunities (Schutjens & Völker, 2010). which seems to be reflected in overall high new firm formation rates in the MRA. Figure 6.5 shows the growth in the amount of new establishments in the different sub-regions of the MRA between 2007 and 2017, which visualises the economic growth in the MRA in this period. At the one hand, the overall number of new firms in the MRA is growing, but it also visualises that there are significant regional differences between the sub-regions and that in Amsterdam the amount of new businesses grows fastest and at considerable higher speeds than the other sub-regions. After the last year covered by the municipal unexplained variation analysis, the differences only increased.

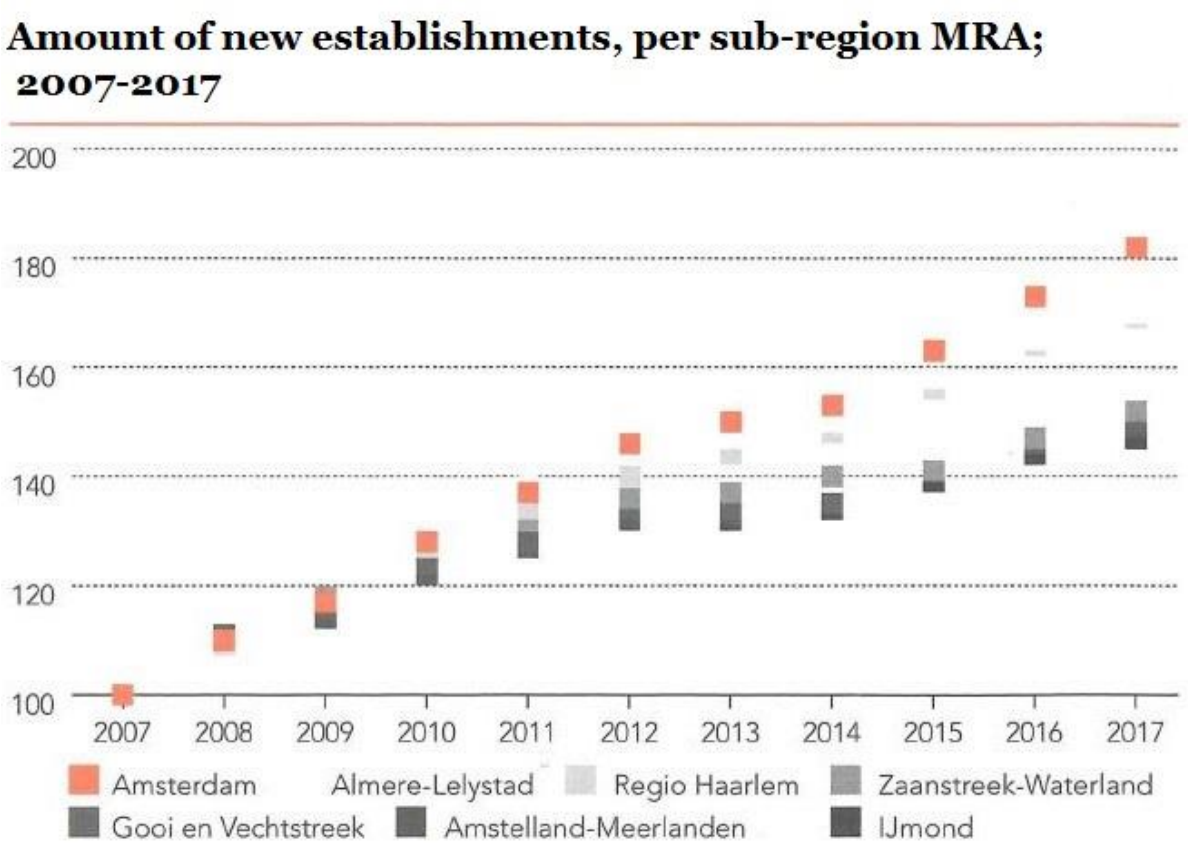

Figure 6.5: Amount of new establishments in the MRA, per sub-region; 2007-2017 (2007 indexed at 100). Source: scanned after MRA (2018).

In summary: as the centre of the MRA, Amsterdam functions as the economic engine of the Netherlands and therefore is home to the biggest markets potentials in the Netherlands. Partly due to two major infrastructure amenities (Schiphol and the port), Amsterdam also has many international market opportunities. Therefore it is argued that Amsterdam, and due to spill-over effects the entire MRA, is rather difficult to compare on a national scale level. This consequently results in higher levels of unexplained variation when compared to the G3 and the respective metropolitan regions. The market spill-over effects generated by Amsterdam are then found to infiltrate into the surrounding regions in various degrees, dependent on other context-specific characteristics.

6.2.6. Physical and social attributes of the context

Following Isenberg (2011) and the World Economic Forum (2013), there is a set of supporting conditions that not directly relate to entrepreneurship but seems to affect the entrepreneurial ecosystem to a great extent. Therefore, the documents were checked for and the interview respondents were asked to indicate whether the following six context-specific characteristics function as beneficial conditions for entrepreneurs in their municipalities:

Infrastructure and connectivity

The availability of excellent infrastructure and transport facilities are seen as crucial for entrepreneurial opportunities, especially for the Gooi & Vechtstreek sub-region (R1/2/3/4/5/6/7). There are excellent road and public transport connections to Amsterdam from each of these municipalities. For Amsterdam and the MRA as a whole, these also include a major international airport (Schiphol), which has been argued to be especially important for

multinational new firm formation in the immediate vicinity of Amsterdam and the airport itself (Gemeente Amsterdam, 2017; R4). Additionally, the Port of Amsterdam (the fourth largest part of Europe) attracts large, specialised industrial firms that '*bring along their entire own ecosystem of firms, which settle in the city itself from where they deliver their services to firms in IJmond*' (R5). This might contribute to the persistently high level of positive unexplained variation in the city of Amsterdam.

Gooi & Vechtstreek consequently benefit from their connectivity to the city of Amsterdam (Gemeente Hilversum, 2007; Gemeente Blaricum, 2010; Gemeente Laren, 2015; Gemeente Gooise Meren, 2017), which is also reflected in the results outlined in Section **5.3.1**. However, the municipalities of Laren, Hilversum and Bussum (and Blaricum) do not just have an excellent road and/or rail connection with Amsterdam; they are also very centrally located relative to (amongst others) Utrecht and Amersfoort. These cities, although smaller and economically not as important as Amsterdam, also offer market spill-over potentials and are within easy reach (R1/2/6). Hence, their central location and good accessibility could explain why many municipalities here have positive unexplained variation between observed and estimated new firm formation rates. These findings resonates with the ideas of Isenberg (2010) who argues that good accessibility is key to the entrepreneurial climate. The case of Blaricum, however, remains a remarkable exception where no explanation was found for.

Living environment

Mason & Brown (2014) argued that a high-quality living environment is an important supporting factor for location behaviour of entrepreneurs. Each respondent argued that the municipality they represent has a good reputation regarding the living environment, and what is argued to be especially speaking in favour of the MRA is the diversity in living environments (R4): Amsterdam has a high-quality living environment because of the availability of many cultural amenities, restaurants and (for a big city) nature, which is also confirmed in many policy documents (Gemeente Amsterdam, 2015/2017; ORAM, 2017). This resonates with the ideas of Florida (2002), who argues that cities with many creative people are likely to be more successful. The Gooi & Vechtstreek municipalities in their turn are said to have a very pleasant living environment because of their landscapes, which are historically seen as very attractive (R1/3/6) and due to their history and green landscapes are highly popular among affluent people from Amsterdam (R4).

Availability of services

Specialised supporting services (e.g. accountancy, consultancy and legal services, as well as high-quality education for children) are beneficiary to sustainably emerge and sustain entrepreneurship and provide access entrepreneurs to services that are not internally available (Cohen, 2006, Isenberg, 2010, Mason & Brown, 2014; Spigel, 2015). Incubators, accelarators and flexible workspaces are also often considered to belong to this category (Totterman & Sten, 2005; Mason & Brown, 2014). Such services facilities are plentiful in Amsterdam (R4/5), and crucial for some of the companies which cause a lot of spill-overs (R4). Unexplained variation could be the result of such services. Because these are present in Amsterdam, they are also within close reach for the other municipalities in the MRA, and as such, might result in positive unexplained variation in these as well, which is confirmed by Bijzonder Laren and the OVGM (R2, R6). However, these facilities are also within close reach for the municipalities that have little or negative unexplained variation. This confirms the hypothesis that it is the interdependence of elements that determines the new firm formation rate, and not so much

the indicators themselves (R5), which resonates with the theoretical concept of entrepreneurial ecosystems (Isenberg, 2011; Spigel, 2015).

Role models and high-profile firms

Successful entrepreneurs and high-profile enterprises are also argued to strengthen the entrepreneurial ecosystem, as they tend to attract talented, highly-skilled employees, which leads to increasing presence of human capital (e.g. Feldman et al., 2005; Mason & Brown, 2014). These ideas are recognised by the interview respondents: in the municipalities under study that are subject to persistently high levels of positive unexplained variation, the influence of such companies and institutes is acknowledged. In Amsterdam, there are plenty of firms that could be seen as high-profile firms that attract people looking for business opportunities, but these '*generally merge with the masses* (R4)', which implies that there are so many of such firms that their collective presence becomes what attracts the entrepreneurs. ORAM and the municipality (R4/R5) emphasised on some particularly relevant ones, which include the 2017 relocation of the EMA from London to Amsterdam (which attracts many firms in the medicine business) and the law firms at the Zuidas, although these developments took place after the time span under study.

In the smaller municipalities of Laren, Blaricum and Bussum such firms and their effects are easier to identify (although the OVGM was unable to identify any specific firms that could have led to an increase in the new firm formation rate). *Bijzonder Laren* (R1/2) argued that Talpa (a high-profile and well-known Dutch media company) could have led to an increase in the number of self-employed entrepreneurs in the media business since Talpa located itself in Laren, which might explain the high levels of positive unexplained variation for Laren (especially since these developments fall within the time span covered by the municipal unexplained variation analysis). In Blaricum, no examples of such firms were addressed (R7).

Social networks

According to e.g. Feld (2012) and Mason & Brown (2014), the presence of social networks (either digital or face to face, formal or informal) are expected to support entrepreneurship. Such networks are present in each municipality that is investigated in the multiple case study analysis, usually well-organised and with a formal board. Amsterdam has a wide range of entrepreneurial associations (of which ORAM is the most important) and all municipalities in Gooi & Vechtstreek have a municipal entrepreneurial association (R1/2, R6, R7). These networks are active, both in maintaining contacts among entrepreneurs and in lobbying with the authorities (R1/2, R5, R6, R7) and provide a useful knowledge resource for nascent entrepreneurs (R6). This resonates strongly with the ideas of Schutjens & Völker (2010), who argue that networks allow for knowledge spill-overs and the exchange of tacit knowledge and market access, which is indeed being seen as their main task.The levels of activity and openness of such networks seems to differ, however, and is argued to be an exponent of the degree to which there is an entrepreneurial culture in a municipality (R5, R7). In Blaricum, the networks activity is limited and a lack of collaboration between different entrepreneur is experienced (R7).

Hence, some of the unexplained variation may thus be caused by the degree to which entrepreneurial networks are open to nascent entrepreneurs and their degree of success with lobbying.

6.3. Perceived presence of an entrepreneurial ecosystem

Like what has been argued in Section **2.4.1**, entrepreneurial ecosystems are about the interrelatedness and interdependence of the local context of entrepreneurship rather than the different elements themselves (after Isenberg (2011), Spigel (2015) and Stam (2015). If this is true, it is likely that at least some of the unexplained variation between observed and estimated start-up rates is caused by the interrelatedness and interdependence. To check whether this way of reasoning is acknowledged and whether there is a perceived entrepreneurial ecosystem in either the municipality or the MRA, the respondents have been asked to elaborate on to what extent they think such a context exists in their municipality and in the MRA. The ecosystem metaphor was mentioned a couple of times in the policy and visionary documents (e.g. ORAM, 2017; Gemeente Gooise Meren, 2017) and used several times by interview respondents to illustrate that the entrepreneurial climate is more than just the sum of the parts that constitute it. Especially the municipality of Amsterdam (R3) and ORAM (R4) extensively argued that *'the city of Amsterdam is an entrepreneurial ecosystem in itself, which increasingly spreads out into the MRA. Everything entrepreneurs want, is here: big market potential, pleasant living climate, culture. That, combined with the business opportunities of course, makes Amsterdam interesting for entrepreneurs.'* (R4). ORAM further outlined that *'big companies attract a whole accompanying ecosystem of smaller firms and additional services that cause self-reinforcing effects to the economy of Amsterdam.'* (R5) and the chair of OVGM argued that *'I strongly believe that for the entrepreneurial climate four times 1 [individual constituting firms] is not four, but let's say seven! It is the interplay of all the different elements that makes Bussum an attractive place to start a firm.'* (R6). In other words, the changing ecosystem is an autonomous phenomenon, in which changes immediately affect other elements as well.

The expectations that persistently high levels of unexplained variation between observed and estimated new firm formation are the result of interdependencies of different characteristics in the wider, non-formal insitutional, social and cultural context seem to be valid for the municipalities investigated within the case study analysi. However, also some other (more physical) characteristics were found to affect new firm formation rates of the MRA. Respondents recognised the concept of an entrepreneurial ecosystem to be valid for the municipalities they represent, and also argued that the MRA is in fact a complementary ecosystem in economic terms. The main findings are: A strong perceived entrepreneurial history and culture (although hard to substantiate; it is mainly a narrative) is present in Amsterdam and (for some sectors) in the Gooi & Vechtstreek region, but seems to lack in the other sub-regions in the MRA;

- The strong economic position of Amsterdam on an international scale level (which lacks the other G3) creates access to a wide range of markets, which results in spill-overs into the surrounding regions;
- Policy is argued to barely affect actual entrepreneurial activity in a direct way, but appropriate interactive governance is argued to result in a beneficial entrepreneurial climate which might attract entrepreneurs.
- A highly-valued living environment and a high degree of connectivity to urban centres are argued to be strongly beneficial for the entrepreneurial climate.
- The availability of physical space in a municipality could result in a distorted image on new firm formation rates in adjacent municipalities.

7. Conclusion and research implications

This chapter presents the conclusion of the research and reflects on the extent to which the implications of the research meet the research goals outlined in Section **1.3**. These are consequently being translated into some concrete policy recommendations on dealing with regional differences in entrepreneurship.

7.1. Conclusion

This research investigated to which extent less tangible context-specific characteristics affect new firm formation rates of Dutch municipalities in the 2005-2013 time span. New firm formation in this period increased for the Netherlands as a whole (despite severe economic downturn), but the differences between different regions increased as well. In literature, a wide variety of socio-economic and demographic indicators are distinguished that affect new firm formation rates. However, as the previous statement indicates, these seem not to be sufficient to explain new firm formation rates in Dutch municipalities. Hence, the research question below has been formulated (see Section 1.4) and is being answered by summarizing the answers on the three sub-questions and linking them to each other.

Which context-specific characteristics possibly contribute to persistent unexplained variation in new firm formation rates among Dutch municipalities during the 2005-2013 time span?

The main findings are that a history of entrepreneurial culture, access to relevant markets and a highly-valued living climate, in combination with a high degree of connectivity with a major urban centre, are non-measured characteristics of the regional context that generally have a positive impact on new firm formation rates.

This research applied a mixed-methods research strategy; a quantitative research method has been used to identify the levels of unexplained variation between observed and estimated new firm formation rates for each municipality, while qualitative research methods were used to get in-depth insights in the complexities of the case studies in their context.

7.1.1. Municipalities with high levels of unexplained variation between observed and estimated new firm formation rates

The quantitative analysis answers the first sub-question of this research: *Which municipalities in the Netherlands do show higher or lower new firm formation rates than what would be expected on the basis of theory?* The results of this unexplained variation analysis are that municipalities which show high levels of unexplained variation are usually neither urban nor rural, and often located in clusters near major urban centres. Other municipalities that are also surrounding these major urban centres, however, do not show high levels of unexplained variation. Hence, it is suggested that other characteristics in the regional context of the entrepreneur determine these levels of unexplained variation. These findings seem to resonate quite strongly to the entrepreneurial ecosystems approach applied by e.g. Isenberg (2011) and Spigel (2015): the context surrounding entrepreneurs is argued to be a complex interdependent relationship between many different regional characteristics. The results of this sub-question are visualised in Figures 7.1 and 7.2.

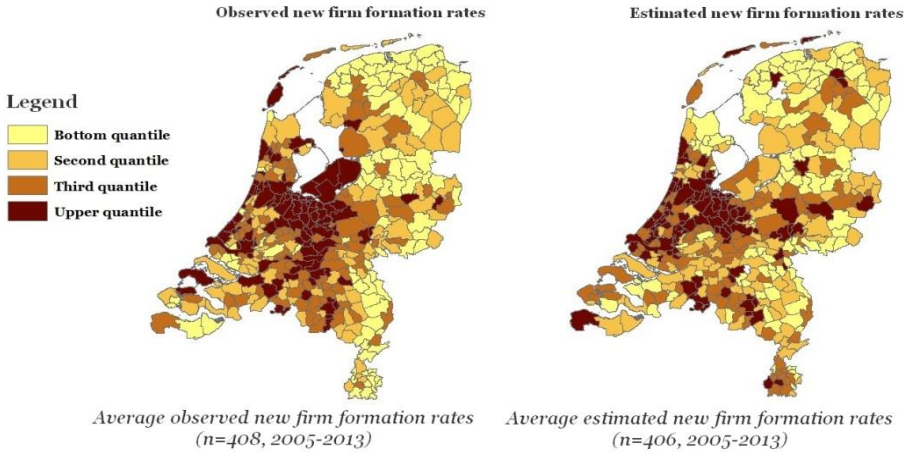

Figure 7 2: Average observed new firm formation rates compared with average estimated new firm formation rates (average for 2005-2013; reproduction of Figure 5.1).

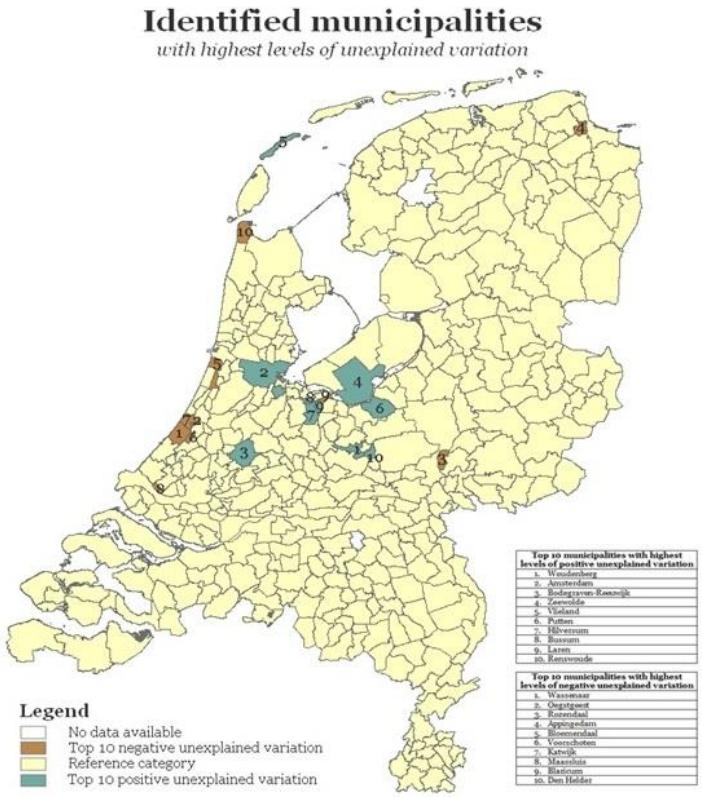

Figure 7.2: Results of municipal unexplained variation analysis (reproduction of Figure 5.2).

Following the conclusions of the municipal unexplained variation analysis, four municipalities in the Metropolitan Area of Amsterdam (MRA) are investigated by applying a multiple case study approach.These municipalities are Amsterdam, Blaricum, Bussum and Laren. Two other municipalities (Bloemendaal and Hilversum) are also investigated and referred to, but to a lesser extent. Data collection is based on document analysis and a series of semi-structured interviews with municipal policy officers and representatives of entrepreneurial associations. Amsterdam, Bussum and Laren show persistently high levels of positive unexplained variation between observed and estimated new firm formation rates, while Blaricum shows persistently high levels of negative unexplained variation.

7.1.2. Spatial relationships in the MRA

Before addressing the context-specific characteristics inside municipalities, first the regional spatial structure is addressed: *To what extent are high levels of unexplained variation between observed and estimated new firm formation rates related to the regional spatial structure?* The regional spatial structure could not be controlled for in the model but is expected to have a significant impact on regional new firm formation rates. Economic analyses of the MRA reveal the municipalities in the MRA surrounding Amsterdam are heavily dependent on Amsterdam with regard to market access. Hence, they are likely to have higher levels of unexplained variation as well. For the Gooi & Vechtstreek region in particular, it is argued that they also are also strongly interrelated with the Utrecht Area, which only strengthens the likelihood of persistently high positive unexplained variation levels.

7.1.3. Municipal context-specific characteristics that affect new firm formation rates

Consequently, the entrepreneurial ecosystems approach is taken as a guide to answer the second sub-question of this research: *What context-specific characteristics are present inside these municipalities, and how could they explain the observed differences between observed and estimated new firm formation rates?* The document analysis and semi-structured interviews resulted in the following main findings: 1) in terms of economic structure, Amsterdam has a strong international position that lacks other big urban centres in the Netherlands, which is not incorporated in the model, 2) the regions of Amsterdam and Gooi & Vechtstreek have a strong historical position with regard to entrepreneurship, 3) due to excellent connectivity (with Amsterdam, but also other urban centres), a highly-valued living environment and strong entrepreneurial networks the Gooi & Vechtstreek region is particularly attractive for entrepreneurs, 4) policy seems to barely affect the persistently high levels of unexplained variation in the municipalities, while appropriate informal governance is argued to be beneficial and, finally, 5) small and adjacent municipalities could be subject to distorted results, as these lack physical space which might result in entrepreneurs locating themselves just across the municipal borders.

7.2. Discussion: scientific implications of the research

As outlined in Sections **1.2** and **1.3,** the aim of this research is threefold: 1) to identify the municipalities in the Netherlands that show the persistently highest levels of unexplained variation between the observed and estimated new firm formation rates, 2) identifying context-specific characteristics present in the regional and local context that possibly contribute to the unexplained variation in these municipalities and 3) explaining how these could affect new firm formation in these municipalities. Third, this research tries to formulate conclusions on and possible implications of these context-specific characteristics. As such, this research aims at expanding the knowledge on determinants of new firm formation activity and the understanding of how these are interrelated.

With regard to the first research goal, the findings illustrate that high levels of unexplained variation are found in municipalities surrounding urban centres, and often clustered together in small groups. These results resonate with the ideas of Partridge et al. (2007), Frenken & Boschma (2007 and Meijers et al. (2016) on borrowed urbanisation effects, who outline that the effect of urbanisation is not endless and dependent on the configuration. It remains unclear however, to what extent this is the result of spatial relationships or other context-specific characteristics of the municipalities. The second sub-question of the research was aimed to get deeper insights on the extent to which the spatial relationships of the municipalities

investigated for the case study analysis could contribute to a better understanding of the observed high levels of unexplained variation, but the results provided a rather limited overview of the mechanisms behind spatial relationships between different municipalities. In addition to the findings that high levels of unexplained variation are generally found in the surroundings of cities, some interesting cases also popped up: Den Helder, Vlieland and Appingedam (and, to a lesser extent: Maassluis) do not fit with this conclusion. The levels of unexplained variation in these municipalities are therefore probably of a different nature.

With regard to the second research goal, this research identified that access to relevant markets, degree of connectivity to major urban centres and a highly-valued living environment are particularly important for the entrepreneurial climate in a municipality. Policy, on the other hand, was perceived to barely affect entrepreneurial activity. This contradicts the findings of e.g. Feld (2012)) but is in line with the conclusions of Fritsch & Müller (2007) and Koster & Hans (2017). However, the interview respondents emphasised that good informal governance and lobbying is certainly contributing to new firm formation It is argued to result in better knowledge of the regional markets and increases the likelihood of municipalities to take the desires of entrepreneurs into account. This confirms the ideas of e.g. Schutjens & Völker (2010), Feld (2012) and Mason & Brown (2014). Limited evidence was found for the suggestion that successful entrepreneurs have a significant effect on new firm formation (e.g. Feldman et al., 2005; Mason & Brown, 2014), although that could be the case due to limited knowledge of the interview respondents on spin-offs. It should be denied neither, as the entrepreneurial association of Laren suggested that a high-profile media company in that municipality may have resulted in increased levels of self-employed entrepreneurs in this business. Access to finance opportunities (hypothesised to be important by e.g. Feld (2012) and Spigel (2015)) was neither perceived to have a major impact on new firm formation rates by the respondents, although they expressed as well that their knowledge was limited regarding these topics.

With regard to the third research goal, this research identified that the importance of the regional context to entrepreneurship is acknowledged in visionary documents on entrepreneurship and among municipal policy officers and entrepreneurial associations, which is in line with the ideas of e.g. Eliassen & Westlund (2013). This is further by the findings that these actors recognise the rationale behind the entrepreneurial ecosystem approach (as proposed by Isenberg (2011), Mason & Brown (2014), Spigel (2015) and Stam (2015)) in their experiences. Therefore, it is concluded at the one hand that the entrepreneurial ecosystems approach is a useful framework for policy making and analysis but also, more importantly, that such ecosystems seem to be present. However, there is still no evidence of the direction of causality between the ecosystem and its context; does the regional context create the ecosystem or does the ecosystem shape the regional context?

With regard to the case study results, some notes should be made. It appeared that the levels of unexplained variation as identified by the municipal unexplained variation analysis are likely to result in a somewhat distorted picture. Like the respondents representing the municipalities and entrepreneurial associations of Laren and Blaricum argued, the differences between the two municipalities are less significant than the numeric results of the regression model might suggest. On such a small aggregation level, MAUP becomes a risk. Therefore, the results of this research should be interpreted with great caution.

7.3. Discussion: societal implications of the research

Although not explicitly formulated as a research goal in Section **1.3**, the conclusions and their implications outlined above also result in a few recommendations for policy makers and other relevant actors that are responsible for the formulation of spatial economic and entrepreneurial policies.

Focus on interactive governance, not on higher new firm formation rates

Following the conclusion that (traditional) policy is perceived to barely affect new firm formation rates, while collaborative interaction between entrepreneurs and authorities is perceived as beneficial to enhancing entrepreneurship and to retain companies within the municipality borders, it is recommended that municipalities focus on interactive and collaborative governance rather than on financial measurements aimed at stimulating entrepreneurs in financial terms. The effects of the latter seems not to be visible in new firm formation rates, while interactive governance is perceived as beneficiary for the entrepreneurial climate.

Invest in the preconditions for a good entrepreneurial climate, but only if the municipality has access to relevant markets and the right physical attributes

Financially investing in the entrepreneurial climate could be the result of interactive governance and result in more entrepreneurship, but only makes sense for locations that have access to relevant markets and which have beneficial physical attributes, like attractive living environments and/or a high degree of connectivity. This is illustrated perfectly in the MRA: most municipalities in the Gooi & Vechtstreek region have higher new firm formation rates than expected, while most municipalities in Zaanstreek-Waterland fit with the estimates. These both have an attractive landscape and access to the same markets of Amsterdam, but their overall degree of connectivity is lower, which might be the reason for the positive unexplained variation in Gooi & Vechtstreek.

Have a long term focus

Policy is not perceived as a major determinant of new firm formation because entrepreneurship is argued to be a rather autonomous development, which is reflected both in academic literature and by the interview respondents (e.g. Fritsch & Müller, 2007). It is most likely to have an effect when it is has a long term focus (following Koster & Hans, 2017). An 'entrepreneurial culture' and history (although it is unclear what it exactly entails), however, is perceived as a determinant of new firm formation. Creating such an entrepreneurial culture seems to be impossible, but it could at least being shaped by creating the right conditions in the present.

8. Reflection and recommendations for further research

This chapter reflects on the applicability of the research strategy and process. It identifies possible limitations to the approach that has been used to conduct this research. The conclusions of this research and the limitations outlined in this chapter are then being used as starting points to formulate recommendations for further research.

8.1. Reflection on research strategy and process

Although **Chapter 4** justifies the chosen research approach as suitable to answer the research questions outlined in Section **1.4**, there are some comments related to the methodology that could be made in retrospect. These could be roughly classified in two categories: the applicability of research strategy and the reliability of the data.

Applicability of research strategy

An important issue regarding the validity of the research results is the lack of congruency between the quantitative data that have been used for the municipal unexplained variation analysis and the qualitative data that were collected to execute the multiple case study analysis. The quantitative data are only available for the 2005-2013 time span, while the policy documents and visionary documents are dating from more recent years. Although the respondents have been specifically asked in the semi-structured interviews to take the time span of the quantitative data into account, it is unavoidable that more recent developments are elaborated upon. Most interview respondents also didn't have extensive knowledge about the period covered in the municipal unexplained variation analysis, as they were not working for the organisations they represent in the semi-structured at the time.

The most important consequence of this issue is that the developments and issues addressed in the multiple case study analysis could have limited connection with the actual results of the model and actually be referring to developments that happened after the last year that is covered by the model. This is actually quite likely, as since 2014 the Dutch economy recovered from an economic crisis with two consequent recessions. The exact impact of this crisis is yet to be studied, but it is likely to have consequences on new firm formation (which is reflected in the demand and supply determinants of entrepreneurship addressed in **Chapter 2**).

Reliability of the data

There are no serious reasons to doubt the quality of the quantitative data for this research that have been used for the model, as they have been obtained from trustful statistic agencies (White (2010) in Clifford, (2012)) . For the qualitative data, however, some reflection on their reliability is necessary. In line with Strauss & Corbin (1998) and Flyvbjerg (2001), it is important to acknowledge that the results of qualitative scientific research are always subject to interpretation by the researcher and that the content of the analysed documents and interview transcripts are subjective interpretations from their experiences and perspectives. Therefore, it is important to critically assess the following points when interpreting the results of the study (Flowerdew and Martin, 2005):

- *Position of the researcher:* During semi-structured interviews, the researcher could unintentionally steer the behavior and answers of the respondent. Aspects of physical attitude and asking suggestive questions are examples of such behavior of the researcher. In retrospect, the researcher realised that suggestive questions have been asked to collect information that would be of interest for the study. Therefore, it could be the case that respondents sometimes had too little space for own input or that the obtained output is treated as more relevant than the respondent would consider it.
- *Interpretation of the raw data:* Both in the documents and the semi-structured, there was a clear focus and goal of the research to collect certain types of data. Therefore, it could be the case that the research dit not cover certain elements that are of importance to the respondent but were not given attention in the interview guide or in the interview themselves. It could be the case that respondents did interpret some of the questions differently than they were intended. Such situations were prevented by asking the respondents for own input at the end of the interview.
- *Subjectivity of the researcher:* The researcher is selecting the documents and respondents, formulates the questions and selects the important elements in documents and is also interpreting the data. As such, there are three moments at which the researcher determines which data are important and which are not. There is a risk of leaving important information out of the analysis, both due to not asking the right questions and selecting a relatively small amount of interview respondents.
- *Generalizability of the results:* As this research focuses on only a few municipalities in only one region, there is a fundamental risk that the results are also only valid for these municipalities in this specific region (namely, the MRA). It could well be the case that a set of interviews with different municipalities or even respondents from the same organisations would result in quite different outcomes. Generalisation of this research should therefore only be done with extreme care.

Additionally, it has to be noticed that getting in contact with some of the proposed interview respondents proved to be difficult. Two municipalities refused to conduct an in-depth semi-structured interview and instead gave a short explanation on the phone or redirected the researcher to a policy or visionary document. In other cases, there appeared to be no entrepreneurial association (Bloemendaal) to interview, so the data of these municipalities are much more superficial, which limits the reliability of these data.

8.2. Recommendations for further research

Following the analysis of the results, the conclusion and the reflection outlined above, several suggestions for relevant further research could be formulated. These suggestions could offer deeper insights in the observed regional differences in new firm formation in the Netherlands in general, as well as in the metropolitan region of Amsterdam in particular. Some of these suggestions are academically relevant as they get deeper insights in theoretical support for new firm formation determinants, while other could connect the findings of this research with policy making in a more fundamental way.

- Apart from the lack of time congruency between the quantitative and qualitative data as addressed in the previous section, it would be useful to extend the data series used for the model to this date (if available). The macro-economic situation has improved considerably in the meantime, which could have severe impacts on the validity of the research today. The interview respondents acknowledged that patterns might look quite different when more recent data would be used (R4, R5).
- The research could deliver stronger and more widely applicable results if a comparison would have been made between the MRA and another region where a large amount of municipalities with high levels of unexplained variations are located, for example the area around The Hague and Leiden (4 municipalities that have persistently high levels of negative unexplained variation). Doing so would create the opportunity to test the validity of the exceptional position of Amsterdam and the MRA in the Netherlands.
- It could be an interesting addition to this study to identify what characteristics of their regional context nascent entrepreneurs themselves find important regarding their location behaviour. Therefore it is recommended to conduct a (series of) survey(s) among nascent entrepreneurs in all municipalities (preferably in different industries as well, see below) and consequently use the results of that survey to test and map whether their preferences are reflected in the observed new firm formation rates.
- Multiple interview respondents touched upon the impact of different types of new firms could have on the economy and the entrepreneurial climate. For example, many new firms in the Gooi & Vechtstreek region appeared to be small holdings which do barely have an effect on employment opportunities. This is especially relevant for the constitution of the model and could limit the applicability and accuracy of the model and, as such, the estimated new firm formation rates. Incorporating a more distinctive classification of different types of new firms could strengthen the model. After that, an eventual re-execution of this research might lead to different but more accurate results.

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Appendices

Appendix I: interview procedures and interview questions

Appendix II: form of consent

Appendix III: overview of municipal reclassifications (1996-2013)

Appendix IV: overview of municipal reclassifications (2013-2016)

Appendix V: overview of municipalities by COROP-region

Appendix VI: regression model output

Appendix VII: yearly fluctuations in unobserved variation in new firm formation rates (2005-2013)

Appendix I: Interview procedures and interview questions

The documents below provide an overview of the different interview questions that were asked during the interviews.

All interviews were held in Dutch, because all respondents and the researcher have Dutch as their native language. Hence, all the questions are first written down in Dutch (first interview guide) and later translated into English (second interview guide). Before the researcher started to ask questions to the respondents, the following steps were followed:

- Introduction (name, study programme);
- Explanation of purpose of the interview and research goals;
- Explanation of interview procedures (length, structure, confidentiality);
- Signing the form of consent **(Appendix II)**

After that, the questions as shown in the table below were asked according to the type of stakeholder that was interviewed. All interviews were finished with the following remarks:

- Room for the respondent to ask questions that have not been asked and elaborate on subjects that have not been covered;
- General word of thank to the respondent for scheduling time to conduct the interview;
- Question if respondent has recommendations for other respondents;
- Question if respondent has relevant documents on economic policy or otherwise relevant topics for the research;
- Option to receive the results, a summary and/or the entire study after the research is finished and graded.

After the interviews were conducted, they were immediately securely stored and being summarised. The summaries of the interviews and the signed forms of consent are available on request, by sending an e-mail to dionglastra@gmail.com.

Interview guide: regionale verschillen in new firm formation rates (NL)

Wie: (RESPONDENT)
Wanneer: (DATUM)
Waar: (LOCATIE)
Focusgemeente: (GEMEENTE)

Introductie

- Voorstellen
- Kunt u kort wat over uzelf vertellen?
- Wat is uw rol binnen (organisatie), en wat zijn uw verantwoordelijkheden?
- Iets over achtergrond onderzoek vertellen:

'Het scriptie-onderzoek waar ik mij bezig houdt gaat over de regionale verschillen in ondernemerschap op gemeenteniveau. Ik kijk daarbij naar de factoren die hier invloed op hebben, maar die moeilijk meetbaar zijn. In de wetenschappelijke literatuur over regionale economie en economische geografie zijn er verschillende indicatoren beschreven die empirisch invloed hebben op het aantal ondernemingen dat in een gemeente wordt gestart. Op basis van een groot aantal van deze indicatoren heb ik een statistisch onderzoek verricht waarin alle Nederlandse gemeenten van het jaar 2013 zijn meegenomen. Dat is gedaan voor de periode van 2005 tot 2013. In dit onderzoek is gebruik gemaakt van gegevens van de Kamer van Koophandel en het Centraal Bureau voor de Statistiek om voor ieder jaar van de meetreeks tot een hypothetisch voorspeld aantal nieuwe bedrijven. Dit noem ik de new firm formation rate: het aantal nieuwe bedrijven gedeeld door het aantal personen tussen 15 en 64 jaar oud. Deze voorspelde waarde is vergeleken met de geobserveerde waarde (afkomstig van de Kamer van Koophandel). Het verschil tussen deze waarden laat als het ware zien hoe goed de gebruikte indicatoren de new firm formation rate kunnen voorspellen.'

Ruimtelijke relatie tot (de marktpotentie van) Amsterdam:

- Herkent u zich in het beeld dat de gemeente (GEMEENTE) meer/minder nieuwe bedrijfsvestigingen heeft dan gemeenten met vergelijkbare demografische en economische kenmerken (zoals VOORBEELD(EN))?
- Heeft u daar (een) verklaring(en) voor?
- Welke rol heeft de positie / ligging van (GEMEENTE) ten opzichte van (de toegang tot de markten van) Amsterdam op de verschillen in de intensiteit van ondernemerschap op de omringende gemeenten, denkt u?
- Er zijn onder de omringende gemeenten een aantal interessante verschillen zichtbaar: Laren, Hilversum en Gooise Meren hebben significant meer start-ups dan op basis van het model wordt voorspeld, Bloemendaal en Blaricum significant minder. Heeft u enige verklaring voor deze verschillen, en dan met name wat betreft de rol van Amsterdam in het macro-economisch klimaat van deze regio?
- Kunt u enkele sterke en zwakke punten noemen aangaande het ondernemingsklimaat in (GEMEENTE) // de MRA?

Beleid:

- Op welke manier heeft ondernemerschap een plaats in het economisch beleid van de gemeente (GEMEENTE)?
- In welke mate denkt u dat de gemeente als overheidslaag een rol kan hebben in het stimuleren en/of faciliteren van ondernemerschap?
- Is er sprake van een ruimtelijke dimensie in het ondernemerschapsbeleid in (GEMEENTE)?
- Is er specifiek beleid om burgers van (GEMEENTE) te 'verleiden' om te gaan ondernemen? Zo ja, hoe ziet dat beleid eruit?

Entrepreneurial ecosystems:

- In welke mate denkt u dat er in (GEMEENTE) // de MRA sprake is van een entrepreneurial ecosystem (een ondernemingsklimaat dat leidt tot synergie-effecten die ervoor zorgen dat er meer ondernemingen gestart worden, waarbinnen die interactie tussen verschillende elementen cruciaal is)?
- Zijn er volgens u relevante netwerken van ondernemers aanwezig in de Gemeente (GEMEENTE)?
- In welke mate denkt u dat die netwerken van ondernemers bijdragen (of kunnen bijdragen) aan het ondernemerschapsklimaat in (GEMEENTE)?
- In welke mate denkt u dat succesvolle bedrijven/ondernemers (bijvoorbeeld succesvolle ondernemers) een rol hebben in de gemeente (GEMEENTE) met betrekking tot het ondernemerschapsklimaat?
- Zijn er ondernemingen in de gemeente actief waarvan u denkt dat deze leiden of hebben geleid tot een groei in het aantal start-ups / een beter ondernemerschapsklimaat?
- In welke mate hebben culturele en/of politieke aspecten een rol binnen (GEMEENTE) een rol/hun weerslag op het ondernemerschapsklimaat in (GEMEENTE)?
- Wat is volgens u de invloed van de volgende aspecten op het ondernemerschapsklimaat in (GEMEENTE)?
- Prettig woonklimaat/leefomgeving
- Infrastructuur/bereikbaarheid
- Aanwezigheid ondersteunende diensten (advocatuur, financiële instellingen, accountancy, etc.)
- Aanwezigheid sociale netwerken van ondernemers
- Aanwezigheid netwerken triple Helix (ondernemers/kennisinstellingen/overheid)
- Aanwezigheid high profile/grote ondernemingen?
- In welke mate hebben andere, niet-genoemde, aspecten een rol binnen uw gemeente waardoor er meer ondernemingen worden gestart dan voorspeld? Welke aspecten zijn dit of zouden dit kunnen zijn?

Afronding

- Ik wil u graag hartelijk bedanken voor het interview en het feit dat u daar tijd voor vrij heft willen maken.
- Heeft u nog vragen of opmerkingen naar aanleiding van dit onderzoek, dit interview of in het algemeen?
- Uiteraard kunt u na afronding het onderzoek toegestuurd krijgen. Heeft u hier interesse in?

Interview guide: regional differences in new firm formation rates (EN)

Who: (RESPONDENT)
When: (DATE)
Where: (LOCATION)
Focus municipality: (GEMEENTE)

Introduction:

- Introductions
- Can you briefly tell me something about yourself?
- What is your role within (organisation), and what are your responsibilities?
- Tell something about background of the research:

'The thesis that I am working on is about regional differences in entrepreneurship at municipal level. I look at the factors that influence this, but that are difficult to measure. In the scientific literature on regional economics and economic geography, various indicators have been described that have empirical influence on the number of enterprises that are started in a municipality. Based on a large number of these indicators, I conducted a statistical survey in which all Dutch municipalities of the year 2013 were included. This was done for the period from 2005 to 2013. In this research, data from the Chamber of Commerce and the Central Bureau of Statistics were used for each year of the series of measurements to a hypothetically predicted number of new companies. This is what I call the new firm formation rate: the number of new companies divided by the number of people between 15 and 64 years old. This predicted value is compared with the observed value (from the Chamber of Commerce). The difference between these values shows, as it were, how well the indicators used can predict the new firm formation rate.'

Spatial relationship with (the market potential of) Amsterdam:

- Do you recognise the pattern that municipality (GEMEENTE) has more / fewer start-ups than municipalities with similar demographic and economic characteristics (such as EXAMPLE(S))?
- Do you have (an) explanation(s) for this pattern?
- What role does the spatial position of (access to the markets of) Amsterdam have on the differences in the intensity of new firm formation on the surrounding municipalities, in your opinion?
- There is a number of interesting differences among the surrounding municipalities: Laren, Hilversum and Gooise Meren have significantly more start-ups than predicted on the basis of the model, Bloemendaal and Blaricum significantly less. Do you have any explanation for these differences, particularly with regard to the role of Amsterdam in the macroeconomic climate of this region?
- Can you mention several strengths and weaknesses concerning the entrepreneurial climate in (GEMEENTE) / the MRA?

Policy:

- In what way does entrepreneurship have a place in the economic policy of the municipality (GEMEENTE)?
- To what extent do you think that the municipality as a government layer can play a role in stimulating and / or facilitating entrepreneurship?
- Is there a spatial dimension in the entrepreneurship policy in (GEMEENTE)?
- Is there specific policy to 'seduce' citizens of (GEMEENTE) to start a business? If so, what does that policy look like?

Entrepreneurial ecosystems:

- To what extent do you think that there is an entrepreneurial ecosystem in (GEMEENTE) (an entrepreneurial climate that leads to synergy effects that enhance new firm formation, in which this interaction between different elements is crucial)?
- Do you think there are relevant entrepreneurial networks and organisations in (GEMEENTE)?
- To what extent do you think that these networks of entrepreneurs contribute (or can contribute) to the entrepreneurial climate in (GEMEENTE)?
- To what extent do you think that successful entrepreneurs or firms have a role in the municipality (GEMEENTE) in relation to the entrepreneurial climate?
- Do you think there are any companies in the municipality that might lead or have led to a growth in the number of start-ups?
- To what extent do cultural and / or political aspects within (GEMEENTE) have a role or impact on the entrepreneurship climate in (GEMEENTE)?
- What is the influence of the following aspects on the business climate in (GEMEENTE)?
- Pleasant living climate/environment
- Infrastructure / connectivity
- Presence of supporting services (legal profession, financial institutions, accountancy, etc.)
- Presence of social networks of entrepreneurs
- Presence of Triple Helix networks (entrepreneurs / knowledge institutions / government)
- High profile or large companies?
- To what extent do other, not-mentioned aspects have a role in your municipality, so that more companies are started than predicted? What aspects are these or could they be?

Concluding remarks:

- I would like to thank you very much for the interview and the fact that you want to schedule time for it.
- Do you have any questions or comments about this research, this interview or in general?
- Of course you can receive the research and/or the results of it after completion. Are you interested in this?

Appendix II: Form of consent

Toestemmingsformulier interview

Regionale verschillen in start-upactiviteit in Nederlandse gemeenten

Doel van het onderzoek

Het in kaart brengen van moeilijk te kwantificeren indicatoren voor start-upactiviteit in Nederlandse gemeenten. Eerst is er een kwantitatieve, statistische analyse uitgevoerd waarbij gekeken is in welke mate gemeenten in de tijdsspanne tussen 2005 en 2013 afwijken van verwachte patronen. Een aantal gemeenten in de Metropoolregio Amsterdam dat sterk lijkt af te wijken van gemeenten die op nationale schaal sociaal-economisch vergelijkbaar zijn, wordt nader onderzocht op de aanwezigheid en aard van deze indicatoren om daarmee een scherper beeld te krijgen van de wederzijdse invloed van de lokale omgeving op het aantal start-ups in een gemeente.

Wat wordt er van u gevraagd?

U hoeft zich niet voor te bereiden op het gesprek. Dit interview wordt gehouden vanwege uw betrokkenheid met beleidsvorming op gemeentelijk schaalniveau of als ondernemer in één van de door mij onderzochte gemeenten. De interviews duren gemiddeld 45 minuten, maar korter of langer kan natuurlijk ook. U kunt tijdens het gesprek altijd aangeven als u wilt stoppen of even pauze wilt nemen. Ook kunt u het aangeven wanneer u een vraag niet wilt beantwoorden. Dit zal uiteraard gerespecteerd worden.

Wat gebeurt er met uw gegevens?

- Het gesprek mag worden opgenomen: JA / NEE

  Indien het gesprek wordt opgenomen, zal de opname met zorg bewaard worden en worden opgeslagen in een beschermde omgeving. Alleen de onderzoeker en de begeleiders van de onderzoeker zullen toegang hebben tot het gesprek. De geluidsopname en de inhoud van het gesprek zullen alleen voor dit onderzoek worden gebruikt.
  Indien gewenst kunt u ervoor kiezen niet uw werkelijke naam te gebruiken voor dit onderzoek. In dat geval worden (al dan niet gefingeerde) initialen of een pseudoniem gebruikt in de uitwerking. Uw identiteit wordt uiterst vertrouwelijk behandeld en is strikt geheim voor iedereen, met uitzondering van de onderzoeker en de begeleider.
- De resultaten zullen worden verwerkt in een wetenschappelijke masterthesis. Deze thesis heeft de vorm van een papieren rapport.
- Indien u dat wenst kunt u na afronding van het onderzoek een kopie van het rapport toegestuurd krijgen.

Toestemming

Bij deze verklaar ik dat ik op de hoogte ben gesteld van:

1. het doel van het onderzoek;
2. wat er van mij verwacht wordt tijdens en na het gesprek;
3. en wat er met mijn gegevens gebeurt.

Datum: _____ Handtekening deelnemer: _____

Datum: _____ Handtekening onderzoeker: _____

Als u verdere vragen en opmerkingen heeft, dan kunt u te allen tijde contact met mij opnemen.

Onderzoeker: Dion (D.Y.) Glastra, BSc., email: d.y.glastra@student.rug.nl
Begeleider: dr. Sierdjan (S.) Koster, email: sierdjan.koster@rug.nl

Appendix III: Overview of municipal reclassifications from 2005-2013

The table below shows all municipal reclassifications that took place in the Netherlands within the period from 2005 to 2013. All affected municipalities of the year 2013 and their municipal codes are listed in alphabetical order, while the year(s) of reclassification and the municipalities that were merged or split in order to create the municipality are positioned next to them, respectively. The last column shows some important notes that affected the reclassification, if applicable.

Code	Municipality (2013)	Year	Code	Former municipalities	Comments
0197	**Aalten**	2005	0197 0219	Aalten Dinxperlo	
1859	**Berkelland**	2005	0211 0229 0266 0278	Borculo Eibergen Neede Ruurlo	
0585	**Binnenmaas**	2007	0585 0517	Binnenmaas 's-Gravendeel	
0377	**Bloemendaal**	2009	0377 0372	Bloemendaal Bennebroek	
1901	**Bodegraven-Reeuwijk**	2011	0497 0595	Bodegraven Reeuwijk	
1876	**Bronckhorst**	2005	0256 0248 0280 0286 0298	Hummelo en Keppel Hengelo (Gld) Steenderen Vorden Zelhem	
1891	**Dantumadiel**	2009	0065	Dantumadeel	Name change only
0736	**De Ronde Venen**	2011	0305 0736	Abcoude De Ronde Venen	
0150	**Deventer**	2005	0150 0144	Deventer Bathmen	
0222	**Doetinchem**	2005	0222 0292	Doetinchem Wehl	
0498	**Drechterland**	2006	0498 0454	Drechterland Venhuizen	
1903	**Eijsden-Margraten**	2011	0905 0936	Eijsden Margraten	
1924	**Goeree-Overflakkee**	2013	0504 0511 0559 0580	Dirksland Goedereede Middelharnis Oostflakkee	
1911	**Hollands Kroon**	2012	0366 0412 0462 0463	Anna Paulowna Niedorp Wieringen Wieringermeer	
1507	**Horst aan de Maas**	2010	1507 0993	Horst aan de Maas Meerlo-Wanssum (55%)	1-1-2010: Horst aan de Maas merged with Sevenum and 55% of Meerlo-Wanssum. The other 45% was transferred to Venray.

1884	**Kaag en Braassem**	2009	0483 0645	Alkemade Jacobswoude	
0537	**Katwijk**	2006	0537 0602 0619	Katwijk Rijnsburg Valkenburg (ZH)	
1598	**Koggenland**	2007	0558 0429	Wester-Koggenland Obdam	
1621	**Lansingerland**	2007	0492 0493 0495	Bergschenhoek Berkel en Rodenrijs Bleiswijk	
640	**Leudal**	2007	0914 0925 0920 1670	Haelen Hunsel Heythuysen Roggel en Neer	
0262	**Lochem**	2005	0239 0262	Gorssel Lochem	
1641	**Maasgouw**	2007	1937 0977 0933	Heel Thorn Maasbracht	
0420	**Medemblik**	2007	0420 0466 0529 0364 0459	Medemblik Wognum Noorder-Koggenland Andijk Wervershoof	1-1-2007: Medemblik merged with Wognum and Noorder-Koggenland 1-1-2011: Medemblik merged with Andijk and Wervershoof
1908	**Menameradiel**	2011	0083	Menaldumadeel	Name change only
1927	**Molenwaard**	2013	0693 0694 0571	Graafstroom Liesveld Nieuw-Lekkerland	
1955	**Montferland**	2005	0207 0218	Bergh Didam	
0569	**Nieuwkoop**	2007	1673 0569 0480	Liemeer Nieuwkoop Ter Aar	
1895	**Oldambt**	2010	1661 0039 0052	Reiderland Scheemda Winschoten	
1586	**Oost Gelre**	2005	0240 0260	Groenlo Lichtenvoorde	From 1-1-2005 till 1-1-2007: Groenlo (0240)
0828	**Oss**	2011	0828 0808	Oss Lith	
1509	**Oude IJsselstreek**	2005	0237 0295	Gendringen Wisch	
1894	**Peel en Maas**	2010	0918 0929 0934 0941	Helden Kessel Maasbree Meijel	
1669	**Roerdalen**	2007	1669 1679	Roerdalen Ambt Montfort	
0957	**Roermond**	2007	0975 0957	Swalmen Roermond	

0599	**Rotterdam**	2010*	0599 0600	Rotterdam Rozenburg	18-3-2010: Rotterdam merged with Rozenburg
0441	**Schagen**	2013	0395 0441 0476	Harenkarspel Schagen Zijpe	
1904	**Stichtse Vecht**	2011	0311 0329 0333	Breukelen Loenen Maarssen	
1900	**Súdwest-Fryslan**	2011	0064 0104 0091 0710 0683	Bolsward Nijefurd Sneek Wúnseradiel Wymbritseradiel	
1525	**Teylingen**	2006	0628 0604 0625	Warmond Sassenheim Voorhout	
1581	**Utrechtse Heuvelrug**	2006	0332 0306 0326 0316 0315	Maarn Amerongen Leersum Driebergen-Rijsenburg Doorn	
0984	**Venray**	2010	0984 0993	Venray Meerlo-Wanssum (45%)	1-1-2010: Venray merged with 45% of Meerlo-Wanssum. The other 55% were transferred to Horst aan de Maas
0983	**Venlo**	2010	0983 0885	Venlo Arcen en Velden	
0299	**Zevenaar**	2005	0199 0299	Angerlo Zevenaar	
1892	**Zuidplas**	2010	0563 0567 1666	Moordrecht Nieuwerkerk aan den IJssel Zevenhuizen-Moerkapelle	
0301	**Zutphen**	2005	0291 0301	Warnsveld Zutphen	

Appendix IV: Overview of municipal reclassifications from 2013-2016

The unemployment data used for the model are only available for the municipal classification of 2016, for the period 2003-2016*. As only minor changed occurred for the period 2013-2016, the decision was made to use the aggregated data for the 2016 municipal classification for the municipalities affected.

The variables affected are:

PERC_UNEMPLOYMENT: Percentage of labour force unemployed at January 1st of **YEAR**.

The municipalities concerned are:

Code	Municipality (2016)	Year	Code	Former municipalities	Comments
0361	**Alkmaar**	2015	0361 0365 0458	Alkmaar Graft-De Rijp Schermer	
0484	**Alphen aan den Rijn**	2014	0484 0499 1672	Alphen aan den Rijn Boskoop Rijnwoude	
1945	**Berg en Dal**	2015	0241 0265 0282	Groesbeek Millingen aan de Rijn Ubbergen	From 1-1-2015 till 1-1-2016: Groesbeek (0241)
0385	**Edam-Volendam**	2016	0385 0478	Edam-Volendam Zeevang	
1940	**De Fryske Marren**	2014	0653 0082 0051 0055 1921	Gaasterlân-Sleat Lemsterland Skarsterlân Boarnsterhim* De Friese Meren	From 1-1-2014 till 1-1-2016: De Friese Meren (1921) 1-1-2014: Boarnsterhim was divided over the municipalities of Heerenveen, Leeuwarden, Súdwest-Fryslân and De Fryske Marren
1942	**Gooise Meren**	2016	0381 0424 0425	Bussum Muiden Naarden	
0796	**'s-Hertogenbosch**	2015	0796 1671	's-Hertogenbosch Maasdonk	1-1-2015: Maasdonk was divided over the municipalties of 's-Hertogenbosch (0796) and Oss (0828).
1931	**Krimpenerwaard**	2015	0491 0643 0644 0608 0623	Bergambacht Nederlek Ouderkerk Schoonhoven Vlist	

Appendix V: Overview of municipalities by COROP-region

For some macro-economic variables included in the regression model, data on municipal level are not available. Therefore, the choice has been made to use the data on the COROP-region level instead. For more explanation on the considerations that have led to this decision, see **Chapter 3**. The table below shows the encryption for this operation, as well as an overview of all 40 COROP-regions and their respective municipalities (based on the municipal classification of 2013).

The variables affected are:

PERC_ADDEDVALUE_COROP: Change in gross added value relative to previous year (percentage)

PERC_WAGERATE_COROP: Change in wage rate, relative to previous year (percentage)

Code	COROP-region	Mun. code	Municipalities	Mun. code	Municipalities
CR01	**Oost-Groningen**	0007 1987 1895 0765	Bellingwedde Menterwolde Oldambt Pekela	0037 0047 0048	Stadskanaal Veendam Vlagtwedde
CR02	**Delfzijl en omgeving**	0003 0010	Appingedam Delfzijl	0024	Loppersum
CR03	**Overig Groningen**	0005 0009 1651 0014 0015 0017 0018	Bedum Ten Boer Eemsmond Groningen Grootegast Haren Hoogezand-Sappemeer	0022 1663 0025 0040 0053 0056	Leek De Marne Marum Slochteren Winsum Zuidhorn
CR04	**Noord-Friesland**	0059 0060 0063 1891 0058 1722 0070 0072 0079	Achtkarspelen Ameland Het Bildt Dantumadiel Dongeradeel Ferwerderadiel Frankeradeel Harlingen Kollumerland en Nieuwkruisland	0080 0081 0140 1908 0088 0093 0737 0096	Leeuwarden Leeuwarderadeel Littenseradiel Menameradiel Schiermonnikoog Terschelling Tytsjerksteradiel Vlieland
CR05	**Zuidwest-Friesland**	0055 0653 0082	Boarnsterhim Gaasterlân-Sleat Lemsterland	0051 1900	Skarsterlân Súdwest-Fryslân
CR06	**Zuidoost-Friesland**	0074 0085 0086	Heerenveen Ooststellingwerf Opsterland	0090 0098	Smallingerland Weststellingwerf
CR07	**Noord-Drenthe**	1680 0106 1731	Aa en Hunze Assen Midden-Drenthe	1699 1730	Noordenveld Tynaarlo

CR08	**Zuidoost-Drenthe**	1681 0109	Borger-Odoorn Coevorden	0114	Emmen
CR09	**Zuidwest-Drenthe**	0118 0119	Hoogeveen Meppel	1701 1690	Westerveld De Wolden
CR10	**Noord-Overijssel**	0148 0160 0166 0175	Dalfsen Hardenberg Kampen Ommen	0180 1708 1896 0193	Staphorst Steenwijkerland Zwartewaterland Zwolle
CR11	**Zuidwest-Overijssel**	0150 1773	Deventer Olst-Wijhe	0177	Raalte
CR12	**Twente**	0141 0147 1774 0153 0158 0163 0164	Almelo Borne Dinkelland Enschede Haaksbergen Hellendoorn Hengelo	1735 0168 0173 1742 0183 1700 0189	Hof van Twente Losser Oldenzaal Rijssen-Holten Tubbergen Twenterand Wierden
CR13	**Veluwe**	0200 0203 0228 0230 0232 0233 0244 0243	Apeldoorn Barneveld Ede Elburg Epe Ermelo Hattem Harderwijk	0246 0267 0302 0269 0273 0279 0285 0289	Heerde Nijkerk Nunspeet Oldebroek Putten Scherpenzeel Voorst Wageningen
CR14	**Achterhoek**	0197 1859 1876 0213 0222 0262	Aalten Berkelland Bronckhorst Brummen Doetinchem Lochem	1955 1586 1509 0294 0301	Montferland Oost Gelre Oude IJsselstreek Winterswijk Zutphen
CR15	**Arnhem/Nijmegen**	0202 0209 0221 0225 0226 0241 0252 1705 0265 0268	Arnhem Beuningen Doesburg Druten Duiven Groesbeek Heumen Lingewaard Millingen aan de Rijn Nijmegen	1734 0274 0275 0196 0277 0282 0293 0296 0299	Overbetuwe Renkum Rheden Rijnwaarden Rozendaal Ubbergen Westervoort Wijchen Zevenaar
CR16	**Zuidwest-Gelderland**	0214 0216 0236 0733 0263	Buren Culemborg Geldermalsen Lingewaal Maasdriel	1740 0304 0281 0668 0297	Neder-Betuwe Neerijnen Tiel West Maas en Waal Zaltbommel

CR17	**Utrecht**	0307	Amersfoort	0339	Renswoude
		0308	Baarn	0340	Rhenen
		0310	De Bilt	0736	De Ronde Venen
		0312	Bunnik	0342	Soest
		0313	Bunschoten	1904	Stichtse Vecht
		0317	Eemnes	0344	Utrecht
		0321	Houten	1581	Utrechtse Heuvelrug
		0353	IJsselstein	0345	Veenendaal
		0327	Leusden	0620	Vianen
		0331	Lopik	0352	Wijk bij Duurstede
		0335	Montfoort	0632	Woerden
		0356	Nieuwegein	0351	Woudenberg
		0589	Oudewater	0355	Zeist
CR18	**Kop van Noord-Holland**	0400	Den Helder	0420	Medemblik
		0498	Drechterland	0432	Opmeer
		0388	Enkhuizen	0441	Schagen
		1911	Hollands Kroon	0532	Stede Broec
		0405	Hoorn	0448	Texel
		1598	Koggenland		
CR19	**Alkmaar en omgeving**	0361	Alkmaar	0399	Heiloo
		0373	Bergen (N.H.)	0416	Langedijk
		0365	Graft-De Rijp	0458	Schermer
		0398	Heerhugowaard		
CR20	**IJmond**	0375	Beverwijk	0450	Uitgeest
		0383	Castricum	0453	Velsen
		0396	Heemskerk		
CR21	**Agglomeratie Haarlem**	0377	Bloemendaal	0397	Heemstede
		0392	Haarlem	0473	Zandvoort
		0393	Haarlemmerliede & Spaarnwoude		
CR22	**Zaanstreek**	0880	Wormerland		
		0479	Zaanstad		
CR23	**Groot-Amsterdam**	0358	Aalsmeer	0415	Landsmeer
		0362	Amstelveen	0431	Oostzaan
		0363	Amsterdam	0437	Ouder-Amstel
		0370	Beemster	0439	Purmerend
		0384	Diemen	0451	Uithoorn
		0385	Edam-Volendam	0852	Waterland
		0394	Haarlemmermeer	0478	Zeevang
CR24	**Het Gooi en Vechtstreek**	0376	Blaricum	0424	Muiden
		0381	Bussum	0425	Naarden
		0402	Hilversum	0457	Weesp
		0406	Huizen	1696	Wijdemeren
		0417	Laren		
CR25	**Agglomeratie Leiden en Bollenstreek**	0534	Hillegom	0575	Noordwijk
		1884	Kaag en Braassem	0576	Noordwijkerhout
		0537	Katwijk	0579	Oegstgeest
		0546	Leiden	1525	Teylingen
		0547	Leiderdorp	0626	Voorschoten
		0553	Lisse	0638	Zoeterwoude
CR26	**Agglomeratie 's-Gravenhage**	0518	's-Gravenhage	0603	Rijswijk
		1916	Leidschendam-Voorburg	0629	Wassenaar
		1926	Pijnacker-Nootdorp	0637	Zoetermeer

CR27	**Delft en Westland**	0503 1842 1783	Delft Midden-Delfland Westland		
CR28	**Oost-Zuid-Holland**	0484 0491 1901 0499 0513 0643	Alphen aan den Rijn Bergambacht Bodegraven-Reeuwijk Boskoop Gouda Nederlek	0569 0644 1672 0608 0623 0627	Nieuwkoop Ouderkerk Rijnwoude Schoonhoven Vlist Waddinxveen
CR29	**Groot-Rijnmond**	0613 0489 0568 0585 0501 0502 0611 1924 0530 0588 0542	Albrandswaard Barendrecht Bernisse Binnenmaas Brielle Capelle aan den IJssel Cromstrijen Goeree-Overflakkee Hellevoetsluis Korendijk Krimpen aan den IJssel	1621 0556 0584 0597 0599 0606 0612 0617 0622 0614 1892	Lansingerland Maassluis Oud-Beijerland Ridderkerk Rotterdam Schiedam Spijkenisse Strijen Vlaardingen Westvoorne Zuidplas
CR30	**Zuidoost-Zuid-Holland**	0482 0505 0689 0512 0523 0531	Alblasserdam Dordrecht Giessenlanden Gorinchem Hardinxveld-Giessendam Hendrik-Ido-Ambacht	0545 1927 0590 0610 0707 0642	Leerdam Molenwaard Papendrecht Sliedrecht Zederik Zwijndrecht
CR31	**Zeeuws-Vlaanderen**	0677 1714 0715	Hulst Sluis Terneuzen		
CR32	**Overig Zeeland**	0654 0664 0678 0687 1695	Borsele Goes Kapelle Middelburg Noord-Beveland	0703 1676 0716 0717 0718	Reimerswaal Schouwen-Duiveland Tholen Veere Vlissingen
CR33	**West-Noord-Brabant**	0748 0758 1719 0777 0779 1655	Bergen op Zoom Breda Drimmelen Etten-Leur Geertruidenberg Halderberge	1709 0826 1674 0840 0851 0873	Moerdijk Oosterhout Roosendaal Rucphen Steenbergen Woensdrecht
CR34	**Midden-Noord-Brabant**	0738 1723 0744 0766 0784 0785 0798	Aalburg Alphen-Chaam Baarle-Nassau Dongen Gilze en Rijen Goirle Hilvarenbeek	0809 0824 0855 0867 0870 0874	Loon op Zand Oisterwijk Tilburg Waalwijk Werkendam Woudrichem

CR35	**Noordoost-Noord-Brabant**	1721 0755 0756 0757 1684 0786 0788 0796 0797 1685	Bernheze Boekel Boxmeer Boxtel Cuijk Grave Haaren 's-Hertogenbosch Heusden Landerd	1671 0815 0828 0844 1702 0845 0846 0856 0860 0865	Maasdonk Mill en Sint Hubert Oss Schijndel Sint Anthonis Sint-Michielsgestel Sint-Oedenrode Uden Veghel Vught
CR36	**Zuidoost-Noord-Brabant**	0743 1724 0753 1728 1706 0762 0770 0772 1771 1652 0794	Asten Bergeijk Best Bladel Cranendonck Deurne Eersel Eindhoven Geldrop-Mierlo Gemert-Bakel Helmond	1659 0820 0823 1667 0847 0848 0858 0861 0866	Laarbeek Nuenen, Gerwen en Nederwetten Oirschot Reusel-De Mierden Someren Son en Breugel Valkenswaard Veldhoven Waalre
CR37	**Noord-Limburg**	0889 0893 0907 1507	Beesel Bergen (L.) Gennep Horst aan de Maas	0944 1894 0983 0984	Mook en Middelaar Peel en Maas Venlo Venray
CR38	**Midden-Limburg**	1711 1640 1641 0946	Echt-Susteren Leudal Maasgouw Nederweert	1669 0957 0988	Roerdalen Roermond Weert
CR39	**Zuid-Limburg**	0888 0899 1903 1729 0917 0928 0882 0935 0938	Beek Brunssum Eijsden-Margraten Gulpen-Wittem Heerlen Kerkrade Landgraaf Maastricht Meerssen	0951 0881 0962 0965 1883 0971 0981 0994 0986	Nuth Onderbanken Schinnen Simpelveld Sittard-Geleen Stein Vaals Valkenburg aan de Geul Voerendaal
CR40	**Flevoland**	0034 0303 0995	Almere Dronten Lelystad	0171 0184 0050	Noordoostpolder Urk Zeewolde

Appendix VI: Regression model output

The illustration below shows the regression model that has been used to execute the municipal unexplained variation analysis as it appears in *Stata* (a software programme to work with statistical analyses and data). The database that has been used for this research is available on request, by sending an e-mail to dionglastra@gmail.com.

```
. xtreg Totnew_LM1 PERC_ADDEDVALUE_COROP PERC_WAGERATE_COROP LOCALIZATION_DEGREE PERC_SECONDARY PERC_3550 PERC_POPCHANGE IMMIGRAN
> TS_PER_INHABITANT PERC_URB_URBAN ADJACENT_TO_CITY AVERAGE_STANDARDISED_INCOME PERC_UNEMPLOYMENT UNIVERSITY, fe
note: ADJACENT_TO_CITY omitted because of collinearity
note: UNIVERSITY omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       3,650
Group variable: GM_CODE                         Number of groups   =         406

R-sq:                                           Obs per group:
     within  = 0.3896                                         min =           5
     between = 0.4075                                         avg =         9.0
     overall = 0.3982                                         max =           9

                                                F(10,3234)         =      206.44
corr(u_i, Xb)  = -0.0842                        Prob > F           =      0.0000
```

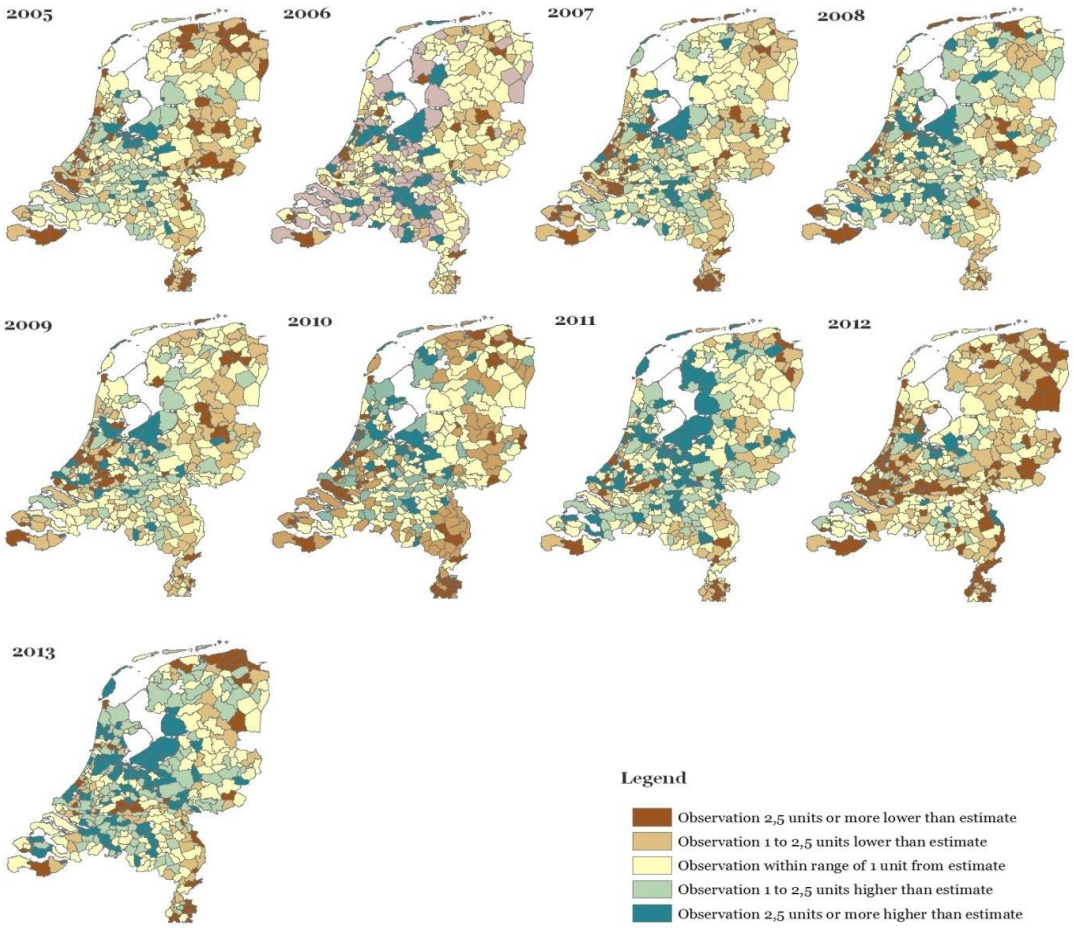
Totnew_LM1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
PERC_ADDEDVALUE_COROP	.0687762	.0117718	5.84	0.000	.0456952	.0918572
PERC_WAGERATE_COROP	5.475724	1.845079	2.97	0.003	1.858082	9.093366
LOCALIZATION_DEGREE	18.13596	1.743973	10.40	0.000	14.71655	21.55536
PERC_SECONDARY	-.1354392	.0320255	-4.23	0.000	-.1982316	-.0726469
PERC_3550	-.3188631	.0613307	-5.20	0.000	-.439114	-.1986122
PERC_POPCHANGE	.0450863	.0560356	0.80	0.421	-.0647826	.1549551
IMMIGRANTS_PER_INHABITANT	4.136691	13.57012	0.30	0.761	-22.47021	30.74359
PERC_URB_URBAN	.0121691	.0160312	0.76	0.448	-.0192633	.0436015
ADJACENT_TO_CITY	0	(omitted)				
AVERAGE_STANDARDISED_INCOME	.0005527	.0000454	12.18	0.000	.0004637	.0006416
PERC_UNEMPLOYMENT	.8038816	.0644405	12.47	0.000	.6775333	.93023
UNIVERSITY	0	(omitted)				
_cons	2.562381	2.352473	1.09	0.276	-2.050108	7.17487
sigma_u	1.9228534					
sigma_e	1.8747029					
rho	.5126773	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(405, 3234) = 6.91                     Prob > F = 0.0000

.
```

Appendix VII: Yearly fluctuations in unobserved variation in new firm formation rates (2005-2013)

The illustration below shows the yearly fluctuations in unobserved variation between new firm formation rates. These are the results the regression model has produced in order to execute the municipal unexplained variation analysis.



Mapped levels of unexplained variation between observed new firm formation rates and estimated new firm formation rates, per year, over the period 2005-2013.