The Geography of Entrepreneurial Activity and Regional Economic Development

The research project reported in this dissertation was conducted at the Urban and Regional research centre Utrecht (URU), Faculty of Geosciences, Utrecht University, which is part of the Netherlands Graduate School of Housing and Urban Research (NETHUR).

ISBN 978-90-902-3994-1

Graphic design, Cartography and figures and DTP:
Geomedia [7419], Faculty of Geosciences, Utrecht University.

Printed in the Netherlands by A-D Druk b.v., Zeist

Copyright © 2009 Niels Bosma. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the permission in writing from the publisher.

The Geography of Entrepreneurial Activity and Regional Economic Development

Multilevel analyses for Dutch and European regions

De geografie van ondernemerschap en regionaal economische ontwikkeling
Multilevel analyses voor Nederlandse en Europese regio's

(met een samenvatting in het Nederlands)

Proefschrift

ter verkrijging van de graad van doctor aan de Universiteit Utrecht
op gezag van de rector magnificus, prof.dr. J.C. Stoof,
ingevolge het besluit van het college voor promoties
in het openbaar te verdedigen

op vrijdag 27 februari 2009 des middags te 2.30 uur

door

Niels Stefan Bosma

geboren op 14 april 1974 te Borger

Promotor:
Prof.dr R.A. Boschma

Co-promotoren:
Dr. V.A.J.M. Schutjens
Dr. F.C. Stam

Contents

Acknowledgements

Many people have, directly or indirectly, contributed to this PhD dissertation. First of all, I would like to express my gratitude to my supervisors Veronique Schutjens, Erik Stam and Ron Boschma. Your idea to invite me to 'finally' complete my PhD at the department of Economic Geography has worked out perfectly for me. Veronique, your guidance, positive attitude, fresh ideas and critical feedback have been very important over the full three-year period. The little presents at some crucial moments, like those I discovered when entering the plane for a final 'work' holiday, also did their trick. I hope I did not drag you into writing too many articles and chapters. Erik, even though you have been travelling a lot you were always available for questions, for which I am thankful. Your track record in not only having an answer to every question, but also in adding at least three relevant references, plus the latest career steps of the authors concerned seems unbeatable. I hope we can continue our co-operation and discussions over the next few years. Ron, many thanks for your valuable comments throughout the project. It has been a real pleasure to work in the stimulating environment of the research group and getting introduced to the arena of (evolutionary) economic geography.

Second, I am grateful to one of my previous employers, EIM Business & Policy Research, for different reasons. In 1998 I entered the exciting and small (but increasing) world of entrepreneurship research by completing my MSc thesis at EIM. Sander Wennekers has been very important in passing on his enthusiasm and ideas. I would also like to thank Roy Thurik for sharing his knowledge and for 'letting me go' without hard feelings when I decided to abandon a first PhD attempt. This has not been wasted time at all: using entrepreneurship research vocabulary I guess you can call me a serial PhD student benefiting from previous experience. I will not go for a third one though. EIM has also provided data used in this dissertation and I have worked very pleasantly with André van Stel and Kashifa Suddle on articles that formed the basis of two of the chapters.

Third, I would like to express my warm thanks to all members of the Global Entrepreneurship Monitor (GEM). There are simply too many people to be mentioned here. Working with the GEM community has been quite some experience in many ways. To me the warm atmosphere, the exchange of new ideas and also the laughter at our annual meetings are very special. Moreover I have used a lot of your data and your permission to do so has been paramount. I hope some parts of this thesis can be of importance in your own research.

Fourth, I would like to thank all my colleagues at the department of Economic Geography of the faculty of Geosciences for valuable feedback and the nice atmosphere – I am truly sorry that I missed most lunches over the past year. Koen Frenken, Frank Neffke, Roderik Ponds, Otto Raspe and Frank Van Oort have provided useful suggestions. Matté Hartog

has also contributed by assisting with Chapter 6. In particular I would like to thank my 'room mates' Sandra Vinciguerra and Anne ter Wal for a great period in room 6.33 in the infamous Unnik building. Sandra, Anne, my apologies for being less communicative over the past year when time, travel distance and day-care closure times became pressing issues.

Of course my fiends and family have also been very important. Special thanks go to Thoas for designing the cover of this thesis. To my parents: thanks for keeping faith in me even though my lack of long-term planning and some of my choices must have been far from obvious to you. Renate, you have always been the best sister I could whish for and in many ways you have been great an example for me. I am looking forward to be living much closer to you, Jos and Jelle. Jannet and Roel: thanks for your support and for your great hospitality. Finally and most of all I would like to thank the two most beautiful women in my life. Elin, you will only be able to read this after a couple of years (you are such a quick learner) and your dad loves you very much! You don't remember now but we had a lot of fun entertaining each other every Tuesday. Dear Rinske, I will never stop realising how lucky I am that I just catched that train and that I chose to sit next to you! Zillion thanks for your love and support and for making my life so joyous.

Niels Bosma
Utrecht, January, 2009

1
Introduction

1.1 Background

"I have had a pretty amazing life. (...) So many people enter and leave your life! Hundreds of thousands of people! You have to keep open the door so that they can enter! But it also means you have to let them go!" (Jonathan Safran Foer, 2005 – Extremely Loud & Incredibly Close, pp. 152-153)

This quotation could be a metaphor for what is nowadays held as the essence of fostering entrepreneurship. Countries and regions are committed to stimulating entrepreneurship by opening doors for (potential) entrepreneurs. The commonly-held belief is that a variety of entrepreneurs leads to the sort of enriched dynamic economic environment that lies at the root of economic prosperity. Audretsch and Thurik (2000) have documented the mechanisms underlying the transition from a post-war *managed economy* to an *entrepreneurial economy* in the late 20th century. Over the past two decades, institutions have indeed promoted entrepreneurship. International organizations such as the European Commission (2003), OECD (1998; 2004b) and the World Bank (2005) have all expressed the importance of fostering entrepreneurship. However, whereas the arguments for promoting entrepreneurship seem to be hard to invalidate, there are some research gaps that hamper a full understanding of the relationship between entrepreneurship and (regional) economic development.

The academic literature on entrepreneurship can be traced back to Cantillon (1755), who has been identified as the first to define an *entrepreneur* as someone who was willing to bear the personal financial risk of a business venture.[1] The importance of entrepreneurship for economic growth really took off after Joseph Schumpeter introduced his theory of *creative destruction* (Schumpeter, 1942). He saw entrepreneurs as economic actors distorting equilibriums and moving the production frontier forward. This crucial view, although not widely acknowledged at the time when Schumpeter wrote his seminal works, now prevails in the entrepreneurship and economics literature. Schumpeter also addressed the importance of firm *exits*: that is, the destruction of obsolete economic activity. Siegfried and Evans (1994) and Caves (1998) have reported that patterns of entry and exit are highly correlated. Eliasson (1996) argues that, within the context of the creative destruction story, it is the entry process that drives exits rather than the other way around. Indeed, opening the door to new entrepreneurial activities implies opening the door for exits, too.[2]

1 See Van Praag (1999) for classic views on entrepreneurship and Hébert and Link (1988) for a complete overview of the history of economic thought of entrepreneurship

2 In this thesis we focus on the early-stage but we also consider exits when linking entrepreneurship to growth in chapter 7.

While the Schumpetarian view on entrepreneurship is about disruptive forces, the second influential perspective on entrepreneurship put forward by Israel Kirzner emphasizes the process of discovery; he views entrepreneurship as an equilibrating force (Kirzner, 1973; 1979). Kirzner's entrepreneur is a person who discovers previously unnoticed profit opportunities. Shane and Venkataraman (2000) underlined the Kirznerian perspective and identified three stages relevant to the entrepreneurial process: opportunity identification, the mobilization of resources, and the exploitation of the identified opportunity.

Apart from the way in which entrepreneurship is viewed, the entrepreneurial mechanism has yet to be specified adequately in economic modelling, despite a number of calls for that to be done. William Baumol stated in the late, 1960s that the theoretical firm is 'entrepreneurless' and compared this situation to "the prince of Denmark having been expunged from the discussion of Hamlet" (Baumol, 1968). Two decades later, Barreto (1989) showed that the neoclassical model leaves no room for the entrepreneur. Vernon Henderson argued in 1985 to 'bring back the entrepreneurs' in spatial economic modelling, although he saw entrepreneurs merely as land developers (Henderson, 1985). Aghion and Howitt (1992) formally introduced the term *creative destruction* in economic modelling, but they focused on innovation (as an outcome of entrepreneurship) rather than the role of entrepreneurs themselves.

Recently, some interesting new models have been proposed that are rooted in Schumpeter's line of reasoning, but also allow for a more Kirznerian interpretation. Acs et al. (2003) see entrepreneurs as agents who filter the region's available stock of knowledge and turn this into promising new ventures. The authors argue that it is the combination of R&D and entrepreneurship in particular that leads to economic growth. Acs et al. (2005b) provide some empirical support. Audretsch and Keilbach (2004a) and Audretsch et al. (2006) see the entrepreneurial processes as an additional factor that enables the productive use and combinations of labour, capital, and knowledge. They also emphasize the geographical perspective in linking entrepreneurship to economic growth.

Even though international institutions as well as many empirical entrepreneurship studies tend to highlight national differences in entrepreneurship, regional differences have proven to be just as relevant. Over the past twenty-five years, entrepreneurship literature has established that entrepreneurial activity is extremely unevenly distributed over regions (see for example Reynolds et al., 1994, Audretsch and Fritsch, 2002, Sternberg, 2009). It has also been confirmed that the regional context matters for individuals' decisions to engage in entrepreneurship (Wagner and Sternberg, 2004, Tamásy, 2006). Therefore, to study the entrepreneurial process and its role in economic development, taking account of *regional* differences in explaining *individuals'* engagement in entrepreneurial activity, is more than worthwhile. Nevertheless, there are still very few studies of these macro-micro types of relationship.

A criticism one might level at the applications by, for example, Audretsch et al. (2006) and Acs et al. (2005b) is that insufficient account is taken of the interrelationship between entrepreneurship and, for instance, human capital. If regional variation in entrepreneurship is caused by regional variation in human capital and consequently entrepreneurship and human capital are positively correlated, the effect of entrepreneurship on economic

development could be overestimated. Similar arguments can be made for financial and social capital. Furthermore, the theoretical arguments of these authors assume specific *types* of entrepreneurship for explaining economic development, whereas the empirical applications generally use self-employment rates or firm-formation rates.

In short, there is a need for more specific knowledge about (i) the impact of regional characteristics on different types of entrepreneurial activity in the region; and (ii) the linkages between these different types of entrepreneurship and regional economic development within particular regional contexts. In this thesis we contribute to the closing of this research gap with empirical studies within a multilevel framework where entrepreneurship impacts on regional levels of economic development in addition to the more traditional inputs of labour, financial capital, human capital, and knowledge. The framework acknowledges that different types of entrepreneurship should be identified at the individual level. Moreover, differences in regional rates of specific types of entrepreneurship may be caused by the presence of composition effects (the overrepresentation of individuals with specific characteristics, such as the share of younger adults in the total adult population) and regional context effects. We concentrate on the spatial perspective rather than the dynamic perspective: we are mainly interested in spatial differences and effects.[3] We have therefore studied the association between regional variation in specific types of entrepreneurship and in economic development while accounting for regional characteristics impacting these different types of entrepreneurship.

The quotation at the start of this chapter results from the encounter of a nine-year-old boy with an old man who has 'seen the world' and met so many people, but now lives the life of a hermit. The book from which the quotation is taken is not about entrepreneurship. It is a compelling story centring on a nine-year-old boy after losing his father in the 9/11 attacks. The boy has severe problems in getting to sleep and dreams up all kinds of new products the world would – in his view – benefit from. His entrepreneurial spirit, curiosity, and close-to-autistic determination lead him on a quest through diverse (and confused) New York, which should help him find peace following his father's death. This search also leads to the old man who, incidentally, lives in the same apartment block. The boy helps the old man by luring him back into the world; the man helps the boy by assisting him in his search.

Even though this brief sketch is about neither academic research nor ordinary life, it raises some issues that are relevant for this thesis and for researching the role of entrepreneurship in economic geography. First, perceptions and acts of entrepreneurship are about people. Therefore, the individual level should be incorporated in research dealing with the determinants or consequences of entrepreneurship. Individual characteristics have been proven to be important predictors of an individual's involvement in entrepreneurial activity (Blanchflower and Oswald, 1998; Van Praag, 1996). The boy in Safran Foer's book not only has some specific personal characteristics himself, but he is also the son of a jeweller. The

3 Regional variation in entrepreneurship is very persistent over time and reflects path dependence, see for example Fritsch and Mueller (2007) and Brenner and Fornahl (2008). Unravelling the 'true' dynamic impact of entrepreneurship on economic development therefore requires analysing data over a long time period. In chapter 7 we pay some attention to dynamic effects by investigating the impact of entry and exit of firms on productivity growth for 40 Dutch regions using panel data analysis.

contagious effect of entrepreneurship through family ties has been documented by, for example, Blanchflower and Oswald (1998).

Second, there is a link between the regional and individual levels. The regional context may, even when people's characteristics are taken into account, have an impact on their entrepreneurial attitudes and entrepreneurial activity (Tamásy, 2006; Sternberg, 2009). Safran Foer's book emphasizes the diversity of New York's inhabitants. And if the question arose, which region was the most entrepreneurial in the world, New York would, at least until the start of the 21st century, have been at the top of most lists. The notion that the regional level and the individual level need to be studied together leads to the multilevel framework used in this thesis.

Third, the vibrant environment of urban areas implies a rich variety of contacts; this may fuel the variation of entrepreneurial activity across regions through peer effects (Nanda and Sorenson, 2007), networking (Malecki, 1997, 2007; Sorenson, 2003) and knowledge spillovers (Armington and Acs, 2002; Audretsch and Feldman, 2004). The boy in Safran Foer's book is influenced by issues in his family, school, and the city and these affect his behaviour. Although the empirical nature of this thesis does not permit us to model these relationships in detail, these issues constitute important parts of our objective to link regional conditions to individuals engaging in certain types of entrepreneurial activity and to describe the relationship between entrepreneurial activity and regional economic development. We seek to shed light on these mechanisms by describing the geography of entrepreneurship while accounting for differences in types of entrepreneurship determined at the individual level. In doing so, we seek to identify the doors that should be opened for new entrepreneurs in realizing growth aspirations at the regional level and avoid revolving door regimes (cf. Audretsch and Fritsch, 2002) in which new entrants exit the market soon after entry without generating economic value for the region.

1.2 Aim and approach of the study

The main objective of this thesis is to identify the causal mechanisms between regional conditions and different types and phases of entrepreneurial activity at the individual level on the one hand, and entrepreneurial activity and regional economic development on the other. The study links recent insights from economic geography and the entrepreneurship literature.

In combining economic geography with the entrepreneurship research field, the importance of urbanization economies immediately attracts attention. Can the 'economies of cities', documented by Jacobs (1969) as spillovers resulting from economic variety (also known as Jacobs externalities), be largely attributed to entrepreneurs, key agents embodying economic activity? If so, is this effect of entrepreneurial activity merely a different way of measuring human capital (Glaeser et al., 1992) or creative economic activity (Florida, 2002)? Or is it truly – or at least to some extent – complementary to these other proposed forces of urbanization economies? The importance of urbanization economies manifests itself in two ways. First, maps of regional entrepreneurship rates mirror maps of urbanization (Bosma and Schutjens, 2007). Second, the economic effect

of entrepreneurship differs between regions and urbanization levels (Armington and Acs, 2002; Fritsch, 2008). Throughout this thesis we pay attention to urbanization as an important indicator of regional entrepreneurship rates and as an intermediary force linking entrepreneurship to economic growth.

The literature on entrepreneurship suggests that identifying the type of entrepreneurship is essential for making the link between entrepreneurial activity and economic growth; different types of entrepreneurship may have different impacts on a region's economic development (Sternberg and Wennekers, 2005). We adopt the broad definition of entrepreneurship as an individual's involvement in starting a new business (Gartner, 1985). However, we recognize the heterogeneity of entrepreneurs defined in this way by concentrating on a number of *types* of early-stage entrepreneurs. Although our focus is the early-stage of entrepreneurship, we also give consideration to individuals who have positive perceptions of entrepreneurship, but are not (yet) entrepreneurially active and to individuals involved in more mature stages of entrepreneurship.

Our distinction of different types of entrepreneurship enables us to disentangle the different micro-level behavioural mechanisms that drive the economic-growth processes at the macro level. Examples of some different types of entrepreneurship involved in different phases of the process are *nascent entrepreneurship* (Davidsson, 2006), *serial entrepreneurship* (measuring the extent of entrepreneurs starting a new business after closing another business, see Schutjens and Stam, 2006), and *turbulence*, the sum of entry and exit rates as a measure of creative destruction in the Schumpeterian sense (Caves, 1998; Fritsch and Mueller, 2004). Further relevant types are *growth orientation* and *growth realization* (Autio, 2007; Henreksson and Johansson, 2008), *innovativeness* (Stam, 2008a) and the *international orientation* of the regional business population (Oviatt and Mc Dougal, 1994; Hessels, 2008).

There is ample evidence of regional characteristics influencing differences in entrepreneurship levels (type A relationships in figure 1.1), for example by analysing the advantages in urbanization, location, social capital, the economic structure or differences in culture (Lee et al., 2004; Scott, 2004; Thornton and Flynn, 2003; Stam, 2007).[4] A second set of studies focuses on the impact of entrepreneurship on regional economic performance (type E relationships in figure 1.1), assuming that knowledge spillovers, competition, and variety within a region are enhanced by entrepreneurship, especially in high-tech sectors (Audretsch and Keilbach, 2004b; Carree and Thurik, 2003; Fritsch and Mueller, 2004). However, the underlying causal mechanisms have yet to be disentangled. More specifically, the macro-micro-macro path shown at the bottom part of figure 1.1 (type B and D relationships) is at most only partially explained; Wagner and Sternberg (2004), Tamásy (2006) and Bergmann (2008) provide some evidence for type B relationships). *Regional* conditions are believed to affect *individual* entrepreneurial behaviour (type B relationships), for example in entrepreneurial *attitude*: the decision to set up a new firm or to create a new

4 Other proposed factors enhancing entrepreneurship are differences in wealth distribution, population density, population growth, individual skills (self-efficacy), and human capital. Industrial organization, reflected by, for example, high levels of average firm size, is an example of a factor influencing entrepreneurship negatively (Storey, 1991; Caves, 1998; Audretsch and Keilbach, 2004a).

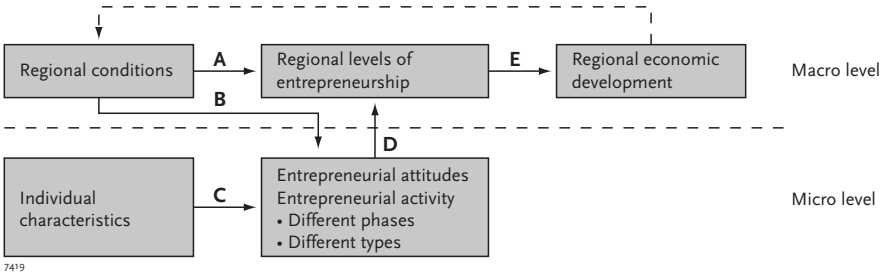


Figure 1.1. Micro-macro relations between entrepreneurship and (regional) economic development

subsidiary firm. In this line of reasoning, it is important to take into account individual-level determinants of entrepreneurial activity (type C relationships). Observed differences in individual characteristics across regions constitute regional composition effects. The additional explanations from the regional level (type B relationships) can be seen as impacts caused by the regional context. The aggregate characteristics of individuals' entrepreneurial behaviour will consequently vary across regions, resulting in a variety of regional levels of entrepreneurship dynamics (type D relationships). Acknowledging the processes at the micro level is also the best way to grasp the effects of possible policy instruments; for policymakers, it is highly relevant to observe how individuals respond to regional conditions and how the set of responses relates to observed differences in entrepreneurship dynamics at the regional level.

1.3 Main contributions

The framework in figure 1.1 is, in subsequent parts, examined throughout this thesis. In the framework, entrepreneurship is considered as both an effect and an indicator of regional economic development. The framework also acknowledges that entrepreneurship is a dynamic process taking place at the individual (micro) level. Even though the partial studies bring with them a set of specific contributions, four overall contributions to the current literature can be identified.

The first contribution to the existing entrepreneurship literature is the focus on the macro-micro-macro path in figure 1.1 (Path B-D-E). This notion is closely related to Giddens' (1984) theory of structuration in which he argues that individuals act as social agents, but that their actions depend on economic, legal, social, cultural, and spatial structures. Although entrepreneurial activity certainly has important social dimensions (see for example Swedberg, 2000), we consider Giddens' work in a more economic setting: we see entrepreneurs as key economic agents. Regional economic development is thus the outcome of individuals' (entrepreneurial and economic) actions. At the same time, regions structure action: regional characteristics can constrain and enable (entrepreneurial and economic) action. Even though a few studies have picked up these relationships (see for example Wagner and Sternberg, 2004; Tamásy, 2006) they have not yet been dealt with adequately. We, for example, consider variations in entrepreneurial perceptions, such as perceived opportunities to start a business in the region, at the regional level, and

determine whether regional entrepreneurial cultures impact on individuals' engagement in entrepreneurial activity.

In accordance with our framework, we empirically model the relationship between regional conditions and individuals' engagement in (different types of) entrepreneurial activity. Multilevel frameworks – in this thesis, represented by individuals nested within regions within countries – call for multilevel modelling techniques. These techniques are widely accepted in social, behavioural, and biomedical sciences (De Leeuw and Meijer, 2008) but have yet to be fully recognized in economics or geography.

The second main contribution to the current literature deals with unravelling the links between urbanization economies, entrepreneurial activity, and regional economic performance. Vernon (1966) was one of the first to link the degree of urbanization to the regional degree of entrepreneurship. Ciccone and Hall (1996) established that there is a positive link between regional density in economic activity and regional productivity levels. Duranton and Puga (2004) described the micro foundations underlying these urbanization economies, but entrepreneurs have only been dealt with implicitly. Exploiting the multilevel framework as described above, we are able to shed more light on (i) the importance of urbanization for different types of entrepreneurial activity, and (ii) the role entrepreneurship plays in urbanization economies: the net economic advantage densely-populated areas have owing to the benefits of a rich variety of economic agents (Jacobs, 1969) and knowledge spillovers (Audretsch and Feldman, 2004)[5].

Third, we emphasize the different phases and appearances of entrepreneurship throughout the thesis, rather than rely solely on aggregate measures such as new-firm formation rates. We identify different operational phases in entrepreneurship dynamics, relating to three phases derived from the entrepreneurship literature: opportunity recognition, resource mobilization, and opportunity exploitation (Shane and Venkatamaran, 2000; Garnsey et al., 2006). We include perceptions of entrepreneurship, entrepreneurial intentions, early-stage entrepreneurship, turbulence rates, and established entrepreneurship. Other relevant dimensions relate to different entrepreneurial types or appearance with respect to independence, innovation, and growth.

Finally, we have extensively used data from the Global Entrepreneurship Monitor (GEM). We created a new database by combining and exploiting existing GEM data, consisting of data on more than 370,000 individuals in 147 regions in 18 countries, covering the period 2001-2006 (see appendix I for the regional classification used). The information gathered by the GEM consortium covers individuals' basic characteristics, their perceptions of entrepreneurship, and – for those who are entrepreneurially active – a range of characteristics of their involvement in entrepreneurial activity[6]. The research design is harmonized over regions *and* countries, thereby facilitating comparison between

5 The term 'net' advantage refers to the idea that not only positive, but also negative economic effects may result from urbanization, such as congestion costs and losses resulting from environmental issues.

6 See www.gemconsortium.org and Reynolds et al. (2005) for more information about the GEM project and its research design.

individuals, regions, and countries and the analysis of their interdependence. Since countries have different requirements regarding the collection of firm-registration data, such internationally-comparable entrepreneurship information has not previously been presented. In addition, the dataset enables us to test empirically multilevel linkages, as proposed in figure 1.1.

1.4 Research questions and approach

Our main objective is to identify the causal mechanisms between regional conditions and types and the phases of entrepreneurial activity at the individual level on the one hand, and on the other entrepreneurial activity and regional economic performance. Our approach follows the framework in figure 1.1. The linkages presented in this framework are tested using partial models, each addressing a specific linkage type or a combination of linkages. Accordingly, we address the following partial research questions:

1. How do levels of entrepreneurial perceptions and entrepreneurial activity differ across Dutch and European regions?
2. What factors determine regional differences in different types of entrepreneurship levels?
3. How and to what extent do *regional* and *national* conditions influence *individuals'* engagement in early-stage entrepreneurial activity and are these conditions different for low-growth-oriented entrepreneurs in comparison with high-growth-oriented entrepreneurs?
4. What is the impact of entrepreneurship dynamics on regional productivity growth and is this impact contingent on regional characteristics?
5. Do different types of entrepreneurship affect regional productivity levels differently and can certain types of entrepreneurship explain urbanization economies?

Below, we elaborate these research questions.

Research question 1:
How do levels of entrepreneurial perceptions and entrepreneurial activity differ across Dutch and European regions?

From the geographical aspects of the entrepreneurship literature, it has become clear that the sub-national level is important for understanding differences in levels of entrepreneurship (Sternberg, 2009; Fritsch and Mueller, 2006; Tamásy, 2006). Various studies have shown that regional variation in entrepreneurship is not only substantial, but also persistent (Audretsch and Fritsch, 2002; Parker, 2005; Fritsch and Muelller, 2007).

Most empirical studies of regional variations in entry rates are based on registration data. Since registration methods and definitions vary across countries, only comparisons within countries are possible (for examples see Ashcroft et al., 1991; Reynolds et al., 1994; Baptista et al., 2005; Bosma et al., 2008c). There is practically no evidence of any studies of entrepreneurial activity that encompass regions and countries at the same time. Moreover, although in conceptual studies and policy reports entrepreneurial attitude is

strongly associated with entrepreneurial activity, empirical analysis and comparison of the spatial patterns of both aspects is limited, mainly because of the lack of spatial data on entrepreneurial values and attitudes (European Commission, 2003). Entrepreneurial attitudes can be seen as one of several components of cultural attitude.

In chapter 2 we explore entrepreneurial perceptions and entrepreneurial activity using data from the Global Entrepreneurship Monitor for the period 2001-2006. We thus provide newly-constructed harmonized regional indices of entrepreneurial perceptions and entrepreneurial activity across eighteen European countries. Mapping these indices allows patterns to emerge on different spatial levels.

To gain more insight into regional differences with respect to the entrepreneurial process of opportunity identification, resource mobilization, and exploitation (Shane and Vankataraman, 2000) in chapter 6 we focus on three labour-market areas in the Netherlands: the regions of East-Groningen (rural area), Twente (former manufacturing area), and Greater Amsterdam (metropolitan area). These regions differ from each other substantially in economic and institutional conditions, levels of entrepreneurship, and regional economic development. We explore regional differences in entrepreneurial perceptions and entrepreneurial activity by comparing several types of entrepreneurs and phases in the entrepreneurial process. At the individual level, we are able to identify participation rates in specific phases of the entrepreneurial process, ranging from vague perceptions to realistic consideration of entrepreneurship as a career option, to starting a business, and currently owning and managing a business. We have also been able to explore different types of entrepreneurial activity, such as distinguishing ambitious entrepreneurs (in terms of job-growth orientation or innovation orientation) from others, irrespective of the sector concerned.

Research question 2:
What factors determine regional differences in different types of entrepreneurship levels?

The effect of regional economic conditions on new-firm formation rates has been documented extensively since the early, 1990s, using the firm-formation data at the regional level that has been available since the early, 1980s (see for example Audretsch and Fritsch, 1994a; Keeble and Walker, 1994; Reynolds, 1994). Determinants of entry were primarily derived from the type of model explaining annual entry rates across sectors from an industrial-organization perspective (see for example Siegfried and Evans, 1994; Carree and Thurik, 1996). A new set of studies added spatial economics to this type of research (Fotopoulos and Spence, 1999; Armington and Acs, 2002; Nyström, 2005; Van Oort and Stam, 2005). These studies demonstrate the importance of localization and urbanization economies for firm-formation rates in a region. With this research question, however, we focus on explaining regional rates of different *types* of entrepreneurship (type A relationships in figure 1.1). We considered two distinct approaches.

The first approach in answering this research question identifies the aspiration levels of early-stage entrepreneurs in terms of growth expectation and innovation (chapter 3). A key notion in conceptualizing the economic effects of new-firm formation is *entrepreneurial variety*. Not all firms can be characterized as truly 'entrepreneurial' (Wennekers and Thurik,

1999) or 'productive' (Baumol, 1990). Although imitators are also beneficial for knowledge diffusion, market expansion, and industry development, stimulating the genuine entrepreneurial pioneers in innovation and growth presumably has the largest multiplier effect in the regional economy (Carree and Thurik, 2003). Our approach therefore focuses on differences in ambition among early-stage entrepreneurs at the regional level. In our search for determinants of both non ambitious and ambitious entrepreneurship over regions and countries, we separate out *specific regional attributes* (for example market opportunities), *regional demographic effects* (an overrepresentation of groups of individuals with high entrepreneurial and/or ambitious spirits), and an *institutional component* consisting of informal institutions (culture, values, norms) and formal institutions (rules, laws, regulations) (North, 1990).

The second approach, reported in chapter 5, has to do with separating independent new firms from new subsidiaries. In general, independent firm founders base their choice whether or not to start a firm on the expected rewards of this new firm relative to an alternative option, such as becoming or remaining an employee with more certainty regarding monthly earnings; see for example Kihlstrom and Laffont (1979, 1983), Parker (2004). This choice may be contingent on location factors, but the decision is very much an intrinsic one. Research has shown that practically all firm founders start their venture in their own region (Figueiredo, et al., 2002; Stam, 2007). This suggests that a low number of independent firm founders choose the location of their firm primarily on the basis of regional characteristics.

With regard to the formation and location choice of new subsidiaries, location aspects can be expected to receive much more attention. Because the founders of a subsidiary company often do not have to work there themselves, they may choose the best location without having to consider the consequences for their personal life of moving to another region. In other words, the choice of location can be made purely on profit-maximizing grounds. These aspects will vary among different regional-production milieus: infrastructure, costs structure, local demand, and so forth. We therefore expected that specific location characteristics captured by measures of localization economies and urbanization economies would be particularly important determinants of the number of new subsidiaries.

Research question 3:
How and to what extent do regional and national conditions influence individuals' engagement in early-stage entrepreneurial activity and are these conditions different for low-growth-oriented entrepreneurs in comparison with high-growth-oriented entrepreneurs?

In chapter 4, having assessed the importance of *regional* conditions for entrepreneurship dynamics, we investigated their impact on *individual* behaviour (type B linkage in figure 1.1). Regional conditions may represent incentives or obstacles for potential entrepreneurs, thus affecting (i) their intention to start a firm and (ii) their performance in the subsequent start-up process. We link the regional conditions already identified in answering research question 2 to characteristics and entrepreneurial aspirations of nascent entrepreneurs and business founders.

To date, studies on growth-oriented entrepreneurship have taken into account determinants at the individual level, but have largely ignored determinants at the regional and national levels. There have been many studies on the spatial distribution of new firms (Reynolds et al., 1994; Tamásy, 2006). However, what has been lacking is a full explanation of growth-oriented entrepreneurship at the individual level that takes into account the determinants at that level (type C linkages) as well as at the regional and national levels. In a multilevel regression model and using over 350,000 observations, we relate involvement in high-growth- and low-growth-oriented entrepreneurship to characteristics of the entrepreneur, the region, and the country.

In chapter 6, we describe a similar exercise for three Dutch regions. Here we examine to what extent the observed regional differences in perceptions of entrepreneurship and involvement in entrepreneurial activity change over and above the determinants at the individual level. We argue that the observed regional differences in levels of entrepreneurial activity become less pronounced if we control for individual characteristics.

Research question 4:
What is the impact of entrepreneurship dynamics on regional productivity growth and is this impact contingent on regional characteristics?

A number of regional features may have an impact on regional competitiveness (Kitson et al., 2004). An important regional feature is the *degree of urbanization*. Urbanization economies may reflect external economies available to all local firms irrespective of sector and arising from population density. High population density might stimulate competitiveness, because of the high levels of competition between different suppliers (lowering input costs) and the possibilities of achieving economies of scale with relatively large demand. Negative effects of high population density on competitiveness arise when low entry barriers give room to too many inefficient entrants, and when cost levels (housing, wages) increase along with population density. These factors could deter employment growth, but might also stimulate entrants to be more labour productive (cf. Kleinknecht, 1998; Madsen and Damania, 2001).

Jacobs' externalities involve external economies available to all local firms stemming from a variety of sectors. These externalities are best captured with the notion of *related variety* (see Frenken et al., 2007). This term reflects both sector diversity and the degree to which the sectors are related. Related variety is assumed to have a positive effect on the probability of new combinations, given the opportunities to combine ideas from different, but related sectors (Jacobs, 1969; Frenken et al., 2007). High levels of related variety in a region are likely to have a catalyzing effect on variety creation via new innovative firms; related variety has been regarded as a source of competitiveness (Jacobs, 1969; Glaeser et al., 1992; Van Oort, 2002).

In addressing this research question in chapter 7, we therefore not only control for these regional features, but also allow for a moderating effect when investigating the impact of firm dynamics on regional productivity growth. In line with the findings of Fritsch and Schroeter (2009), who analyse the interaction effects between regional rates of firm formation and regional characteristics when explaining regional levels of employment

growth, we expected a positive impact of firm dynamics (entry and exit) in particular for regions with higher population density and higher related variety. We investigated the impact of firm dynamics on regional total-factor-productivity (TFP) growth for manufacturing and services industries, acknowledging the interplay with regional features.

Research question 5:
Do different types of entrepreneurship affect regional productivity levels differently and can certain types of entrepreneurship explain urbanization economies?

Regional economic growth literature has established that differences in regional productivity can to a large extent be explained by the density of economic activity. This effect of urbanization economies has been documented for regions in the United States (Ciccone and Hall, 1996) and Europe (Ciccone, 2002) [7]. An important regional-level mechanism that allows these processes is knowledge spillovers taking place via Jacobs' externalities (Jacobs, 1969). Since the, 1980s, many studies have contributed to the opening of the black box of urbanization economies. Convincing evidence concerning micro-level foundations of urbanization economies is provided in reviews by Duranton and Puga (2004) and Rosenthal and Strange (2003; 2004). Others have concentrated on specific characteristics of the labour force in cities, such as human capital (Glaeser et al., 1992) and creative class (Florida, 2002). An important overall conclusion from Duranton and Puga (2004) is that different microeconomic mechanisms may be used to justify the existence of cities and their particular importance for economic development. These mechanisms generate final outcomes that are observationally equivalent in most (but not all) respects. The authors also argue that the microfoundations of learning mechanisms, and especially of knowledge spillovers, have not yet been dealt with satisfactorily: "Given the importance that such spillovers appear to play in our perception not only of cities but also of growth and innovation, better and more microfounded models of learning and spillovers ought to be an important priority for research in this area."

The link between entrepreneurship and urbanization economies is only referred to implicitly in Duranton and Puga's overview. A few authors, such as Becker and Henderson (2000), consider the role of entrepreneurs at the individual level by arguing that their monitoring role increases the marginal product of workers; entrepreneurs in charge of a smaller range of tasks are believed to monitor their workers better. In equilibrium, this mechanism yields increasing returns at the city level. Only recently has entrepreneurship been introduced more explicitly into economic modelling. Audretsch and Keilbach (2004a) and Audretsch et al. (2006) see the entrepreneurial processes as an additional factor that enables productive use and combinations of labour, capital, and knowledge. Acs et al. (2003) regard entrepreneurs as agents who filter the available stock of knowledge in the region and turn this into promising new ventures. They argue that it is the combination of R&D and

7 Both studies use the term *agglomeration economies*. However, agglomeration economies involve localization economies and urbanization economies. Localization economies are not considered in the studies by Ciccone and Hall (1996) and Ciccone (2002). For the sake of clarity, we therefore refer to *urbanization economies*. In the terms of Rosenthal and Strange (2004), this term corresponds with the *geographical scope* of agglomeration economies. In addition, they identify the industrial scope and the dynamic scope.

entrepreneurship in particular that leads to economic growth. Acs et al. (2005b) provide some empirical support. In line with the framework shown in figure 1.1 and based on the model proposed by Ciccone (2002), we put forward a regional model of entrepreneurship impacting on levels of productivity in addition to the traditional inputs of labour, capital, and knowledge. The model acknowledges that different types of entrepreneurship should be identified at the individual level. We followed Carree and Thurik (2003) in expecting a positive contribution to regional levels of productivity, in particular for growth-oriented and innovation-oriented early-stage entrepreneurs.

A further extension of the model is inspired by the notion that the interplay between regional characteristics and individual behaviour is still lacking in empirical models investigating the link between entrepreneurship dynamics and regional economic development (Audretsch and Keilbach, 2004b). We contribute to the existing theory by proposing such a multilevel model while still focusing on the role of urbanization economies. Our proposed model also recognizes that the chances of being engaged in (types or stages of) entrepreneurship are not exogenous. Individual characteristics are believed to exert a significant influence on the odds of being entrepreneurially active (type C relationships in figure 1.1). We test the model empirically using the above-mentioned comprehensive GEM dataset on European regions enabling linkages between individual, regional, and national levels. The combination of regional- and individual-level analyses requires an appropriate multilevel regression estimation technique. In this way, we investigated whether the impacts of entrepreneurship on regional performance merely overlap with the other identified determinants of regional productivity levels (labour, financial capital, human capital, and urbanization) or whether accounting for the entrepreneurial process at the individual level forms a complementary contribution to the explanation of regional performance.

1.5 Structure of the thesis

The framework in figure 1.1 serves as the umbrella for the partial studies carried out in the remainder of this thesis. All the studies reported in Chapters 2-8 are primarily of an empirical nature. The spatial scope of the studies drives the order of the chapters. The richness of the GEM database enables us to find persistent patterns of and explanations for entrepreneurship and its variety in types and phases at the country, regional, and individual levels. This dataset also has a limitation; we are only able to define regions in the Nuts1 classification for some countries, and for others in the Nuts2 classification (which corresponds with the classification by ESRI; see chapter 2).[8] In addition, we identified urban areas at the Nuts2 and Nuts3 levels where data availability permitted us to do so; we denote this classification as Nuts1/3 (see also appendix I). The studies in the Dutch context are necessary to separate out the regional differences in more detail, as we could now narrow down the regional level to Nuts3 (instead of Nuts1/3). It is at this more detailed spatial level where the mechanisms underlying urbanization economies can best be discerned,

8 Nuts stands for Nomenclature of Units for Territorial Statistics and was created by the European Office for Statistics (Eurostat) as a single hierarchical classification of spatial units used for statistical production across the European Union

both conceptually and empirically. Furthermore, focusing on entrepreneurship types and phases in three contrasting Dutch regions via a newly-developed questionnaire gave us the opportunity to examine perceptions and underlying ambitions more closely. In returning to the EU level, this detail in both space and information helps us link entrepreneurship conceptually to regional levels of labour productivity.

We start by investigating European regions in Chapters 2-4, exploring relationships A, B, and C. In Chapter 2, we describe the regional differences in entrepreneurial perceptions and entrepreneurial activity for the European regions we examine more thoroughly in the remainder of the thesis. In Chapter 3, we describe the determinants of several types of entrepreneurial activity in a macro-level analysis. In chapter 4, the individual level is introduced and we describe our derivation of the regional and national determinants of entrepreneurial activity while controlling for basic individual characteristics.

The next three chapters are devoted to regions in the Netherlands. In Chapter 5, we examine the determinants of regional variation in firm-formation rates among 40 Dutch (Nuts3 level) regions. In Chapter 6, we link the individual entrepreneurial process to the regional level by concentrating on entrepreneurial perceptions, intentions, and activity for three of these 40 Dutch regions: East-Groningen, Twente, and Greater Amsterdam. In Chapter 7, we report our investigation of the impact of entrepreneurial dynamics on regional productivity growth.

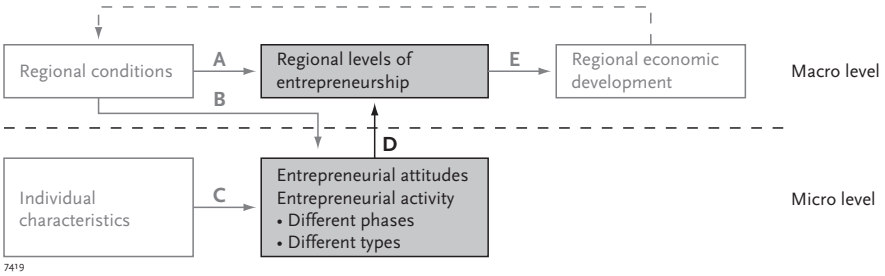
In Chapter 8 we again widen the scope to the European level. We present a comprehensive analysis that includes all the relationships of the model in figure 1.1, while focusing on urbanization effects. Table 1.1 gives an overview of the contents of the thesis. The table also shows how each chapter relates to the framework in figure 1.1, and which research questions are dealt with in the subsequent parts. While table 1.1 gives an overview of the thesis as a whole, we provide a graphical representation at the start of each chapter, highlighting its position within the framework shown in figure 1.1.

Table 1.1 Structure of the thesis

Chapter		Main Data Source	Relation in Figure 1	Research Question	Method and spatial levels applied
1	Introduction				
2	Mapping entrepreneurial attitudes and entrepreneurial activity in European regions	Europe GEM 2001-2006 data. Nuts1/2, adapted from GEM	D	1	Correlations, Cluster analysis: regional level
3	Determinants of ambitious entrepreneurial activity in European regions	Europe GEM 2001-2006 data. Nuts1/3, adapted from GEM	A	2	Multilevel regression: regional and national level
4	Explaining individual involvement in entrepreneurial activity for European regions; a multilevel approach	Europe GEM 2001-2006 data. Nuts1/3, adapted from GEM	B,C	3	Multilevel logistic regression: individual, regional and national level
5	The geography of new firm formation: Evidence from independent start-ups and new subsidiaries in the Netherlands	Dutch registration data. Nuts3, Dutch Chamber of Commerce & EIM	A	1, 2	Seemingly Unrelated Regression (SUR), regional level
6	Whither a flat landscape? Entrepreneurial perceptions and entrepreneurial activity in three Dutch regions	Dutch Regional GEM 2007. Three Nuts3 regions, EIM	B,C,D	1,3	Descriptive analysis, logistic regressions: individual level and regional level
7	Creative destruction and regional productivity growth: Evidence from the Dutch manufacturing and services industries	Dutch registration data. Nuts3, Dutch Chamber of Commerce & EIM	E	4	OLS, Generalised Method of Moments (GMM) – Panel data analysis, regional level
8	Entrepreneurship, urbanisation economies and productivity of regions; A multilevel approach applied to European regions	Europe GEM 2001-2006 data. Nuts1/3, adapted from GEM	A,B,C,D,E	5	OLS (instrumental variables), Multilevel regression: individual, regional and national level
9	Conclusion				

2

Mapping Entrepreneurial Activity and Entrepreneurial Attitudes in European Regions[9]



2.1 Introduction

Entrepreneurship has received increasing attention in the past three decades and has been shown to be one of the key drivers of economic growth (Birch, 1979; Acs et al., 2003; Audretsch et al., 2006; Wennekers and Thurik, 1999). By now considerable knowledge has been accumulated on antecedents and consequences of cross-country differences in entrepreneurial activity (for an overview see Blanchflower et al., 2001; Wennekers, 2006). However, it has also become clear that the sub-national level is important for understanding differences in levels of entrepreneurship (Sternberg, 2000; Fritsch and Mueller, 2006; Tamásy, 2006). In various studies it is found that regional variation in entrepreneurship is not only substantial, but also persistent (Audretsch and Fritsch, 2002; Parker, 2005).

Most empirical studies on regional variations in entry rates are based on registration data. Since registration methods and definitions vary across countries, this enables comparisons within countries only (for examples see Ashcroft et al., 1991, Reynolds et al., 1994, Baptista et al., 2005, Bosma et al., 2008c). There is practically no evidence of studies on entrepreneurial activity that encompass regions *and* countries at the same time. Moreover, although in conceptual studies and policy reports entrepreneurial attitude is strongly associated with entrepreneurial activity, empirical analysis and comparison of the spatial patterns of both aspects is limited, mainly due to lack of spatial data on entrepreneurial values and attitudes (EU, 2003). A recent exception is the study of Tamásy (2006), based on Global Entrepreneurship Monitor data (GEM). Therefore we argue that despite of the active EU stimulation of entrepreneurial activity as part of the Lisbon agenda (European Commission, 2003), an 'outlook on early-stage entrepreneurship in European regions' has

9 This is chapter is based on Bosma, N.S. and Schutjens, V.A.J.M. (2009), Mapping Entrepreneurial Activity and Entrepreneurial Attitudes in European Regions, *International Journal of Entrepreneurship and Small Business* 7 (2), forthcoming

been missing so far[10]. This chapter provides a first step towards linking both spatial levels and exploring the relation between spatial patterns of entrepreneurial activity and attitude.

The relevance of studying entrepreneurial attitudes in relation to entrepreneurial behaviour follows from the findings of an emerging set of empirical papers. Arenius and Minniti (2005) and Tamásy (2006) for example, find evidence of a very strong positive effect of entrepreneurial attitudes on entrepreneurial behaviour at the individual level. At the national level, Wennekers et al. (2006) establish a link between uncertainty avoidance and business ownership. At the regional level, Davidsson and Wiklund (1997) found a significant but marginal contribution of cultural differences in explaining regional variation in new firm formation in Sweden. Obviously cultural differences can be expected to be higher when comparing regions across several European countries rather than comparing regions within a single country. In this chapter we present harmonised regional indicators on both early-stage entrepreneurial activity and entrepreneurial attitudes for the Nuts1 level regions (Eurostat Nomenclature of Territorial Units for Statistics) in eighteen European countries. The main purpose of this chapter is to present and discuss the spatial patterns in entrepreneurial attitude and activity in European countries and regions.

2.2 Literature on spatial variations of entrepreneurial attitudes and activities

The spatial pattern of entrepreneurial activity has mainly been studied on two different levels of spatial detail, leading to two quite separate research fields. The first one is the cross-national perspective, in which the description, comparison, and analysis of national differences in entrepreneurial activity is central (*inter*national). The second level is the description and explanation of regional variation in entry rates within countries (*intra*national). Although in both types of research the underlying mechanism of starting a firm, i.e. entrepreneurial attitude, is conceptualized as one of the main explanations of entry, with the notable exception of Tamásy (2006), thus far the lack of data precluded the integrated empirical analysis on both entrepreneurial activity and attitude at different spatial levels. The literature review below shortly describes recent studies on spatial variation in first entrepreneurial attitude and second entrepreneurial activity, as in general also at the individual level attitude precedes activity (incentives preceed behaviour, see Arenius and Minitti, 2005, Beugelsdijk and Noorderhaven, 2005). Within these two aspects of entrepreneurship we will focus on the literature regarding *inter*national (cross-country) and *intra*national (inter-regional) differences respectively.

Entrepreneurial attitudes

Entrepreneurial attitudes can be seen as one of several components of cultural attitude. Although not focusing on specific entrepreneurial indices, Beugelsdijk et al. (2006) show, using a regional database on cultural attitudes for 55 European regions in the period, 1990-1999, that regional differences in cultural attitudes are significant and persistent over time. They find support for Ingelhart's view that economic development may tend to push (regional) societies in a common direction, but move on parallel trajectories shaped

10 Eurostat presents regional data on self-employment in the Statistical Yearbook since, 2005, but this is a 'static' measure and does not reflect dynamic processes in entrepreneurship.

by their cultural heritage (Inglehart and Baker, 2000). Davidsson and Wiklund (1997) also document regional differences in values and beliefs in Sweden. Outside these studies, there is not much information on interregional differences in cultural attitude.

Considering attitudes directed specifically towards entrepreneurship, there is currently empirical evidence of cross-country differences. Both the annual GEM and Eurobarometer data (see for GEM Bosma et al., 2008a; Acs et al., 2005a, for Eurobarometer Grilo and Thurik, 2006) demonstrated that entrepreneurial perceptions varies substantially between countries. Especially inhabitants of Southern Europe, the UK and Ireland show relatively high self-employment preferences. The EU is especially concerned (if not obsessed) about the apparent difference in entrepreneurial attitudes between EU-countries and the United States: on average, 45% of the EU-citizens prefer to be self-employed whereas this percentage is 67% for the US (European Commission, 2003). This difference appears to be largely caused by extremely low entrepreneurial attitudes in the larger EU-countries, viz. Germany and France. With respect to entrepreneurial attitudes at the regional level, the number of studies is limited. Beugelsdijk and Noorderhaven (2004) derive an index relating to 'enterprise culture', which only indirectly links to entrepreneurship, and find significant differences between European regions. Tamásy (2006) uses regional GEM data for studying regional differences in Germany and also reports significant differences in entrepreneurial attitudes. In fact the abovementioned findings would call for a *regional* approach to Hofstede's measurement of national cultural values (Hofstede, 2001). In a critical assessment of Hofstede's indices, Baskerville (2003, p.3) states that '...cultures do not equate with nations...'.

Entrepreneurial activities

While the evidence on cross regional differences in entrepreneurial *attitudes* has been emerging only recently, differences in entrepreneurial *activity* have been documented since the early, 1980s. With respect to national differences, Blanchflower et al. (2001), Verheul et al. (2002), Djankov et al. (2002), World Bank (2005), Grilo and Thurik (2006), Wennekers (2006) and the GEM project[11] all concentrate on the cross-country variation in different stages of entrepreneurial activity. This interest in the national level of entrepreneurship is fuelled by the desire of both policy makers and academic scholars to compare countries with respect to economic growth and its determinants. According to Hall and Soskice (2001) the most important institutional structures affecting firm behaviour (labour market regulations, education systems, social security system and governance) exist at the national level. As such, the persistent national differences in entry rates are often explained by differences in institutional barriers and possibilities to enter, i.e. regulations and registration definitions and procedures. The importance of the institutional framework is highlighted by the success of recent German subsidies stimulating self-employment (Bergmann and Sternberg, 2007). World Bank (2005) and Djankov et al. (2002) focus on high entry barriers caused by a high regulatory and administrative burden. However, following up on Blanchflower et al. (2001), Van Stel et al. (2006), conclude that it is mainly the minimum capital requirements to entry which holds nascent entrepreneurs back from actualizing their plans. In a reaction, Grilo and Irigoyen (2006) raise the question whether cross-country differences can be attributed to institutional barriers or to cultural variation. They

11 See www.gemconsortium.org. GEM's research methodology is described in Reynolds et al. (2005).

argue that national differences in new firm formation may also reflect cultural variations in the inclination to become an entrepreneur. According to Verheul et al. (2002), this cultural background is hard to influence, even on the longer term (see also Arenius and Minitti, 2005, p. 245). It is difficult to make a distinction between institutional context9 and cultural setting, because, after all, institutions are designed to safeguard societal and cultural norms and values. Institutions and culture are therefore not only strongly interconnected, but both are also very persistent over time (Hall and Soskice, 2001, p. 13).

Even if we could understand the determinants of cross-*country* variation in entrepreneurial activity, this still would neglect the well-documented variation in entrepreneurial activity across *regions*. For instance Ashcroft et al. (1991) found that regions matter and this was confirmed in the special issue on regional variations of new firm creation (Reynolds et al., 1994 in *Regional Studies Special Issue, 1994*). In explaining large variations in regional entry rates, regional differences in economic conditions, such as market size and market growth, immigration patterns and labour market opportunities have been found to be major determinants. However, the empirical evidence on the size, strength and direction of the effect of specific regional characteristics on entry rates, is rather weak or mixed.

Reviewing the empirical studies from the, 1990s onwards, Bosma et al. (2008c) argue that three main categories of regional determinants of new firm formation can be identified: demand and supply; agglomeration effects; and policy environment and culture. The first group relates to population growth, (expected) income and profitability on the demand side, which also includes local industry diversity and size structure (see Reynolds et al., 1995; Siegfried and Evans, 1994; Fotopoulos and Spence, 1999). On the supply side, evidence of the effect of the unemployment level on firm formation is not consistent (Storey, 1991). On the one hand, unemployment may increase self-employment levels, as people see no other option (e.g. Reynolds et al., 2002). On the other hand, high unemployment rates mirror unfavourable economic conditions, which may limit new entry (Grilo and Thurik, 2005). For instance, Fritsch (1992) has found that German regions with high start-up rates are characterized by low unemployment. Audretsch et al. (2008) account for the two effects (which they call the "refugee effect" and the "entrepreneurial effect" respectively) in a two-equation model and found evidence for both mechanisms. The size and structure of the local population and labour market, in terms of education levels, age, gender and ethnic origin also matters to firm formation (Audretsch and Fritsch, 1994a; Clark and Drinkwater, 1998). More recently, Lee et al. (2004) stress the positive effect of social relationships (social context, diversity and creativity among local residents) on new firm formation.

The second group of determinants of firm formation encompass agglomeration effects, e.g. regional or local consumer market opportunities and broad access to necessary resources, including (tacit) knowledge and a diversified and large labour market (Bosma et al., 2008c). Of course, a spatial concentration of firms may also have negative effects on firm formation, e.g. congestion and high land and input costs, including labour, caused by high competition. However, positive agglomeration effects still overrule the agglomeration diseconomies to (new) firms (Armington and Acs, 2002; Nyström, 2005). The agglomeration effect can be split up in localisation and urbanisation economies. Localisation economies arise when firms active within the same industry are located near each other. This spatial proximity of related firms stimulates specialized knowledge flows and access to tacit knowledge,

which, according to Nyström (2005), may even give rise to innovative firms. Urbanisation economies emerge from mere locating near other firms, regardless of their industry type. In these economic centres, firms benefit from the proximity to large and diversified customer (niche)markets and supplier inputs, a large, qualified and experienced labour force, and more general knowledge about markets and resources. In a recent empirical study on explanations of ICT firm growth, this customer and market orientation proved to be among the most important determinants (Lasch, 2007).

The third group of regional determinants of firm formation, policy environment and culture, encompasses local or regional authorities, whose tax and spending strategies may influence small and new firms. Sutaria and Hicks (2004) found regional differences in the supportiveness of local policy makers towards (small) business activity (see also Davidsson, 1995). Although cultural differences between regions may also play a role (according to Davidsson and Wiklund, 1997, they certainly do at the cross-national level), limited data on entrepreneurial culture at the regional level preclude empirical evidence so far.

In sum, many studies on regional differences in entrepreneurial activity provide convincing empirical evidence of important determinants. However, a link to supra-national regions or cross-country differences is missing, as most studies concentrate on analyzing regions within one county. Reynolds et al. (1994) made an important contribution here as the authors have compared national explanations of regional variations firm entry among countries. Although they did not analyse directly the entry rates among all regions in all countries, their meta-analysis succeeded in showing robust cross-national processes and explanations of regional start-up variation. From a comparative analysis of new firm formation in seven countries, the authors conclude that demand growth (both Gross Domestic Product and population), urbanization and an overrepresentation of small business and urbanization are strongly associated to a high regional entry rate.

Linkage between entrepreneurial attitudes and entrepreneurial activity

The relationship between entrepreneurial attitudes and entrepreneurial activity has mainly been studied at the national and at the individual level. For example, Arenius and Minniti (2005) and Tamásy (2006) establish a link between entrepreneurial attitude and activity using GEM data on the individual level. Grilo and Irigoyen (2006) use Eurobarometer data and conclude that, although entrepreneurial desires are fairly strong in many of the EU countries, entrepreneurial behaviour is still lagging behind – a conclusion that confirms the empirical evidence for the Netherlands (Bosma and Wennekers, 2004). Based on Eurobarometer data, Grilo and Thurik (2006) found that administrative complexities in several countries limit both willingness to become an entrepreneur and actual firm formation. Blanchflower et al. (2001) claim that, as regards institutional barriers to entry, national differences will be larger than regional variations. This may be correct, but as set out above, there are more determinants at play at the regional level than institutional barriers. Lowering the level of analysis from the country to the region has proven valuable in understanding nascent entrepreneurship and new firm formation. Local and regional characteristics do matter to entrepreneurial activity.

Tamásy (2006) recently focused on interregional differences in entrepreneurial activity (within Germany) and concludes that regions matter, even after controlling for personal

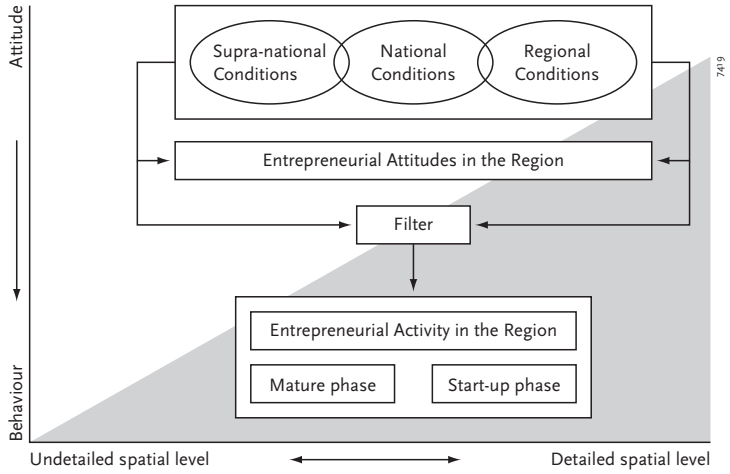


Figure 2.1 Relationships between entrepreneurial attitudes and entrepreneurial activity, covering different spatial levels

attributes. Regional variation influences entrepreneurial activity both directly and indirectly. The indirect effect, via entrepreneurial attitudes which strongly differ between German regions, is even stronger than the direct regional effect. It is shown that the regional effect on indicators of entrepreneurial attitude exceeds its effect on entrepreneurial activity. This can be due to selection bias, as the GEM questionnaire selects (nascent or new) entrepreneurs who are then inclined to agree strongly with the proposed statement on perceptions of one's own entrepreneurial skills[12]. Still, the significant regional effect on both entrepreneurial attitudes and activity is striking. In our view it demonstrates that irrespectively of individual attitudes and perceptions about entrepreneurship, regional forces are at play. In contrast with the abovementioned findings, Davidsson and Wiklund (1997) have found only limited empirical evidence of the effect of values and beliefs on regional firm formation rates. This may partly be due to their focus on general cultural explanations and indicators.

The 'natural' linkage between entrepreneurial attitudes and entrepreneurial activity may thus be distorted or strengthened by other forces. These forces can be at play both on the national level and on the regional level. National institutions, as described by Blanchflower et al. (2002), Djankov et al. (2006) and Van Stel et al. (2006) – or rather the perception of national institutions – may form a barrier for individuals to act on their entrepreneurial attitude and try to get a business started. Also at the regional level such forces may exist. Considering the evidence in Reynolds et al. (1994) and several other studies investigating the determinants of regional firm formation rates, several regional characteristics may invoke or deter entrepreneurial activity on top of the broad entrepreneurial culture or attitudes and national, institutional effects.

12 The author provided us with estimates for the model including region dummies but excluding three attitudinal variables, for which we are grateful. The region dummies indeed came out stronger in this regression.

Table 2.1 Explanations of spatial differences in entrepreneurial attitudes and entrepreneurial activity.

	Supra-national differences	**Cross-country differences**	**Interregional differences**
Entrepreneurial attitude	Explained by: - Geographical climate - Historically rooted culture ++	Explained by: - National economic growth indicators (consumer trust etc.) - Tax/welfare systems ++	Explained by: - Population growth & composition - Network environment +
Entrepreneurial activity		Explained by: - Entrepreneurial attitudes - Regulation, legislation - Institutional framework ++	Explained by: - Entrepreneurial attitudes - Urbanization economies (so called 'Marshal Arrow Romer externalities') - Regional policy programs - Industry structure ++

++: high relevance of spatial level for explaining differences in attitudes/activity
+: some relevance of spatial level for explaining differences in attitudes/activity

Summarising these arguments leads to Figure 2.1. Entrepreneurial attitudes at the regional level are determined by cultural influences from different spatial angles. At the supra-national level, influences like risk-avoidance may play a role. Furthermore, there are values at the national and regional levels influencing entrepreneurial attitudes. Based on the abovementioned arguments we hypothesise that entrepreneurial attitudes are linked to entrepreneurial activity, however this relationship is not clear-cut. The relationship is strengthened and/or 'distorted' by forces at the national and regional level. Inter-regional variation in entrepreneurial activity is expected to be higher than inter-regional variation in entrepreneurial attitude. Determinants explaining differences in entrepreneurial attitudes and entrepreneurial activity are listed in Table 2.1 for each spatial level. By mapping our regional indicators across eleven countries in Europe we reveal:

- Cultural patterns by looking at supra-national regions; considering Figure 2.1 and Table 2.1 this will mainly emerge from our figures on entrepreneurial attitudes;
- Institutional patterns by looking at differences between countries; these factors might affect both entrepreneurial attitude and activity;
- Urbanisation effects by examining population density and GDP at the regional level. These regional factors are expected to influence entrepreneurial activity more than entrepreneurial attitude.

2.3 Data and methodology

We use data from the Global Entrepreneurship Monitor (GEM) for creating indicators on regional entrepreneurial activity. Since, 1999 GEM provides *national* indicators on entrepreneurial activity for an increasing number of countries (see Reynolds et al., 2005;

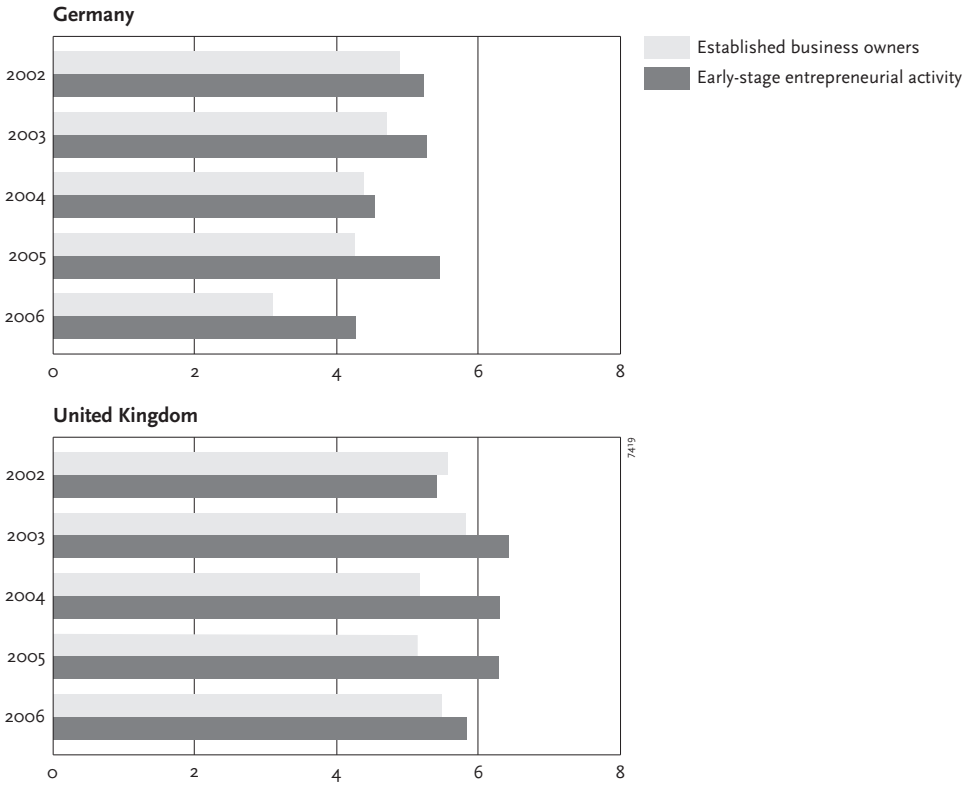


Figure 2.2 GEM evidence of persistency in differences in levels of entrepreneurial activity (Germany and United Kingdom, 2002-2006)

Bosma et al., 2008a). The indicators are based on telephone surveys among the adult population. One important finding of the GEM studies so far is that cross-country variation in early-stage entrepreneurial activity is very persistent over years. By merging 2001-2006 GEM data, we create *regional* indicators on entrepreneurial activity and attitudes that pertain to the 2001-2006 period. We believe that merging 2001-2006 data is justified since the existing evidence clearly points at the pervasiveness of regional differences in entrepreneurial attitudes and cultural values in general (Beugelsdijk et al., 2006). In addition, other regional measures of early-stage entrepreneurial activity seem to exhibit a large extent of path dependence (Parker, 2005). This is reinforced by the GEM evidence by looking at development over time on the national level. Figure 2.2 reflects rather stable levels of both early-stage entrepreneurial activity (around 5% for Germany, 6% for UK) and established business ownership rates. We use Germany and the UK as examples because they have the largest sample sizes over the years. The vertical bars in figure 2.2 represent 95 percent confidence intervals. This means that where vertical bars overlap from year to year, we cannot conclude differences to be statistically different. In displaying our maps in the results section, this can mean that some regions' estimated value may appear in a different category as the (unknown) actual value would have ended up. However, by using the approach of merging data for several years we increase the number of observations and

this seriously limits length of the confidence intervals and therefore also the probability of incorrect classifications. Nevertheless it is important to interpret the results in general patterns and not to focus on one particular region.

We have created indices for 125 regions in Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland and the United Kingdom. The selection of these countries is based on participation in GEM as we require GEM participation for at least three years in the 2001-2006 period. We use the Nuts1 spatial level for most countries. We use the Nuts2 level for Denmark, Finland, Italy, Spain and Sweden to provide for more spatial detail for those countries. Ideally the Nuts3 level would probably be the most relevant spatial level for studying differences in entrepreneurial activity, but the data availability limits us to do so. All regional indices were obtained after weighting each respondent according to regional age and gender structures as provided by Eurostat's regional database. From several maps and tables we explore cultural, institutional and urbanization effects relating to entrepreneurial activity and entrepreneurial attitudes.

The six regional indices provided in the chapter are described in Table 2.2. The measures link directly to the presupposed interdependencies as set out earlier in Figure 2.1. We have three distinct variables relating to entrepreneurial attitudes. Fear of failure relates to Hofstede's well-known risk-avoidance index, but in the GEM survey the question on which this measure is based specifically addresses risk avoidance to setting up a business. Differences are expected to be mainly of supra-national and national nature. Perceived opportunities in the region are of course relevant for the regional level but these perceptions are also bound to be linked to economic development and regulation at the national level. Our measure of self-efficacy is an individual assessment. Perceived knowledge and skills to set up a business can be linked to human capital and demographics. Since these differ across regions, also within countries, this measure will not only show variation between countries but also across regions – within countries.

Our two measures of entrepreneurial activity relate to different stages of entrepreneurship. Regional differences in entrepreneurial attitudes lead – ceteris paribus with respect to national and regional forces – to regional differences in the start-up phase: early-stage entrepreneurial activity. Our framework in Figure 2.1 presupposes that national forces will affect entrepreneurship in the process after start-up, leading to lower regional variation in the prevalence of established business ownership. Consistently with the framework and the GEM, 2007 Global Report (Bosma et al., 2008a), the three indicators on entrepreneurial attitudes are regional prevalence rates in the *non-entrepreneurially active* adult population between 18 and 64 years. For our analysis it is especially important to measure entrepreneurial perceptions for those who are not involved in entrepreneurial activity (early stage or mature stage). As can be expected, entrepreneurial attitudes are far more positive for those who have already opted for involvement in entrepreneurial activity.
Since our main focus is to present our data on entrepreneurial attitudes and entrepreneurial activity, we use maps to display our results. The maps on entrepreneurial attitudes are supported with empirical classifications of the regions, based on the three different measures of entrepreneurial attitudes. To this end we use straightforward (two-step) clustering methods. A similar exercise is applied for establishing a classification based on

Table 2.2 Regional entrepreneurship indicators uses in this study

Measure			
Variable	**Spatial Level**	**Description**	**Abbreviation**
Entrepreneurial attitudes			
Fear of failure	Supra-national & national	Fear of failure would prevent the respondent to set up a business; percentage of adult population 18-64 years	FEARFAIL
Opportunities	National & regional	Percentage of adult population 18-64 years perceiving good opportunities for start-ups in the area where they live	OPPORREG
Self-efficacy	Regional and national	Percentage of adult population 18-64 years claiming to have required knowledge and skills to start a firm	SUSKILLS
Entrepreneurial activity			
Early-stage entrepreneurial activity	Start-up phase; regional & national	Percentage of adult population 18-64 years Involved in either nascent entrepreneurial activity or young firms up to 3,5 years old	ESEA
Established business ownership	Mature phase; mainly national	Percentage of adult population 18-64 years involved in established business ownership – businesses have been operational for at least 3,5 years	EBO
Linking attitudes and activity Untapped entrepreneurial potential	Multiple levels	Percentage of adult population 18-64 years who (i) believe they have the required skills and knowledge to start a firm and (ii) believe there are good opportunities in their region to start a firm, but (iii) are currently not involved in any kind of entrepreneurial activity, nor do they expect to be involved in the near future.	ENTPOT

early-stage entrepreneurial activity, gross regional product (GRP) per capita and population density. Information on GRP per capita and population density is obtained from the ESRI database.

Our attempt to link entrepreneurial attitudes to entrepreneurial activity is conducted by using a newly constructed variable which we call 'untapped entrepreneurial potential'. Grilo and Thurik (2006) also an 'untapped entrepreneurial potential' measure using Eurobarometer data. Their definition differs from ours as it is based on the difference between the regional averages of actually involvement in entrepreneurship on the one hand, and preference to be self employed on the other. We start at the individual level and identify those respondents who reveal high entrepreneurial attitudes (i.e. self-efficacy and perceived opportunities) but are not involved in entrepreneurship, nor do they expect to be involved within the next three years. To stress the complexity of the relationship between attitudes and behaviour, a high value on untapped entrepreneurial attitude can mean different things:

- A culture with high entrepreneurial attitudes, but with institutions or regional characteristics that prevent people from starting or running their own business.

- A culture where setting up businesses is easy and part of normal life, partly due to limited competition. These regions are characterised by a high degree of small-scaled businesses and a large share of family businesses.
- A culture leading to low entrepreneurial attitudes but (due to national and regional forces) even lower levels of entrepreneurial activity.

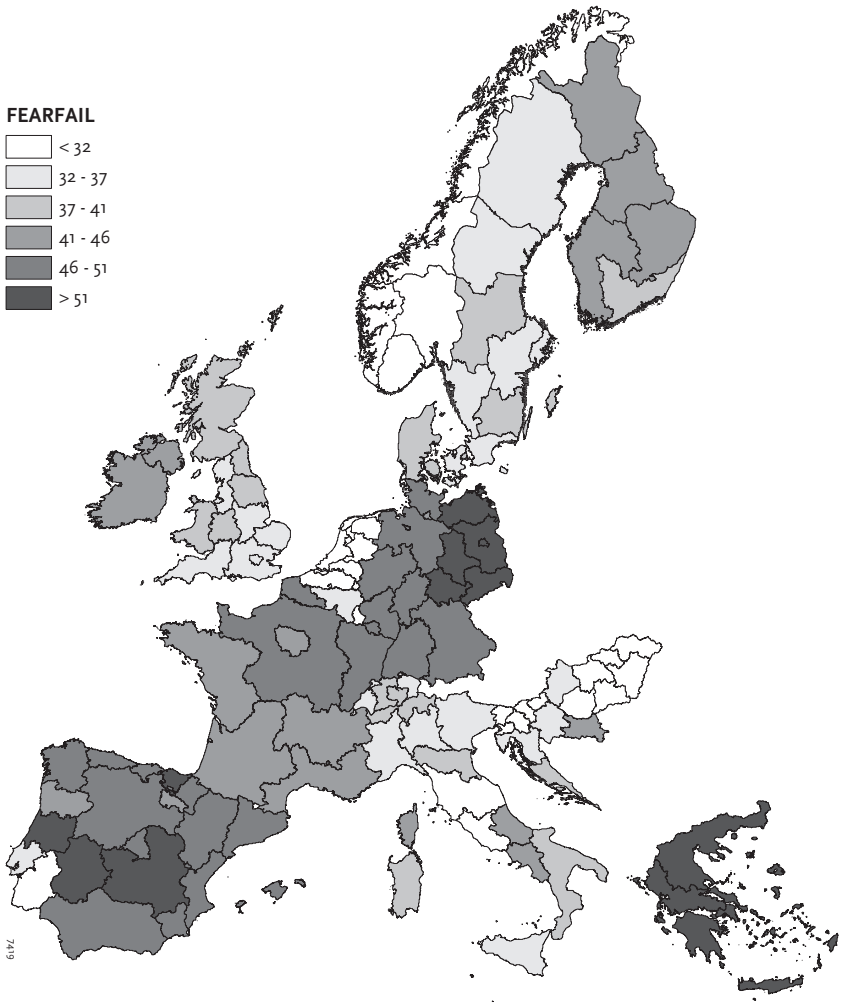
2.4 Results

Before presenting the spatial patterns of our measures of entrepreneurial attitudes and entrepreneurial activity, it is useful to examine their correlations to see whether our presupposed relationships are confirmed by the data (Table 2.3). As regards entrepreneurial attitudes, we see that the 'supra culture' variable, fear of failure, is negatively (but weakly) correlated with the national culture variable, proxied by perceived opportunities to start a business. The sign of this correlation coefficient makes sense; regions characterised by low levels of perceived opportunities to start a business are also more prone to exhibiting higher risk-avoidance. The self-efficacy variable, expected to provide differences at regional levels but also at the national level, is also correlated with perceived opportunities but not with fear of failure. Thus, the entrepreneurial attitude variables used in this study measure different aspects of entrepreneurial attitudes and seem to resemble the associations in Figure 2.1 fairly well, although it is not easy to see a clear spatial threshold between e.g. OPPORREG and SUSKILLS. Both have regional and national perspectives, but since SUSKILLS is directly related to the individual (and individuals make up for regional differences) we believe that the self-efficacy variable SUSKILLS is more important for identifying regional differences. The two indicators for phases of entrepreneurial activity are positively correlated: in general, regions with high degrees of early-stage entrepreneurial activity also have high levels of established business ownership. However, this is certainly not a clear-cut relationship as will be discussed further below. Early-stage entrepreneurial activity is strongly correlated with self-efficacy and weakly correlated with perceived opportunities. Established business ownership activity is strongly correlated with both. This provides initial evidence for the association between entrepreneurial attitudes and entrepreneurial activity at the regional level. The question remains *how* both measures are related. We will investigate this further in the remainder of this section by presenting and discussing the indicators using maps.

Table 2.3 Correlations between measures of entrepreneurial attitudes and entrepreneurial activity (125 European regions).

	OPPORREG	SUSKILLS	ESEA	EBO
FEARFAIL	-0.21 *	0.10	0.19 *	0.22 *
OPPORREG		0.22 *	0.13 *	0.35 **
SUSKILLS			0.40 **	0.44 **
ESEA				0.44 **

* p < 0.10. ** p < 0.05 (2-tailed).

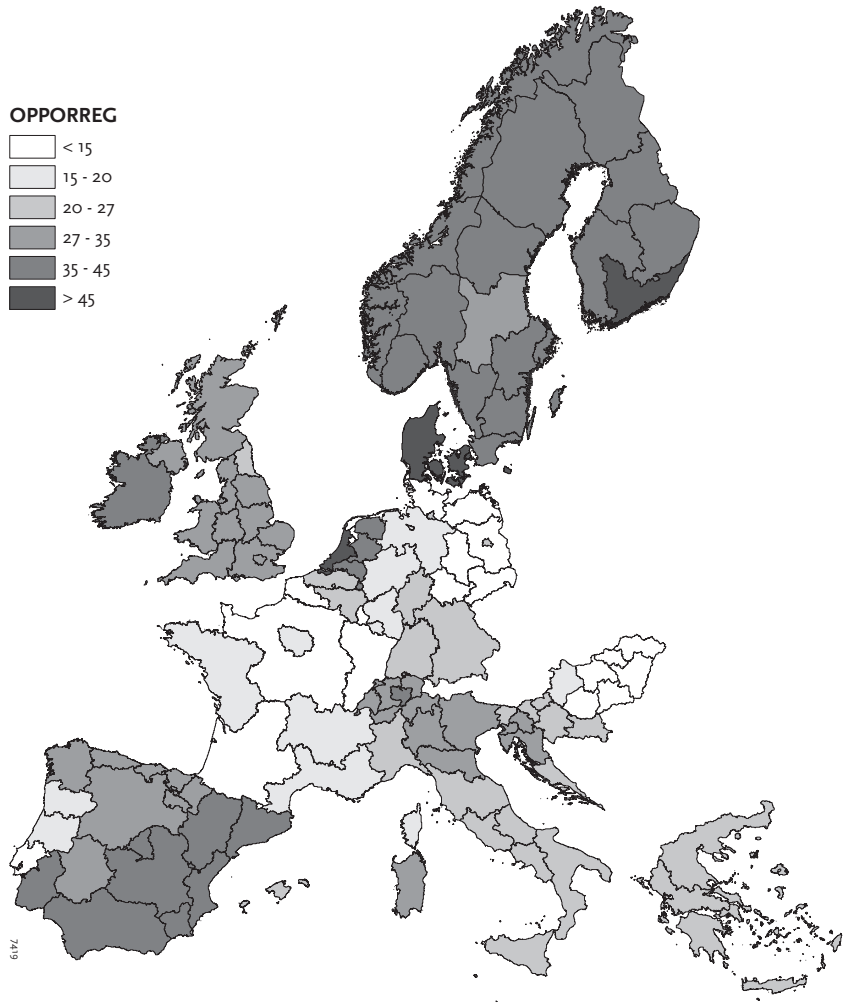


* All indices are prevalence rates covering the period 2001-2006 and expressed as percentages of population between 18-64 years. Note: Classifications are based on natural breaks, identifying 6 categories - Source: Global Entrepreneurship Monitor

Figure 2.3a: *"Fear of failure would prevent you from setting up a business".**

Entrepreneurial attitudes

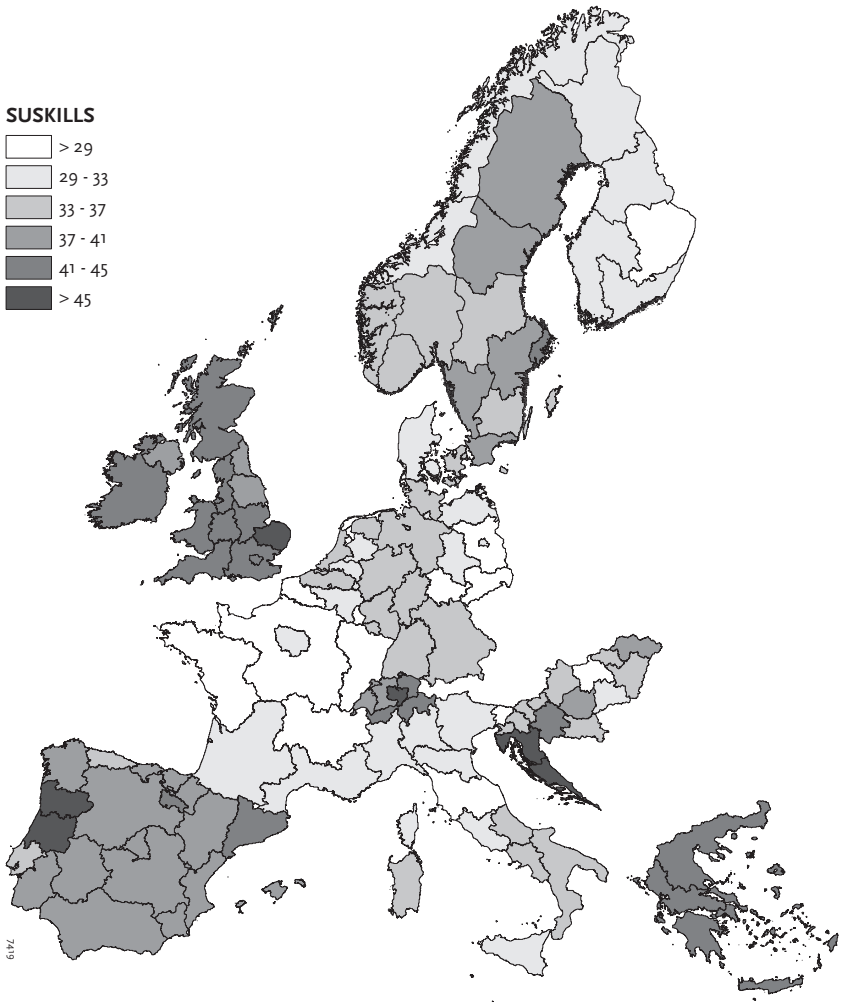
Our three variables measuring entrepreneurial attitudes are presented in Figure 2.3. As regards fear of failure (Figure 2.3a) we observe some cultural patterns at the supra-national level. We see for instance a linkage between France – especially the Northern and Central part – and Germany. Scandinavian countries, the United Kingdom, Belgium and the Netherlands exhibit lower levels of fear of failure. This group of countries also demonstrates fairly high perceived opportunities (Figure 2.3b) and perceived capabilities (Figure 2.3c) for starting a business, although there are regional differences. The idea that perceived opportunities and perceived skills need not go together is demonstrated in Hungary, where perceived opportunities are low in all regions but a large regional variation exists as regards perceived skills.



* All indices are prevalence rates covering the period 2001-2006 and expressed as percentages of population between 18-64 years. Note: Classifications are based on natural breaks, identifying 6 categories - Source: Global Entrepreneurship Monitor

Figure 2.3b: *"There are good opportunities to start a business in the area where you live".**

A general regional classification is confirmed in a cluster analysis based on the three attitude variables. The clustering results in three groups that are supra-national in nature but where national borders are clearly relevant (see Table 2.4). The first group including Germany and France, as well as most regions in Eastern Europe have more negative attitudes to entrepreneurship. This is different for the two other groups, between which the main difference lies in the attitude towards failure. This is relatively low in the "North-West" of Europe and relatively high in the South of Europe. The UK and Ireland are included in the third group with higher fear of failure but are close to the second group. All in all fear of failure seems to be a relevant measure identifying entrepreneurial culture beyond the national level. Yet the question remains if this component of entrepreneurial attitudes affects entrepreneurial activity; if so one would expect a negative correlation between fear of



* All indices are prevalence rates covering the period 2001-2006 and expressed as percentages of population between 18-64 years. Note: Classifications are based on natural breaks, identifying 6 categories - Source: Global Entrepreneurship Monitor

Figure 2.3c: *"You have the required skills and knowledge to start business".**

failure and entrepreneurial activity. However Table 2.3 reveals this is not supported by the data we use.

Entrepreneurial activity

Figure 2.4a sets out early-stage entrepreneurial activity (ESEA) rates per region. ESEA measures the percentage in the adult population who are either involved in a start-up attempt or owner-manager of a young business. Our results clearly point at the importance of distinguishing regions for exploring early-stage entrepreneurial activity. We observe that for most countries this percentage is highest in dense areas such as London, Madrid, Catalunya (Barcelona), Berlin, Hamburg, Bavaria (Munich), Copenhagen, Stockholm, Brussels, Paris and the Western part of the Netherlands (Amsterdam, Rotterdam and The

Table 2.4 Classifying European regions in groups based on entrepreneurial attitudes

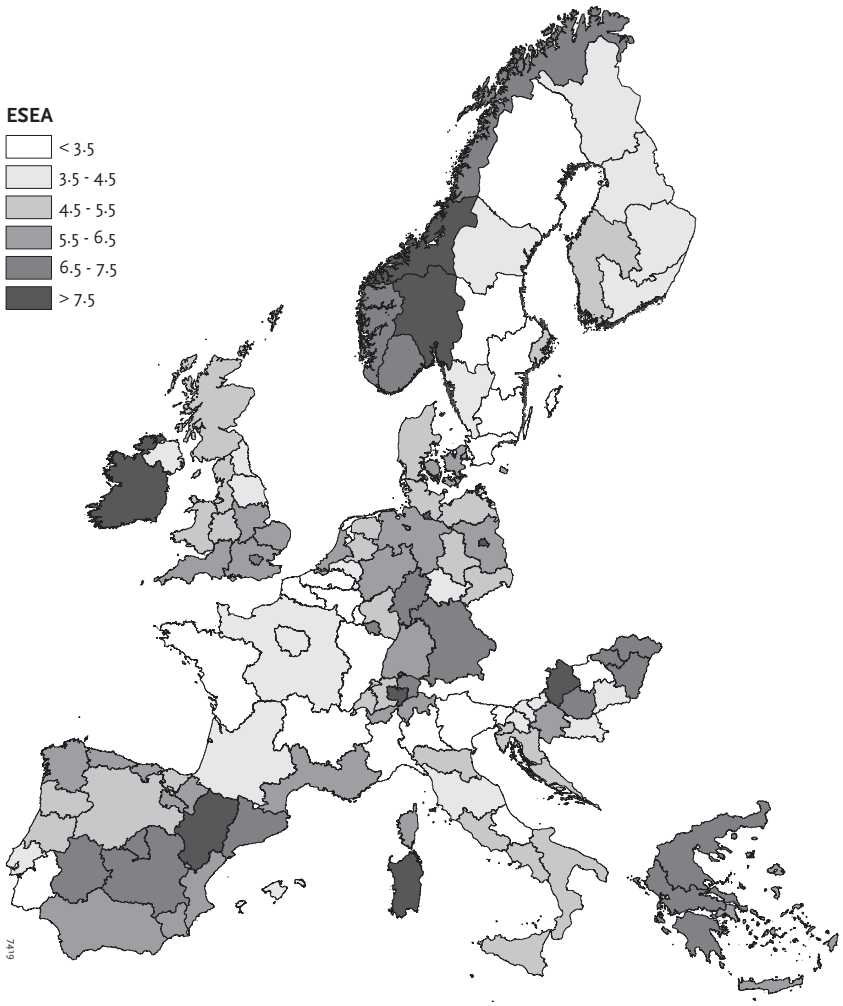
Cluster characterisation	Fear of failure	Perceived opportunities	Self-efficacy
1. Central Europe & Italy (n=50) - All Regions in Belgium (except Brussels) Germany, France, Hungary and Italy and Slovenia (except Dolenjsaka); Ita-Suomi (FI), Slavonija (HR), Lisboa e Vale de Tejo (PT), North-East (UK)	High	Low	Low
2. Scandinavia and North-West Europe (n=31) - All regions Denmark, Finland (except Ita-Suomi), Netherlands, Norway, Sweden; Brussels (BE), Lombardia and Nord-Est (IT), Alentejo (PT), Dolenjsaka (SI)	Low	High	Middle
3. Anglo-Swiss & Southern Europe (n=44) - All Regions in Croatia (except Slavonija), Greece, Spain, Switzerland and UK (except North-East); Ireland.	Middle	High	High

Hague). Next to population density there may, as discussed with Figure 2.1, also be other regional forces affecting regional levels of early-stage entrepreneurial activity. As an initial exercise, we capture these in a variable measuring the stage of economic development and proxy this by regional levels of GDP per capita (this variable reflects both national and regional forces). However, in addition we do distinguish a more explicit regional force which is the population density. A cluster analysis on variables ESEA, population density and economic development on all 125 regions identifies four groups (Table 2.5). It makes clear that high levels of ESEA need not go together with high levels of urbanization (let alone high levels of GDP per capita). Put differently, a region exhibiting a high degree of early-stage entrepreneurial activity is not necessarily a well-developing region.

Figure 2.4b reflects the second indicator of entrepreneurial activity; established business ownership. From this map it is obvious that the regional variation is much less significant. National forces appear to be dominant here as the significance of the variation between countries (as compared to variation within countries) is much larger for established business ownership (F-value: 21.9) than for early-stage entrepreneurship (F-value 7.4).

Links between entrepreneurial attitudes and entrepreneurial activity

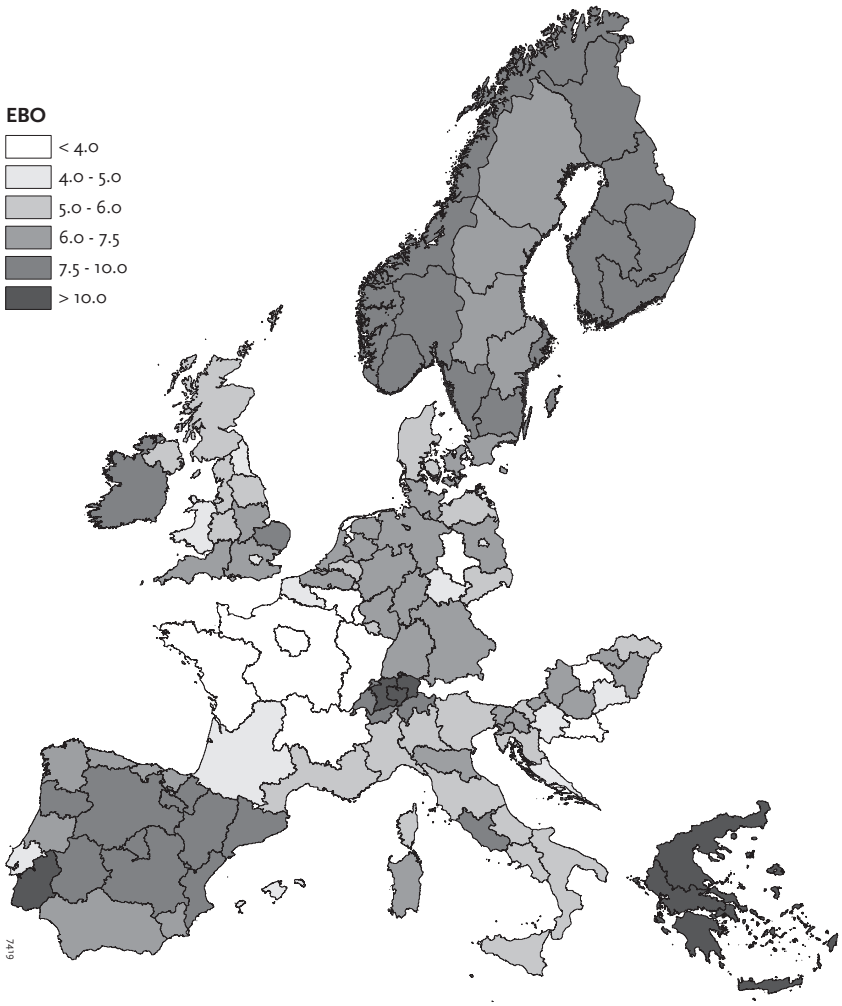
Our measure on untapped entrepreneurial activity is mapped in Figure 2.4c. Some national differences immediately surface. Sweden is an example of a regime with high rates reflecting high opportunity costs: attitudes are fairly high, but activity is lagging behind (probably as a result of the Swedish welfare system being far more generous to employees in comparison to self-employed; Henrekson, 2006). Spain also exhibits high values in untapped entrepreneurial potential but the additional evidence from Bosma and Schutjens (2007) suggests that Spain seems to be an example of a country with relatively low competition and low opportunity costs. There are high levels of perceived opportunities and perceived skills, but the regions are generally not exhibiting high potential new firms (and unemployment rates in Spain have also been high during 2001-2005). In comparison



* All indices are prevalence rates covering the period 2001-2006 and expressed as percentages of population between 18-64 years. Note: Classifications are based on natural breaks, identifying 6 categories Source: Global Entrepreneurship Monitor

Figure 2.4a: *Early-stage entrepreneurial activity (ESEA)**

to Sweden, Spain also has a higher fear of failure rate. The low untapped entrepreneurial activity in France is primarily caused by negative attitudes to entrepreneurship. We also observe regional differences in figure 2.4c. For instance, the region of Bavaria (Munich area) has, compared to the rest of Germany, higher untapped potential. This is because of positive attitudes in the region. From figure 2.4a it was already observed that Bavaria is performing well on early-stage entrepreneurial activity. Also in Finland there seems to be a clear distinction between the South (Helsinki area) and the East when it comes to untapped entrepreneurial potential. Here the South of Finland exhibits more positive attitudes to entrepreneurship and relates to Sweden.

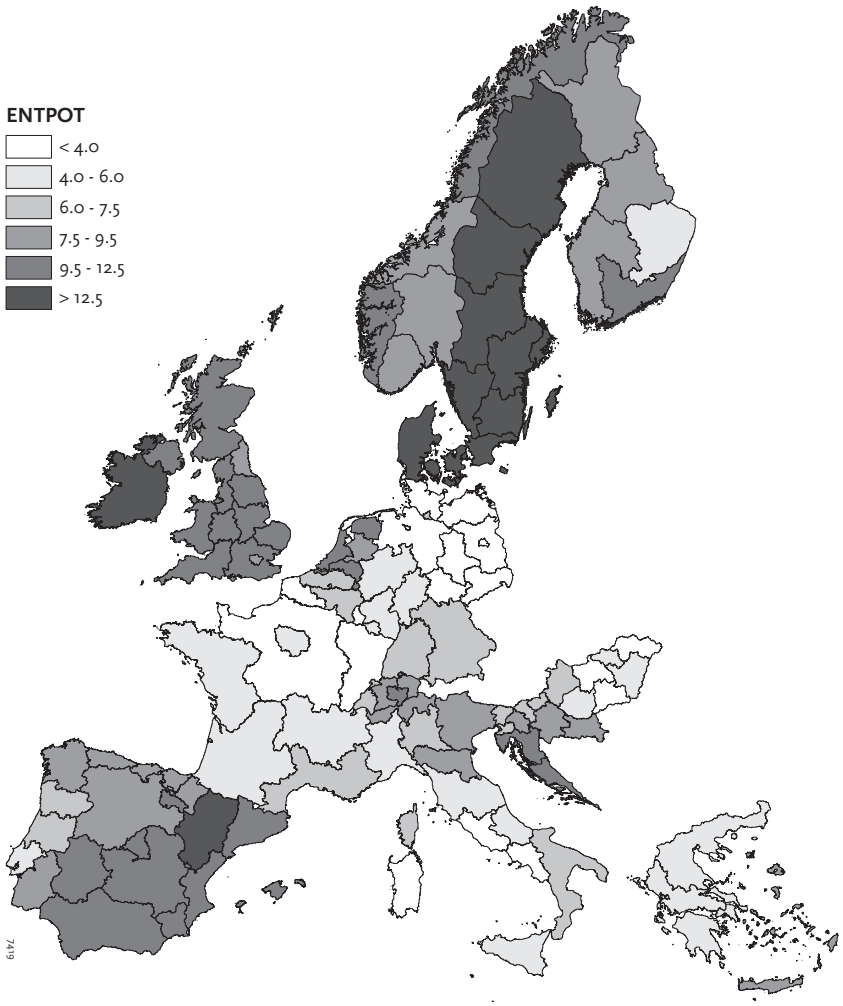


* All indices are prevalence rates covering the period 2001-2006 and expressed as percentages of population between 18-64 years. Note: Classifications are based on natural breaks, identifying 6 categories Source: Global Entrepreneurship Monitor

Figure 2.4b: *Established business ownership (EBO) rates**

2.5 Discussion

Since this chapter focuses on mapping entrepreneurial attitudes and entrepreneurial activity and we have not included sufficient data on potential national and regional forces, we can at this point only hint at how observed differences are caused by national and regional forces. As regards early-stage entrepreneurial activity at the national level, we see Belgium, France and Sweden underperforming. This may be related to the effect of institutions hindering early-stage entrepreneurial activity, such as the administrative burden attached to setting up a firm (see Djankov et al., 2002), the degree of employment protection and union power (Worldbank, 2005), or the minimum capital requirements (Van Stel et al., 2006). And while regulation may actually have improved, i.e. administrative burdens may



* All indices are prevalence rates covering the period 2001-2006 and expressed as percentages of population between 18-64 years. Note: Classifications are based on natural breaks, identifying 6 categories Source: Global Entrepreneurship Monitor

Figure 2.4c: *'Untapped' entrepeneurial potential (ENTPOT)**

have diminished and for instance the degree of employment flexibility in France may have begun to increase, it is the *perception* to these burdens that fuel entrepreneurial attitudes and as such really matter for establishing entrepreneurial behaviour. Clearly there is much potential for further investigation into this research area by lowering the spatial level from national to regional analysis.

We found support for the existing evidence on the importance of urbanization for (early-stage) entrepreneurship (e.g. Armington and Acs, 2002). In addition to population density, regional forces may have to do with specific regional policy regulations. In Italy for instance, regions in the south (such as Campania, Sicilia and Sardinia) have many policies aimed at start-ups, especially in terms of grants and loans – these were put into place

Table 2.5 Classifying European regions in groups based on early-stage entrepreneurial activity, population density and GDP per capita

Cluster characterisation	ESEA	Population density	GRP per capita
1.Urbanized, high income areas (n=13) - Copenhagen, Brussels, Bremen, Hamburg, Berlin, London, Merseyside (UK), Centre (SW); Ireland; Norway regions (except North)	High	Middle – High	High
2. Non-urbanized, lower ESEA (n=47) - Regions in Belgium, Finland (East & North), Croatia (North-West & Slavonija), Germany (East), France (except Paris, Mediterranean), Germany (M-Vorpommern, Sachsen, Sachsen-Anhalt, Thüringen), Hungary (Central Transnubd. & Southern Great Plain), Italy (except Emilia-Romagna & Lazio), Portugal (except Centro), Spain (Baleares), Sweden (except Stockholm), Slovenia, UK (North-East, Northern Ireland, Humberside).	Low	Low	Middle
3. Non-urbanized, higher income (n=36) - Regions in Denmark, Germany (West), Finland, France (Paris), Italy (Emilia-Romagna & Lazio), Netherlands, Spain (Pais Vasco & Navarra), Norway (North), Sweden (Stockholm), Switzerland, UK (except North-East, Northern Ireland, Humberside).	Middle	Low	High
4. Non-urbanized, lower income, higher ESEA (n=29) - Regions in Croatia (Dalmatia, Central-North), Germany (Brandenburg, Saarland), Greece, Hungary (except Central Transnubd. & Southern Great Plain), Italy (Sardegna), Spain (except Pais Vasco, Navarra, Baleares), Portugal (Centro)	High	Low	Low

after the closures of some multinational plants (e.g. Fiat) in the, 1980s. Also in Germany different schemes exist (Sternberg, 2005, Bergmann and Sternberg, 2007). Another important regional feature is migration – immigrants generally exhibit higher prevalence in entrepreneurship (e.g. Reynolds et al., 2004, Levie, 2007 for examples in the United States and the United Kingdom respectively). These factors, as well as others discussed in the present chapter, need to be taken into account within an appropriate multivariate framework before any judgements is made on determinants of entrepreneurial activity at the regional level – and the importance of perceptions/attitudes to entrepreneurship in this. Still, the provided maps and the initial linkage with GRP per capita and population density already uncover interesting patterns in entrepreneurship prevalence rates, at different spatial levels. The finding that high levels of ESEA need not go together with high levels of GRP per capita is consistent with the evidence of a U-shaped relationship between GDP per capita and ESEA at the national level (see Carree et al., 2002 for evidence using self-employment data; Bosma et al., 2008a using GEM data). Our initial descriptive analysis

thus confirms the importance of acknowledging regional differences on top of this general U-shaped relationship.

From our results it seems that established business ownership rates, which can be seen as an indicator measuring the potential for businesses to be sustainable, are especially affected by national determinants. Regions or nations with high rates of established entrepreneurship may find themselves anywhere between two extreme regimes: (i) institutions may provide good guidance for people setting up a firm, leading to high rates of established businesses within a competitive environment (regimes with high opportunity costs to entrepreneurship); and (ii) there is limited competition in the region leading to relatively high numbers of sustaining but low-potential firms (regimes with lower opportunity costs to entrepreneurship). For the former group we expect that high rates of established entrepreneurship would go together with high degrees of (expected) new product-market combination. For the latter we would expect high established entrepreneurship rates combined with low degrees of *ambitious* entrepreneurial activity. GEM provides a measure on the expected degree of ambitious entrepreneurship (in terms of expected innovation and/or job growth) by those people involved in ESEA (see Bosma and Schutjens, 2007). When we categorise the regions in groups on the variables EBO and ambitious ESEA, also using cluster analysis, it turns out that, 19 of the 29 regions belonging to the final group in Table 2.5 also belong to the group characterised by high EBO rates and low ambitious entrepreneurship rates. These include many regions in Greece, Hungary and Spain, as well as the Centro region in Portugal[13].

2.6 Conclusion

This chapter contributes to field of entrepreneurship studies by presenting harmonised entrepreneurship data over European regions *and* countries. By mapping patterns in entrepreneurial activity and entrepreneurial attitudes for regions, countries and supra-national areas we are able to explore (possible) influences of urbanization, institutions and culture. Although we only performed some initial analysis on our regional entrepreneurship indices, the emerging patterns reveal some interesting topics for more in-dept research. An important message from our preliminary analysis of the data is that high degrees of entrepreneurial activity in the region do not necessarily relate to well-developed or well-developing regional economies. The underlying mechanism may go beyond the necessity/opportunity divide as measured in GEM. Our regional indices suggest that entrepreneurial activity may be high in both highly competitive environments (in many cases characterised by agglomeration economies) and in lower competitive environments. The latter regional regimes may or may not exhibit positive entrepreneurial attitudes. Entrepreneurial attitudes may be positive from the economic perspective but also because of the habitual function entrepreneurship may have in the region. This especially seems to divide the northern part of Europe from the southern part.

Within countries, it is clearly the dynamic high-density areas that exhibit higher degrees of early-stage entrepreneurial activity paired with higher levels of GDP. There is clearly less

13 Results are not reported here but available on request.

of a regional pattern in the prevalence of established business ownership. Our results thus suggest that, as started businesses progress and mature, they will be affected more and more by the national institutions. Put differently, the first step of setting up a business is a matter of regional conditions and is affected less by national institutions. However, in next phases of entrepreneurship, such as survival and growth, national conditions gain in importance.

The newly constructed Untapped Entrepreneurial Potential index is unique in that it combines entrepreneurial attitudes and behaviour which makes it highly relevant for policy makers. In adopting a regional approach, we also circumvent the problem of selectivity biases when linking entrepreneurial attitudes to entrepreneurial behaviour on the individual level in a cross-section design; we constructed regional indices on entrepreneurial attitudes only for the people who were *not* involved in entrepreneurial activity.

We should note that using the GEM data for constructing regional indices on entrepreneurship has three main drawbacks. First, our indices are based on surveys rather than count data and therefore our indices are statistical estimates. In this, larger samples imply smaller confidence intervals. This is the reason to merge data into a five-year period rather than presenting the data for single years, which can be considered as a second drawback. However, we argue that the existing evidence in entrepreneurship literature on the pervasiveness of regional differences in early-stage entrepreneurship justifies our approach. Nevertheless, for analysing our indices one should focus on regional patterns rather than the outcomes of specific regions.

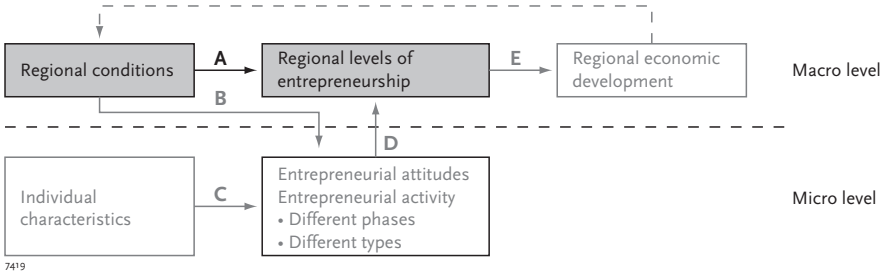
Second, we should also note that the spatial level we distinguish in these maps is not always comparable. For example, the Helsinki area is much wider than the Stockholm area, therefore urban effects are more pronounced in the latter. Also, it is conceivable that breaking the Nuts 1 regions further down into smaller regions would probably lead to even more spatial differences in entrepreneurial activity rates. Since we are using survey data we can only use a classification for which a sufficient sample size is warranted. This limits us in conducting tests as to which spatial level is the most relevant.

And finally, it should also be noted that our indices, as most measures on entrepreneurial activity, assume some kind of independent new business activities. Of course, it is perfectly conceivable that regions or countries with low business dynamics have many employees pursuing activities that can be considered as entrepreneurial – these are also known as *intrapreneurs* as discussed by e.g. Wennekers and Thurik (1999). It is still unclear what the contribution of these intrapreneurs is for economic development and whether a conversion from intrapreneurship to entrepreneurship would lead to additional growth. In the set-up of our study we can unfortunately, like almost any other study, not measure intrapreneurship. However, from a conceptual point of view it is clear that the forces deterring people to become entrepreneurs are very similar, whether the individual is currently 'intrapreneur' or someone who can be considered as 'untapped entrepreneurial potential'. In fact, we consider intrapreneurs as a subset of the group we indicate as untapped entrepreneurial since it is more than likely that genuine intrapreneurs will claim to have the required skills to start a business and see opportunities for doing so in the region. Measuring the size and

contribution of intrapreneurship (next to 'independent' entrepreneurship) is probably one of the main challenges in entrepreneurship research for the next decade.

3

Determinants of Early-stage Entrepreneurial Activity in European Regions; Distinguishing Low- and High-ambition Entrepreneurship[14]



3.1 Introduction

Entrepreneurship has received increasing attention during the past three decades and has been shown to be one of the engines of regional economic growth (Acs et al., 2003; Audretsch and Keilbach, 2004a; Wennekers, 2006). Theoretically, entrepreneurship and new-firm formation contribute to economic growth in at least three ways. First, in the Schumpeterian vocabulary, a direct economic effect results from the fact that entrepreneurs themselves are the people making *Neue Kombinationen* of products and markets (Schumpeter, 1934; 1942). Schumpeter regarded an entrepreneur as '...a master innovator, as a force behind economic development' (Etzioni, 1987, p. 177). Among the many other scholars who have defined entrepreneurship, ranging from Marshall's 'coordinator of economic resources' in 1890 to Casson's 'decision maker' (see Van Praag, 1999 for an overview), Schumpeter stood out in stressing that innovativeness is the key characteristic of an entrepreneur. This type of entrepreneur introduces new products, new processes, new market applicants, and new organization structures. Innovative entrepreneurship fuels the productivity growth of individual firms and, at a higher level, regional economic development. A second direct effect of entrepreneurship relates to employment creation. In particular, gazelles (rapidly-growing firms) that succeed in combining resources and opportunities fuel employment growth (Henrekson and Johansson, 2008). Many of these gazelles turn out to be young firms that grow more organically than older gazelles (Henrekson and Johansson, 2008, p. 11). Finally, a third, more indirect, effect of

14 This chapter is based on Bosma, N.S. and V.A.J.M. Schutjens (2009), "Determinants of early-stage entrepreneurial activity in European regions; Distinguishing low and high ambition entrepreneurship" in: Smallbone D., Landstrom H. and Jones Evans D. (eds) 'Making the Difference in Local, Regional and National Economies: Frontiers in European Entrepreneurship Research', Edward Elgar, forthcoming.

entrepreneurship on economic growth relates to the competition effect of new market entry, leading to the passive and active learning of incumbents, and eventually to an increase of productivity.

In conceptualizing the economic effects of new-firm formation, a key notion is *entrepreneurial variety*. Not all firms can be characterized as truly 'entrepreneurial' (Wennekers and Thurik, 1999) and entrepreneurial activities in the region, shaped by institutions forming the rules of the game, need not be 'productive' (Baumol, 1990). In reality, many new firms walk along well-trodden paths and can be regarded as imitators rather than innovators (Schutjens and Wever, 2000). Setting up a new firm is a risky business, and playing safe by entering familiar markets with familiar products can at least lift the burden of uncertainty to some extent. Although even imitators are necessary for knowledge diffusion, market expansion, and industry development, the stimulation of the genuine entrepreneurial pioneers in innovation and growth presumably has the largest multiplier effect in the regional economy (Carree and Thurik, 2003). It seems that, in the regional economy, not only the level, but also the type of entrepreneurship matters, especially its quality (in surviving) and potential (in growth and innovative productivity). In our view, the distinction between high- and low-ambition entrepreneurship is the key to recent propositions of the role of *entrepreneurship capital* (Audretsch et al., 2006) or entrepreneurship as the *knowledge filter* (Acs et al., 2003) in fuelling economic growth. However, in seeking empirical support for this, measurements of entrepreneurship have been used that also include non-ambitious entrepreneurs; while a large share of these can, in economic terms, be considered as labour or at most resemble managerial business owners with a limited distinctive impact on growth. Positive exceptions to this supposition are studies focusing on entrepreneurship in specific sectors.

Because of their (alleged) relatively large direct economic effects, we focus on innovation- and growth-oriented-entrepreneurship in this chapter. Following Davidsson et al. (2006), we argue that the firm's growth and innovative potential are both strongly determined by the aspirations and expectations of the entrepreneurs at the time of start-up. As argued above, most new entrepreneurs have low growth ambitions, show satisfying behaviour in running a firm (small business ownership, shop keeping or refugee firms), which is reflected in the relatively low survival or growth rates of new firms. But many people who start off with high ambitions about future growth and innovation eventually turn their young business into a gazelle in terms of the number of employees (Birch, 1979) or into a really innovative business. Wong et al. (2005) came up with empirical evidence that high-growth-oriented early-stage entrepreneurial activity significantly stimulated GDP growth per worker, while overall early-stage entrepreneurial activity did not. With respect to employment effects, Autio (2007) showed that nascent and new firms with high job-growth ambitions (10 percent of the sample) accounted for 80 percent of the total expected job creation. This is in line with the findings of Wiklund (2006), who stated that firm performance depends on entrepreneurial strategy, which can be captured by a company's entrepreneurial orientation measured by innovation, proactiveness, and risk taking.

It has been shown that most explanations of the differences in entrepreneurship rates can be found at the sub-national level rather than at the national level (Reynolds et al., 1994; Sternberg, 2000; Tamásy, 2006; Bosma and Schutjens, 2009b). Furthermore,

there is empirical evidence of regional differences in growth- and innovation-oriented entrepreneurship (Bosma and Schutjens, 2007). What we undertake is the study of regional prevalence rates of ambitious early-stage entrepreneurial activity, identified at the individual level, in a similar fashion to that of Wong et al. (2005) at the national level. However, where Wong et al. focused on economic effects in linking prevalence rates to economic growth, we investigate the determinants of regional variation in ambitious entrepreneurship.

In this chapter, we report our analysis of whether some regions perform better than others in innovative and growth-oriented entrepreneurship, and whether the regional pattern of ambitious (new) entrepreneurship in Europe differs from the pattern of non-ambitious entrepreneurship. Furthermore, in the search for underlying processes, we describe our investigation of the potential determinants of the regional patterns of both non-ambitious and ambitious entrepreneurship. Since we have included factors at both the regional and the national level, this is a multilevel exercise. Studying the determinants of both non-ambitious and ambitious entrepreneurship over regions and countries has enabled us to separate out *specific regional attributes* (for example market opportunities), *regional demography effects* (an overrepresentation of groups of individuals with high entrepreneurial and/or ambitious personalities), and an *institutional component* consisting of informal institutions (culture, values, norms) and formal institutions (rules, laws, regulations) (North, 1990). The results are relevant to policymakers in two ways. First, a high prevalence of current innovative- and high-growth-oriented early-stage entrepreneurs may in the near future boost employment growth or innovation at the firm level; and economic growth at the regional level (Autio et al., 2007). Second, the outcomes provide insights into which spatial levels of intervention and which specific policy instruments could be most effective to stimulating promising entrepreneurial activities.

In the next section, we review the literature on explanations of regional variations in entrepreneurship and, more specifically, ambitious entrepreneurship. We then attend to the data and methodology we use for obtaining measures of ambitious entrepreneurial activity in European regions. Based on entrepreneurship rates calculated from over 400,000 individual observations from the Global Entrepreneurship Monitor (GEM), we show regional patterns of people's involvement in different types of early-stage entrepreneurial activity in 125 (mainly) Nuts1 regions in 18 European countries. In the following section, we explain regional variation in four different types of entrepreneurship. In the last section, we discuss our findings and put forward our conclusions.

3.2 Explaining regional differences in entrepreneurship – a literature review with a focus on ambitious entrepreneurship

The literature on explaining differences in regional entrepreneurship rates – albeit low- or high-level-ambitious entrepreneurship – shows that underlying processes operate at different analytical levels (Schutjens and Wever, 2000). Since the basic decision to start a firm lies within the individual, the event of taking this step depends highly on the balance between economic opportunities and individual values, preferences, personality, and capabilities (Frank et al., 2007). At the regional level, for instance, the local availability of (mainly cheap) business premises, regional market perspectives, employment possibilities,

competition structure, and accessibility may affect personal opportunities. Also at the regional level, the population composition influences firm entry as an aggregate of individual entrepreneurial capabilities and personal attitudes towards entrepreneurship. At a higher level, both analytically and spatially, sociocultural values and attitudes towards firm ownership or even national regulatory impediments matter in individual values and assessments of capabilities and opportunities. As a consequence, regional differences in entrepreneurship may be the effect of a specific *regional economic attributes* (for example job or market opportunities), a *regional demography component* (an overrepresentation of groups of individuals with high entrepreneurial spirits or actual entrepreneurial behaviour), or an *institutional component* encompassing informal (national or regional values concerning self-employment) and formal (national or regional regulations to employment protection, tax policies) factors.

Regional economic attributes

At the regional level, specific opportunity-related factors may enhance or limit entrepreneurship rates. In the view of traditional industrial economists, the carrying capacity of the market indicates whether there is any room left for new firms. Market entry and exit arise from the confrontation of supply and demand. The industry structure involved plays an important role here, especially with respect to firm size, innovativeness, competition, and job opportunities. Market concentration (Tödtling and Wanzenböck, 2003), a high share of small and medium-sized firms (Fritsch, 1992), and entry or exit barriers affect new-firm entrance negatively. It has also been asserted that turbulent and high-growth industrial sectors generate more innovative start-ups than mature industries do (Schumpeter, 1942). A negative relationship exists between high shares of alternative job opportunities and entrepreneurship. On the demand side, market potential and market growth, together with GDP change, influence firm formation. Market conditions at both national and regional levels influence entrepreneurial activity; good market opportunities will trigger new entrepreneurs. Originally based on the urban-incubator hypothesis, the large market potential in terms of both customers and suppliers and high knowledge intensity are important benefits for potential entrepreneurs (Tödtling and Wanzenböck, 2003). With respect to agglomeration economies, the current debate is whether the presence of similar or different firm types stimulates new-firm formation (localization and urbanization effects respectively) (Fotopoulos and Louri, 2000, Rocha and Sternberg, 2005). Regional unemployment rates may also affect start-up rates because, for the unemployed, the opportunity costs of self-employment are relatively low.

The regional demography component

Since starting a firm is an individual decision, individual characteristics are important determinants of new firm formation. Many scholars in the field of entrepreneurship therefore use the labour-market approach rather than the business-stock perspective when explaining regional rates of entry (Bosma et al., 2008c). Since, in the latter perspective, entrepreneurship or firm formation rates are calculated as a percentage of the existing business stock, it is assumed that the characteristics of the incumbent firms, such as numbers or average firm size, underlie firm formation. In contrast, the labour-market approach, in which the rate of new firms is measured with labour market size as the denominator, emphasizes that individual decisions depend on personal characteristics or – at a regional level – on population structure (Santarelli and Vivarelli, 2007). According to

this labour-market approach to firm formation (Koster, 2007), age structure, gender, and the education structure of the population play a central role in explaining firm-formation rates (Delmar and Davidsson, 2000). In their study of the effects of social capital on new firms, Liao and Welsch (2003) stress that, in the early firm-formation stage, obtaining access to resources is crucial and that social capital "..can be a substitute for other resources.." (p.152). A relatively recent, but well-received contribution to this view is the work of Florida (Lee et al., 2004), pointing to the positive effect of a creative class on entrepreneurship and especially new firm formation.

An institutional component

With regard to *informal* institutions, there is a widely-held view that entrepreneurial perceptions precede entrepreneurial activity (see for example Arenius and Minniti, 2005; Freytag and Thurik, 2007). For instance, in the GEM Conceptual model used to guide the GEM data collection, entrepreneurial perceptions – in particular perceived opportunities and perceived capabilities – are thought to be intermediate states between entrepreneurial framework conditions (EFCs) and entrepreneurial activity[15]. Levie and Autio (2008) describe these relationships at length and test the impact of one of these entrepreneurial framework conditions: entrepreneurship education and training. For high-income countries, they find that there is a positive link between the EFC on higher entrepreneurship education and the perceived opportunities to start a business, controlling for other relevant factors[16]. They also find a positive link between perceived opportunities and early-stage entrepreneurial activity – overall as well as high-growth-oriented early-stage entrepreneurial activity – and that perceived opportunities are moderating the effect of higher education on entrepreneurial activity. Freytag and Thurik (2007) did not find any direct link between measures of national entrepreneurial culture and entrepreneurial activity, even though the relationship between them was statistically significant. A possible explanation is the spatial level applied in their work. Attitudes to entrepreneurship may, as discussed above, differ within countries and therefore impact on entrepreneurial activity at the regional level rather than the national level.

At the regional level, a positive relationship indeed exists between entrepreneurial perceptions and entrepreneurial activity (Bosma and Schutjens, 2009b). Regions with higher levels of entrepreneurial perceptions show higher levels of entrepreneurial activity. This finding does not in itself point exclusively at a positive impact of entrepreneurial attitudes on entrepreneurial activity; the reverse effect may also hold: entrepreneurial activity can manifest itself 'contagiously' in the region. Bosma et al. (2008b) found in an empirical study of three Dutch regions (based on the GEM survey) that, for more than half the early-stage entrepreneurs, another entrepreneur – or firm – served as an example when

15 The GEM Conceptual model is described in most annual GEM Global Reports (see for instance Bosma et al., 2008) and more thorough theoretical underpinnings are supplied by Levie and Autio (2008)

16 The EFC 'Higher entrepreneurship education' is a composite factor on the scores of three items in the annual 'National Expert Survey' that is held annually among experts in the field of entrepreneurship (see Reynolds et al, 2005). The items relate to the degree to which, according to the experts, (i) colleges and universities (ii) the level of business and management education, and (iii) the vocational, professional and continuing education systems provide good and adequate preparation for starting-up and growing new firms. See for more details Levie and Autio (2008).

setting up their firms. Over 70 percent of the entrepreneurial role models worked in the same labour market area. Also, the great majority of people who knew someone personally who had started up a business in the past two years lived in the same labour market area. These findings point to a reinforcing mechanism between entrepreneurial perceptions and entrepreneurial activity. The results of this study also show that the networking activities of individuals – the 'personification' of this reinforcing mechanism – take place largely within the region.

A second noteworthy issue is that there could be regional and national forces at play that hinder (or reinforce) a direct transition from attitudes to activity. For example, if region A is characterized by an abundance of good job opportunities or a high degree of social security, thus increasing the *opportunity costs* of entrepreneurship for individuals, the observed entrepreneurial activity may be lower than could be expected from observed entrepreneurial attitudes. These interaction effects should be taken into account. A regional indicator consisting of (individual) attitudes towards entrepreneurship and business ownership may contribute to our understanding of variations in (different types of) entrepreneurship rates, especially if it is also possible to take the abovementioned opportunity costs of entrepreneurship into account.

From the studies focusing on international differences in *formal* institutions related to entrepreneurship, the impact of national factors on entrepreneurial attitude and maybe even subsequent activity is striking. The World Bank report (2005) revealed enormous national differences with respect to legislation, regulations, and procedures in entrepreneurship registration. These regulatory obstacles may discourage entrepreneurial spirits[17]. National institutional forces (regulations, policy instruments) therefore also affect entrepreneurial activity. With respect to entrepreneurship policy, large national differences have always existed, according to an extensive international comparison of policy in ten countries (Stevenson and Lundström, 2001). Within many European countries, specific regional policy instruments have been used to affect entrepreneurship rates, but the most influential factors (taxes, regulations, and laws) are still set by national policymakers.

Ambitious entrepreneurship

Entrepreneurship has many different faces. Not every entrepreneur starts up a firm that survives and eventually grows into a large or innovative business, as indicated by the distinctions drawn between managerial business owners, imitative and innovative entrepreneurs (Wennekers and Thurik, 1999, Koellinger, 2008), 'real' entrepreneurs, and 'revolving door' entrepreneurs (Santarelli and Vivarelli, 2007, p. 464) or 'mice, gazelles and elephants' (Acs and Mueller, 2008). The employment and innovation effect of new firms shows an enormous variation, which has to be taken into account in linking economic growth with entrepreneurship (Baumol, 1990). Explanations of actual firm growth and innovation draw on factors of different spatial levels: individual factors, firm characteristics,

17 The World Bank 'Doing Business' Indicators, including those related to start-ups, are based on regulations involving businesses with 250 employees or more. Therefore, the World Bank figures do not allow a very good measurement of the link between formal institutions and start-up activity. However, one could argue that the perceptions of institutional barriers may be correlated with the World Bank measures related to start-ups.

industry effects, business cycle effects, (regional) market size and growth. However, there is only limited empirical evidence of factors explaining actual firm growth or the innovative performance of *new firms*, mainly because of the longitudinal data needed. A notable exception is the seminal work of Davidsson (1991), who conducted a longitudinal analysis of realized firm growth showing that the growth motivation of an entrepreneur had a significantly positive effect. Vivarelli and Audretsch (1998) also found empirical evidence of a positive effect of innovative propensity on post-entry performance, economic returns, employment growth, and export growth. In another study, Arrighetti and Vivarelli (1999) also found that innovative motivation and previous innovative experience were positively correlated with post-entry performance.

That is not to say, however that innovative motivation is the only factor affecting firm growth, since evidence shows that, despite high aspirations, many new entrepreneurs do not reach their goals. The converse is also true: firm growth may occur even for entrepreneurs without explicit growth ambitions. Similarly for entrepreneurial intentions with respect to innovation, which is almost impossible to assess realistically at the time of start-up. According to Koellinger et al. (2007), many new entrepreneurs are overconfident about their own entrepreneurial capacities and are overoptimistic about their future prospects. The inability to grasp market and competition reality at the time of start-up and the failure to manage firm internal and firm external threats and opportunities in the early stages of the firm's life course are the main reasons why growth ambition and actual firm growth are not perfectly correlated. Furthermore, entrepreneurial growth intentions may change over time, especially in the period following the initiation of a venture (Kreuger, 2000, Dutta and Thornhill, 2008). However, we may conclude that entrepreneurial ambition is a strong predictor of actual firm performance in later stages.

In our search for explanations of regional differences in ambitious entrepreneurship rates, we again seek refuge in the labour-market perspective. Since we support the view that, at the basis of entrepreneurship, there is a person taking the step to start a business, conditioned by individual and personality characteristics, we believe these aspects are even more important when we focus on that person's ambitions or intentions related to the firm. In the last resort, especially in the early stages, a firm is embodied by the person who founded it and the ambitions of the new firm can then be equated with the ambitions of the entrepreneur involved (Garnsey et al., 2006). Our focus on the individual level is also justified by the extensive literature overview of the drivers of initial growth intention by Dutta and Thornhill (2008), who found many more studies with empirical evidence of the effects of individual factors than with evidence of organizational or environmental effects.

Turning back to Davidsson's finding that entrepreneurial motivations affect actual outcomes, he also showed that this motivation depended on the entrepreneur's ability, opportunities, and need to grow. However, even more interesting was his conclusion that not only do objective measures of ability, opportunity and need matter; so does the entrepreneur's individual *perception* of ability, opportunity, and need. He concluded that objective aspects only explain part of actual growth. In this view, variables related to the personal characteristics of the entrepreneur, the firm or the environment are less important.

If perceptions of individual ability, opportunity, and need are important for firm growth motivation, what explains these individual perceptions? The theory of planned behaviour (Ajzen, 1985, 1991) sheds light on this relationship between motivations, perceptions, and actual behaviour. The idea is that the value a person attaches to a certain behaviour is strongly affected by the expected consequences of that behaviour (Wiklund et al., 2003). If nascent entrepreneurs perceive high administrative burdens in hiring and firing employees, their ambitions in terms of firm size will be relatively low. This line of reasoning also applies to positive effects: when regional income and welfare is high or growing, people expect market growth on which they can anticipate starting a new ambitious firm. In this sense, GRP growth might trigger highly-ambitious entrepreneurs. From their empirical study on the revenue aspirations of nascent entrepreneurs, Liao and Welsch (2003) conclude that social capital (network size and trust) positively influences growth aspiration, while the effect of human capital variables (experience and education) was absent. A significant positive effect of financial capital on growth aspirations, however, could be found, together with a positive influence of cognitive capital, that is, strong shared norms and values.

Ajzen's theory of planned behaviour and the findings of Liao and Welsch lead us to the view that traditional explanations based on such entrepreneurial characteristics as age and education level can only be expected to partially explain ambitious entrepreneurship. In the explanatory studies of firm-growth ambitions by Wiklund et al. (2006), Davidsson (1991), and Liao and Welsch (2003), the personal characteristics of the entrepreneur, the firm or the environment are found to be less important than perceptions, personal strategies, and shared values. Koellinger (2008) also found empirical evidence for the importance of perceptions in explaining the innovative aspirations of nascent entrepreneurs. These innovative ambitions were strongly correlated with the perceptions of both individual skills and regional opportunities, next to gender, education level, working status, and national economic development. Compared with general entrepreneurial activity, in analysing ambitious entrepreneurship, we might therefore expect lower explanatory power of entrepreneurial personal characteristics, and stronger effects of entrepreneurial attitudes, values, and perceptions towards future firm growth or innovation (Koellinger, 2008, see also Wiklund et al., 2003). The testing of both hypotheses on ambitious entrepreneurship, that is 1) the relatively limited impact of determinants of non-ambitious entrepreneurship and 2) (compared with non-ambitious entrepreneurship) the relatively large effect of (regional) entrepreneurial attitudes in studying ambitious entrepreneurship, is reported in this chapter.

3.3 Data and Methodology

We use data from the Global Entrepreneurship Monitor (GEM) for creating indicators of regional entrepreneurial activity (dependent variables) and attitudes (independent variables). Additional independent variables at the regional level are obtained from Cambridge Econometrics, European Regional Data and, at the national level, from the OECD. The selection of countries included in our study is restricted by data availability. First, we required GEM participation for at least three years in the 2001-2006 period. The result is indices on entrepreneurial activity and entrepreneurial perceptions over 125 larger regions

in 18 countries[18]. By mapping these indicators, we are able to explore cultural, institutional, and urbanization effects relating to our four measures of entrepreneurial activity. We then proceed with the empirical investigation of the determinants of each type of entrepreneurial activity. To this end, we first identified some densely-populated regions situated in the previously-identified larger regions; where the sample size permitted, we abstracted these dense regions and treated them as if they were separate from the larger regions of which they form part. An example is the Munich metropolitan area. This is situated in the Nuts1 region of Bavaria. However, based on the literature, we could expect patterns of entrepreneurial activity in the Munich area that are different from the rest of Bavaria. We therefore treated Munich, and the Bavarian region excluding Munich, as two separate regions in our empirical analysis. In short, this exercise led to an augmented sample of 147 regions[19]. Owing to data availability for the independent variables and our restriction of a sample size of at least 750 valid cases per region, we ended up with 121 observations over 16 countries in the regression analysis. These regions are listed in Appendix I.

Dependent variables

Since, 1999, GEM has provided several *national* indicators of entrepreneurial activity for an increasing number of countries (see Reynolds et al., 2005; Bosma et al., 2008a). The indicators are based on telephone surveys among the adult population. A key GEM indicator is the early-stage entrepreneurial activity (ESEA) rate[20]. This measure is defined *as the prevalence rate (in the 18-64 population) of individuals who are involved in either nascent entrepreneurship or as an owner-manager in a new firm in existence for up to 42 months. Nascent entrepreneurs* are identified as individuals who are, at the moment of the GEM survey, setting up a business. Moreover they have indicated (i) that they have done something to help start a new business, such as looked for equipment or a location, organized a start-up team, worked on a business plan, saved money or any other activity that would help launch a business; and (ii) that they would be the single owner or a co-owner of the firm in gestation. They have also not paid any salaries, wages or payment in kind (including to themselves) for more than three months; if they have, but not for more than 42 months, they are considered to be an *owner-manager of a new firm*.

While the ESEA rate is an overall measure of early-stage entrepreneurial activity, identifying different types is also possible. An example of a specific type of entrepreneurship is *high-growth-expectation* entrepreneurship (see for example Autio, 2007). We draw a similar distinction, but identify three different types of growth orientation:

---

18 In this first selection we have indices for 125 regions corresponding to the classification used by ESRI. This classification consists of Nuts1 levels for Belgium, France, Germany, Greece, Ireland, the Netherlands, and the United Kingdom. Nuts2 levels are applied for Croatia, Denmark, Finland, Hungary, Norway, Portugal, Slovenia, and Sweden and a combination of Nuts1 and Nuts2 for Italy, Spain, and Switzerland.

19 The abstracted regions are Antwerp and Ghent (Belgium); Aarhus (Denmark); Helsinki (Finland); Duisburg-Essen, Düsseldorf, Köln, Rhein-Main, Stuttgart and Munich (Germany); Budapest (Hungary); Dublin (Ireland); Amsterdam, Rotterdam, The Hague, and Utrecht (Netherlands); Barcelona, Valencia, Seville, and Malaga (Spain).

20 This is the same measure as that known as 'TEA' in most GEM reports. We have chosen to use the abbreviation ESEA because it better reflects the early-stage nature of the measure.

1. Early-stage entrepreneurial activity with low-growth ambitions (ESEAGR_LO): Individuals in early-stage entrepreneurial activity who expect to have no or one employee in the next five years
2. Early-stage entrepreneurial activity with modest-growth ambitions (ESEAGR_MD): Individuals in early-stage entrepreneurial activity who expect to have between two and nine employees within the next five years
3. Early-stage entrepreneurial activity with high-growth ambitions (ESEAGR_HI): Individuals in early-stage entrepreneurial activity who expect to have 10 or more employees within the next five years

A second type of entrepreneurship involves the innovative orientation of early-stage entrepreneurs. All entrepreneurs were asked to indicate if all, many or none of their (potential) customers considered their product or service new and unfamiliar (Answers: All/Some/None). They were also asked to indicate whether many, few or no other businesses offered the same products or services to their (potential) customers. We classify early-stage entrepreneurs to be oriented towards innovation if they indicate that at least some customers consider their product or service new and unfamiliar *and* not many businesses are offering the same products or services.

4. Early-stage entrepreneurial activity with innovative ambitions ESEAINNOV: Individuals in early-stage entrepreneurial activity who expect (i) at least some customers to consider the product or service new and unfamiliar *and* (ii) not many businesses offer the same products or services.

We acknowledge that this last measure may not be perfect for assessing innovative entrepreneurship, but it gives at least some indication of the innovative ambitions, in terms of new product-market combinations, of individuals in the region. At the regional level, the indicator reveals innovative entrepreneurial ambitions, but we should keep in mind that individuals in some regions may tend to be more optimistic than in other regions, and some of them may be highly over-optimistic.

One important finding of the GEM studies so far is that cross-country variation in early-stage entrepreneurial activity is very persistent over time. Since it has been shown empirically that regional variation in entrepreneurship is also persistent (Parker, 2005; Fritsch and Mueller, 2007), we merged the GEM data of six subsequent years (2001-2006). This merging exercise resulted in *regional* indicators of entrepreneurial activity and perceptions that pertain to the 2001-2006 period. Note that all the dependent variables were obtained from individual data, so whether a person is involved in any of the four types of early-stage entrepreneurial activity has been determined at the individual level. It is also important to point out that each individual involved in innovation-oriented early-stage entrepreneurship is also classified in one of the three growth-orientation categories. As could be expected, early-stage entrepreneurs were found relatively often in the category of high-growth orientation. Of all the high-growth-oriented individuals involved in ESEA, 25 percent were also characterized as innovative, whereas the percentages for the medium and

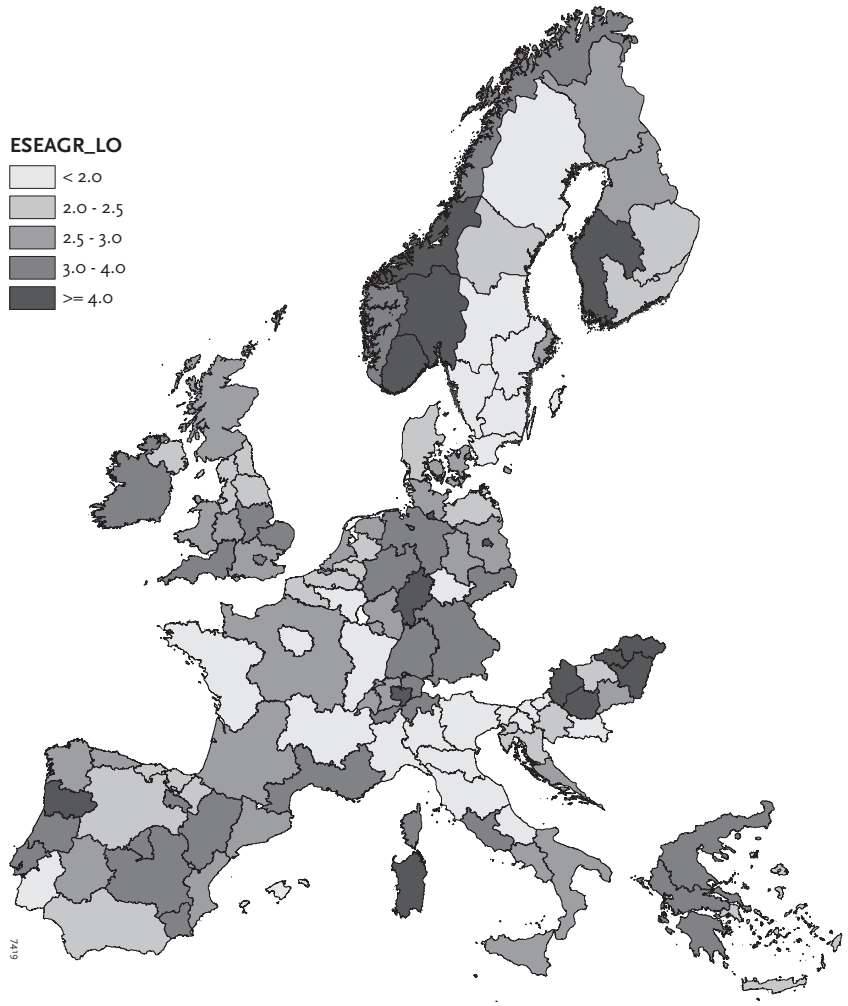


Figure 3.1 Early-stage entrepreneurial activity with low growth ambitions (0-1 employees)

low levels of growth orientation were, 19 and 16 respectively. These percentages are not very different, so innovative orientation does not necessarily coincide with growth ambitions[21].

The regional pattern of the different types of entrepreneurship in Europe, as pictured in Figures 3.1-3.4, shows large differences, underlining the importance of distinguishing regions rather than just nations. The average non-growth regional entrepreneurship rate (ESEAGR_LO) pictured in Figure 3.1 is 2.8 percent and ranges from 1.2 percent in the western part of France to 6.0 percent in Western Transdanubia (Hungary). The rate of high-growth-oriented ESEA in Figure 3.2 ranges from 0.6 percent in the French Parisien Bassin to 2.6 percent in the Hamburg area. We should note that, since the indicators are *estimates*

21 The correlations between the independent variables are all positive and significant at $p<0.05$, ranging from 0.29 (ESEAGR_LO and ESEAGR_MD) to 0.64 (ESEAGR_HI and ESEAINNOV).

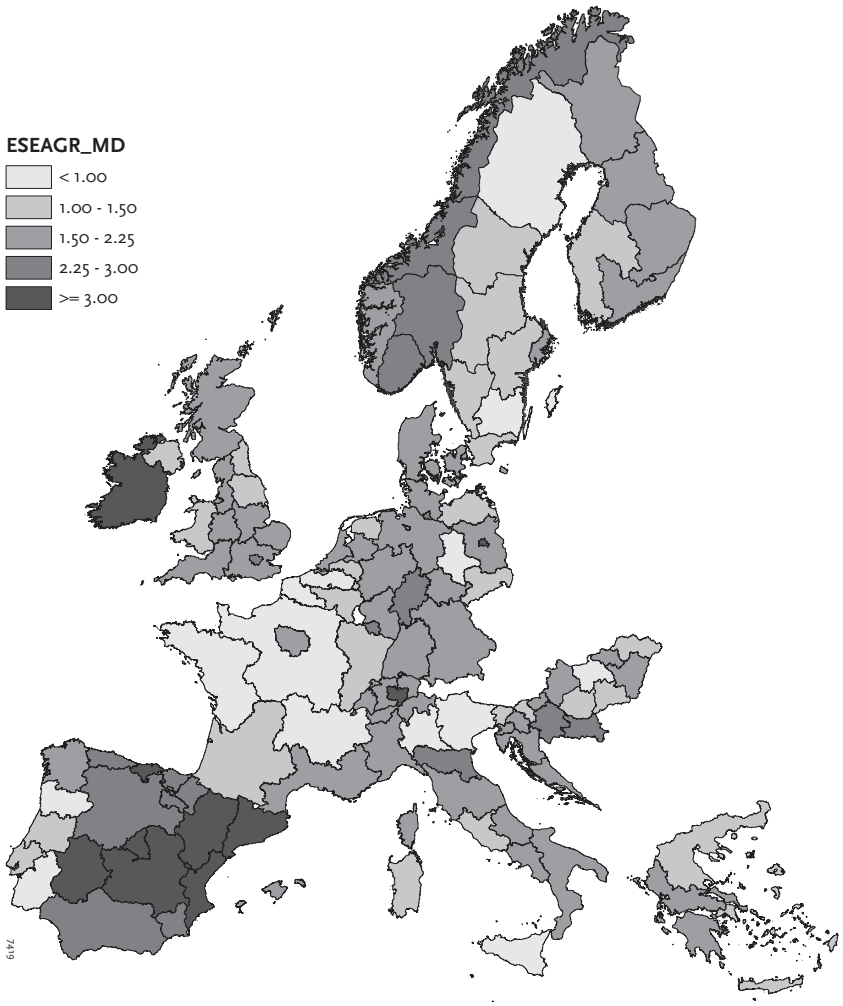


Figure 3.2 Early-stage entrepreneurial activity with modest growth ambitions (2-9 employees)

rather than count data, confidence intervals are attached to them. These may be quite high in some cases, even though the minimum sample per region is set at 750. Therefore, when examining the maps one should concentrate on general patterns rather than the outcome for a particular region.

Although we can still discern national borders in these European maps, regional variations within countries are also large. With respect to the main differences between the less ambitious (Figures 3.1 and 3.2) and more ambitious types of entrepreneurship (Figures 3.3 and 3.4), we see some remarkable differences. In general, the growth- and innovation-oriented entrepreneurship rates appear to be somewhat higher in or around densely-populated regions. In addition, there appear to be some country-specific effects. In many Spanish areas there are many early-stage entrepreneurs with low or modest growth ambitions, but relatively fewer who are highly ambitious. The same finding applies to

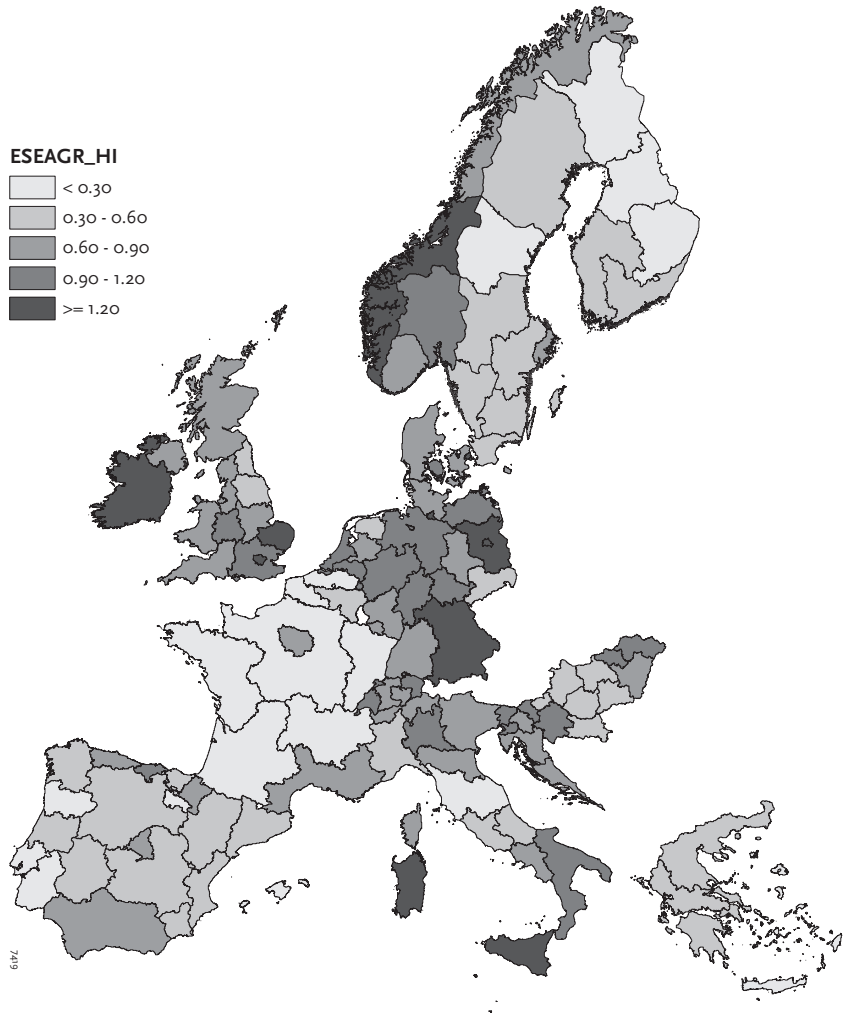


Figure 3.3 Early-stage entrepreneurial activity with high growth ambitions (10 or more employees)

Northern Portugal and Greece. In the northern regions of Italy, there seems to be relatively little participation in ESEA with low-growth orientation, but the scores on ambitious entrepreneurship are clearly higher. In this respect, the Western part of Slovenia connects with Northern Italy.

France and Sweden are examples of countries showing low overall entrepreneurship rates, but performing much better on ambitious entrepreneurship. The Stockholm and Paris areas, the Northern part of Sweden, and the French Mediterranean region have relatively many ambitious entrepreneurs. Regions performing relatively poorly in all types of entrepreneurship are situated in the East of France and, to a lesser extent, some Swedish regions, and the whole of Belgium. Finally, we observe some interesting differences between high-growth-oriented ESEA and innovation-oriented ESEA. In France, for

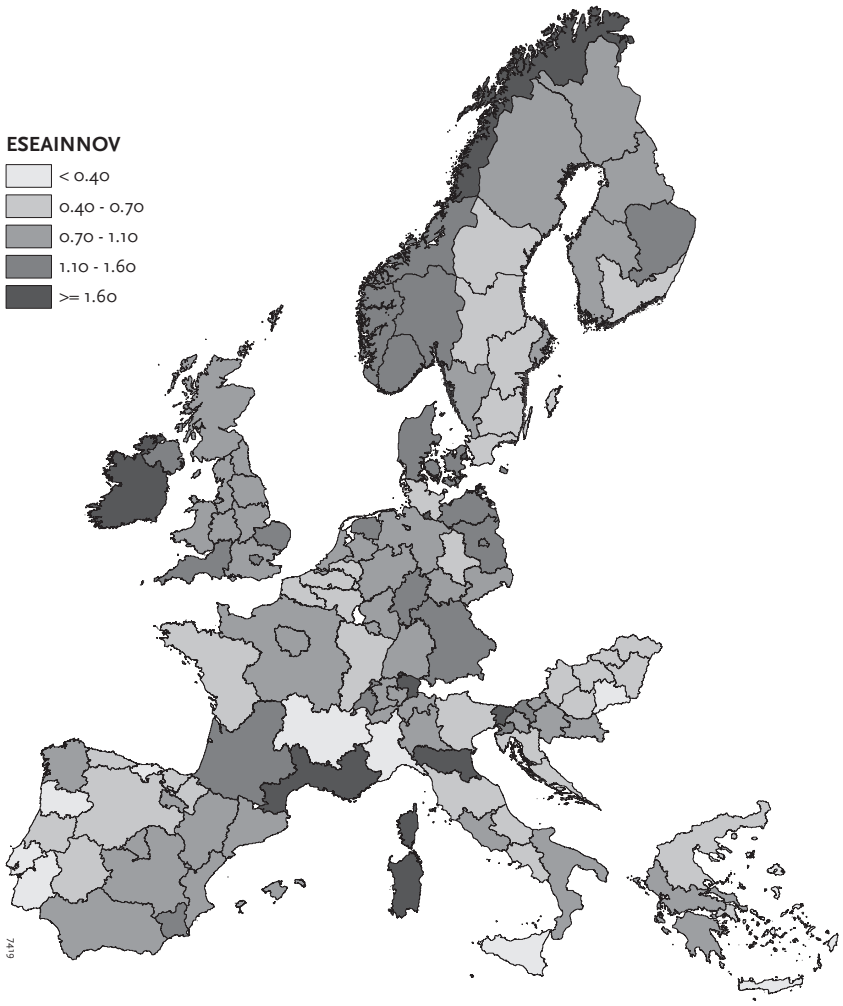


Figure 3.4 Early-stage entrepreneurial activity with innovative ambitions

example, the Paris and Mediterranean regions stand out in terms of growth orientation, while the regional pattern is more mixed if we look at innovation orientation. Here, the Mediterranean area seems to be outstanding in comparison with the rest of France[22].

Independent variables

We include determinants along our conceptual framework identifying regional composition and regional economic attributes as well as indicators reflecting regional (informal) and national institutions. Informal institutions are captured by variables measuring perceptions of entrepreneurship. These variables measure perceived opportunities, perceived capabilities, and fear of failure – all related to early-stage entrepreneurship. The economic attributes included are gross regional product (GRP) per capita in purchasing power

22 This region includes the innovative Sophia-Antipolis cluster.

Table 3.1 Independent variables: definitions

Variable	Description	Data source
Regional informal institutional effects		
Perceived skills	Percentage of adult population 18-64 years indicating to have required knowledge and skills to start a firm	GEM Adult Population Surveys 2001-2006
Perceived opportunities	Percentage of adult population 18-64 years perceiving good opportunities for start-ups in the area where they live	GEM Adult Population Surveys 2001-2006
Fear of failure	Percentage of adult population 18-64 years indicating that fear of failure would prevent them from starting a business;	GEM Adult Population Surveys 2001-2006
Regional demographic and economic attributes		
Know start-up entrepreneurs	Percentage of adult population 18-64 years (nascent entrepreneurs and business owner-managers excluded) who personally know someone who started a business in the past two years	GEM Adult Population Surveys 2001-2006
Share 18-34 years	Share of people aged between 18-34 years in the 18-64 population	Eurostat Regional Database
Population growth	Growth in total population, 1999-2004	Cambridge Econometrics Database
Opportunity costs	Ratio of GRP per capita to compensation per employee, 2003	Cambridge Econometrics Database
Population density	Number of inhabitants per km^2, 2003	Cambridge Econometrics Database
GRP per capita	GRP in PPS (European Union = 100), 2003	Cambridge Econometrics Database
GRP growth	Growth in GRP, 1999-2004	Cambridge Econometrics Database
Unemployment rate	Number of unemployed as percentage of labour force, 2003	Cambridge Econometrics Database & Eurostat Regional Database
National effects		
Employment protection	OECD Employment protection index (version 2), 2003	OECD
Immigration	OECD Factbook	OECD

parities, GRP growth, unemployment rates, and a variable designed to measure opportunity costs. We have defined this measure as the ratio between GRP per capita and compensation per employee. Although this measure is an imperfect assessment of the opportunity costs of entrepreneurship, which are hard to capture at the regional level, the measure denotes the difference between production and wages and indicates a region's relative advantage of entrepreneurship (compared with salaried employment). Data on economic attributes at the regional level are mainly drawn from the Cambridge Econometrics database on European Regions. In the case of missing values (in this case: for unemployment rates) we used the Eurostat regional database. Both data sources were also used for deriving regional composition attributes (population growth, share of people aged 18-34). National indicators

Table 3.2 Descriptive statistics

	Mean	Std.dev	Correlation Matrix															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 ESEA low growth orientation	2.8	0.9																
2 ESEA modest growth orientation	1.9	0.8	0.29															
3 ESEA high growth orientation	0.7	0.4	0.42	0.29														
4 ESEA innovative growth orientation	0.9	0.5	0.34	0.36	0.64													
5 Perceived skills	41	5.8	0.40	0.46	0.26	0.14												
6 Perceived opportunities	32.4	12.7	0.00	0.35	0.24	0.35	0.23											
7 Fear of failure	39	9	-0.08	0.19	-0.21	-0.08	-0.03	-0.24										
8 Know start-up entrepreneurs	34.8	6.6	0.17	0.07	0.25	0.30	-0.15	0.30	0.06									
9 Share 18-34 years	0.36	0.04	0.04	0.39	0.06	-0.02	0.24	0.07	0.05	-0.07								
10 Population growth	2.3	3.6	-0.09	0.44	0.04	0.21	0.25	0.41	0.03	-0.14	0.50							
11 Opportunity costs	1.73	0.35	0.12	0.04	0.39	0.27	0.26	0.28	-0.05	0.13	-0.05	0.15						
12 Population density	0.4	0.9	0.12	0.06	0.34	0.20	0.07	0.00	-0.17	-0.08	0.22	0.03	0.32					
13 GRP per capita	109.3	53.5	-0.10	0.05	0.15	0.19	0.00	0.20	-0.12	0.14	-0.04	0.12	0.39	0.24				
14 GRP growth	12.4	7.3	0.08	0.28	-0.10	0.00	0.44	0.09	0.12	-0.18	0.46	0.37	0.02	-0.05	-0.07			
15 Unemployment rate	7.27	4.48	-0.09	0.07	-0.23	-0.17	-0.16	-0.30	0.57	0.07	0.14	-0.19	-0.40	-0.01	-0.17	0.11		
16 Employment protection	2.35	0.62	-0.18	0.15	-0.35	-0.33	-0.31	-0.09	0.48	0.19	0.31	0.22	-0.19	-0.12	-0.09	-0.06	0.34	
17 Immigration	10.79	4.82	-0.01	-0.18	0.17	0.22	0.24	-0.18	-0.01	-0.08	-0.22	-0.04	0.39	0.03	0.09	-0.16	-0.24	-0.40

All descriptive statistics are based on 121 observations (regions) over 16 countries entering the regressions

of employment protection and immigration were obtained from the OECD. See Table 3.1 for descriptions and sources of the independent variables entered into the regressions. Table 3.2 shows the descriptive statistics for the variables (only for the regions included in the empirical analysis). We intended to include social security rates in accordance with Hessels et al. (2007). However, in tests for multicollinearity, the high correlation between social security rates and employment protection gave some problems. We decided to include the employment protection index, because this measure is more specific and we are particularly interested in its effect on ambitious types of early-stage entrepreneurial activity. Some individuals who have the potential to be a growth- or innovation-oriented entrepreneur may prefer to remain employed if there are strong employment benefits.

Potential reversed causality issues at the individual level (*I am ambitious because I have succeeded so far* versus *I am ambitious and therefore I will be successful*) are to some extent prevented by adopting the regional rather than the individual level. However, as stated earlier, reversed causality is not ruled out at the regional level. One should also be cautious when interpreting our results with respect to informal effects measured by perceptions of entrepreneurship. Significant positive results are more likely to be interpreted as a two-way reinforcing mechanism between perceptions and activity. We therefore initially ran a regression model excluding the variables measuring perceptions of entrepreneurship. This model helped us appreciate the effects informal institutions can have and to what extent they interact with the other determinants. The regression analysis was conducted for the dependent variables separately, using multilevel analysis (allowing for random intercepts for country levels). The Likelihood Ratio tests all suggested that we should indeed consider the national level as a relevant spatial scale[23].

3.4 Results and implications

What determines the regional variation in the four different types of early-stage entrepreneurship? The estimation results are described in Table 3.3. Each type was assessed by two models; the first excluding informal institutional effects and the second including these determinants. All dependent and independent variables were standardized before they were entered into the regression. A first overview of the table gives support to the hypothesis that non-ambitious and ambitious entrepreneurship have different determinants. In particular, the explanations for the first two types of early-stage entrepreneurship (models 1 and 2) differ from those of the high-growth-oriented ESEA (model 3) and innovation-oriented ESEA (model 4). Early-stage entrepreneurial activity with no growth orientation is largely explained by *perception of skills* and *knowledge to start a business* (model 1b). If we exclude perceptions of entrepreneurship (model 1a), the explained variance decreases significantly and shifts partly to the factor of *knowing entrepreneurs who started a business*.

23 If we had not found the country level important, we could have modelled all four dependent variables simultaneously in a Seemingly Unrelated Regression (SUR). SUR estimation takes the potential correlation of residuals of the equations into account. However, SUR estimation is to our knowledge not available in a multilevel setting.

Table 3.3 Estimation results: explaining different types of early-stage entrepreneurial activity (ESEA) at regional level [a)]

	ESEA low growth orientation		ESEA modest growth orientation		ESEA high growth orientation		ESEA innovative orientation	
	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b
Regional informal institutional effects								
Perceived skills		0.67 ***		0.46 ***		0.18		-0.03
		(0.13)		(0.11)		(0.11)		(0.12)
Perceived opportunities		0.32 *		0.44 ***		0.22		0.31 *
		(0.17)		(0.15)		(0.15)		(0.16)
Fear of failure		0.34 *		-0.01		-0.17		0
		(0.18)		(0.15)		(0.15)		(0.16)
Regional demographic & economic attributes								
Know start-up	0.42 ***	0.14	0.18	-0.12	0.40 ***	0.26 **	0.39 ***	0.3 **
entrepreneurs	(0.15)	(0.15)	(0.13)	(0.13)	(0.12)	(0.13)	(0.13)	(0.14)
Share 18-34 years	0.06	-0.06	0.05	-0.02	0.22 **	0.19 **	0	0
	(0.12)	(0.11)	(0.1)	(0.09)	(0.1)	(0.1)	(0.11)	(0.11)
Population growth	0.01	-0.02	0.05	-0.06	-0.04	-0.12	0.23 **	0.16
	(0.11)	(0.1)	(0.1)	(0.09)	(0.09)	(0.1)	(0.1)	(0.11)
Opportunity costs	0.08	0.07	0.01	-0.09	0.17 *	0.11	0.02	-0.05
	(0.13)	(0.12)	(0.11)	(0.11)	(0.11)	(0.11)	(0.12)	(0.12)
Population density	0.07	0.07	0.15 *	0.15 **	0.22 ***	0.22 ***	0.19 **	0.2 **
	(0.1)	(0.08)	(0.08)	(0.07)	(0.08)	(0.08)	(0.09)	(0.09)
GRP per capita	-0.09	-0.06	0.05	0.04	-0.27 ***	-0.28 ***	-0.09	-0.1
	(0.11)	(0.1)	(0.1)	(0.09)	(0.09)	(0.09)	(0.1)	(0.1)
GRP per capita, squared	0.00	-0.02	-0.03	-0.01	0.06 **	0.07 **	0.02	0.03
	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
GRP growth	0.07	-0.04	0.02	-0.03	0.06	0.06	0.05	0.07
	(0.15)	(0.14)	(0.13)	(0.12)	(0.12)	(0.12)	(0.13)	(0.13)
Unemployment rate	-0.02	0.07	-0.06	0.01	-0.12	-0.07	0.01	0.02
	(0.13)	(0.12)	(0.12)	(0.11)	(0.11)	(0.11)	(0.12)	(0.12)

We did not find any

	ESEA low growth orientation		ESEA modest growth orientation		ESEA high growth orientation		ESEA innovative orientation	
	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b
National effects								
Employment protection	-0.11	0.00	-0.19	0.03	-0.49 **	-0.32	-0.53 ***	-0.44 **
	(0.24)	(0.29)	(0.22)	(0.23)	(0.20)	(0.22)	(0.19)	(0.21)
Immigration	0.00	-0.18	-0.05	-0.04	-0.01	0.06	0.08	0.2
	(0.21)	(0.26)	(0.2)	(0.21)	(0.17)	(0.2)	(0.17)	(0.18)
Constant	0.08	0.22	-0.17	-0.15	-0.24	-0.26	-0.09	-0.14
	(0.24)	(0.28)	(0.22)	(0.22)	(0.2)	(0.21)	(0.19)	(0.19)
Log restricted-likelihood	-159.38	-147.29	-143.93	-133.75	-136.37	-135.95	-149.21	-148.08
Wald Chi-squared	15.68	57.98 ***	15.82	49.62 ***	79.02 ***	89.97 ***	46.74 ***	42.29 ***
LR test vs. linear regression: Chi^2	29.43 ***	34.78 ***	55.17 ***	45.61 ***	42.90 ***	47.38 ***	20.86 ***	23.12 ***

*** p<0.01, ** p<0.05, * p<0.10. Standard errors between parentheses. All regressions are based on 121 observations (regions) over 16 countries.

[a)] All regressions performed using Stata (xtmixed) with random intercept for each country.

relationships with any of the economic attributes[24]. We also found no impact of national levels of employment protection. Hence, involvement in non-growth-oriented entrepreneurship at the regional level seems to be largely determined by processes reflecting an '*I can do this too*' mentality, a combination of perceptions and seeing other early-stage entrepreneurs rather than a rational choice on economic grounds. Knowing people in ESEA personally may also enhance the self-perceived skills to start a business. We should note that we were not able to include some potentially relevant attributes, such as education levels. Perceptions are also important in explaining early-stage entrepreneurship with modest growth orientation. In addition, a positive, but weakly significant effect is found for population density.

For growth-oriented early-stage entrepreneurship the picture is clearly different. We find very limited evidence of the importance of informal institutional effects. The effects of *perceived skills, perceived opportunities,* and *fear of failure* are all insignificant. However, we do find a significant and positive effect for the variable measuring a network effect: that is, *knowing entrepreneurs who recently started a business* (note that entrepreneurs themselves were not included when deriving this measure from the representative sample of the regional adult population). An important finding is that entrepreneurs who are ambitious in terms of job-growth orientation and in terms of innovation are particularly prevalent in dense areas. Furthermore, we find that the share of younger people has a positive impact on ESEA with high-growth orientation. Interestingly, the degree of employment protection has a negative effect on ambitious entrepreneurship concerning orientation to both employment growth and innovation: see models 3a and 4a. There are two possible explanations that may complement each other. First, in a regime with high degrees of employment protection, potential high-ambition entrepreneurs – whether these ambitions reflect a desire for growth or innovation – may feel fewer incentives to engage in entrepreneurship and prefer safe, adequate employment. Second, new entrepreneurs may lower their expectations of high growth in a regime of high employment protection. We observe that the impact of employment protection disappears (in model 3b) or weakens (in model 4b) when we include the informal institutional effects, even though these effects are not themselves found to be significant. In our view, this result indicates that the effects of formal institutions may impact not only on individuals' activities, but also on their perceptions. Indeed, Table 3.2 indicates that the correlation of national levels of employment protection with regional aggregates of individuals' perceived skills to start a business are substantial and negative (-0.31), and the correlations with fear of failure is substantial and positive (0.48). Thus, the distinction between informal institutions (in our exercise: perceptions of entrepreneurship) and formal institutions (employment protection) may not be as clear-cut as may sometimes be supposed.

3.5 Conclusion and discussion

This chapter contributes to entrepreneurship studies by presenting and analysing harmonized entrepreneurship data for European regions *and* countries in two ways.

24 Where the effects of GRP per capita were not significant we also ran regressions excluding the square component of GRP per capita. The results did not change.

First, by mapping patterns in both general and ambitious entrepreneurial activity for 125 regions in 18 countries we showed that the regional level is an appropriate level to study entrepreneurship. The second main contribution is the distinction drawn between several types of entrepreneurial activity and analysing their determinants. Based on the existing literature, we expected the determinants for more ambitious types of entrepreneurship to differ from those of less ambitious types of entrepreneurship. Our empirical analysis showed that only some of the determinants of regional rates of ambitious entrepreneurship played a significant role for lower-growth-oriented entrepreneurial activity. For instance, population density does not affect less ambitious entrepreneurship rates, but is related to ambitious entrepreneurship. Furthermore, a subdivision of ambitious entrepreneurship into growth-oriented and innovation-oriented entrepreneurship shows that here, too, the impact of regional and national factors varies to some extent. While growth-oriented entrepreneurship is positively associated with the share of younger people and exhibits a U-shaped relationship with regional wealth levels, population growth is positively linked to innovation-oriented entrepreneurship. Common determinants are network effects (measured by the degree to which people – excluding entrepreneurs – personally know someone who started a business in the past two years), population density, and a negative effect of the degree of national employment protection.

Our hypothesis regarding a greater impact of regional entrepreneurial perceptions on ambitious entrepreneurship rates than on overall entrepreneurship rates, however, was not confirmed. While regional levels of (self-perceptions of) start-up skills attitudes are of significant importance in explaining less-ambitious early-stage entrepreneurial activity, none of the three regional attitude indices was significant in explaining ambitious early-stage entrepreneurship. The influence of perceived skills on non-ambitious entrepreneurship needs further detailed investigation. Observing the regional variation in the maps (see also Bosma and Schutjens, 2009b for maps displaying perceptions of entrepreneurship), we have reason to believe that starting a business is considered to be less of a special event (in other words, it is an event embedded in society) in Southern Europe and people may therefore perceive that fewer skills and less knowledge are required for starting a business. It may even be the case that the 'average' business in some countries is perceived differently than in others – and therefore the perceptions of opportunities and required capabilities relating to start-ups may differ substantially. We should also note that the perception variables included in our study relate to starting a business rather than *growing* a business or starting an *innovative* business.

With regard to formal institutions at the national level, these appear to affect total early-stage entrepreneurial activity to some extent, even in our case with 16 counties across Europe. We find some evidence of negative impacts, that is, of employment protection, on growth- and innovation-oriented entrepreneurial activity. This finding certainly invites further research. Our results indicate that this effect, as an example of a *formal institutional* effect, may also be captured to some extent in variables measuring individual perceptions of entrepreneurship. More research is called for on how formal institutions affect informal institutions and *vice versa*.

The limitations of our study are fourfold. First, our focus on regional entrepreneurship levels obscures the influence of individual characteristics on the decision to start a firm,

and also on the growth and innovation ambitions associated with it. According to many studies based on the labour-market perspective, it is at this individual level where the most decisive determinants can be found: age, gender, education level, income level, network (see for example Davidsson, 1991). In our study, we circumvented this omission of individual level by including regional demographic characteristics, but we are aware that, at most, the regional composition effect proxies the individual characteristics involved in the personal decision of becoming an (ambitious) entrepreneur[25].

Second, our focus on the ambitions of entrepreneurs in the period before or soon after start-up does not permit inferences on realizations of job growth or innovation. As explained in the literature overview, this relationship is not straightforward owing to the high level of uncertainty about existing and future markets, competition, and capabilities to cope with internal and external challenges, especially in the first phases of a firm's life course. Longitudinal analysis is needed to trace the post start-up performance of new firms.

A third limitation of our contribution is that we have to distinguish rather large regions, owing to the limited availability of data and small sample sizes on a lower spatial scale. Ideally, we would have worked solely with Nuts3 regions, but this was not feasible in the GEM research design. For some countries we have abstracted smaller, densely-populated areas from the larger areas. Another consequence of using regional aggregates of individual observations is that we had to merge 2001-2006 data to obtain regional measures of entrepreneurial activity and entrepreneurial perceptions. This procedure amounts to a cross-sectional analysis; interpretations on causality, especially concerning the relationship between entrepreneurial perceptions and activity, should be treated with caution.

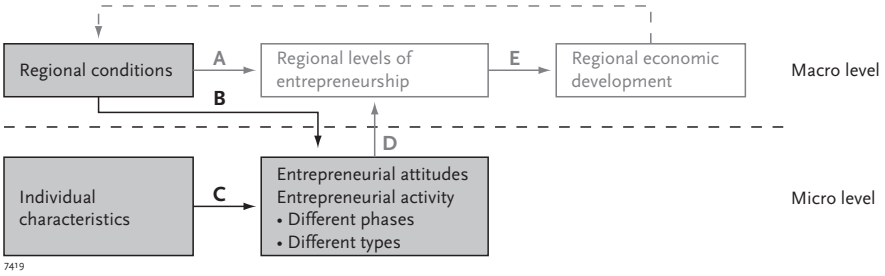
Finally, more data is needed on the regional level in order to incorporate the possible effects of economic specialization, knowledge intensity, and agglomeration economies on entrepreneurship in general and innovation-oriented entrepreneurship in particular. In addition, regional data on unemployment levels may improve the explanations of not only non-ambitious entrepreneurship, but also growth-oriented entrepreneurship since low labour costs may increase growth aspirations. Finally, data on the regional firm-size structure, especially of small-size businesses and new and young firms, may shed light on our finding that regional networks, as proxied by knowing other new entrepreneurs, relate positively to regional entrepreneurship rates.

Our outcomes are of relevance to policymakers aiming at stimulating the most promising types of entrepreneurship. In stimulating new firm formation, one should be aware that specific national regulations and institutions may not automatically affect ambitious entrepreneurship positively. In order to address this group of firms in particular, making employment more flexible could be a key trigger. Further research should be conducted in this area. With regard to policy implications at the regional level, a general message from our results is that one should be aware that densely-populated areas have advantages for fostering ambitious entrepreneurship, in line with traditional urbanization economies stimulating the concentration of economic activity. Dense areas are not only directly associated with ambitious entrepreneurial activity; they also tend to have relatively high

25 Chapter 4 explicitly takes the individual level into account.

proportions of younger residents and more networking possibilities (that is, people in dense areas will know more people, and probably also more people who have recently started a firm). Disentangling the exact mechanisms underlying these urban advantages for ambitious entrepreneurship in order to develop policy instruments is a challenge for both academics and policymakers.

4 Determinants of Low- and High-Growth Oriented Entrepreneurship; A Multilevel Approach



4.1 Introduction

The importance of entrepreneurship in economic development is widely recognized. In their search for the economic effects of entrepreneurship, scholars have encountered two important phenomena. First, there is wide heterogeneity within the broad category of entrepreneurship (Santarelli and Vivarelli, 2007; Stam, 2008b). In empirical analyses, a straightforward measure of new-firm formation is most often used, but we know from the entrepreneurship literature that some types of entrepreneurship are more important for economic growth than others (Audretsch and Keilbach, 2005; Acs, 2008). One of the more important types is growth-oriented entrepreneurship (Wong et al., 2005; Stam et al., 2007). A second phenomenon is the markedly uneven spatial distribution of entrepreneurship, which also seems to be persistent over time. Until now, studies of the geography of entrepreneurship have concentrated on (the determinants of) the spatial variations of (nascent) new firms (Keeble and Wever, 1986; Reynolds et al., 1994; Tamásy, 2006; Koster, 2007) or self-employment (Parker, 2005). This literature assumes a dichotomous choice between employment and self-employment, thereby neglecting the heterogeneity in entrepreneurship, such as growth-oriented entrepreneurship. As a result of these two aspects, growth-oriented entrepreneurship has been high on the agenda of both national and regional policymakers (Smallbone et al., 2002; Fischer and Reuber, 2003).

In this chapter, we bring both phenomena together, thereby enriching the field of the geography of entrepreneurship. Our goal is to explain why people are involved in growth-oriented entrepreneurship, taking into account individual-, regional-, and national-level factors. Thus far, studies of growth-oriented entrepreneurship have taken into account determinants on the individual level, but have largely ignored determinants on the national and particularly the regional level. In this chapter, we analyse the determinants of growth-oriented entrepreneurship at the individual, regional, *and* national levels. We use data at

the individual (entrepreneur) level from the Global Entrepreneurship Monitor (GEM) for 131 regions in over 16 European countries in 2001-2006. We thus have information on involvement in entrepreneurship at the individual level and are able to discern the ambition level of the entrepreneur in terms of job creation. We are then able to check for differences in the effects of the individual-, regional-; and national-level factors on high- and low-growth-oriented entrepreneurship. In a multilevel regression model, using over 350,000 observations, we relate individual involvement in high- and low-growth-oriented entrepreneurship to characteristics of the entrepreneur, the region, and the country. This approach allows to some extent for a comparison with the results of chapter 3, where we concentrated on explaining regional levels of growth-oriented entrepreneurship instead of measuring individual odds of entrepreneurial involvement.

The chapter is organized as follows. After the introduction, we review studies of the antecedents of ambitious entrepreneurship. We then describe our data and methods, present the spatial distributions of early-stage entrepreneurial activity with and without growth orientation, and discuss our empirical findings. The effects of the control variables met our expectations. We found that, at the individual level, growth-oriented entrepreneurship is strongly related to human capital, household income, and employment status. Even when personal-level factors are appropriately controlled for, there are still several regional- and national-level factors that seem to drive growth-oriented entrepreneurship. At the regional level, a high regional level of people knowing an individual who has recently started a business has a positive impact on actual involvement in growth-oriented entrepreneurship. Furthermore, growth-oriented entrepreneurship is also positively affected by regional population density and a population characterized by a young age structure. At the national level, strong employment protection regimes seem to constrain growth-oriented entrepreneurship. These regional and national factors do not seem to be important for early-stage entrepreneurs without growth ambitions. We conclude by discussing the implications of our findings for further research and policy.

4.2 Involvement in growth-oriented entrepreneurship: a multilevel approach

How can we explain individual involvement in growth-oriented entrepreneurship? Until now, studies have taken into account determinants at the individual level, but have largely ignored determinants at the regional and national levels. There have been many studies on the spatial distribution of new firms (Reynolds et al., 1994; Tamásy, 2006), and recently also on the spatial distribution of ambitious entrepreneurship (Bosma and Schutjens, 2007). However, what has been lacking is a full explanation of growth-oriented entrepreneurship at the individual level that takes into account determinants at the individual level as well as at the regional and national levels. In his seminal study on the determinants of and interrelationships between growth ambitions and actual small-firm growth, Davidsson (1991) found that the growth aspirations of small-firm owners depend on their ability, opportunity, and need to grow. Behind the factors of *ability* and *need to grow* lie evident individual characteristics, which for nascent entrepreneurship amount to education level and experience in the industry (both increase growth ability) or the age of the entrepreneur (which decreases the need for growth). Objective geographic attributes such as market growth, market size or proximity to a university were said to be important indicators for

the opportunity to grow (Davidsson, 1991). These objective geographic attributes did not lead to the expected effect on growth motivations. One of the conclusions drawn was that *objective* measures of ability, opportunity, and need might matter less to growth aspirations than do the entrepreneurs' individual *perceptions* of ability, opportunity, and need. In the next section, we review the (potential) determinants of growth-oriented entrepreneurship at three levels of analysis: individual, regional, and national.

Individual level determinants

Several studies have distinguished between entrepreneurs on the basis of their growth aspirations. Human capital variables have been shown to have a positive effect on the growth ambitions of entrepreneurs (Kolvereid, 1992; Gundry and Welsch, 2001; Brush et al., 2001). In addition, financial capital (household income) was also shown to have a positive effect on growth ambitions (Gundry and Welsch, 2001; Brush et al., 2001). Individuals with high levels of human and financial capital are likely to have high ability and/or need (because of opportunity costs: cf. Cassar, 2006) to start a growing firm.

Regional level determinants

With respect to the opportunity to grow, neither Davidsson (1991) nor Kolvereid (1992) found any effect of geographic attributes (or location) on the growth ambitions of entrepreneurs. In line with Davidsson (1991), we argue that, next to the objective regional characteristics, subjective regional (average) perceptions of the regional possibilities, regional entrepreneurial attitude or culture might affect growth ambitions.

Two of the most important drivers of growth ambitions are the growth and heterogeneity of product demand, which increase sales and open up new niches for entrepreneurs respectively. This effect has been measured and confirmed empirically by regressing the growth and level of GDP on new-firm formation (Reynolds et al., 1994) and growth-oriented early-stage entrepreneurship (Levie and Autio, 2008; Hessels et al., 2008). We expected an even stronger effect of regional-level incomes for growth-oriented entrepreneurship, because it is more proximate than the national level (especially in large countries).

Another objective factor that has been found to affect entrepreneurship rates positively is *urbanization* (most often measured in terms of population density). The studies that found this effect were performed at the regional level (Reynolds et al., 1994) and thus did not take into account regional composition effects (for example, the fact that the population of urban areas tends to contain more young and highly-educated individuals who are more likely to enter growth-oriented entrepreneurship). In this study, we have controlled for this composition effect by taking individual level variables into account, to discover whether this urbanization effect goes beyond the mere demography of urban regions (and, if so, whether it involves other urbanization economies).

Studies of firm-growth ambitions (Wiklund et al., 2003, Davidsson, 1991, and Liao and Welsch, 2003) have revealed that the objective characteristics of the entrepreneur, the firm or the environment are less important than perceptions, personal strategies, and shared values. In analysing growth-oriented entrepreneurship, we might therefore expect lower explanatory power of objective regional characteristics and stronger effects of regional entrepreneurial attitudes and values towards entrepreneurship in comparison with non

growth-oriented entrepreneurial activity (see Wiklund et al., 2003). Liao and Welsch (2003) emphasize the importance of social capital (or a supportive environment) in forming ambitious goals for the start-up. With relatively few entrepreneurial role models around, ambitious individuals are less likely to realize their ambitions with a start-up. So we expected that, in regions where relatively many people knew a new start-up, the probability of growth-oriented entrepreneurship would be relatively high.

People can only judge their own capabilities with reference to start-ups. That is why we think that the share of people stating that they have the skills for starting a new firm should be measured only as a fraction of the people who are actually familiar with a new start-up. In this subgroup, we expect that, in regions with high shares of people claiming they have the skills to start a business, the probability of growth-oriented entrepreneurship is higher than in regions with low shares of people claiming to have these skills.
Another subjective attribute of the region that might be important for growth-oriented entrepreneurship is the general perception of entrepreneurial opportunities in a region by its inhabitants. In this respect, we expected that, in regions where people more frequently indicate that there are opportunities for start-ups in the region, the probability of growth-oriented entrepreneurship would be higher than in other regions.

Fear of entrepreneurial failure is said to be an important constraint on opting for entrepreneurship, but this deterrent is probably more important for a group of people who recognize regional start-up possibilities. Empirical studies have shown a negative effect of fear of entrepreneurial failure on entrepreneurship in general (Wagner and Sternberg, 2004; Vaillant and Lafuente, 2007). We hypothesised that a frequently-perceived fear of failure (in the subgroup of people perceiving good regional start-up opportunities) in a region also has a negative effect on growth-oriented entrepreneurship.

National level determinants
Kolvereid (1992) reported that Norwegian entrepreneurs were over four times less likely to want their firm to grow than were British or New Zealand entrepreneurs. He posited that restrictive legislation with regard to firing personnel might explain the differences between the countries. However, the relationship between national-level institutions and entrepreneurial-growth intentions has not been fully analysed. The underlying mechanisms of the effect of employment protection on growth-oriented entrepreneurship may be twofold. First, ambitious individuals who are currently employed may feel that the opportunity costs of entrepreneurship may be too high compared with employment (cf. Hessels et al., 2008). Second, for early-stage entrepreneurs, employment protection may limit their growth ambition in terms of hiring employees.

We expected that early-stage entrepreneurs who faced or perceived high administrative or institutional burdens for hiring and firing employees would have relatively-low ambitions in terms of firm size (cf. Henrekson, 2005). Employment protection decreases the incentive to contract employees. More specifically, early-stage entrepreneurs in countries with relatively-less-strict employment protection face relatively-lower firing costs, and are thus more likely to contract employees. Alternatively, early-stage entrepreneurs in countries with strict employment protection are more likely to choose relatively-conservative strategies with respect to contracting (and firing) employees. Thus we expected early-stage entrepreneurs in

countries with relatively-strict employment protection to be less likely to have employment growth ambitions.

4.3 Data and research method

We have used data from the Global Entrepreneurship Monitor (GEM) for creating individual-level indicators of entrepreneurial activity (dependent variables) and regional-level indicators of perceptions of entrepreneurship (independent variables) (see also Bosma and Schutjens, 2009b)[26]. Additional independent variables at the regional level were obtained from the Cambridge Econometrics' European Regional Dataset and Eurostat's regional database. At the national level, we included OECD indicators. The selection of countries and regions included in our empirical study is based on data availability.

First, we required GEM participation for at least three years in the 2001-2006 period. This participation yielded indices on entrepreneurial activity and entrepreneurial perceptions over 125 regions in 18 countries[27]. In a second step, we identified some dense regions situated in the previously-identified larger regions; if the sample size allowed, we abstracted these dense regions and treated them separately from the larger region of which they form part. An example is the Munich metropolitan area (*Raumordnungsregion*), situated in the Nuts1 region of Bavaria. Based on the literature, we expected different patterns of entrepreneurial activity in the Munich area from the rest of Bavaria (Tamásy, 2006). We therefore classified Munich, and the Bavarian region excluding Munich, as two separate regions in our empirical analysis. This exercise led to an augmented sample of 147 regions[28]. Because of data availability for the independent variables and our stipulation that sample size should be at least 500 valid cases per region, we finally had 359,469 observations over 131 regions and 16 countries in the final regression analyses.

Dependent variables
Our dependent variables are binary variables indicating two degrees of growth-oriented early-stage entrepreneurial activity in the adult population between 18-64 years. Early-stage entrepreneurial activity (ESEA) contains those setting up a business they will (partly) own and manage, as well as those who are currently owner-managers of a business that is not older than 42 months. The two types of early-stage entrepreneurial activity are as follows:

---

26 See Reynolds et al. (2005) for a detailed description of the GEM methodology.

27 In this first selection we have indices for 125 regions corresponding to Nuts1 levels for Belgium, France, Germany, Greece, Ireland, the Netherlands, and the United Kingdom. Nuts2 levels are applied to Croatia, Denmark, Finland, Hungary, Norway, Portugal, Slovenia, and Sweden and a combination of Nuts1 and Nuts2 to Italy, Spain, and Switzerland.

28 The abstracted regions are Antwerp and Ghent (Belgium); Aarhus (Denmark); Helsinki (Finland); Duisburg-Essen, Düsseldorf, Köln, Rhein-Main, Stuttgart and Munich (Germany); Budapest (Hungary); Dublin (Ireland); Amsterdam, Rotterdam, The Hague, and Utrecht (Netherlands); Barcelona, Valencia, Seville and Malaga (Spain).

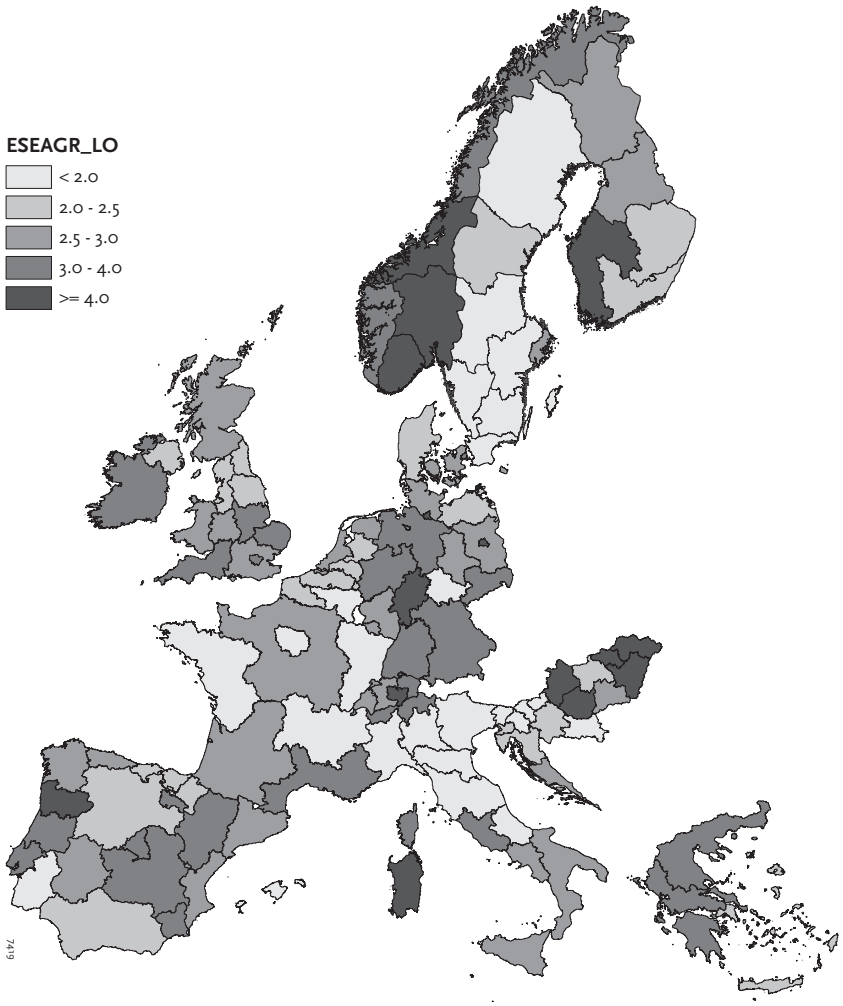


Figure 4.1 Early-stage entrepreneurial activity with low growth ambitions (0-1 employees in the next five years)

- Early-stage entrepreneurial activity with low-growth ambitions (ESEAGR_LO): individuals involved in early-stage entrepreneurial activity who expect to have no or one employee(s) in the next five years
- Early-stage entrepreneurial activity with high-growth ambitions (ESEAGR_HI): Individuals involved in early-stage entrepreneurial activity who expect to have 10 or more employees in the next five years

Even though in our regression we analyse types of entrepreneurial activity at the individual level, a preliminary glance at the spatial (regional) variation in European entrepreneurship rates is worthwhile. The regional patterns of the different types of entrepreneurship, as pictured in Figure 4.1 and Figure 4.2, show large differences, indicating the importance and relevance of distinguishing regions as well as countries. The average low-growth-

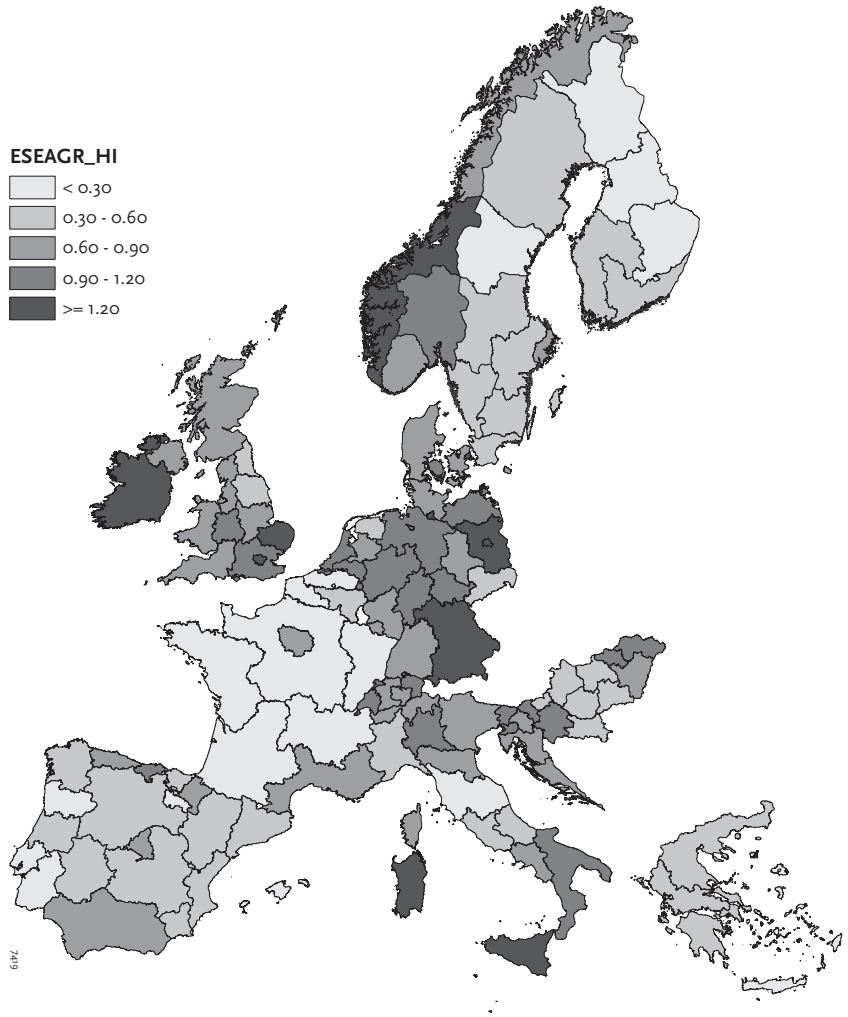


Figure 4.2 Early-stage entrepreneurial activity with high growth ambitions (10 or more employees in the next five years)

oriented regional entrepreneurship rate (ESEAGR_LO) pictured in Figure 4.1 is 2.8 percent and ranges from 1.2 percent in the western part of France to 6.0 percent in Western Transdanubia (Hungary). The rate of high-growth-oriented ESEA in Figure 4.2 ranges from 0.6 percent in the French Parisien Bassin to 2.6 percent in the Hamburg area. We should note that, since the indicators are *estimates* rather than count data, there are confidence intervals attached to them. Therefore, when examining the maps, one should pay attention to general patterns rather than outcomes for particular regions[29].

Although we can still discern national borders in these European maps, regional variations within countries are also clear. With respect to the main differences between the two types

29 This issue is not relevant for our empirical analysis since it is based on the individual-level observations constituting the regional aggregates shown in Figures 4.1 and 4.2.

of entrepreneurship, we see some notable differences. In general, the growth-oriented entrepreneurship rates appear to be somewhat higher in or around densely-populated regions. In comparison with other European regions, there are relatively many early-stage entrepreneurs with low-growth ambitions in many Spanish areas, but the rate of ambitious entrepreneurs in terms of hiring employees is relatively low. The same can be said for Northern Portugal, Greece, and parts of France. Sweden is an example of a country showing low overall entrepreneurship rates, but performing better on growth-oriented entrepreneurship. Similarly, in the northern part of Italy, there is relatively little participation in ESEA with low-growth orientation, but the scores on growth-ambitious entrepreneurship are substantially higher. In this respect, the Western part of Slovenia connects with Northern Italy. Within France, only the Parisian and Mediterranean areas have relatively many growth-oriented early-stage entrepreneurs, while the rate is low in all other regions. Regions performing relatively poorly in all types of entrepreneurship can be found in the East of France, to a lesser extent some Swedish regions, and the whole of Belgium. See also Chapter 3, where we have maps of medium-growth-oriented entrepreneurship and innovation-oriented entrepreneurship.

Independent variables

We have included *individual* level variables to account for basic personal characteristics. The variables included are age, gender, education, household income, and work status. These serve as important control variables in our analysis since we are particularly interested in regional-level determinants.

Average regional entrepreneurial perceptions enter the regression as *regional* level determinants. One crucial finding of the GEM studies so far is that cross-country variation in early-stage entrepreneurial perceptions as well as entrepreneurial activity is very persistent over time (Bosma et al., 2008a). Regional variations in entrepreneurial perceptions have also been shown empirically to be persistent (Beugelsdijk, 2007), so we merged the GEM data of six consecutive years (2001-2006). This merging exercise resulted in regional indicators of entrepreneurial perceptions that relate to the 2001-2006 period[30]. Here we excluded regions with less than 500 observations – a requirement for acceptable standard errors of the regional estimates. The regional entrepreneurial perceptions refer to:

- Knowledge of start-ups: the percentage of individuals personally knowing an entrepreneur who started a business in the previous two years.

30 In line with Davidsson (1991), one might wonder why individual level perceptions of ability and opportunities to start firms are not included in our analyses. Indeed, Arenius and Minniti (2005) find a strong relationship between individuals' perceptions of entrepreneurship and their involvement in nascent entrepreneurship. However, we feel that the data poses methodological restrictions, since perceived ability, opportunities, and fear of failure are posed *directly after* questions on involvement in entrepreneurial activity. One would not expect many people involved in early-stage entrepreneurial activity to say that they did not have the skills to start a business or that they did not see opportunities to start a business – let alone that people already making actual preparations to start a firm would answer that fear of failure would prevent them from starting a business.

- Start-up skills: the percentage of those individuals who personally know a start-up entrepreneur (as above) and believe that they themselves have the required skills and knowledge to start a business.
- Regional opportunities: the percentage of entrepreneurs indicating that there are good opportunities for starting a business in the region where they live.
- No fear of failure: the percentage of those individuals who perceive good opportunities (as above) and indicate that fear of failure would not prevent them from setting up a business.

Other regional determinants involve regional population characteristics and regional economic attributes. The economic attributes included gross regional product (GRP) per capita in purchasing power parities, GRP growth, and unemployment rates. Data on economic attributes at the regional level are mainly drawn from the Cambridge Econometrics database on European Regions. In the case of missing values (in this instance, for unemployment rates) we used the Eurostat regional database. We also combined both data sources to derive regional population characteristics (population growth, share of people aged 18-34). We have used one determinant at the *national* level: the employment protection index (version 2) for, 2003, provided by the OECD. This index is a composite of three components measuring the protection of regular workers against (individual) dismissal, specific requirements for collective dismissals, and the regulation of temporary forms of employment (OECD, 2004a, p.5).

Table 4.1 presents the descriptions and sources of the independent variables entering the regressions. Table 4.2 depicts the descriptive statistics for the variables (only for the regions included in the empirical analysis). For our regression analyses, all independent variables at the regional and national level have been standardized.

Methodology

We applied multilevel analysis to investigate individuals' entrepreneurial behaviour[31]. Consequently, in our model individuals are hierarchically nested in their regional environment and regional environments are in turn nested in a national context. As in the classic example in educational studies where pupils are nested within schools, and will therefore differ from pupils in other schools (Van Duijn et al., 1999, Goldstein, 2007), it can be argued that people in entrepreneurial regions will resemble each other with respect to entrepreneurial behaviour. In effect, the assumption of independent observations is violated. Multilevel models – in contrast with standard multivariate models – control for the assumption of the independence of observations in grouped data. In terms of our specific analysis, this means that we acknowledge that some regional and national characteristics may shape individual entrepreneurial behaviour, and that this context may not be independent for individuals because of such influences as peer effects, regional role models, and knowledge spillovers. The co-variation between individuals' behaviour sharing the same regional externalities can be expressed by the *intra-class* correlation (Hox, 2002). With this, the between-regions variance contributes to individual behaviour in addition to the

31 The general idea of multilevel analysis is that individuals in the same social context show similar progressive behaviour. Most research cases are in educational studies on school performances: students learn through individual and class influences (Raudenbusch and Bruyk, 2002).

Table 4.1 Independent variables: definitions and sources

Variable	Description	Data source
Individual effects		
Age	Age in five age bands (reference category: 18-24 years)	GEM 2001-2006
Education	International Harmonized Education Level (reference category: no secondary degree)	GEM 2001-2006
Household Income	Household Income, 3 categories in third tiles per country (reference: lowest third tile)	GEM 2001-2006
Work Status	Harmonized Work Status (reference category: working)	GEM 2001-2006
Regional economic effects		
GRP per capita	GRP in PPS (European Union = 100), 2003	Cambridge Econometrics Database
GRP growth	Growth in GRP, between year t-2 and t-1	Cambridge Econometrics Database
Unemployment rate	Number of unemployed as percentage of labour force, 2001	Cambridge Econometrics Database & Eurostat Regional Database
Regional demographic effects		
Share 18-34 years	Share of people aged between 18-34 years in the 18-64 population, 2003	Eurostat Regional Database
Population growth	Growth in total population,, between year t-2 and t-1	Cambridge Econometrics Database
Population density	Number of inhabitants per km^2, 2003	Cambridge Econometrics Database
Regional entrepreneurial culture		
Know start-up entrepreneurs	Percentage of adult population 18-64 years (nascent entrepreneurs and business owner-managers excluded) who personally know someone who started a business in the past two years	GEM 2001-2006
– Perceived skills	Percentage of those who know a start-up entrepreneur (as defined above) indicating to have required knowledge and skills to start a firm	GEM 2001-2006
Perceived opportunities	Percentage of adult population 18-64 years perceiving good opportunities for start-ups in the area where they live	GEM 2001-2006
– No fear of failure	Percentage of those who perceive good opportunities (as defined above) indicating that fear of failure would not prevent them from starting a business;	GEM 2001-2006
National effects		
Employment protection	OECD Employment protection index (version 2), 2003	OECD

Table 4.2 Descriptive statistics for regional and national level variables

		Mean	Std.dev	Correlation Matrix												
				1	2	3	4	5	6	7	8	9	10	11	12	13
1	ESEA low growth orientation	2.8	0.9	1.00												
2	ESEA high growth orientation	0.7	0.4	0.38	1.00											
3	Know start-up entrepreneurs	0.37	0.07	0.24	0.29	1.00										
4	– Perceived skills	0.58	0.07	0.20	0.01	-0.39	1.00									
5	Perceived opportunities	0.32	0.13	0.02	0.25	0.33	0.01	1.00								
6	– No fear of failure	0.66	0.08	0.11	0.18	0.09	0.18	0.05	1.00							
7	Share 18-34 years	0.37	0.04	0.02	0.04	-0.11	0.27	0.04	-0.07	1.00						
8	Population growth	0.02	0.04	-0.06	0.01	-0.13	0.27	0.40	-0.15	0.48	1.00					
9	Population density	0.42	0.85	0.11	0.33	-0.07	0.06	0.01	0.12	0.21	0.02	1.00				
10	GRP per capita	108	52	-0.09	0.14	0.15	-0.15	0.21	0.05	-0.05	0.12	0.24	1.00			
11	GRP growth	0.12	0.07	0.09	-0.08	-0.16	0.22	0.09	-0.21	0.43	0.36	-0.04	-0.07	1.00		
12	Unemployment rate	7.37	4.60	-0.10	-0.16	0.02	-0.14	-0.31	-0.26	0.16	-0.22	-0.01	-0.18	0.11	1.00	
13	Employment protection	2.37	0.61	-0.16	-0.35	0.11	-0.11	-0.13	-0.34	0.32	0.21	-0.12	-0.10	-0.05	0.32	1.00

All descriptive statistics are based on 131 observations (regions) over 16 countries entering the regressions.
Note: Early-stage entrepreneurial activity (ESEA) variables are described here at the regional level but enter the regression as independent variables at the individual level.

variance between individuals. If standard-significance tests are used treating the individual as the single unit of analysis and regional level variables are included for each individual, the important assumption of the independence of residual error terms would be violated, potentially leading to large errors and too liberal significance levels (see for example Rabe-Hesketh and Skrondal, 2005). Processes that in fact play a role at different (individual or spatial) levels should not be analysed at only one level, since conclusions would be damaged by ecological fallacies (aggregated correlations and individual correlations are not the same, either in magnitude or in sign). Multilevel analysis has been developed for this reason; it resolves these kinds of problem (Hox, 2002).

As described by Hox (2002), Goldstein (2003), and others, we incorporate three fully-nested levels: the model assumes that we have data from K countries, with a different number of regions r_j for each country. Each region consists of n_i respondents. At the respondent level, variable Y_{ijk} denotes a binary outcome of respondent i in region j and country k. We assume that there is one explanatory variable X_{ijk} at the individual (respondent) level, a region-level explanatory variable Z_{jk}, and a country-level explanatory variable C_k. To model these data, in each group a separate regression model is formulated:

$$Y_{ijk} = \beta_{jk}^{\circ} + \beta_{jk}^{\circ} X_{ijk} + e_{ijk} \tag{4.1}$$

The variation of the regression coefficients β° is modelled by a region-level regression model:

$$\beta_{jk}^{\circ} = \gamma_{k}^{\circ\circ} + \gamma_{k}^{\circ 1} Z_{jk} + \xi_{jk}^{\circ}, \tag{4.2}$$

Finally, the variation of the regression coefficient $\gamma_k^{\circ\circ}$ is modelled by a country-level regression model:

$$\gamma_{k}^{\circ\circ} = \alpha + \delta_k C_k + \eta_k ; \tag{4.3}$$

This model is known as a three-level model with random intercepts. It differs from a usual regression model in that we assume that each region j has a different intercept coefficient β_{oj}, which is stochastically modelled – and in turn related to the country level. We have not modelled random slopes, meaning that the β^1 coefficients in (4.1) for the individual independent variables entering the regression have been assumed to be equal across regions and countries. We have incorporated a binomial logit-link in order to investigate the odds of being involved in different types of early-stage entrepreneurship[32]. The main objective of the study reported in this chapter is to describe the effect of regional conditions on individual entrepreneurial activity. In explaining our results in the next section, we therefore stress the results we find at the levels identified: individual, regional, and national.

32 We apply Stata's gllamm procedure (see Rabe-Hesketh and Skrondal, 2005), using the logit link from the binomial family.

4.4 Results: determinants of growth-oriented entrepreneurship

What determines involvement in growth-oriented entrepreneurship? The results are shown in Table 4.3. The first model shows the results of low-growth-oriented early-stage entrepreneurial activity as the dependent variable; the second model examines high-growth -oriented entrepreneurship.[33] At the individual level, we find strong associations between the human-capital and financial-capital variables and growth-oriented entrepreneurship, confirming findings in the literature (Schutjens and Wever, 2000, Bosma et al., 2004, Kim et al., 2006). These effects are much larger than for low-growth-oriented entrepreneurship. The control variables *age* and *gender* were also found to have statistically-significant relationships with growth-oriented entrepreneurship. We find that the unemployed, students, and retired people are less inclined than employed people to become involved in growth-oriented entrepreneurship; this is also the case for low-growth-oriented entrepreneurship.

With respect to our central issue, the additional effects of regional and national characteristics on involvement in growth-oriented entrepreneurship, we find no evidence of an effect of objective regional economic attributes on growth-oriented entrepreneurship. In contrast with our expectations, GRP level and GRP growth are not significantly related to growth-oriented entrepreneurship (in contrast with previous findings in national-level studies). Also, high regional levels of unemployment are not linked to growth-oriented entrepreneurship. A young regional population composition and high population density in particular relate positively to growth orientation, whereas these effects are absent for low-growth-oriented entrepreneurship. These findings indicate that, next to the individual level, the effects of age, and human and financial capital, there are additional regional level factors influencing growth-oriented entrepreneurship. High levels of population density and a relatively young population in a region may be favourable circumstances for entrepreneurs intending to recruit a substantial number of employees. We also found evidence of a positive effect of a high regional level of knowing new start-ups on individual firm-growth ambitions. If an individual lives in a region where the perceived abilities to start a firm (among those who know a start-up entrepreneur) are higher, the odds of being involved in growth-oriented entrepreneurship tend to rise. Quite unexpected is our finding that high regional levels of perceived opportunities to start a business are negatively linked to low-growth-oriented entrepreneurship, and do not relate to growth-oriented entrepreneurship at all. Also in contrast with our expectations, a lower regional level of *fear of failure* does not increase the odds of being involved in growth-oriented entrepreneurship. The most relevant regional characteristics for growth-oriented entrepreneurship, measured by averages of entrepreneurial attitude, are the rate of people knowing new start-ups and the rate of those people who judge that their start-up skills are good. Finally, in accordance with our expectations, we found a clear and significant negative relationship between employment protection at the national level and growth-oriented entrepreneurship.

33 We also conducted the analysis without accounting for the multilevel nature of the data by using an ordinary logit analysis. It was indeed observed that regional-level coefficients were overestimated if not accounted for in the multilevel nature of the data.

Table 4.3 Estimation results: explaining different types of early-stage entrepreneurial activity (ESEA) at regional level [a)]

	Low growth oriented ESEA			High growth oriented ESEA		
Individual effects						
gender (female)	-0.42	(0.02)	***	-1.15	(0.05)	***
age: 18-24		ref			ref	
age: 25-34	0.55	(0.04)	***	0.19	(0.08)	**
age: 35-44	0.51	(0.04)	***	0.14	(0.08)	+
age: 45-54	0.24	(0.05)	***	-0.15	(0.08)	+
age: 55-64	-0.10	(0.05)	*	-0.48	(0.09)	***
education: no secondary		ref			ref	
education: secondary degr.	0.11	(0.03)	***	0.27	(0.06)	***
education: post-secondary	0.22	(0.03)	***	0.52	(0.07)	***
education: graduate	0.30	(0.03)	***	0.74	(0.07)	***
household income: low		ref			ref	
household income: middle	-0.03	(0.03)		0.11	(0.06)	+
household income: high	0.00	(0.04)		0.66	(0.07)	***
work status: employed		ref			ref	
work status: unemployed	-0.63	(0.06)	***	-0.70	(0.13)	***
work status: student	-1.39	(0.11)	***	-1.39	(0.21)	***
work status: retired	-1.50	(0.11)	***	-1.59	(0.24)	***
work status: other	-1.19	(0.09)	***	-1.26	(0.24)	***
Regional economic effects						
GRP per capita	0.00	(0.03)		-0.03	(0.04)	
GRP squared	0.01	(0.01)		0.01	(0.02)	
GRP growth	0.01	(0.01)		-0.02	(0.02)	
Unemployment rate	0.04	(0.02)	+	0.03	(0.03)	
Regional demographic effects						
Share 18-34 years	-0.01	(0.02)		0.05	(0.03)	+
Population growth	0.03	(0.02)		-0.01	(0.03)	
Population density	0.00	(0.02)		0.06	(0.02)	**
Regional entrepreneurial culture						
Know start-up entrepr.	0.14	(0.03)	***	0.10	(0.04)	**
- Perceived skills	0.04	(0.02)	+	0.08	(0.03)	**
Perceived opportunities	-0.08	(0.02)	***	0.03	(0.03)	
- No fear of failure	-0.01	(0.02)		-0.03	(0.03)	
National effects						
Employment protection	-0.03	(0.03)		-0.23	(0.04)	***
Constant	-3.54	(0.06)	***	-5.04	(0.12)	***
Number of observations		359,469			359,469	
Number of regions		131			131	
Number of countries		16			16	
Log Likelihood		-42981.19			-14137..38	

*** p<0.001, ** p<0.01, * p<0.05. +p<0.10

Standard errors between parentheses. Observations over 131 regions nested in16 countries. Year dummies for 2002-2006 included in the regression but not reported.

[a)] All regressions performed using Stata (gllamm procedure with logit-link from binomial distribution) with random intercept for region and country levels. Test statistics supported the inclusion of random intercepts for regions and countries.

4.5 Conclusions and discussion

In this section we discuss the findings of the analyses of growth-oriented entrepreneurship and compare them with the results for low-growth-oriented entrepreneurship, the latter type until now making up the bulk of empirical studies in the geography of entrepreneurship.

In this chapter, we adopted a multilevel approach in order to investigate the regional and national determinants of involvement in growth-oriented entrepreneurial activity. Our contribution to the existing studies explaining individual entrepreneurship is twofold. First, we have identified a specific type of entrepreneurship at the individual level: growth-oriented early-stage entrepreneurship. This is important, since the previous literature documenting the link between entrepreneurship and economic growth often takes ambitious forms of entrepreneurship as a point of departure. However, only a small share of all the people involved in early-stage entrepreneurship has explicit growth ambitions. The largest share aims only at self-employment (see Acs, 2008). Second, we have taken into account individual, regional, and national effects and modelled the spatial levels accordingly in our empirical analysis. The outcomes at the individual level were highly significant and very similar to the documented results in the literature on the growth of new and small firms.

We found no evidence of a positive impact of GRP growth on the odds of being involved in growth-oriented entrepreneurship. The state and development of regional income, as measured by objective indicators, is not associated with growth-oriented entrepreneurship when other (individual) characteristics and regional entrepreneurial culture features are controlled for. However, when the analysis is repeated without the individual characteristics, resulting in a multilevel analysis of region and country characteristics alone, again no impact can be seen of regional income on the odds of being involved in growth-oriented entrepreneurship[34]. This finding is in contrast with our results in chapter 3, where we focused on the regional prevalence rates of people involved in high-growth-oriented entrepreneurship, also in a multilevel model[35]. There, we found that regional levels of growth-oriented entrepreneurship, controlled for other (regional and national) characteristics, showed a significant U-shaped relationship with regional prosperity levels. It seems that the switch from modelling the odds (this chapter) instead of regional rates (chapter 3) is sufficient to cause the impact of subjective regional characteristics to take over the GRP effect. This is probably the result of the greater emphasis on individual behaviour, individual valuations, and individual perceptions of the regional context in this chapter's analysis on the chances of individual involvement in entrepreneurship.

Indeed, as table 4.3 shows, we did find evidence of subjective regional factors affecting the odds of being involved in growth-oriented entrepreneurship. High regional levels of people personally knowing an individual who recently started a business have a positive impact on actual involvement in growth-oriented entrepreneurship. Also, high regional levels of individuals perceiving that they have mastered start-up skills (among those who personally know other start-up entrepreneurs), positively influence involvement in growth-oriented

34 Results are not shown here; available on request.

35 Note, however, that in chapter 3 some of the independent variables were defined differently.

entrepreneurship. Other regional entrepreneurial perception rates do not affect the odds of becoming a growth-oriented entrepreneur. Regional levels of individuals spotting good start-up opportunities and fear of entrepreneurial failure among those who see good start-up opportunities seem to have no effect on growth-oriented entrepreneurship. What do matter, however, are high population density and young age of the regional population. The importance of urban areas for high-growth-oriented entrepreneurship may be an important micro-level mechanism that helps explain urbanization economies (see Duranton and Puga, 2004)[36]. Our findings on the positive impact of regional levels of population density, knowing other new entrepreneurs, and a young age structure on the odds of being involved in growth-oriented entrepreneurship are quite robust, since they closely resemble the results of the models on regional rates of growth-oriented entrepreneurship reported in chapter 3.

At the national level, we found a profound negative effect of the degree of employment protection on growth-oriented entrepreneurship[37]. As hypothesised above, this may expose two mechanisms. First, high-level employment protection holds back current employees with a talent for entrepreneurship from discovering hidden entrepreneurial ambitions and realizing their future. These employees feel safe in their current employee-employer situation. A second mechanism that comes to light is that high national employment protection may lower growth ambitions among those who have already opted for entrepreneurship. In such an institutional context, it is more difficult (and more costly) to fire employees and this may function as a barrier to growth aspirations. Further research into the effects of employment protection (or social security in general) on specific types of entrepreneurship is required (see also Hessels et al., 2008; Henrekson, 2005).

How and to what extent do the (regional and national) drivers of growth-oriented entrepreneurship differ from or match those of low-growth-oriented entrepreneurship?
Concerning regional factors, the most important differences can be found regarding regional rates of population density, regional age structure, knowing start-up entrepreneurs, and perceived entrepreneurial opportunities in the region. The former two factors clearly relate positively only to growth-oriented entrepreneurship[38]. The levels of perceived entrepreneurial opportunities in a region are negatively related to low-growth entrepreneurship and not to growth-oriented entrepreneurship. It seems counter intuitive that, in regions where many people perceive good start-up possibilities, the rate of (low-growth) early-stage entrepreneurship lags behind the rate in other regions. Perhaps perceived competition plays a role here. Finally, as expected, the national-level indicator for employment protection has a strong negative effect on the odds of being involved in growth-oriented entrepreneurship, but has no effect at all on low-growth entrepreneurship. This difference was also found in chapter 3 when regressing regional levels of growth-oriented entrepreneurship on employment protection.

---

36 These relationships are explored in more depth in Chapter 8

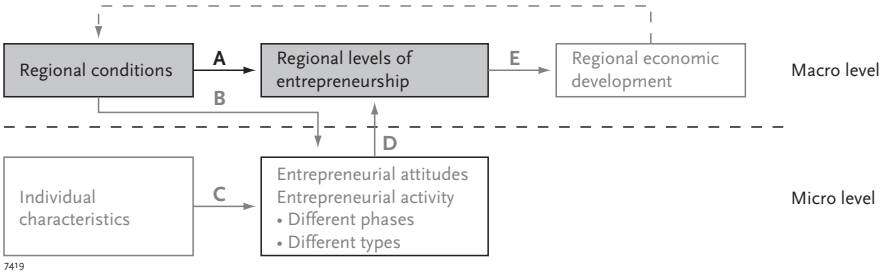
37 This effect was also found in one of the models on regional rates of growth-oriented entrepreneurship in chapter 3

38 Again, the regional level model in chapter 3 yields the same results.

These outcomes seem to suggest that regions with high population density, high levels of people knowing start-up entrepreneurs, and low levels of employment protection are particularly favourable to growth-oriented entrepreneurship. These outcomes provide valuable insights, since loosening employment protection is regarded as an important issue for European policymakers. Lowering the levels of employment protection might actually help stimulate employment growth in the long term, because more growth-oriented entrepreneurs could be expected to create employment. Nevertheless, the policy debate about optimal levels of employment protection is about finding a good balance between stability for employees (high employment protection) and dynamics in economic activity (low employment protection). Both have their benefits and the optimal balance may differ per country and even per region. We have demonstrated that the returns to dynamics in economic activity are not only about the benefits of employment flexibility; they are also about enhancing growth-oriented entrepreneurship. This new insight may help policymakers in making their decisions.

Of course, our study has its limitations. A first limitation concerns the variables used and their measurement. The regional subjective indicators used are composed of interview questions on perceptions about just *starting* a business, while we focus on the growth ambitions of people starting a business with expectations of considerable employment growth. In addition, in order to unravel the mechanism behind the employment-protection effect, we would like to include potentially-relevant variables, that is, national regulations on sick leave, incorporation legislation, labour security, and income security (Henrekson, 2005). We would also like to include information on incorporation legislation and the supply of regional capital. A second issue concerns the availability of data, the lack of which restricts our definition of regions. As a result, we can only distinguish relatively-large regions, although this is still a more fine-grained level of analysis than the national level for most countries. A third limitation is that we have been measuring involvement in growth-oriented entrepreneurship as a homogenous category, while there are indications that this involvement might come from two different groups: first, ambitious adults who either choose to realize their ambitions in an existing firm or take the entrepreneurial route and are preparing a growth-oriented new business; second, young business owners who have to decide whether they want to grow their business or whether they only want to be self-employed. The decision of the first group involves a particular occupational choice (whether to become an employer), while the decision of the second group reflects a growth choice in a (young) business-owner context. This limitation brings us to interesting future research questions that deal more adequately with this heterogeneity of growth-oriented entrepreneurship.

5 The Geography of New Firm Formation: Evidence from Independent Start-ups and New Subsidiaries in the Netherlands[39]



5.1 Introduction

Regional governments have been competing for employment, entrepreneurship and productivity for centuries. So when Michael Porter narrowed his "Competitive Advantages of Nations" to the regional level, in a period in which data collection was thriving, this certainly boosted the creation of new regional indices (Porter, 1990; Porter, 2000; Kitson et al., 2004). However, the relevance of the regional (sub-national) scale was certainly not new. As regards entrepreneurship, this was already confirmed by the high degree of variance in firm entry rates across regions, as found in the first waves of consistent regional data collection on firm formation (see e.g. Reynolds et al., 1994). Furthermore, globalization and openness of markets, especially in the European Union, fed the notion that regions were gaining importance over nations. The research question "what determines the rate of firm entry" was initially primarily analyzed at the industry level (Mansfield, 1962; Orr, 1974) although Hoover and Vernon (1962) already pointed out differences in spatial scales. By now it is generally acknowledged that the regional dimension must be included (Fritsch and Schmude, 2006). The question has become even more relevant because some recent empirical studies find a significant effect of different aspects of business dynamics on regional economic growth (e.g. Audretsch and Keilbach, 2004b; van Stel and Storey, 2004; van Stel and Suddle, 2008). [40]

39 This chapter has been published as Bosma, N.S., A.J. van Stel and K. Suddle, 2008, "The Geography of New Firm Formation: Evidence from Independent Start-ups and New Subsidiaries in the Netherlands", *International Entrepreneurship and Management Journal* 4(2),

40 These studies find a positive net effect of the number of start-ups on regional employment growth. In contrary to most studies that use gross entry, Bosma, Stam and Schutjens (2006) investigate the impact of turbulence (sum of entries and exits) on growth of total factor productivity for the Netherlands. They find a positive effect for services and no effect for manufacturing

The effect of regional economic conditions on new firm formation has already been documented extensively since the early, 1990s using firm formation data at the regional level that became available since the early, 1980s (see e.g. Audretsch and Fritsch, 1994a; Keeble and Walker, 1994; Reynolds, 1994). Determinants of entry were primarily derived from the type of models explaining annual entry rates across sectors from an industrial organization perspective (see e.g. Siegfried and Evans, 1994, Carree and Thurik, 1996). A new set of studies added spatial economics to this type of research (Fotopoulos and Spence, 1999, Armington and Acs, 2002; Nyström, 2005; Van Oort and Stam, 2005). These studies demonstrated the importance of localization and urbanization economies for firm formation rates in a region.

The data used in the current chapter show that, in the past decade, the Netherlands has witnessed an increase in the number of new subsidiaries, relative to the total number of entries from 32% in, 1988 to 39% in, 2002. The regional average in this period ranges from 16% to 46%. In this chapter we argue that the incentives for establishing a firm in one particular region are essentially different for independent start-ups as compared to new subsidiaries. In general, the independent firm founder will base his or her choice whether or not to start a firm on the expected rewards of this new firm, relative to an alternative option such as becoming or remaining an employee with more certainty on monthly earnings, see e.g. Kihlstrom and Laffont (1979, 1983), Parker (2004). This choice may be contingent on location factors but the decision is very much an intrinsic one. Research has shown that practically all firm founders start their venture in their own region (Figueiredo et al., 2002; Stam, 2007). This suggests that the number of independent firm founders who choose the location of their firm primarily on the basis of regional characteristics is very limited. For example, only 25% of firm founders in the Netherlands even considered an alternative location before they started their firm (EIM, 2002). As regards the formation of new subsidiaries, location matters can be expected to receive much more attention. Because the founders of the subsidiary company often do not have to work in the subsidiary company themselves, they may choose the best location without having to consider the consequences for their personal life of moving to another region. In other words, the choice of location can be made purely on profit maximizing grounds. These aspects will vary among different regional production milieus, i.e. infrastructure, costs structure, local demand etc. Therefore we expect that specific location characteristics captured by measures of localization economies and urbanization economies may be particularly important determinants of the number of new subsidiaries.

Although there is an extensive literature on the determinants of regional new firm formation, to our knowledge there are no studies investigating the determinants of the number of independent start-ups and the number of new subsidiaries separately. As regards the Netherlands the study by Wever (1984) only *described* the differences between independent start-ups and branch plants in the Netherlands. The data base employed in the present chapter enables us to distinguish between these two modes of entry. Using a data base at the Dutch regional and sectoral level for the period, 1988-2002, we investigate to what extent the determinants of independent start-ups and new subsidiaries are different. We include determinants on the demand side and supply side of entrepreneurship (see Verheul, et al., 2002, for a conceptual framework). In this we highlight the effects of localization economies and urbanization economies from the economic geography

literature, as well as policy environment variables. As argued we expect that particularly localization economies and urbanization economies may have a strong impact on the number of new subsidiaries as compared to the number of independent start-ups.

The setup of this chapter is as follows. We start with a review of the literature, followed by descriptions of our database, our research model and our methodology. The final sections are used for the description and interpretation of our estimation results.

5.2 Review of the Literature

From the early, 1990s several empirical studies have shown that a high proportion of regional variation in firm births in several European countries can be explained by appreciating the specific characteristics of different regions within countries (a.o. Audretsch and Fritsch, 1994a; Keeble and Walker, 1994; Reynolds et al., 1994, Armington and Acs, 2002). These relevant factors can be grouped under the following broad headings: (i) demand and supply factors for entrepreneurship, (ii) agglomeration effects and (iii) cultural or policy environment determinants. Below we assess these groups of determinants from the empirical literature that predominantly takes independent start-ups as a point of departure. At the end of this section we briefly discuss the expected differences between determinants of independent entry and determinants of new subsidiaries by relating this to the empirical literature of location determinants of multinational enterprises.

Demand and Supply for Entrepreneurship
Since new businesses tend to serve local markets, spatial variations in local consumer demand conditions are likely to be important in the demand for entrepreneurship. Among others, Keeble and Walker (1994), Reynolds et al. (1995) and Armington and Acs (2002) find that population growth has a significant positive effect on entry rates. Income is another factor that influences demand in a specific region, as increased levels of incomes increase demand. However income growth also implies greater access to capital for a potential entrant (e.g. Reynolds, 1994) and can as such be seen as a supply factor. For one particular form of income, viz. wages, there may also be negative effects involved as increased wage rates increase the opportunity costs of self-employment, and also the cost of hiring workers (Ashcroft et al., 1991). Hence the overall effect of wages may be positive or negative. Expected profitability can also explain entry, although data are not easily available (e.g. Siegfried and Evans, 1994). Next, economic output is a driver of the dynamics of entry, as this may indicate favorable economic conditions for running a firm (Audretsch and Keilbach, 2004b). The spatial variation in industry mix may also be important, as a high degree of services in a certain area may provide more opportunities for new firm formation because of lower average start-up costs (e.g. Fritsch, 1997). Likewise, a smaller degree of manufacturing has a positive effect on the start-up ratio (Evans and Leighton, 1989; Reynolds et al., 1995). A final demand factor is the size structure of local industry. The idea is that greater competition in a region contributes to new firm formation. Areas with a relatively greater amount of small scale activity therefore tend to have higher birth rates *ceteris paribus* (cf. Ashcroft et al., 1991; Fotopoulos and Spence, 1999; Armington and Acs, 2002; Gabe, 2003).

Unemployment may be important in the supply side context of new firm formation, as the unavailability of paid employment opportunities may increase the self-employment rate and thus entry (Storey, 1991; Evans and Leighton, 1990; Johnson and Parker, 1996). However, the role of unemployment in influencing spatial variations in new firm formation rates is neither simple nor consistent (Audretsch and Fritsch, 1994b; Stam, 2008b), as some studies show that a high unemployment ratio reflects a weak regional economic situation and thus hampers new firm formation (Reynolds et al., 1994; Carree, 2002; Sutaria and Hicks, 2002). Several studies have investigated the effect of the composition of population and labor force on firm entry. The proportion of highly skilled labour (cf. Audretsch and Fritsch, 1994a; Fotopoulos and Spence, 1999) and the proportion of college graduates (cf. Armington and Acs, 2002) have a positive effect on new firm formation. Also, demographic characteristics may be relevant determinants on the supply side. Age, gender and ethnic origin are particularly relevant (resp. Evans and Leighton, 1989; Verheul, 2005; Clark and Drinkwater, 1998).[41] The availability of financing is a further supply side factor found to be important in explaining regional variation in firm birth rates (Reynolds et al., 1994). Finally, personal wealth may be important in the context of new firm formation. It can be measured by household income, the presence of owner-occupied housing, housing prices and land prices. Reynolds et al. (1995) find a weak positive effect for the US, but Ashcroft et al. (1991) find a significant positive effect of owner-occupied housing on new firm formation in the British counties.

Agglomeration Effects

Whereas the above general demand and supply factors are relevant for analysis on individual, sub-national and national level, agglomeration effects particularly relate to the sub-national scale. Agglomeration effects contribute to new firm formation via increased local market opportunities in terms of customers and required inputs (Reynolds et al., 1994; Fritsch et al., 2006). Also a higher diversity of the population in dense areas leads to a higher variety in demand for products and services, which, in turn, stimulates the emergence of niche markets. Positive agglomeration effects also include access to a broader labor market, the sharing of research organizations and the easier diffusion of (tacit) knowledge (Werker and Athreye, 2004, p. 508). Hence, heavily populated areas are attractive locations to start new firms. Several studies show that agglomeration, controlled for other determinants, indeed has a positive impact on the rate of new firm formation (Audretsch and Fritsch, 1994a; Keeble and Walker, 1994; Reynolds et al., 1994; Armington and Acs, 2002).

Proxies of agglomeration effects are the degree of localization and the degree of urbanization. Localization economies differ from urbanization economies in that localization economies are associated with benefits for firms that arise when locating near to other firms in the same industry, while urbanization economies are associated with benefits for firms that arise when locating near to firms irrespective of their activity (Frenken, Van Oort, Verburg and Boschma, 2007). Benefits emerging from localization economies include transmission of (tacit) knowledge between firms locating close to each other (knowledge

41 However, the relevance of some demographic determinants heavily depends on the regional scale of analysis. For example there is often very limited regional variation in age distributions and practically none in gender distributions within countries at the Nuts1 or Nuts2 level.

spillovers). Nyström (2005) argues that within-industry agglomeration may increase the creation of strong knowledge-intensive regional clusters for innovative entrepreneurship. Benefits emerging from urbanization economies are broader than knowledge spillovers and also include more general agglomeration benefits such as closeness of a large and diversified customer base, closeness of suppliers, access to a highly qualified labor pool, etc.

Negative agglomeration effects exist as well. For instance, if too many firms locate close to each other, it might cause increasing wages and increased input prices (including land use and housing) when they compete for the same resources, possibly deterring entry (Nyström, 2005; Arauzo-Carod and Teruel-Carrizosa, 2005). Negative effects of agglomeration also include congestion. However, as noted above, most studies report positive effects of agglomeration on new firm formation, suggesting that the positive agglomeration effects outweigh the negative effects.

Policy Environment and Culture

Governments may attempt to influence the demand for entrepreneurship and its supply directly or indirectly (Verheul et al., 2002). Indirect policy measures aim to stimulate demand and supply factors described above. In this section we focus on the effects of direct policy measures. Johnson and Parker (1996) argue that there may be spatial variations in the supportiveness of local authorities in relation to small business activity. Sutaria and Hicks (2002) use the local government spending, proxied by the local government's per capita expenditure on service delivery. Also, taxation and interest rates can be relevant, but it is likely that the regional influence within countries is small. Cultural differences are at play to a very limited extent within national borders (Davidsson and Wiklund, 1997, Wennekers, 2006). A pervasive problem with investigating the effects of local policy in empirical analyses is the limited availability and quality of the data.

Determinants of Regional Variation in the Number of New Subsidiaries

What can we expect regarding differences in determinants between independent entry and new subsidiaries? Since there is practically no existent empirical research into the determinants of regional variation in new subsidiaries we adopt the findings in the literature on location decisions of multinational enterprises (MNE's). In this, we assume that for new subsidiaries similar processes are underlying the location decisions as those for multinational enterprises. The empirical literature points at the importance of most of the determinants discussed above, but the balance may be different. Coughlin and Segev (2000), for instance, find significant impacts of economic size, educational attainment, localization economies and urbanization economies on firm formation for MNE's in US manufacturing. In addition, they found the region's transportation infrastructure (measured by the existence of an interstate highway), as well as state and local taxes (negative) to play a key role. The latter finding is confirmed in Holl (2004) for (primarily) independent entry in manufacturing and services in Portugal. It must be noted however, that it is difficult to disentangle the effects of infrastructure from the effects of urbanization economies and economic size. From a conceptual point of view and considering the findings in the empirical MNE literature we expect that localization and urbanization advantages especially relate to the creation of new subsidiaries. As regards policy environment, it depends on the kind of policy measures considered. For example, regional differences in taxes might, conform the findings by Coughlin and Segev (2000) for MNE's, especially affect new

subsidiaries. Other measures that aim at reducing barriers to start especially from the individual's point of view would be particularly beneficial for increasing the number of independent start-ups.

5.3 Data and Methodology

Data

We use a regional panel dataset on annual numbers of independent start-ups and new subsidiaries for the Netherlands, identifying 40 regions at the Nuts3 level in a 14 year period (1988-2002). The Nuts3 level is the most suitable level of territorial aggregation for the Netherlands (cf. Kleinknecht and Poot, 1992; van Stel and Nieuwenhuijsen, 2004). It consists of functional regions that indicate a regional labor market. The data are provide by the Dutch Chamber of Commerce and based on new registrations.[42] The definition of new subsidiaries excludes spin-outs; a condition is that an existing firm is accountable of initiating the new firm.

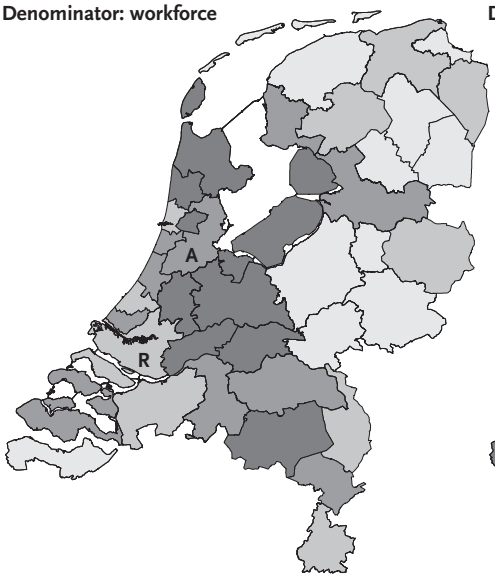
Entry Rates in 40 Regions in the Netherlands

Audretsch and Fritsch (1994b) set out two approaches in measuring entry. The first measure applies the so-called 'labor market approach', in which annual firm formation is related to the number of employees (in the same region, sector and year). This reflects the assumption that new entrepreneurs originate from the existing pool of labour. The second measure, known as the 'ecological approach', calculates entry rates based on the stock of existing firms. Audretsch and Fritsch show that the two measures demonstrate very different patterns for Germany. In most empirical studies investigating determinants or economic consequences of regional entry rates, the labour market approach is applied (see e.g. van Stel and Storey, 2004). The difference in the two approaches mirrors our conceptual argumentation to separate independent start-ups from start-ups originating from incumbent firms. Thus, we relate independent entry to the workforce in the same region, while the number of new subsidiaries is related to the number of existing firms. In other words we assume that independent entry stems from the existing pool of labor while new subsidiaries stem from the stock of existing firms.

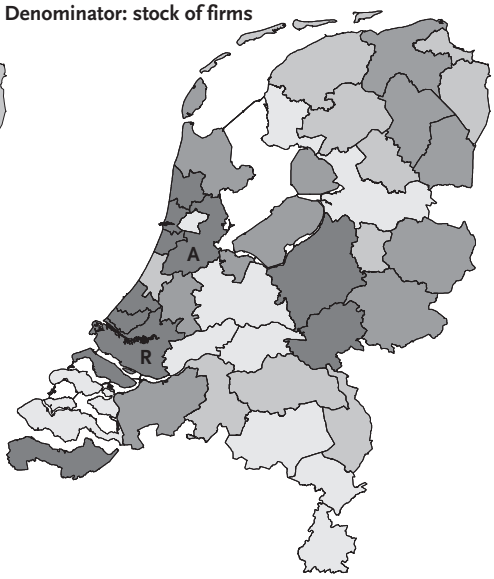
Regarding the time dimension, Fritsch and Mueller (2006) report that the level of regional new firm formation activity shows a pronounced path dependency and persistence over time. Regions with relatively high rates of new firm formation in the past are likely to experience a corresponding high level of start-ups in the near future. This pattern is found for the Netherlands as well. Figure 5.1 sets out the regional patterns for independent start-up rates (left hand side) and new subsidiaries (right hand side). The upper graphs A1 and B1 are averages for 1988-1992; the lower graphs A2 and B2 refer to the same measures one decade later. We see for both time spans that independent entry is concentrated within the central area known as the Randstad. However the Netherlands' two largest cities (and mainports) Amsterdam and Rotterdam, although part of the Randstad, are not in the highest level category. Focusing on the right hand side in figure 5.1, the Amsterdam and

42 In our data base registrations of new independent startups are separated from registrations of new subsidiaries and new branch plants.

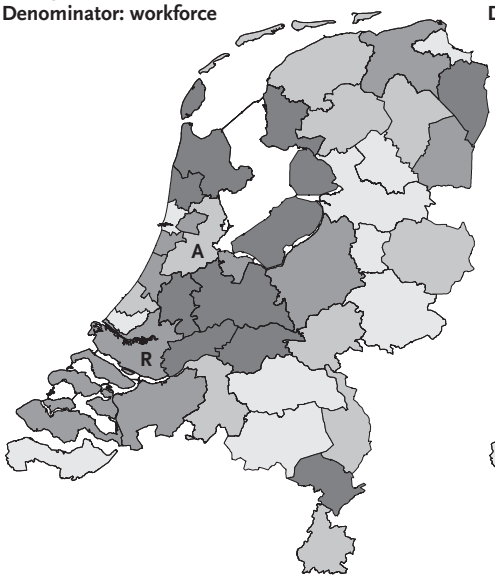
A1. Independent Entry Rates, average 1988-1992, in quartiles. Denominator: workforce



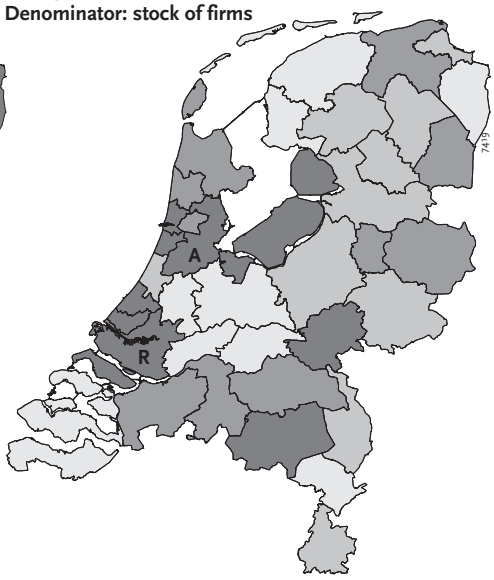
B1. New Subsidiaries Rates, average 1988-1992, in quartiles. Denominator: stock of firms



A2.Independent Entry Rates, average 1998-2002, in quartiles. Denominator: workforce



B2. New Subsidiaries Rates, average 1998-2002, in quartiles. Denominator: stock of firms



Note: A=Amsterdam Region, R=Rotterdam region
Source: EIM based on Dutch Chambers of Commerce

Figure 5.1 Firm formation rates for independent entry and new subsidiaries, over two time frames

Rotterdam regions exhibit consistently high rates of new subsidiaries. Here we also see more changes between the two time frames; especially the southern area near Eindhoven has gained more new subsidiaries. In general there seems to be an optical negative correlation between regional rates of independent entry and new subsidiaries: regions in the highest category of independent entry rates are not in the top category of rates of new subsidiaries and vice versa. However, although the correlations are indeed negative for both periods (-0.21 for, 1988-1992 and -0.11 for, 1998-2002), they are not statistically significant. Still, since we intend to explain both modes of new firm formation, we have to acknowledge their possible interdependence in our empirical analyses. We will elaborate on this in the next section.

Methodology

While demonstrating geographical variations in entry rates is a valuable exercise, there is no guarantee that using these rates enlightens our objective to assess the determinants of new firm formation (rather than determinants of new firm formation *rates*). Instead, we view the size of the workforce and the stock of existing firms as control variables in explaining the number of respectively new independent firms and new subsidiaries. As the propensity to start firms differs across sectors, the coefficients for the scaling variables are expected to differ across sectors of industry.

Accordingly our empirical model can be described by equations (5.1) and (5.2). The dependent variables $ENTRY^{ind}$ and $ENTRY^{sub}$ are the annual numbers of independent start-ups and new subsidiaries respectively; N_{workf} is the size of the workforce (number of employees added with the number of people receiving an unemployment benefit) while N_{firm} is the number of existing firms. We explicitly allow the coefficient γ to deviate from unity in both equations; regressing entry *rates* would come down to forcing γ to be equal to one. Demand and supply factors related to entrepreneurship are captured in the matrix *X*, including the incentives and barriers, agglomeration effects and policy environment discussed in the literature section. Policy environment effects may be present if the qualities of institutions differ across regions and/or institutions may change over time. For the Netherlands we have no evidence of institutional or cultural differences that would affect regional variation in start-up behaviour. We do investigate a possible institutional effect over time by measuring the impact of an important relaxation of the Establishment Act in the Netherlands in, 1993 (see e.g. Carree and Nijkamp, 2001).

$$\ln(ENTRY^{ind}) = \alpha^{ind} + \gamma^{ind} \ln (N_{workf}) + \beta^{ind} X + \varepsilon^{ind} \quad (5.1)$$

$$\ln(ENTRY^{sub}) = \alpha^{sub} + \gamma^{sub} \ln (N_{workf}) + \beta^{sub} X + \varepsilon^{sub} \quad (5.2)$$

We estimate equations (1) by taking logarithms. If γ will be close to one, this would *ceteris paribus* reflect a constant start-up rate with respect to the workforce (γ^{ind}) or stock of firms (γ^{sub}). Therefore, we test if γ differs significantly from 1. We estimate three models, an aggregate model and two sector models. The first model is an aggregate model on the regional level (whole regional economy). To investigate sector differences we also estimate the equations separately for manufacturing and services. In our chapter the manufacturing sector includes the International Standard Industrial Classification code D, while the services sector includes the ISIC codes J, K, N, O and P. In the aggregate model regional

entry is corrected for regional differences in industry structures at the 1-digit level, using employment data. This is necessary as differences in sector structure may cause regional startup rates to be different. Annual firm formation and independent variables are controlled for sector differences by imposing the national sector structure (see Ashcroft et al., 1991, van Stel and Storey, 2004).

When estimating the model there are a number of methodological issues to be dealt with. *First*, the two dependent variables in our study are mutually correlated and so may the error terms. Although the correlation between independent entry and new subsidiaries is positive (coefficient ranges from 0.59 in, 1990 to 0.80 in, 2002), the correlation between the error terms could be zero or negative. Therefore we use SUR (seemingly unrelated regression) as estimation technique. SUR estimation provides separate sets of coefficients for both equations but acknowledges correlations between the error terms of both equations (Zellner, 1962; 1963). *Second*, as we are mainly interested in the effect of the geography variables which hardly vary over time, fixed effects estimation is not a suitable estimation technique, even though our data base has a panel structure. We will not include regional dummies because it would make us unable to estimate the effect of the geography variables. *Third*, as shown in the data section, start-up rates are heavily correlated over time. The observations for the individual years between 1988 and 2002 are insufficiently independent and hence including all years in the sample may result in an underestimation of the standard errors of the estimated coefficients, yielding artificially high significance levels. To deal with this problem we will use only four years that are equally distanced from each other: 1990, 1994, 1998 and 2002. We argue that the four-year distance between these sample years make the time observations sufficiently independent from each other.

Independent Variables
We include the following variables as scaling variables in our regression. *Workforce* is measured by the number of employees in each region plus the number of people receiving an unemployment allowance, in logarithm. For new subsidiaries, we take the log of the number of existing firms (at the beginning of the year) as the scaling variable.

We include three indicators measuring changes in demand and supply factors. *Growth in value added* is defined as the growth in value added between years t-3 and t-1. *Growth in the average wage rate* measures the development of the opportunity costs of self-employment in the same period. *Population growth* reflects increased supply as well as demand for new entrepreneurship and also relates to the period between t-3 and t-1. The supply side is also captured by the number of people that newly applied for an *unemployment benefit* in the region. We finally include a dummy variable indicating whether or not there is a university in the region.

We include two agglomeration indicators. The first is the number of active firms in the same sector relative to population. It captures the importance of clustering and within-sector knowledge spillovers (*localization economies*). A disadvantage of our measure is that the sectors may be too broadly-defined to adequately measure localization economies. In the analysis for the entire regional economies we will interpret this variable merely as a measure of competition. The degree of *urbanization* is measured by the percentage

Table 5.1 Determinants of new firm formation included in this study

	Expected signs	Findings in literature	Source
Demand & supply			
Growth in value added - Percentage growth between (t-3) and (t-1) in the region	IND + SUB +	Reynolds (1994) +; Siegfried and Evans (1994) +	Statistics Netherlands
Growth in wage rate - Percentage growth between (t-3) and (t-1) in the region	IND +/- SUB +/-	Ashcroft et al. (1991) -; Armington and Acs (2002) +	Statistics Netherlands
Population growth - Percentage growth between (t-3) and (t-1) in the region	IND + SUB +	Keeble and Walker (1994) +; Armington and Acs (2002) +; Reynolds et al. (1995) +	Statistics Netherlands
(Entry in) Unemployment - Number of people who newly applied for unemployment benefit in the region, relative to regional population	IND +/- SUB +/-	Evans and Leighton (1990) +; Storey (1991) +; Reynolds et al. (1994) -; Audretsch and Fritsch (1994) +/-; Johnson and Parker (1996) +; Carree (2002) -	Statistics Netherlands
University presence - Dummy variable: 1=presence of university	IND + SUB +	Armington and Acs (2002) +	
Agglomeration			
Localization economies - Number of existing firms in the region relative to regional population	IND + SUB +	Keeble and Walker (1994) +; Armington and Acs (2002) +	Dutch Cambers of Commerce, Statistics Netherlands
Urbanization economies - Percentage of people in the region living in highly urbanized areas, in 2000	IND 0/+ SUB +	Reynolds et al. (1994) +; Arauzo-Carod and Teruel-Carrizosa (2005) +; Coughlin and Segev (2000) +	Statistics Netherlands
Policy environment			
Policy change in 1993 - Year dummies	IND + SUB 0/+	Carree and Nijkamp (2001) +	

of people living in a highly urbanized or urbanized area.[43] It captures general benefits of locating in dense regions. This measure is time independent and calculated for the year, 2000.

Our policy environment variable relates to the significant *relaxation of the Establishment Act* in, 1993. A large part of mandatory courses required for the new self-employed were abolished. There have been several studies that confirmed a significant increase of firm entries since that year (e.g. Carree and Nijkamp, 2001; Bosma et al., 2005). As this policy change was implemented in all Dutch regions in, 1993, we capture the policy effect by

43 These are based on item 1 of a five-item Corop-measure on the degree of urbanization that is formed by information at the zip-code level and provided by Statistics Netherlands. In this measure item 1 represents the percentage of people in the Corop region who live in a highly urbanized area and item 5 represents the percentage in a highly rural area.

examining the coefficients for the year dummies. The reference year in the regressions is 1990; therefore we expect a significant and positive impact for 1994, 1998 and 2002.

The determinants included in this study are summarized in Table 5.1, along with the data sources, findings from other studies and hypothesized sign based on the theoretical section. As argued in the previous section, we expect differences between determinants of independent entry and those of new subsidiaries for urbanization economies and, to lesser extent, for localization economies. Considering the nature of the policy change, which is aimed at reducing barriers to entry for individuals, we expect this variable to primarily influence independent start-ups.

5.4 Results

The results of the regression for the entire regional economies are presented in table 5.2. Both scaling variables, the working force for independent entry and the stock of firms for new subsidiaries, appear to be close to unity; the coefficients do not significantly deviate from 1. Nonetheless, the coefficient for new subsidiaries appears to be higher than the one for independent start-ups in all regressions. This was to be expected considering the increasing share of new subsidiaries in total new firm formation. Growth in value added is positively linked to independent firm formation – which supports the findings of e.g. Reynolds et al. (1994) and Siegfried and Evans (1994) – while the rate of newly unemployed affects the number of independent start-ups negatively. Apparently, and similarly to e.g. Reynolds et al. (1994) and Carree (2002), the hypothesized negative influence caused by the business cycle outweighs the alternative hypothesized (positive) effect of the 'unemployment push' as found by Evans and Leighton (1990) and Storey (1991). For both determinants we find no effect on the number of new subsidiaries. This suggests that the business cycle – proxied by growth in value added and entry in unemployment – affects the degree of firm formation through independent firms rather than through new subsidiaries.[44] Yet the positive coefficient for, 1998, a very prosperous year for the Dutch economy, in the final column in table 5.2 may also be seen as a specific business cycle effect. Population growth is an important determinant for the number of new subsidiaries, reflecting an increase in demand for additional firms. Contrary to Armington and Acs (2002) in their study for the United Sates we do not find a significant effect for the presence of a university. As expected and already revealed by Figure 5.1, a high degree of urbanization involves relatively more new subsidiaries. The effect of the new Establishment Act seems to have had a clear impact on independent entry. All years since, 1993, the year in which the Act became effective, have significantly higher number of entries in comparison to, 1990, controlled for all other determinants – including those that relate to business cycle, such as growth in value added and unemployment rates. As hypothesized, the effect of this policy variable is stronger for independent start-ups.

44 If we use workforce as scaling variable in both equations, the SUR estimates of the unemployment rates are non-significant for both modes of entry. The non-robustness of the effect of this variable is in line with the mixed results found in the literature, see Table 1.

Table 5.2 SUR estimation results for aggregate model (whole regional economy)

	Independent Start-ups		New Subsidiaries	
Constant	-4.8	***	-4.7	***
	(10.2)		(9.7)	
Workforce	.99	***		
	(21.9)			
Stock of firms			1.08	***
			(19.4)	
Growth in value added	1.37	**	-.96	
	(2.4)		(1.3)	
Growth in wage rate	-1.32		2.51	
	(1.0)		(1.4)	
Population growth	.28		4.3	**
	(0.2)		(2.4)	
Unemployment rate	-6.6	***	2.2	
(newly unemployed)	(3.5)		(0.9)	
University presence	-.064		-.008	
	(1.4)		(0.1)	
Degree of localization	2.05		-.78	
(competition)	(1.1)		(0.3)	
Degree of urbanization	-.18		.70	***
	(1.1)		(3.4)	
Dummy 1994[a]	.34	***	-.18	
	(3.7)		(1.5)	
Dummy 1998[a]	.25	***	.20	**
	(4.6)		(2.8)	
Dummy 2002[a]	.25	**	.092	
	(2.0)		(0.6)	
R^2	0.93		0.92	
N	155		155	
Correlation between residuals of both equations:			-0.35	
Breusch-Pagan test of independence (p-value):			0.000	

Note: Absolute t-values are between parentheses.
* p <.05
** p <.01
*** p <.001
a Reference year is 1990.

For manufacturing (table 5.3), localization seems to be especially important with independent entry. Clustering of firms thus seems to be important in manufacturing, facilitating easier diffusion of (tacit) knowledge. However, we should be cautious since we deal with manufacturing as a 1-digit sector. We do not find a significant effect for new subsidiaries. Perhaps spillovers are relatively less important for new subsidiaries since they may dispose of specific knowledge through the mother company. In other words, they may be less dependent on spillovers to obtain new knowledge compared to independent start-ups. The degree of urbanization impacts both components of new firm formation similarly. New subsidiaries do not seem to be influenced by growth in wage rates and unemployment levels. This is in contrast to independent start-ups where growth in wage rate appears to deter entry, possibly due to the increased attractiveness of employment. The effects

Table 5.3 SUR estimation results for Manufacturing

	Independent Start-ups		New Subsidiaries	
Constant	1.24	***	-4.7	
	(6.6)		(9.7)	
Employment	0.74	***		
	(10.2)			
Stock of firms			1.08	***
			(19.4)	
Growth in value added	0.59		-.96	
	(1.2)		(1.3)	
Growth in wage rate	-2.89	**	2.51	
	(1.98)		(1.4)	
Population growth	4.03*		4.3	**
	(1.7)		(2.4)	
Unemployment rate	-13.56	***	2.2	
(newly unemployed)	(3.5)		(0.9)	
University presence	0.04		-.008	
	(0.5)		(0.1)	
Degree of localization	160.9	***	-.78	
	(4.8)		(0.3)	
Degree of urbanization	1.13	***	.70	***
	(4.4)		(3.4)	
Dummy 1994[a]	0.24	*	-.18	
	(1.7)		(1.5)	
Dummy 1998[a]	0.18	*	.20	**
	(1.8)		(2.8)	
Dummy 2002[a]	-0.13		.092	
	(0.9)		(0.6)	
R^2	0.77		0.81	
N	155		155	
Correlation between residuals of both equations:			-0.17	
Breusch-Pagan test of independence (p-value):			0.038	

Note: Absolute t-values are between parentheses.
* p <.05
** p <.01
*** p <.001
[a] Reference year is 1990.

associated with the rate of newly unemployed mirrors the results of the entire regional economies.

The results for services sectors are shown in table 5.4. The estimates of the scaling variable (indicating economic size) are higher than in manufacturing as in Holl (2004), reflecting the need of more spatial proximity in services. The outcomes of the general demand and supply resemble the outcomes in table 5.2. As regards agglomeration effects, we find a (weakly) positive effect for localization economies only for independent entry. We find a negative effect for urbanization economies in relation to independent entry. A possible explanation is that many new firms in services, although benefiting from spatial proximity,

Table 5.4 SUR estimation results for Services

	Independent Start-ups		New Subsidiaries	
Constant	2.41	***	-4.67	***
	(17.6)		(9.3)	
Employment	0.99	***		
	(18.0)			
Stock of firms			1.13	***
			(16.7)	
Growth in value added	1.26*		-1.65	
	(1.7)		(1.5)	
Growth in wage rate	0.24		1.04	
	(0.3)		(0.7)	
Population growth	0.33		5.03**	
	(0.2)		(2.0)	
Unemployment rate	-9.85	***	3.26	
(newly unemployed)	(5.2)		(1.1)	
University presence	-0.08		0.001	
	(1.4)		(0.0)	
Degree of localization	8.39	*	-4.68	
	(1.7)		(0.7)	
Degree of urbanization	-0.57	***	0.54	*
	(2.6)		(1.9)	
Dummy 1994[a]	0.20	**	-0.30	**
	(2.0)		(2.1)	
Dummy 1998[a]	0.05		0.20	*
	(0.6)		(1.8)	
Dummy 2002[a]	-0.08		0.15	
	(0.7)		(0.9)	
R^2	0.92		0.89	
N	155		155	
Correlation between residuals of both equations:			-0.38	
Breusch-Pagan test of independence (p-value):			0.000	

Note: Absolute t-values are between parentheses.
* p <.05
** p <.01
*** p <.001
[a] Reference year is 1990.

are less dependent on the availability of qualified labor and other urbanization advantages.[45] In other words, the incubator function of urbanization associated with the work of Hoover and Vernon (1962) is of less relevance for services. Unfortunately we cannot distinguish between high-skilled services and low-skilled services. For independent entry in high-skilled services we would have expected a positive effect of urbanization. The estimated impact of urbanization on the number of new subsidiaries is positive weakly significant, suggesting that positive agglomeration effects play a role in the location choice of new subsidiaries. The designed effect of the policy change, captured by the year dummies is not as pronounced

45 Also, many low-tech services (new) firms in rural areas sustain the viability of small village communities.

as in manufacturing. An interesting finding though, is the significant positive effect for independent entry in 1994 – directly after the relaxation of the establishment became effective – and the negative effect for new subsidiaries in the same year. This finding suggests that the policy change partly induced a shift from new subsidiaries to independent startups.

5.5 Concluding remarks

New businesses are important for economic development. Therefore there has been a substantial amount of studies explaining regional variations in firm formation. This chapter contributes to the existing literature by separating independent start-ups from new subsidiaries. As shown in figure 5.1, different spatial patterns exist in these two components of total firm formation for the Netherlands, which supports the idea to disentangle determinants of the numbers of new independent firms and those of new subsidiaries.

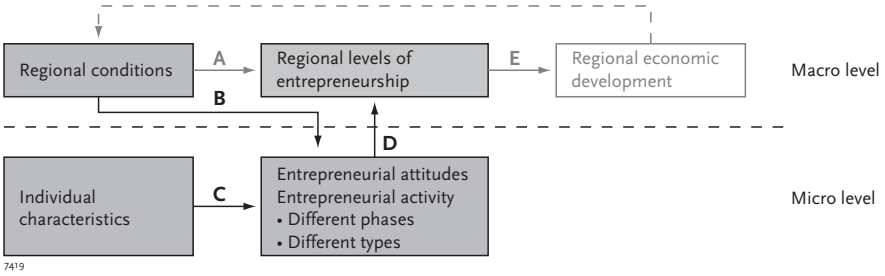
Implications
In general our findings as regards determinants of new firm formation confirm the findings in the existing empirical literature (see table 5.1); we found a significant influence for demand and supply factors and agglomeration effects. In this study we were particularly interested whether different types of agglomeration effects, i.e. localization and urbanization, impact rates of independent start-ups and rates of new subsidiaries differently. Our empirical exercises revealed three important results. *First*, urbanization economies have a particularly strong impact on the number of new subsidiaries, suggesting that general benefits of locating in dense areas are indeed important considerations for entrepreneurs when they choose a location to establish a new subsidiary firm. This effect is weaker for independent entry. *Second*, localization economies are particularly important for independent start-ups, implying large benefits (in particular knowledge spillovers) of clustering together with firms from the same sector. This effect is weaker for new subsidiaries possibly indicating a smaller dependence on spillovers to obtain new knowledge. *Third*, agglomeration effects are more important in manufacturing industries compared to services industries. This reflects the higher degree of knowledge-intensity in manufacturing firms. From a policy perspective these results suggest a careful assessment as regards the type of firms that will be attracted in any consideration of conducting regional policies to enhance entrepreneurship.

Apart from the effects of urbanization and localization, another notable finding of our work is the lack of an effect of the presence of a university in the region. Although we cannot claim to measure transfer of knowledge to new ventures since we cannot separate high-skill firms from low skill-firms, our results are in line with the general notion in the Netherlands that – while the quality of knowledge creation is at least acceptable – the degree of technology/knowledge transfer to (new) firms has been lagging behind so far (see EIM/Dutch Ministry of Economic Affairs, 2003). The same measure was found positive and significant for United States regions, for example (see Armington and Acs, 2002).

Limitations and Future Research

Mainly due to data limitations we were not able to include some of the determinants of (regional variation in) entry rates put forward in literature, such as the proportion of highly skilled labor, access to finance and the degree of small scale business activity. Nevertheless the principal, most commonly used determinants are included. Another limitation of our work is the high sectoral aggregation level applied. Future research investigating differences in determinants of new firm formation between different modes of entry should therefore aim for data at lower sectoral levels. However, to our knowledge there are no data sets available where firm demography statistics are simultaneously available at low regional *and* low sectoral levels, while also identifying different modes of firm formation. This defines an important challenge for statistical bureaux as well since the proportion of new subsidiaries in total new firm formation is considerable and shows, at least in the Netherlands, an increasing trend.

6 Whither a Flat Landscape? Entrepreneurial Perceptions and Entrepreneurial Activity in three Dutch regions[46]



6.1 Introduction

In this chapter we contribute to the set of studies that feature explanations of entrepreneurial attitudes and activity. From the early, 1990s, several empirical studies have shown that a high proportion of regional variation in firm births in several European countries can be explained by the specific characteristics of different regions within countries (see for example. Audretsch and Fritsch, 1994a; Keeble and Walker, 1994; Reynolds et al., 1994; Armington and Acs, 2002).

A full understanding of regional differences in entrepreneurial spirit (perceptions of entrepreneurship) and entrepreneurial activity requires an investigation that takes individuals into account (Feldman, 2001; Tamásy, 2006; Sternberg, 2009). After all, entrepreneurship is about people (Arenius and Minniti, 2005). *Regional* conditions are believed to affect *individual* entrepreneurial behaviour, for example in entrepreneurial attitude, the decision to set up a new firm or to create a new subsidiary firm. Aggregate characteristics of individual firm behaviour will thus vary across regions, resulting in a variety of regional levels of entrepreneurship dynamics.

In this chapter, we report our investigation of entrepreneurial attitudes and entrepreneurial activity in three contrasting labour-market regions in two stages. First, we explore regional differences in entrepreneurial activity by looking at several *types* of entrepreneur and *phases* in the entrepreneurial process (relation D in figure 1.1). At the individual level, we are able

46 Previous work to this chapter was published as Bosma, N.S., V.A.J.M. Schutjens and K. Suddle, 2008, Whither a flat landscape? Regional differences in Entrepreneurship in the Netherlands, EIM Scales Paper H200805. The empirical part of this study has been funded by the research program SCALES which is carried out by EIM and is financed by the Dutch Ministry of Economic Affairs.

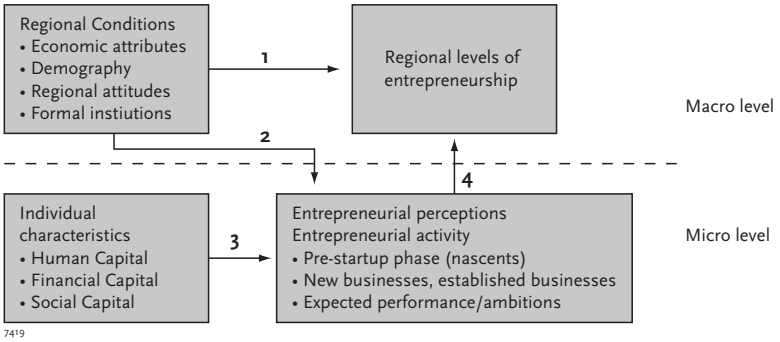


Figure 6.1 Micro-macro relations explaining regional differences in entrepreneurship

to identify participation rates in specific phases of the entrepreneurial process, ranging from vague perceptions to entrepreneurship (such as considering entrepreneurship as a realistic future career option) to preparing to start business or actually owning and managing a business. We are also able to explore different types of entrepreneurial activity, such as separating ambitious entrepreneurs (in terms of employment or innovation) from others irrespective of the sector concerned. Second, we investigate to what extent the observed regional differences in perceptions of entrepreneurship and involvement in entrepreneurial activity change when taking into account determinants at the individual level (relationships B and C in figure 1.1). We argue that the observed regional differences in levels of entrepreneurial activity become less pronounced if we control for individual characteristics.

Figure 6.1 illustrates the mechanisms described above. While most research focuses either on the macro level (relation 1) or the micro-level (relation 3), the effect of arrow 2 connecting the spatial barriers needs to be addressed. Although we are unable to investigate fully the impact of this relationship, since we only distinguish three labour-market areas, the evidence provided in the present chapter suggests that both the macro- and micro-levels should be considered for a full understanding of entrepreneurial attitude and activity at the regional level. The link from entrepreneurship at the micro-level to the macro level (type 4 relation) is merely an aggregation of the individual-level results.

The Global Entrepreneurship Monitor (GEM) research methodology (Reynolds et al., 2005) is useful for assessing these macro-micro types of relationship, since information is gathered at the individual level for both entrepreneurial attitudes and entrepreneurial activity. Although the main objective within GEM is to compare countries on their level of entrepreneurial activities, several regional approaches have been undertaken in, for instance, the United Kingdom, Germany, and Spain (see for example Tamásy, 2006; Bergmann and Sternberg, 2006; Levie, 2007; De la Vega Pastor et al., 2005). The present chapter draws on the GEM methodology for assessing entrepreneurial attitudes and entrepreneurial activity in three distinct regions representing different labour markets in the Netherlands.

The structure of this chapter is as follows. First, we discuss the relevant literature on the determinants of regional differences in entrepreneurial attitude and activity in section 6.2.

Next, we provide some background information on the three contrasting Dutch regions, along with some key figures. In section 6.4, we describe our data and the empirical research method we have used. In section 6.5, we present the results for the three regions. Finally, we present our conclusions, discuss the limitations of our study, and make suggestions for future research.

6.2 Theoretical background

Relevance of exploring regional levels of entrepreneurial attitudes
Entrepreneurship is a socioeconomic phenomenon. Consequently, the characteristics of entrepreneurship are contingent on the regional culture (Swedberg, 2000). In this respect, positive perceptions of entrepreneurship in the region may be an important cultural resource leading to higher individual engagement levels in entrepreneurial activity. Also, at the individual level, participation in entrepreneurial activity is (partly) explained by entrepreneurial perceptions such as the perception or recognition of opportunities, perceived ability or self-efficacy, and willingness or desirability (see for example conceptual models proposed by Krueger, 2000; Van Praag, 1996; Shane, 2003, Davidsson, 1995). Individual perceptions of entrepreneurship, possibly leading to involvement in entrepreneurial activity, may be affected by the regional entrepreneurial spirit.

There is ample empirical evidence of variation in entrepreneurial attitudes at the international and national levels. Both the annual GEM and Eurobarometer data (see for GEM Bosma et al., 2008a; for Eurobarometer Grilo and Thurik, 2006; Grilo and Irigoyen, 2006) have demonstrated that entrepreneurial attitude varies substantially among countries. Looking at the European context, the inhabitants of Southern Europe, the UK and Ireland in particular show relatively high self-employment preferences. The European Commission has expressed concern about the apparent difference in entrepreneurial attitudes between EU countries and the United States: on average 45 percent of EU citizens prefer to be self-employed whereas this percentage is 67 percent for the US (European Commission, 2003).

With respect to entrepreneurial attitudes at the regional level, the number of studies reported is still limited. Beugelsdijk and Noorderhaven (2004) derive an index relating to *enterprise culture*, which only indirectly links to entrepreneurship, and find significant differences between European regions. Tamásy (2006) uses regional GEM data for studying regional differences in Germany and also reports significant differences in entrepreneurial attitudes. Bosma and Schutjens (2009) also find that attitudes to entrepreneurship exhibit significant sub-national variation. Furthermore, they show that different components measuring entrepreneurial attitudes reflect different spatial patterns; there is, for instance, considerably more regional variance in the index measuring self-efficacy (perceptions of skills and knowledge to start a firm) compared with the index measuring fear of failure when it comes to starting a business..

As for the causal relationship between perceptions of entrepreneurship and involvement in entrepreneurial activity, there is still a gap in the entrepreneurship literature. One would ideally investigate this linkage at the individual level longitudinally, that is, in a panel

survey design. Arenius and Minniti (2005) and Tamásy (2006) establish a link between entrepreneurial perceptions and entrepreneurial activity using GEM data on the individual level. However, the cross-sectional nature of the data (perceptions of entrepreneurship and entrepreneurial involvement have been measured at the same point in time) does not allow firm conclusions to be drawn: almost any entrepreneur who is in the process of setting up a business would respond positively to such questions as: '*Do you have the skills and knowledge required to start a business?*'

Types and phases of entrepreneurship
Recent literature on entrepreneurship suggests that identifying the *type* of entrepreneurship is essential for making the link between entrepreneurial activity and economic growth: different types of entrepreneurship may have a different impact on a region's economic development (Sternberg and Wennekers, 2005). This distinction of different types of entrepreneurship makes it possible to disentangle the different micro-level behavioural mechanisms that drive the growth processes at the macro level. Different types of entrepreneurship exist, for example, with respect to the start-up situation and motivation (necessity versus opportunity) and high ambitions regarding employment growth or innovation.

Different entrepreneurial types can also be discerned according to phases or stages in the entrepreneurial process. We can disentangle, for example, *potential entrepreneurs* (Bosma and Wennekers, 2004), *nascent entrepreneurs* (Davidsson, 2006), *young firms* or *new businesses* (Acs et al., 2005a; Stam, 2005), and *serial entrepreneurs* (entrepreneurs starting a new business after closing another business, see Schutjens and Stam, 2006). The relative occurrence of different types of entrepreneurial activity may reflect the industry structure (cf. Van Oort and Stam, 2005) as well as the institutional structure, the innovativeness, and international orientation of the regional business population (Bosma et al., 2008a). For example, a population with many ethnic minorities may be related to a large number of new and young firms. Assessing different types of entrepreneurship requires identifying characteristics at the individual and/or the firm level. Entrepreneurship literature indicates that the human, social, and financial capital of individuals constitute important determinants of entrepreneurial activity and entrepreneurial performance (see for example Davidsson and Honig, 2003; Bosma et al., 2004; Tamásy, 2006; Kim et al., 2006).

Explanations of individual entrepreneurial attitude and activity
Individual entrepreneurial attitudes and activities can only be partly explained by personal or personality characteristics: "...(A)ny business activity is embedded in a broader socio-institutional context and therefore the economic dimensions or relationships cannot be separated from the socio-institutional ones.... (Rocha and Sternberg, 2005, p. 288)." Determinants of entrepreneurship must therefore be sought at the level of the individual and the context or region.

According to human capital theory (Becker, 1964), people invest in themselves in order to earn higher incomes. Investing in human capital also means that profitable entrepreneurial opportunities come within reach. Human capital consists of both formal and non-formal education; in the latter case, labour-market experience and vocational training add to one's knowledge and skills. However, the empirical results of studies on the positive effect

of human capital on entrepreneurship are rather mixed; possibly the effects of human capital are not straightforward (Gimeno et al., 1997). Opportunity costs also play a role: the unemployed face lower opportunity costs of entrepreneurship than highly-paid employees do. The previous labour-market position may therefore influence the setting up of a business.

There is abundant empirical evidence of a positive effect of substantial *financial capital,* such as income or wealth, on business start-up decisions (Blanchflower and Oswald, 1998; Kan and Tsai, 2006). New or unexpected financial gains in particular spur the probability of starting up a company (Santarelli and Vivarelli, 2007).

The *social capital perspective* on entrepreneurship emphasizes the links to the external environment and third persons in order to start a new firm; or, as Dimov (2007) put it, the social context influences the generation and shaping of ideas. This perspective is strongly related to the increasing attention for the stages through which would-be entrepreneurs go and the resources they subsequently need (Shane and Venkataraman, 2000; Stuart and Sorenson, 2003; Stam, 2007). The effect of social capital and, more specifically, social exchange patterns on the discovery process of nascent entrepreneurs has been studied and tested empirically by Davidsson and Honig (2003). Bonding social capital in particular, indicated by coming from entrepreneurial families, will increase the chance that an individual discovers (entrepreneurial) opportunities. Also, after this opportunity-recognition stage, when it comes to the point of actually realizing ambitions by starting and managing a firm, entrepreneurs have to rely on others to exchange resources, provide for initial credibility, opportunities, and start-up capital or market information. Entrepreneurship is simply no "..individualistic pursuit..."(Hanlon and Saunders, 2007, p. 619).

Linkage between regional conditions and individual entrepreneurial activity
In an extensive empirical study, Tamásy (2006) has investigated interregional differences in entrepreneurial activity (within Germany) and concludes that regions matter, also after controlling for personal attributes. Perceptions of entrepreneurship are shown to be very important in explaining entrepreneurial activity. This importance could be the result of selection bias, since the GEM questionnaire selects (nascent or new) entrepreneurs who are then inclined to agree strongly with the statement put to them on perceptions of one's own entrepreneurial skills. Regional differences are more pronounced when these individual-level perceptions are excluded. Davidsson and Wiklund (1997) have found only limited empirical evidence of the effect of values and beliefs on regional firm-formation rates. This lack may result from their focus on general cultural explanations and indicators rather than specific entrepreneurial values.

The impact of regional entrepreneurial attitudes on individual entrepreneurial attitudes and behaviour is the result of people's strong local embeddedness. New firms' founders are almost always local residents (Allen and Hayward, 1990; Lenz and Kulinat, 1997) or have worked in the area/region in which they have located their new firm (Figueiredo and Guimaraes, 1999; Zander, 2004). Entrepreneurs are likely to have social and business contacts in a location in which they have been working and living before starting their firm (a familiar environment). This observation feeds sociologists' argument that economic

actors are shaped and constrained by the socio-historical context in which they are located (Dowd and Dobbin, 1997).

Empirical evidence of a home-region preference of potential and nascent entrepreneurs in setting up a firm is limited. In their study of new computer-services firms in Denmark, Illeris and Jakobsen (1991, p.42) found that '(t)he choice of location turned out to be an un-premeditated decision; for the vast majority of the firms studied,: they were simply located as near as possible to the founder's residence' (or perhaps even *in* the founder's residence). The firms that had moved several times since their start-up invariably stayed within the same urban area. Stam (2007) came to a similar conclusion as he found that even high-growth firms tend to stick to their home region.

So, to many nascent and new entrepreneurs, and even growing firms, the home region is the relevant location-choice arena. This preference results from the fact that the two fundamental pillars of new-firm formation, opportunity recognition and intentions to act upon these business opportunities (Shane and Venkataraman, 2000), are firmly rooted in the home region. First, potential entrepreneurs will more easily perceive market opportunities, discover consumer needs or imagine new combinations of resources in a well-known and familiar environment. The second entrepreneurship pillar, focusing on intentions to act on perceived opportunities, consists of different phases in which perceptions of desirability, social norms, self-efficacy and collective efficacy are central (Zander, 2004). The normative beliefs of significant other people, close to the potential entrepreneur, are important in entrepreneurial decision making. Consequently, when (thinking about) setting up a business, friends, family, and acquaintances are consulted; they will often be based in the home region. An active entrepreneurial climate, and knowing many new local entrepreneurs, will then stimulate starting the business in the home region. According to Stam (2007), a third reason for starting a new firm in the home region is simply a lack of financial resources and the need to limit risks. These factors may deter the would-be entrepreneur even considering a less familiar and therefore risk-prone location. As a result, distant alternative sites are rarely considered for initial locations (OTA, 1984, p.135). The given location conditions the choice of activities with which an entrepreneur can start a business.

Turning back to the regional level, an entrepreneurial atmosphere can stimulate new-firm formation in at least two ways. First, an active and thriving small or medium-sized local business base enhances the building, maintenance, and rejuvenation of formal and informal business networks that may also be accessible to nascent and new firms. Furthermore, small-scale business dynamics reveal flows or resources and clear market boundaries that are visible and accessible and open to new combinations, challenges, and opportunities. Local economic diversity in particular fuels the spread of ideas, as (among others) Jacobs (1969) and Glaeser et al. (2002) have convincingly shown. Second, potential entrepreneurs may be stimulated to set up their own firm in a regional context of many small-scale businesses, new firms, and surrounding entrepreneurial activities. Entrepreneurship and economic activity are clearly visible in their own surroundings and living area and may act as a role model and stimulate risk taking and self efficacy. This psychological effect of local entrepreneurship and small-business development is largest on the local and regional level. Indeed, Davidsson (1995) has found empirical support for

a positive effect of entrepreneurial values and new-business formation. Maskell (2000) referred to this social business environment as *community*, where trust and a climate of cooperation between individuals, firms, and actors in a region encourage the emergence of new firms.

6.3 Background information on the three Dutch regions

Before moving on to the empirical investigation, it is useful to consider a description of the three regions that are included in our study.

Greater Amsterdam
The Amsterdam agglomeration is a metropolitan area characterized by a high degree of dynamism and creativity. It had 1,213,535 inhabitants as of 1 January, 2007 (source: Statistics Netherlands). Residential areas are concentrated in the east of this region, while plenty of employment is located in the west. Greater Amsterdam is considered to be a European Urban Region, owing to its high concentration of European headquarters locations, financial activities, and advanced business services (Brenner, 2000). Amsterdam is part of the *blue banana* (Brunet, 1989) or 'Europe's vital axis' (Dunford and Perrons, 1994), in which the European metropolitan core is seen to stretch in an arc from the south-east of England through the Benelux countries, Germany, Switzerland and into northern Italy. Although this concept is rather simplistic, Taylor and Hoyler (2000) show that there is a remarkable continuity between this and earlier concepts, showing its long-standing historical importance (Wilks-Heeg et al., 2003).

The urban form of Amsterdam could be described as a *finger plan* structure, with urban expansion following radial corridors that are separated by wedges of greenery (Gieling, 2006). The finger-plan structure is characterized by a balanced relationship between city and landscape and the city centre's good accessibility. This structure gives rise to Amsterdam as a strong regional-network city. In addition to the main centre of Amsterdam, some subcentres are gaining importance: the development of the Zuidas and the Zuidoost area. In a wider context, the international airport Schiphol, the manufacturing area in the IJmond, and the surrounding city centres of Haarlem, Zaandam, Amstelveen, and Almere contribute to the strength of the Amsterdam agglomeration as a regional urban network.

For the Amsterdam agglomeration to maintain its role as the centre of a region of creativity and knowledge, it is necessary to satisfy the needs of entrepreneurs. In contrast with the past, nowadays the importance of an attractive environment outweighs the presence of infrastructure and seaports in firm-location decisions. This is the result of the high representation of the knowledge-based business-services sector. However, restrictions imposed by a lack of space in the area and national (environmental) policies put pressure on the regional and entrepreneurial ambitions of Amsterdam (Alexander, 2002).

Twente

Twente, consisting of 14 municipalities, is a diverse region with some rural areas and some large cities. As a consequence of severe changes in the agricultural sector, the regional economy has developed less than the national average in the last few decades. The regional economic structure is rather simple (textiles and manufacturing), which makes the region sensitive to the business cycle. The number of inhabitants has remained stable and the unemployment rate is above the national average. Competition from surrounding regions is becoming stronger, and Twente suffers from the mediocre accessibility of the region. On the other hand, Twente is moving from an industrial area to a technology- and knowledge-intensive area. The presence of the University of Twente and the increasing number of technology- and knowledge-based institutes make the region innovative. Research shows that the Twente region held fourth position in R&D intensity in, 2004 (Regio Twente, 2006). Twente aims to become the third industrial region of the Netherlands.

In Twente, sociocultural characteristics are important in the designation of regional identities. This is particularly to do with the diversity in traditions, values, and symbolic aspects that are considered typical of Twente. These traditions and values are viewed as inherent elements in the cultural-historical identities that form the basis of the Twente way of life.

East-Groningen

East-Groningen, consisting of nine municipalities, is a rural region that differs in some socio-economic respects from the urbanized regions. The unemployment rate of this region is the highest in the Netherlands: 6.3 percent of the labour force received unemployment benefit in, 2006. This figure compares with 4.6 percent in Twente and 4.0 percent in Greater Amsterdam. However, in the last few years, many support programmes have been introduced to boost the economy in East-Groningen (the unemployment rate was 9 percent in, 2004). Very recently, a four-year socioeconomic development programme was launched. The principal aims of this programme are to increase the labour-participation rate and the education level. Another pilot programme started in, 2007 aims to decrease administrative burdens for entrepreneurs. Innovations in SMEs are also stimulated; entrepreneurs are supported by innovation scans and the provision of advice[1].

Comparison of the three sample regions

Thus the three selected regions differ from each other in several ways. This variation also emerges from key figures provided by Statistics Netherlands. Table 6.1 makes it clear that the three regions differ substantially in terms of demography and economic output. The Greater Amsterdam labour market area stands out, not only with regard to urbanization, but also in terms of income levels and GRP growth.

Examination of the start-up rates throughout the entire private sector in the three regions in figure 6.2 reveals that Greater Amsterdam shows the highest prevalence of start-up firms relative to the total population. In particular, since the end of the, 1990s this start-up rate has strongly increased. Figures 6.3-6.5 show the development of the number of start-ups using, 1988 as the baseline year. The number of start-ups dramatically increased; for construction, (figure 6.3) the number of start-ups increased by 400 percent in the period, 1993-2003. In, 1993, the mandatory 'self-employment' exam was effectively abolished and this clearly resulted in a rise in the number of firm entries in construction. A similar, but

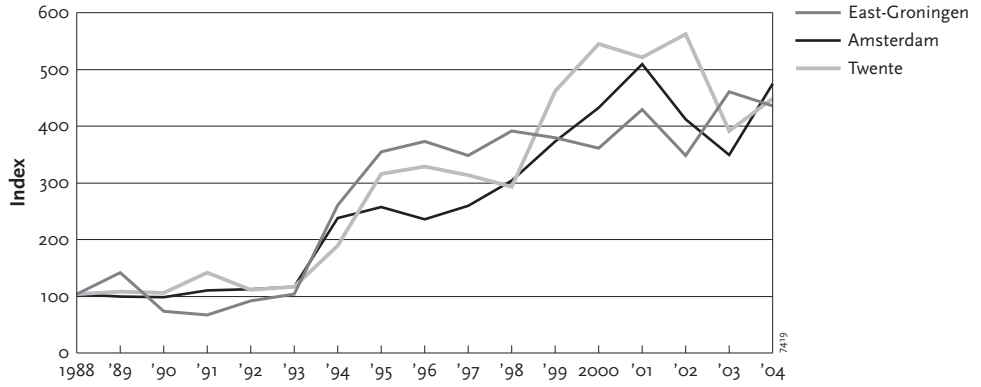
Table 6.1: Demographic & economic characteristics of the three Dutch regions

	Urban area coverage, 2006	Rural area coverage, 2006	Average population density, 2006	Share 15-45 years population, 2006	Average income, 2004 (€)*	Average GRP growth 2001-2004
East-Groningen	3%	50%	185	37%	15,500	-1.3%
Twente	31%	21%	415	40%	16,500	1.0%
Greater Amsterdam	79%	5%	1687	45%	18,900	2.8%

Source: Dutch Statistics
* Income: only for those who report income during the entire year

Source: Dutch Chambers of Commerce

Figure 6.2 Start-up rates: number of start-ups in total population

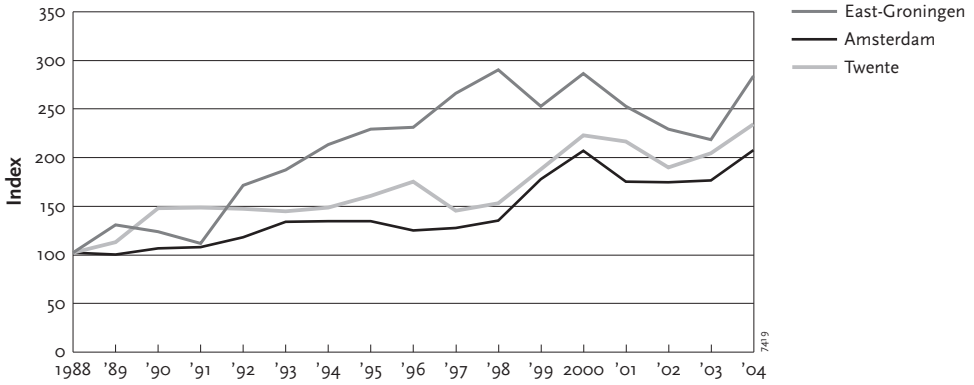


Note: 1988=baseline year - Source: Dutch Chambers of Commerce

Figure 6.3 Independent start-ups in construction, 1988-2004

Note: 1988=baseline year - Source: Dutch Chambers of Commerce

Figure 6.4 Independent start-ups in trade, 1988-2004



Note: 1988=baseline year - Source: Dutch Chambers of Commerce

Figure 6.5 Independent start-ups in services, 1988-2004

weaker effect can be seen in business services (figure 6.5). The development in trade is different (figure 6.4), which probably has to do with the increasing dominance of chain retail stores, pushing out the (entry of) independent firms.

6.4 Data and Methodology

We have used data from the first Dutch Regional Entrepreneurship Monitor, conducted by EIM Business & Policy Research in October and November, 2007, adopting the Global Entrepreneurship Monitor (GEM) questionnaire. Since, 1999, GEM has provided national indicators on entrepreneurial activity for an increasing number of countries (see Reynolds et al., 2005; Bosma et al., 2008a). The indicators are based on telephone surveys among the adult population. In all three regions, a representative sample of 1,000 respondents was interviewed on their perceptions of, and involvement in, entrepreneurial activity. A number of questions were added to the standard questionnaire in order to derive more information

Table 6.2 Variables measuring entrepreneurial attitude and activity at the regional level

Variable	Description
Entrepreneurial perceptions	
Fear of failure	Fear of failure would prevent the respondent to set up a business; percentage of adult population 18-64 years
Opportunities	Percentage of adult population 18-64 years perceiving good opportunities for start-ups in the area where they live
Self-Efficacy	Percentage of adult population 18-64 years claiming to have required knowledge and skills to start a firm
Entrepreneurial intentions	
Expects to start business in next three years	Respondent expects to start up a business in the next three years; percentage of adult population 18-64 years, but excluding those who are involved in entrepreneurial activity
Entrepreneurship realistic option in next ten years	Respondent sees entrepreneurship as a realistic option; percentage of adult population 18-64 years, excluding those involved in entrepreneurial activity or expecting to start a business in the next three years
Previously considered starting a business	Respondent has ever considered setting up a business; percentage of adult population 18-64 years, excluding those involved in entrepreneurial activity (now or in the past) or expecting to start a business in three years
Phases of entrepreneurial activity	
Early-stage entrepreneurial activity (ESEA)	Percentage of adult population 18-64 years involved in either nascent entrepreneurial activity or young firms up to 3,5 years old
Nascent entrepreneurship	Percentage of adult population 18-64 years involved in nascent entrepreneurial activity – setting up a firm & no revenue for more than 3 months
New business ownership	Percentage of adult population 18-64 years involved in young business ownership – businesses have been operational between 3 months and 3,5 years
Established business ownership	Percentage of adult population 18-64 years involved in established business ownership – businesses have been operational for at least 3,5 years
Types of early-stage entrepreneurial activity (ESEA)	
Job growth expectations	
No growth	Percentage of ESEA expecting no jobs in five years
Growth ambitious	Percentage of ESEA expectig 10 or more jobs in five years
Innovation	
New product	Percentage of ESEA: claim to have a product or service that is new to at least some customers
New market	Percentage of ESEA: few (or none at all) competitors offer the same product or service
New product/market	Percentage of ESEA: claim to have a product that is new to at least some customers and that there are only few (or none) businesses offering the same product.
New technology	Percentage of ESEA: uses technology that did not exist five years ago
Ambitious entrepreneurial activity	Percentage of ESEA: involved in either growth oriented early-stage entrepreneurial activity or new product/market oriented entrepreneurial activity – as defined above.
Spatial orientation	
International orientation	Percentage of ESEA: at least 25% of customers lives outside the country
Regional orientation	Percentage of ESEA: at least 75% of customers lives in the same region

on entrepreneurship as a regional event (Feldman, 2001): that is, the impact of the regional context on individuals' involvement in entrepreneurship.

Methodology

The first of our analyses is descriptive: how do the three Dutch regions differ along various dimensions of entrepreneurship? Table 6.2 describes the different measures used in our study. We have explored regional differences in entrepreneurial perception by looking at perceived opportunities in the region, inhabitants' self-perception of the skills and knowledge required to start a business, and assessments of fear of failure when starting a business. We consider three phases of entrepreneurial activity: the *pre-start-up phase* (nascent entrepreneurship) and the *early post-start-up* phase (new-business ownership) taken together are defined as *early-stage entrepreneurial activity*. The final phase is *established business ownership*. For early-stage entrepreneurial activity, the phase that involves most entrepreneurial dynamics, we distinguish individuals who expect to achieve significant growth and those who do not expect any growth in terms of numbers of employees. We have also looked at the shares of early-stage entrepreneurs who are innovation-oriented in terms of new products, new markets, and new technology. Ambitious early-stage entrepreneurship is defined as being involved in either growth- or innovation-oriented entrepreneurial activity. The descriptive part also assesses the extent of local embeddedness: the degree to which people in the adult population are connected with entrepreneurs in their region and the degree to which entrepreneurs are influenced by other entrepreneurs or firms in the region, together with the significance of the regional market for their businesses.

Dependent variables

Dependent variables in the logistic regressions explaining entrepreneurial perceptions and involvement with entrepreneurial activity are listed in Table 6.2. With respect to perceptions of entrepreneurship, we analysed all three measures, since they are all very different components of the perception of entrepreneurship (see Bosma and Schutjens, 2009). With regard to the phase of entrepreneurship, we performed a multinomial logistic regression technique. Through multinomial logistic regressions we can recognize different phases (without assigning a particular importance to any phase) and use the individuals who are not involved in entrepreneurial activity, nor have been in the past, as a reference. Here we also considered those who have owned and managed a business in the past. This is important, because it can be argued that this group of people would have much in common with entrepreneurs and should therefore not be treated like the people who are currently not involved in entrepreneurship. We also identified the people with entrepreneurial intentions; they form a separate category.

The analysis was narrowed further by looking at two types of early-stage entrepreneurial activity as described in Table 6.2: growth-oriented early-stage entrepreneurial activity and innovation-oriented entrepreneurial activity; these are the types of entrepreneurial activity that should, according to the literature, lead to economic growth (Carree and Thurik, 2003; Bosma and Schutjens, 2007).

Table 6.3 Regional differences in perceptions to entrepreneurship

	East-Groningen	Twente	Greater Amsterdam
Perceptions			
Personally know someone who started a business	*29%*	*33%*	*41%*
Perceived opportunities	*40%*	*52%*	*60%*
Perceived skills & knowledge	*42%*	*40%*	*43%*
Fear of failure	*29%*	*26%*	*31%*
Past, present and future intentions			
Has ever considered starting a business *	*30%*	*29%*	*30%*
Expects to start business in next three years	*5%*	*3%*	*7%*
*Entrepreneurship realistic option in next ten years **	*19%*	*21%*	*35%*
Phases of entrepreneurial activity			
Early-stage entrepreneurial activity	*4.5%*	*5.4%*	*7.2%*
Nascent entrepreneurship	*2.1%*	*2.5%*	*3.0%*
New business ownership	*2.3%*	*3.0%*	*4.2%*
Established business ownership	*7.2%*	*7.4%*	*7.8%*
Has set up a business in the past *	*7.5%*	*4.4%*	*7.6%*

Weighted by age & gender at regional level
* *denominator: non-entrepreneurial adult population, also excludes ex-entrepreneurs*
** *denominator: non-entrepreneurial adult population, includes ex-entrepreneurs*
Rows in italics indicate differences to be significant at p<0.01

Independent variables
With regard to human capital, we have information available on age and education level. Financial capital is assessed by household income. For social capital, we have included some additional questions that have proved valuable in research dealing with the start-up phase. Davidsson and Honig (2003), for instance, argue that bonding social capital (strong ties) is particularly important in the pre-start-up phase, while bridging (weak ties) is more relevant in the post-start-up phase. Thus, ideally we would like to have information on entrepreneurial involvement from close relatives as well as information on professional networking. Unfortunately, we only have the latter available for those who are active in entrepreneurship.

6.5 Results

Regional differences in entrepreneurial perceptions, entrepreneurial intentions, and entrepreneurial activity
Table 6.3 shows the prevalence rates of entrepreneurial perceptions, entrepreneurial intentions, and entrepreneurial activity by region. Regional perceptions of entrepreneurial activity differ only for some components. More specifically, we observe significant differences in perceived opportunity and differences in the degree to which people know someone who started a business. For both factors, the Amsterdam-area scores are highest. Perceived skills and knowledge needed for starting a business do not differ significantly, and neither does fear of failure seem to differ much over the regions. Indeed, Bosma and

Table 6.4 Motivations to become involved in entrepreneurship, % of early-stage entrepreneurs*

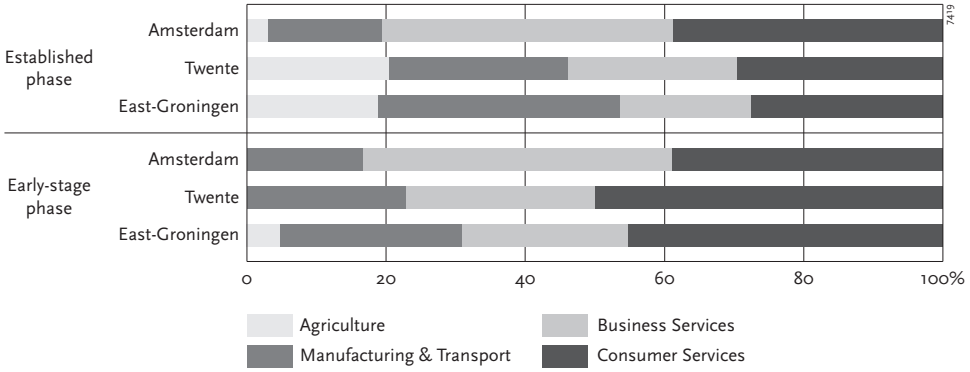
	East-Groningen	Twente	Greater Amsterdam
Desire to be independent	50%	48%	55%
Challenge	34%	20%	26%
Making more money	14%	10%	5%
Recognition of unique business opportunity	7%	10%	7%
Combine childcare and work	5%	12%	3%
Not satisfied with job	7%	6%	5%
Unemployed or threatened by unemployment	5%	4%	7%
Other reasons	25%	38%	32%

* Entrepreneurs could mention multiple items

Schutjens (2009) find that this fear of failure measure reflects supra-national rather than sub national patterns. These four components of entrepreneurial perceptions are indicative and useful for analysing the regional entrepreneurial spirit, but they do not tell us anything about intentions of engaging in entrepreneurial activity. Regional rates of past, present, and future intentions to start a business are shown directly below the perceptions. Whereas past intentions are remarkably evenly distributed across the three regions, present intentions and future considerations are mentioned more often in, again, the Amsterdam region.
Moving on from intentions to the next essential step in the entrepreneurial process, that is, actual involvement, we observe some differences in the stage pattern of entrepreneurial activity across the three Dutch regions. While established business-ownership rates are quite similar across the three regions, early-stage entrepreneurial activity is clearly highest in Greater Amsterdam. The observed pattern is the same as that derived from the most recent firm-registration data shown in Figure 6.2[47]. For both phases in early-stage entrepreneurial activity, that is, nascent entrepreneurship and new-business ownership, the pattern is very similar. The ESEA rate in East-Groningen is significantly lower than that of Greater Amsterdam ($p<0.05$). Of the people identified in entrepreneurial activity (that is, all stages from nascent entrepreneurs to established business owners), 44 percent of them are involved in the early-stage in Greater Amsterdam. This is somewhat higher than in the regions of Twente (39 percent) and East-Groningen (37 percent).

An initial assessment of the different types of entrepreneur was through an examination of the main drivers of becoming involved in entrepreneurial activity. Table 6.4 reveals that no important regional differences were observed. The items most often mentioned are *desire to be independent* and the *challenge*. Negative drivers such as not being satisfied with a job as an employee or (fear of) unemployment did not play an important role in these three regions in, 2007. Various other reasons were given. Some items mentioned multiple times were (i) social/idealistic reasons; (ii) the opportunity to turn a hobby into a business; and (iii) the result of a need for expansion of existing business activities.

47 Nonetheless, we should stress that our measures using the GEM methodology are not directly comparable with firm registration data, see Bosma et al. (2008, p. 10).



Source: EIM

Figure 6.6 Sector distribution for early-stage entrepreneurial activity and established business ownership

We find some significant differences pertaining to business activities across regions, and across phases of entrepreneurship. Figure 6.6 indicates that relatively many early-stage entrepreneurs in Greater Amsterdam are active in business services. The region of Twente is, as far as early-stage entrepreneurial activity is concerned, highly concentrated in personal services. The patterns of business activities in the early stage clearly differ from those in the established phase for East Groningen and Twente. Both regions seem to be in a process of developing more services-oriented businesses.

In Table 6.5 we classify the ambitions of the early-stage entrepreneurs regarding job-growth expectation, innovation orientation, and international orientation (for definitions see Table 6.2). The results reveal that early-stage entrepreneurs in Twente are more innovation oriented than those in Greater Amsterdam (difference significant at $p<0.10$). Twente also has the highest scores for ambitious job-growth expectation, but these differences are not statistically significant[48]. However, for a combined measure of ambitious ESEA reflecting the regional extent of growth orientation and/or innovation orientation (see Bosma and Schutjes, 2007), the observed difference between Twente and Greater Amsterdam is statistically significant at $p<0.05$. Thus, while *overall* early-stage entrepreneurial activity is highest in the Amsterdam region, the more promising type of entrepreneurial activity is found relatively often in the two other regions – and in Twente in particular. If we look at the prevalence rates of ambitious ESEA in the adult population, Twente has 1.9 percent ambitious early-stage entrepreneurs and the two other regions have 1.4 percent. These differences are not significant.

International orientation among early-stage entrepreneurs appears to be relatively high in the region of East-Groningen. This finding reflects the region's economic dependence on the neighbouring German regions. Regional orientation is very significant for all three regions, although significantly more so for early-stage entrepreneurs in East-Groningen and Twente than in Greater Amsterdam.

48 A large share of the non-ambitious entrepreneurs in Amsterdam is active in business services. We observe for instance a significant amount of consultants.

Table 6.5 Regional differences in types of entrepreneurship

Types of entrepreneurship (all % within ESEA)	East-Groningen	Twente	Greater Amsterdam
Job expectations:			
Non-ambitious: No jobs expected in next five years	26%	26%	41%
Ambitious: More than 10 jobs expected in next five years	11%	14%	9%
Innovation			
New product: product or service is new to all customers	40%	39%	32%
New market: product or service is not supplied by many competitors	55%	70%	55%
New product/market combination	26%	27%	14%
New technology: uses technology that did not exist five years ago	16%	30%	22%
Spatial orientation			
International: at least 25% of customers lives outside the country	23%	8%	14%
Regional: at least 75% of customers lives in the same region	61%	71%	48%

Local embeddedness

Earlier, we saw that the degree to which people know (at least) someone who has started a business followed the same pattern as the rate of early-stage entrepreneurial activity. When respondents were asked about this particular person, it transpired that some 50 percent of these role-model entrepreneurs lived in the same municipality (see Table 6.6). While in East-Groningen and Greater Amsterdam about one third of these potential role models lived outside the region, in Twente only 20 percent of the entrepreneurs who had recently started a business and were known personally by the respondent lived outside that area. These figures give some indication of the potential importance of role models for entrepreneurship in the region. However, they do not make clear whether entrepreneurs are actually influenced by other entrepreneurs – or other businesses. Table 6.6 also shows that over 30 percent of the people involved in entrepreneurial activity have, in their decision to become an entrepreneur, been influenced by another entrepreneur. Similarly, individuals are influenced by other businesses. Interestingly, influences by entrepreneurs and businesses only partially overlap. Overall, 22 percent of the respondents are influenced by both entrepreneurs and businesses, while 34 percent are influenced by just one of the two – about equally distributed. Further inspection reveals that about 80 percent of the *entrepreneurial role models* were active in the same region as the respondent, while about 70 percent of the *business role models* were active in the same region.

Having reported the descriptive results from our questionnaire in the three contrasting regions, we turn to the determinants of entrepreneurship in various types and phases. But first we pay attention to individuals' perceptions of entrepreneurship, since these are commonly thought to trigger people to become involved in entrepreneurial activity.

Explaining individuals' perceptions to entrepreneurship

We start with the three components of entrepreneurial perceptions. The results are described in Table 6.7. All the regressions confirm the importance of human, social, and financial capital for explaining entrepreneurial perceptions. There is an inverse U-shaped

Table 6.6 Local embeddedness of entrepreneurship

	East-Groningen	Twente	Greater Amsterdam
Personally know someone who started a business	29%	33%	41%
*This person lives in:...**			
Same municipality	45%	58%	51%
Different municipality, same region	20%	23%	13%
Different region, but within the Netherlands	35%	18%	33%
Outside the Netherlands	1%	2%	2%
Entrepreneurs and existing business influencing the decision to become an entrepreneur for early-stage entrepreneurs			
Influenced by other entrepreneur	33%	34%	44%
Influenced by other business	35%	38%	45%

* In case of multiple persons it concerns the person with the most contacts

relationship between age and perceived skills. The top of the associated curve occurs at the age of 43. For *fear of failure*, the top (indicating greatest fear of failure) occurs at the age of 36. Higher education levels increase the odds of positive assessment on perceived skills and perceived opportunities to start a business in the region. The impact on perceived skills is certainly no surprise. The impact on perceived opportunities in the region also makes sense, assuming that well-educated people tend to live in more promising places[49]. Household income is associated in particular with perceived knowledge and skills. Education and income are not significant predictors of fear of failure – only individuals in households receiving over twice the reference income have a lower fear of failure. We find some evidence of long-established residents having greater fear of failure, while those who were born outside the Netherlands exhibit lower fear of failure with respect to starting a business.

When we control for these individual effects, significant regional differences in perceptions of entrepreneurship become apparent. Even though at the regional level we found comparable levels of perceived skills and knowledge for starting a business, the adult population in the region of Eastern Groningen appears to be relatively positive about their own skills and knowledge if we account for their individual characteristics. The differences for perceived opportunities were significant, as seen in Table 6.3, and these differences continue to hold when individual characteristics are controlled for. This finding strengthens the idea that there are indeed regional differences in opportunities. Controlling for individual characteristics, there appears to be relatively little fear of failure associated with setting up a business in the Twente region.

49 Most highly-educated people in the sample live in the Amsterdam region. The effect changes if we introduce an interaction term with education and region. It appears that highly educated people in East-Groningen (in particular) and Twente see relatively *fewer* opportunities than do those in Amsterdam.

Table 6.7 Determinants of perceptions to entrepreneurship, logistic regression results

	Perceived skills and knowledge to start a business		Perceived opportunities for startups in the region		Fear of failure	
REGION						
East-Groningen	0.31	***	-0.50	***	-0.09	
Twente	0.02		-0.21	*	-0.24	**
Greater Amsterdam	*ref*		*ref*		*ref*	
HUMAN CAPITAL						
Age	0.10	***	0.05		0.09	***
Age/10, squared	-0.11	***	-0.08	**	-0.13	***
Education – lower	*ref*		*ref*		*ref*	
Education – medium/vocational	0.28	**	.0.36	***	-0.20	
Education – graduate	0.43	**	0.80	***	0.04	
Education – post graduate/vocational	0.68	***	0.83	***	-0.21	
Education – university	0.71	***	1.38	***	0.04	
SOCIAL & FINANCIAL CAPITAL						
Entrepreneur in family	0.86	***	0.36	***	-0.22	**
HH income – below reference	-0.13		-0.25	*	-0.05	
HH income – reference salary	*ref*		*ref*		*ref*	
HH income – above reference	0.19	*	0.19		0.04	
HH income – twice reference	0.44	***	0.18		0.04	
HH income – over twice reference	1.28	***	0.28		-0.63	***
CONTROLS						
Years in region (ln)	-0.07		0.08		0.13	*
Gender (male)	0.90	***	0.25	***	-0.16	*
Immigration: first generation	-0.12		0.05		-0.45	**
Immigration: second generation	0.07		0.10		0.17	
Constant	-0.64		0.51		-2.82	***
Number of observations	2581		2016		2540	
-2 Log Likelihood	3093.49	***	2553.12	***	4940.93	***
Nagelkerke R^2	0.217		0.150		0.041	

* p<.10, ** p<.05, *** p<.01

Explaining individuals' engagement in different phases of entrepreneurial intentions and activity
Table 6.8 presents the results of the entrepreneurial *status,* identifying three distinct phases of entrepreneurial intentions and three phases of entrepreneurial activity. The groups are considered to be mutually exclusive; we do not consider the entrepreneurial intentions of someone already involved in entrepreneurial activity. Concerning intentions, the table shows that the Amsterdam region hosts significantly larger shares of individuals who consider entrepreneurship as a realistic career choice for the next 10 years, in particular in comparison with Twente. Education levels are also indicative of entrepreneurial intentions; highly- educated people tend to consider entrepreneurship or have more explicit intentions of starting a business than less well educated adults.

Table 6.8 Determinants of stages in the entrepreneurial process, multinomial logit results

	ever considered N=402		realistic option in next ten years N=319		intentions in next three years N=76		Involved in early-stage entrepreneurial activity (N=155)		Owner-manager of established business (N=229)		ex-entrepreneur N=197	
REGION												
East-Groningen	0.13		-0.27		-0.29		-0.01		-0.10		-0.13	
Twente	0.14		-0.37	**	-0.52		-0.12		-0.16		-0.58	***
Greater Amsterdam	*ref*		*ref*		*ref*		*ref*		*ref*		*ref*	
HUMAN CAPITAL												
Age	0.07		0.00		0.01		0.29	***	0.31	***	0.09	
Age/10, squared	-0.07		-0.10	*	-0.09		-0.38	***	-0.31	***	-0.06	
Education – lower	*ref*		*ref*		*ref*		*ref*		*ref*		*ref*	
Education – medium/vocational	0.14		0.64	**	1.13	*	-0.51		0.14		0.54	**
Education – graduate	0.15		0.87	**	0.92		-0.10		0.19		0.63	*
Education – high/vocational	-0.04		0.87	**	1.48	**	0.17		0.02		0.45	*
Education – university	-0.16		1.15	***	1.92	***	0.69	**	0.08		0.18	
SOCIAL & FINANCIAL CAPITAL												
Entrepreneur in family	0.52	***	0.95	***	1.28	***	0.84	***	0.98	***	1.13	***
HH income – below reference	-0.17		-0.13		0.27		0.51		-0.32		0.51	**
HH income – reference	*ref*		*Ref*		*ref*		*ref*		*ref*		*ref*	
HH income – above reference	0.04		0.39	**	0.56		0.40		-0.05		0.08	
HH income – twice reference	-0.03		0.13		0.41		0.64	**	0.16		0.28	
HH income – over twice reference	0.72	**	1.18	***	1.39	***	1.12	***	0.85	**	1.41	***
CONTROLS												
Years in region	-0.06		-0.14		-0.18		-0.03		0.06		-0.43	***
Gender (male)	0.95	***	0.94	***	1.22	***	0.56	***	0.54	***	0.76	***
Immigration: first generation	0.28		0.28		0.20		-0.14		0.22		0.25	
Immigration: second generation	0.56	*	0.13		0.41		-0.22		-0.13		-0.00	
Constant	-2.27	**	0.81		-1.88		-7.67	***	-9.68	***	-2.07	
- 2 Log Likelihood	7275.54	***										
Nagelkerke R^2	0.310											

Reference category: never considered starting a business (N=1439)
* p<.10, ** p<.05, *** p<.01)

To investigate entrepreneurial activity, we identified people who were involved in early-stage entrepreneurial activity (ESEA), people who were owner-managers of an established business (EBO), and people who had been owner-managers of a business previously (but were currently not involved in any of the other two phases; EXBO). Among those who were entrepreneurially active, we assigned the earliest stage to individuals who were active in more than one stage. As with the results for perceptions of entrepreneurship, we observe an inverse-U-shaped relationship between age and involvement in entrepreneurial activity. For ESEA, the age with maximum odds of being engaged is 38, while for EBO it is 50. For ex-entrepreneurs the line slopes gradually upward, as expected. Education levels do not seem to be very decisive for engagement in entrepreneurial activity except for early-stage activity, for which the impact of a university degree is positive and significant. For ex-entrepreneurs, medium levels of education are significant and positive. Taken together, these results indicate a relatively high participation of university graduates in early-stage entrepreneurial activity in this particular sample. Having one or more entrepreneurs in the family is highly significant for explaining involvement in any phase of entrepreneurship. While for the early stage we may assume the causal relationship modelled to be reasonable, for the established phase the reversed causation (that is, the entrepreneur has served as a role model for other family members) cannot be ruled out. A similar argument holds for the financial capital measure, so we have concentrated on the early-stage. Starting from twice the reference income, the household income level makes a difference for being involved in ESEA. We observe gender differences similar to those in Table 6.7. There is no evidence that adults born outside the Netherlands, or their parents, are more inclined to be involved in entrepreneurial activity. However, we only have a limited number of first and second generation immigrants in our sample. Statistics Netherlands reports indicate relatively high and increasing start-up rates among immigrants (EIM, 2004; Kloosterman, 2003).

An important finding from Table 6.8 is that, when individual characteristics are controlled for, the regional differences in ESEA rates as observed in table 6.5 become non-significant. In other words, the observed regional difference can to large extent be explained by the characteristics of the regional adult population. The only remaining significant regional differences pertain to ex-entrepreneurs. Our finding that Twente hosts fewer ex-entrepreneurs can be related to its industrial nature some decades ago. At that time, the prevalence of business owners was fairly small, because of the large manufacturing plants. Twente appears to have recovered fairly well (in terms of entrepreneurial activity) from the problems that arose when the manufacturing sector in Twente declined. We also investigated whether the effects of human, social, or financial capital differ across regions by performing regression models for each region separately. In broad terms the results appear to be similar[50].

50 Results are not reported here, but are available on request. Human capital appeared to have a lower impact in Twente, while the highest household income categories were not significant for East-Groningen (probably owing to the limited number of respondents with high incomes for this particular region). Also, we did not find a gender gap, that is. a significant gender effect for East-Groningen whereas the gender effect was significant for the two other regions.

Table 6.9 Determinants of different types of early-stage entrepreneurial activity, logistic regression results

	ESEA with innovation orientation		ESEA with job growth expectation		Ambitious ESEA (job growth or innovation)	
REGION						
East-Groningen	1.53	**	0.68		1.20	**
Twente	1.08	*	0.35		0.93	*
Greater Amsterdam	*ref*		*ref*		*ref*	
HUMAN CAPITAL						
Age	0.17		-0.02		0.19	
Age/10, squared	-0.15		-0.02		-0.19	
Education – lower	*ref*		*ref*		*ref*	
Education – medium/vocational	0.28		-0.11		0.03	
Education – graduate	–		–		–	
Education – post graduate/vocational	0.69		1.15		1.14	
Education – university	1.78	**	0.16		0.71	
SOCIAL & FINANCIAL CAPITAL						
Entrepreneur in family	0.82		0.00		0.71	
HH income – below reference	-0.01		1.01		-0.18	
HH income – reference salary	*ref*		*ref*		*ref*	
HH income – above reference	0.09		1.24		0.23	
HH income – twice reference	-0.63		2.24	*	0.05	
HH income – over twice reference	-0.73		1.56		-0.30	
ENTREPRENEUR/FIRM						
Team start-up	-0.17		1.62	**	0.69	*
Inspired by other entrepreneur	1.09	**	-0.34		0.70	
Inspired by other firm	-0.72		0.13		-0.51	
CONTROLS						
Years in region (ln)	0.23		-0.01		0.15	
Gender (male)	-0.48		2.03	**	0.31	
Immigration: first generation	-2.51	**	-0.10		-1.58	*
Immigration: second generation	-0.52		-0.81		-0.48	
Constant	-5.37		-2.88		-5.10	
Number of observations	155		155		155	
-2 Log Likelihood	128.88	**	85.89	**	159.55	**
Nagelkerke R^2	0.246		0.330		0.217	

* p<.10, ** p<.05, *** p<.01

Explaining individuals' engagement in different types of entrepreneurial activity

Having assessed the different *phases* of the entrepreneurial process, we now pay attention to the different *types* in the early stages of entrepreneurial activity. The results of three logistic regressions among all the adults in the sample who were involved in early-stage entrepreneurial activity are presented in Table 6.9. We may observe that the occurrence

of relatively ambitious entrepreneurs in East-Groningen -for innovation-oriented entrepreneurship in particular – still holds after controlling for individual characteristics.

For innovation-oriented ESEA, the significant indicators at the individual level are education (university degree), being inspired by another entrepreneur, and being born in the Netherlands. Growth-oriented entrepreneurs are relatively often male and part of team start-ups. Of course, we only have a limited sample of early-stage entrepreneurs and for investigating the determinants of growth it would be more fruitful to use datasets consisting of firm founders followed over time. Our focus here is mainly on ascertaining to what extent regional differences in types of entrepreneurship exist after controlling for individual effects.

6.6 Conclusion and Discussion

In this chapter we have extensively described the levels of entrepreneurship in three contrasting Dutch labour-market regions. In our model entrepreneurship encompasses perceptions of entrepreneurship, entrepreneurial intentions, and several types and phases of entrepreneurial activity. Our aim has been to contribute to the set of studies explaining regional differences in levels of entrepreneurship by taking into account the individual level.

Using a telephone questionnaire among 3,000 adults aged 18-64 years and adopting the GEM methodology, we were able to pinpoint some differences in entrepreneurial attitudes and behaviour across three Dutch regions. Aggregate results confirmed that there was more early-stage entrepreneurial activity in the Amsterdam region than in the regions of East-Groningen or Twente. Similarly, some of the components measuring the entrepreneurial spirit stood out for the Amsterdam region. However, controlling for individual characteristics mitigates these differences. Hence, dense areas with larger shares of young residents and high levels of education and income (Greater Amsterdam in our sample), have higher early-stage entrepreneurial activity rates, especially thanks to these people.

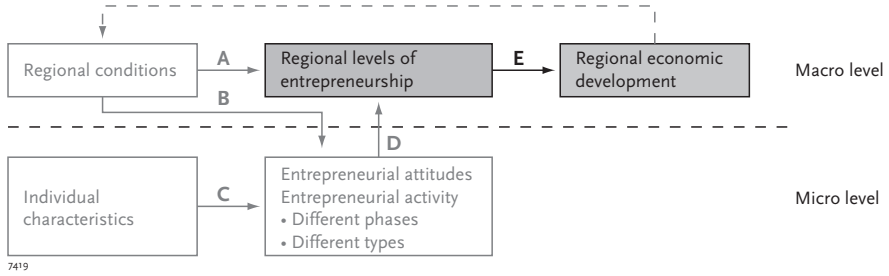
Of course, one could argue that people who have the features associated with entrepreneurship would locate in promising areas. Even when acknowledging our additional evidence that most entrepreneurs start their business in the area where they live, individuals may have moved to that region *before* considering entrepreneurship. A prominent example is students who are attracted to vibrant cities and become attached to the city where they have studied for some years. According to this line of reasoning, regions may attract potential entrepreneurs who can play a large role in regional development in the future.

Our results underline the importance of role models and peer effects. Having a member of the direct family involved in entrepreneurship dramatically increases the odds of becoming involved in entrepreneurship, in any phase. We do not find entrepreneurs with entrepreneurial members in the family to be more ambitious. Innovation-oriented entrepreneurs are, however, often inspired by other entrepreneurs – most of whom reside in the same region. Interestingly, Greater Amsterdam had relatively few ambitious

entrepreneurs in comparison with East-Groningen and Twente. We also found that over 50 percent of the individuals in early-stage entrepreneurial activity were influenced by other entrepreneurs or enterprises in their decision to become an entrepreneur. These substantial effects of peers as role models, also pleasingly documented by Nanda and Sorenson (2007), appears to have a strong regional dimension since about 75 percent of the peers are situated in the same region as the early-stage entrepreneur. From our three cases studies, the peer-effect mechanism was strongest in Amsterdam. Further research into these mechanisms could lead to increased knowledge of the relationship between agglomeration economies, knowledge spillovers, and regional variation in entrepreneurship rates.

Our study has one main empirical drawback. Owing to the limited number of regions involved, we could not investigate adequately which regional influences underlie the observed regional differences in entrepreneurial activity after controlling for individual characteristics. We hope our study will lead to some new efforts in this respect. Nevertheless, even with only three regions involved, we have created a broad picture of entrepreneurship and have been able to point out that a major explanation of sub-national differences in start-up rates is simply the basic characteristics of the people concerned. Also, we found that a high regional start-up rate does not necessarily imply high levels of *ambitious* new entrepreneurs. These are important messages for policymakers at the regional and the national level.

7 Creative Destruction and Regional Productivity Growth: Evidence from the Dutch Manufacturing and Services Industries[51]



7.1 Introduction

In the last few decades, entrepreneurship has increasingly been linked with economic growth (Wennekers and Thurik, 1999; Carree and Thurik, 2003). Rooted in Schumpeter's seminal works (Schumpeter, 1934; 1942), there is now widespread agreement that entrepreneurship is important for the competitiveness of nations (Porter, 1990), particular with respect to productivity growth (Baumol, 2004). At the same time, many authors have argued that, in the current era of globalization, regions have become more important than countries in the creation of economic growth (Castells and Hall, 1994; Storper, 1997; Porter, 2000; Camagni, 2002) and competitiveness (Krugman, 2005). Entrepreneurship is also highly sensitive to regional conditions (Feldman, 2001; Bosma and Schutjens, 2007). These findings suggest that, in establishing a link between entrepreneurship and economic growth, the region is a more appropriate unit of analysis than the nation. For entry, competition, and learning in particular, the regional level might be more relevant than the national level (Fritsch and Schmude, 2006).[52] In addition, Audretsch and Keilbach (2004a), found that entrepreneurship stimulates labour productivity at the regional level.

In this chapter, we seek to clarify the combined effects of entry and exit (as a measure of creative destruction) on competitiveness within a national policy setting (the Netherlands)

51 This chapter is based on Bosma, N.S., E. Stam, (2009) Creative Destruction and Regional Productivity Growth; Evidence from the Dutch Manufacturing and Services Industries, *Small Business Economics*, forthcoming

52 Competition in product markets, especially in labour markets, is likely to be concentrated in the home region of the firm. The learning that takes place through knowledge spillovers is probably even more localized (see Jaffe et al., 1993; Breschi and Lissoni, 2003).

that is characterized by a consistent emphasis on entrepreneurship, particularly on early-stage entrepreneurship. For the Netherlands, it can be said that, at the national level, there was a pronounced and stable policy program directed to stimulating entrepreneurship during, 1988-2002, the period we feature in this chapter (Stevensson and Lundström, 2001; Wennekers, 2006).[53] Our study analyses the dynamics in firm entry and exit in two distinctive sectors at the regional level. This regional orientation results from the fact that most firm founders set up their businesses in the location where they were born (Michelacci and Silva, 2007) or where they were previously employed (Stam, 2007). In addition, the market scope of these entrepreneurs is largely local or regional, since their knowledge of the specific business and market environment leads to a better exploitation of opportunities (Bosma et al., 2008a). This regional focus on market and business relationships could be quite persistent, since "...firms even tend to narrow their spatial scope in their first three years..." (Schutjens and Stam, 2003, p. 115). In addition, challenges by new competitors are better recognized if this entry occurs in close proximity.

This chapter contributes to the existing literature in three ways. First, we acknowledge that entrepreneurship (as a determinant of productivity growth) includes both firm entry and exit. Second, we analyse firm entry and exit and their effect on productivity growth at the most relevant level of analysis, namely the region, and allow the effects of firm dynamics on regional growth to differ along some specific attributes of the region. Third, the effect of firm entry and exit is studied in both manufacturing and services. For the services sector in particular, new firms' orientation can be expected to be primarily local or regional.

The chapter is organized as follows. First, we review the literature on (elements of) creative destruction and its effect on competitiveness. We then present the data, method, and outcomes of our empirical analyses. We report our analyses of the effect of entry and turbulence (defined as the sum of firm entry and exit) on regional competitiveness (measured as total-factor productivity growth) across 40 regions in the Netherlands over the period, 1988-2002. Our analyses suggest that firm entry and exit lead to productivity growth in services, but not in manufacturing. Finally, we discuss our findings and put forward our conclusions.

7.2 Creative destruction and regional competitiveness

Many studies on competitiveness are inspired by Schumpeter's (1934; 1942) work on the mechanisms of economic development, especially the role of entrepreneurship. These studies tend to equate entrepreneurship with new firm formation and disregard the firm exit mechanism, treating it as another important aspect of entrepreneurship. Schumpeter's (1942) theory of *creative destruction* involves both creation (new firm formation) *and* destruction (firm exit). Firm exit reflects the selection mechanism that is a crucial outcome of the competition process and one of the causes of territorial competitiveness (Porter, 1990). The Schumpeter Mark I argument on creative destruction (*entrepreneurial regime*) runs as follows (cf. Eliasson, 1996). Entrepreneurs introduce new combinations embodied

53 In the Netherlands there are practically no regions where regulations differ from those set by national legislation.

in new firms. These innovative entrants enforce incumbents either to adapt to the new efficiency standard or to exit the industry. As a consequence, a new situation emerges in which the productivity of the industry has improved. This improvement is brought about by innovative entrants who are more productive than the average incumbent, and the exit of less productive incumbents via the competition process. These exits are important, because resources are released that can be reallocated to more productive activities. The productivity gains might be reinforced if incumbents are able to improve their productivity (cf. Aghion and Bessonova, 2006). The competitive threat of entrants in the same region and sector as the incumbent is likely to be much higher than that of entrants in other regions and sectors. Consequently, the productivity of incumbents is most likely to be spurred on by entrants in the same sector and region. Eventually, creative destruction leads to improved total-factor productivity (TFP), although not necessarily to higher employment levels: more output is realized with the same amount of labour and capital inputs.

However, if new entrants are less efficient than the incumbents, the efforts involved in the emergence of entrants may even waste valuable resources. In the latter situation entrepreneurship – measured as new firm formation – is not a driver of competitiveness at all.[54] This situation has been identified in the literature as a *revolving door regime*: entrants have to exit relatively soon after start-up owing to an insufficient level of efficiency (Audretsch and Fritsch, 2002). This revolving door regime reflects a situation with high entry rates, but with no subsequent improvement of either employment levels or productivity. There are several explanations for this phenomenon. For example, Jovanovic's (1982) theory of passive learning assumes that individuals do not know what entrepreneurial talents they have in advance, and can only find out by experience in a spell of entrepreneurship. Many individuals start inefficient firms, only to find out that they are not successful in entering the market with a new firm. Relatively many individuals will set up firms if the prospects of business ownership are perceived to be attractive, for example in the emergence of a new industry or a substantial upturn of the economy (as in the late, 1990s). A completely different situation with inefficient entry might occur in s period of economic depression, when individuals are pushed into self-employment.

A more structural view of economic change provides a different role for entrepreneurship. New entrants cause structural change when they introduce innovations that create completely new knowledge (Metcalfe, 2002) and possibly new markets. In this respect, Audretsch and Keilbach (2004b) have argued that there is a gap between scientific and technological knowledge (developed in research and development activities) and exploitable knowledge or economic knowledge. In their view, economic knowledge emerges from a selection process across the generally available body of knowledge. They suggest that entrepreneurship is an important mechanism in driving that selection process, thereby creating the diversity of knowledge that in turn serves as a mechanism facilitating its spillover. The authors provide empirical evidence that regions with higher levels of

54 Perhaps innovative entrants are the strongest stimulators of competitiveness. For example, Geroski (1989) found that higher entry rates led to higher productivity growth, which he explains by assuming that entry stimulates competition, and greater competition spurs on productivity growth. But he also showed that innovation was an even more important driver of productivity (cf. Baily and Chakrabarti, 1985).

entrepreneurship indeed exhibit stronger growth in labour productivity. This kind of entry does not necessarily drive out incumbents, but might do so when new markets substitute existing markets (such as personal computers driving out typewriters, and digital cameras driving out analogue film cameras). The situation where incumbent firms are not affected might be called creative *construction* (Agarwal et al., 2007), whereas the crowding out of incumbents reflects creative *destruction*. This structural change might improve total factor productivity (TFP), and possibly employment, if the newly created market does not fully cannibalize existing markets.

Several studies have confirmed the effect of turbulence on total factor productivity (TFP) growth in manufacturing; see for example Geroski (1989); Bailey et al. (1992); Liu (1993); Carlin et al. (2001); Callejón and Segarra (1999); and for a review Bartelsman and Doms (2000). Recent studies by Braunerhjelm and Borgman (2004) and Dejardin (2009) have also analysed the services sector and found a positive effect of firm entry on labour productivity in regions, and of net entry rates on value added growth in Belgium.

Since we have adopted a regional approach in the present study, it is important to highlight some specific regional features that may have an impact on regional competitiveness. First, we have *urbanization economies* that reflect external economies available to all local firms, irrespective of sector and arising from population density. High population density might stimulate competitiveness, because of the high levels of competition between different suppliers (reducing input costs) and the possibilities of achieving economies of scale with relatively large demand. Possible negative effects of high population density on competitiveness arise when low entry barriers give room to too many inefficient entrants and when cost levels (housing, wages) increase along with population density. The latter could deter employment growth, but might also stimulate entrants to be more labour productive (cf. Kleinknecht, 1998; Madsen and Damania, 2001).

Second, we have *Jacobs externalities* involving external economies available to all local firms stemming from a variety of sectors. The latter externalities are best captured with the notion of *related variety* (see Frenken et al., 2007). It reflects both sector diversity and the degree to which sectors are related. Related variety is assumed to have a positive effect on the probability of new combinations given the opportunities to combine ideas from different, but related sectors (Jacobs, 1969; Frenken et al., 2007). High levels of related variety in a region are likely to have a catalyzing effect on variety creation; this has been regarded as a source of competitiveness (Jacobs, 1969; Glaeser et al., 1992; Van Oort, 2002). In our analysis, we control for these regional features, but we also allow for a moderating effect when investigating the impact of firm dynamics on regional productivity growth. In accordance with the findings of Fritsch and Schroeter (2009), who analyse several regional characteristics, we expect a positive impact of firm dynamics in particular for regions with higher population density and greater related variety.

7.3 Data and Methodology

Measurement issues

To date, most regional studies linking entrepreneurship with economic growth have measured entrepreneurship in terms of firm formation rates and regional competitiveness as employment growth (Van Stel and Storey, 2004; Acs and Armington, 2004). Both indicators are open to improvement. First, these studies have been inspired by Schumpeter's works (1934;1942) on the mechanisms of economic development, in which the role of entrepreneurship was central. Although these studies equate entrepreneurship with new firm formation, Schumpeter's (1942) original theory of *creative destruction* involved both creation (new firm formation) *and* destruction (firm exit). This latter aspect reflects the selection mechanism that is a crucial outcome of the competition process and a cause of competitiveness and economic growth. In this chapter, we analyse entry rates, but also take into account the combined measure of entrepreneurship – that is, turbulence rates defined as the *sum of entry and exit rates.*[55] In line with the arguments put forward in the theoretical section, we allow a time lag for entry to impact competitiveness, but not for exit; the exit of inefficient firms should have a direct positive impact on regional productivity growth. Thus, we estimate the effect of turbulence on regional competitiveness by considering turbulence as a combination of past entry rates and current exit rates. With regard to the measurement of firm dynamics, the sectors under consideration are situated in a certain territorial context. In this study, we have adopted the ecology approach for specifying entry rates and turbulence rates (Audretsch and Fritsch, 1994b): we define our measures of firm dynamics relative to the number of existing firms at the start of the year in the same sector and in the same region.

Although regional competitiveness is a frequently-used term, it is hard to define (Kitson et al., 2004). Even though employment growth is indeed an important element of economic development, competitiveness might be a better measure of productivity growth, reflecting increasing economic efficiency within firms and regions.[56] Authors like Porter (1990;, 1998) and Krugman (1990) have made a plea for using productivity as the indicator of competitiveness. In the long run, a rising standard of living depends on the productivity with which resources are employed. An important empirical drawback of this indicator is that hardly any data is available at the sub-national scale (Kitson et al., 2004), or from industries other than manufacturing (Van Ark et al., 1999; Bartelsman and Doms, 2000). Another possible drawback is that productivity might reveal perverse effects, when labour shedding (for example, with an extensive shakeout of workers and closure of plants) is the cause of improved (labour) productivity. Ideally, both employment growth and productivity growth should go together: a virtuous circle of increasing productivity causing improved competitiveness, which leads to higher demand for the goods and services produced, which then leads to an increased demand for labour inputs.

---

55 Turbulence rates are often also defined as firm turnover rates, see e.g. Caves (1998).

56 Competitiveness is often measured as either employment growth or growth in total factor productivity (TFP). There are some notable differences between these measures. For example, during a recession, the efficiency measures by managers in incumbent firms might lead to employment loss and TFP growth in the short term. In the medium term, unemployment-push entrepreneurship might absorb the employment loss, and decrease TFP.

In addition to these measurement issues, there is also a need to improve our insight into the role of creative destruction in the service sector. Although this sector has become more dominant than manufacturing in capitalist economies, most studies on productivity growth are based on the manufacturing sector.

Dataset

We have specified two sectors: manufacturing (ISIC 15-37) and services (ISIC 65-74, 85, 90-93). The distinction between these two major sectors is primarily data-driven: that is, by the limited availability of TFP data in the Netherlands. As a result, we are unable to disaggregate the data into more specific industries.[57] We prefer a measure of TFP to labour productivity, because capital deepening may have a serious impact and labour productivity would therefore be biased. We have used the most suitable level of territorial aggregation for the Netherlands: the Corop level of analysis (EU Nuts 3) (cf. Van Stel and Nieuwenhuijsen, 2004; Kleinknecht and Poot, 1992). The division into 40 Corop regions is based on regional commuting patterns that indicate regional labour markets.

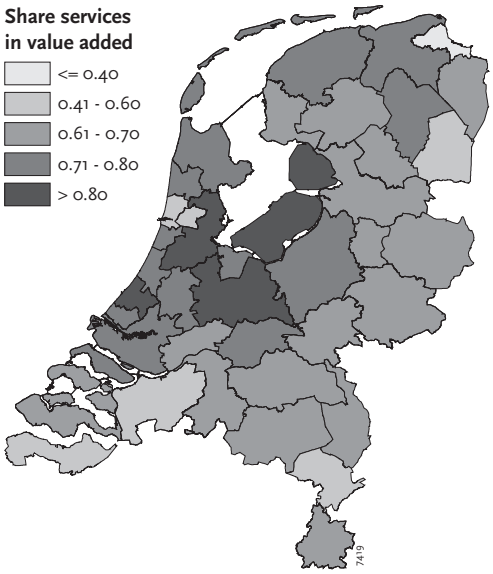
For deriving TFP growth, we have taken data on annual employment, value added, and investment at the regional level from Statistics Netherlands. The capital stock was calculated using the Perpetual Inventory Method (PIM, see e.g. Hall and Mairesse, 1995). An initial regional capital stock level for, 1989 was derived based on investments at the regional level for, 1977-1988; assuming a constant annual growth rate *g* of investments in the period before, 1977; this growth rate *g* was estimated at 4.5 percent using available time-series data on investments between, 1960 and, 1976. The capital stock for every following year has been calculated as the sum of the depreciated capital stock plus investments in the current year. The depreciation rates for both sectors have been estimated using the initial levels of the capital stock in, 1989 and investment levels from, 1960-1976 per region.[58]

The panel dataset on annual entry and exit and the total number of existing firms for 40 regions in the Netherlands is available for a 15-year period (1988-2002). Registrations and deregistrations are available from the Dutch Chambers of Commerce. Entries include independent new businesses as well as subsidiaries; exits include bankruptcies together with other modes of firm exit.[59] Unfortunately, we cannot distinguish between an exit resulting from business closure (varying from simply finishing economic activity to forced liquidation) and an exit resulting from changes in ownership (mergers or acquisitions). Firm relocations within Corop regions are not counted as entry or exit. The dataset excludes

57 As a robustness check, we excluded five regions from the analysis in the manufacturing sector, because their regional growth rates were heavily determined by extraction (gas and electricity), which could possibly interfere with our model since regional output may primarily be caused by one or two large companies. There appears to be no significant change in the results if we exclude these five regions.

58 The derived depreciation rates were 5.8 percent for manufacturing and 4.7 percent for services.

59 We use a general measure of firm entry, and – apart from the distinction between manufacturing and services – do not concentrate on a specific type of entry. Aghion and Bessanova (2006), for instance, focus on the entry of foreign firms. They argue that these are on average larger and more likely to enter at the technological frontier than domestic entrants are, and are thus more likely to be a threat to incumbents, triggering a process of creative destruction. Our data does not enable us to test the differential impact of foreign entries.



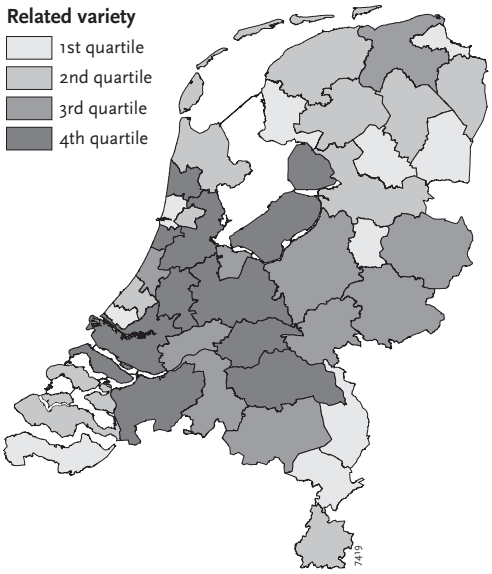
Source: Statistics Netherlands

Figure 7.1 Gross value added in services, as a percentage of gross value added in manufacturing and services combined

inactive firms. The sector structure varies over the regions. There are more firms in services than in manufacturing in every region, with even higher concentrations of service firms in urban regions. The ratio of service firms to manufacturing firms varies between 2 and 10. The importance of the services sector is clear if we examine the levels of gross value added. Figure 7.1 shows the share of gross value added in services as a percentage of value added for manufacturing and services combined.

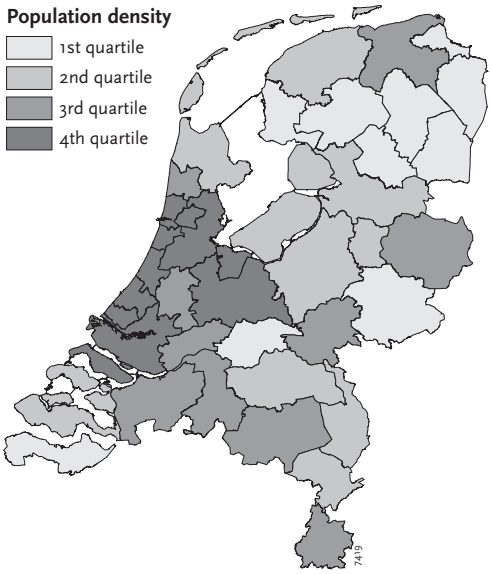
Two control variables reflect the nature of the region and the possible economic advantages stemming from this: urbanization economies and Jacobs externalities. Urbanization economies are measured in terms of *population density*. This is defined as the percentage of people in the region living in urbanized or highly urbanized areas, in, 2000. Jacobs externalities are captured by the notion of *related variety*. This measure was introduced by Frenken et al. (2007) and involves both sector diversity (variety) and the degree to which the sectors are related. Entropy statistics have been used to calculate this measure. *Related variety* is thus measured for each region as the weighted sum of industrial variety (over 5-digit classes) within each of two digit classes (for a detailed description and formal computation see Frenken et al., 2007).

Ideally, we would require variables capturing urbanization and Jacobs externalities to vary with time, but unfortunately we only have a single year at our disposal for population density (2000) and two years for related variety (1996 and, 2002). Including these



Source: EIM based on Dutch Chambers of Commerce

Figure 7.2 Related variety by Nuts3 regions in the Netherlands, in quartiles



Source: EIM based on Dutch Chambers of Commerce

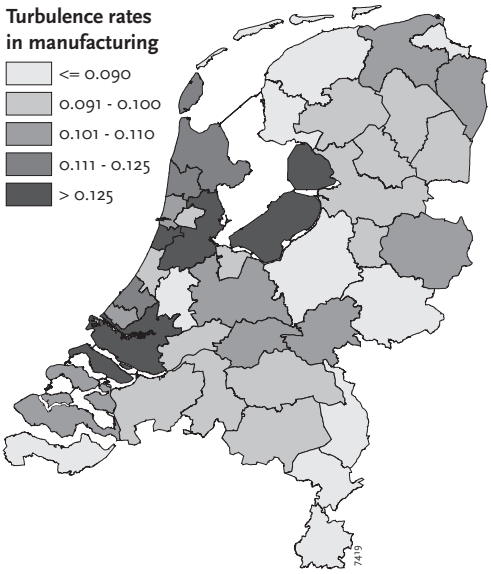
Figure 7.3 Population density, by Nuts3 regions in the Netherlands, in quartiles

determinants is still worthwhile, however, since their variation over time is limited[60]. They are useful for controlling for structural regional differences in explaining TFP growth without making inferences on causality over time. The geographical pattern of both measures is shown in Figure 7.2 and 7.3.

Table 7.1 shows descriptive statistics of our dependent and independent variables for services and manufacturing, while table 7.2 shows the correlation coefficients for both sectors. Averages over the 40 Dutch regions for TFP growth and firm dynamics are also depicted over five time frames. The average turbulence rates rose gradually in the period, 1988-2002, in particular in services. Although the turbulence rates are somewhat lower than those Bartelsman et al. (2005) found for the, 1989-1994 period, the rate in the service sector is still higher than in manufacturing. This difference is probably the result of the lower start-up costs in the service sector. There appears to be a substantial variation between these firm-dynamics measures across regions, especially where turbulence is concerned.[61] Figures 7.4 and 7.5 depict these regional differences in turbulence rates for manufacturing and services. Since the business cycle may be affecting our analysis of productivity growth, we have accounted for business cycle effects in our regression model in order to minimize the possible effects of spurious correlations.

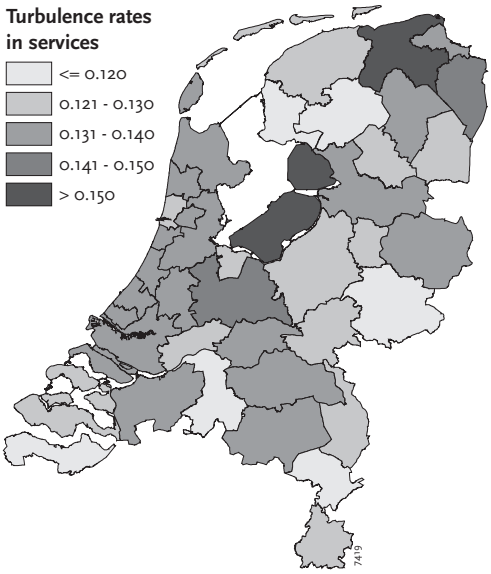
60 Indeed, the, 1996 values appeared to be strongly correlated with the, 2002 values. Because of the time frame explored in our study (1990-2002), we chose to include only the, 1996 level.

61 The F-statistics with respect to variance between regions for turbulence in services amounts to 20.7. In manufacturing, the corresponding F-value is 9.0; all significantly different from zero (p>0.95).



Source: EIM based on Dutch Chambers of Commerce

Figure 7.4 Turbulence rates in Manufacturing, by Nuts3 regions in the Netherlands, averages over 1988-2000



Source: EIM based on Dutch Chambers of Commerce

Figure 7.5 Turbulence rates in Services, by Nuts3 regions in the Netherlands, averages over 1988-2000

National and historical context

Since, 1988, the annual number of new firms in the Netherlands has expanded enormously, as our data confirms. The increase in the annual number of new firms has been promoted by several institutional changes (see also Bosma et al., 2005). One of the most important institutional changes is the Wassenaar Treaty of, 1982, which started a long period of wage restraint. The limited wage increases may have contributed to the attractiveness of becoming self-employed.[62] Occupational choices are influenced by the risks of entrepreneurship (failure) versus those of wage employment (dismissal). In this respect, the increased flexibility of the labour market in the Netherlands as a result of the, 1982 Treaty reduced the opportunity costs of entrepreneurship. Further major general policy initiatives implemented in the past two decades include (i) a significant relaxation od the (old) Establishment Act of, 1937, implemented in several steps between, 1993 and, 2006; (ii) a persistent effort to diminish administrative burdens for entrepreneurs (see World Bank, 2007); (iii) a modernization of the bankruptcy regulations, in particular enabling a timely intervention in the case of problems that challenge the survival of a firm (in terms of the early closure of hopeless cases and of providing assistance in re-starting ventures); (iv) ongoing deregulation of several markets; (v) a recent simplification of the juridical aspects associated with limited liability companies.

62 The Treaty of Wassenaar resulted in long-term agreements between the national government and bodies representing employers and labour unions.

Table 7.1 Descriptive statistics of the variables used in this study, non-weighted averages

			Averages over each time period				
	Mean	St..Dev	1990-1991	1992-1994	1995-1997	1998-2000	2001-2002
Manufacturing							
TFP	0.03	0.06	0.01	0.04	0.04	0.04	0.03
Entry (t-2)	0.06	0.02	0.06	0.06	0.06	0.07	0.06
Turbulence	0.11	0.03	0.09	0.10	0.11	0.11	0.10
Services							
TFP	0.00	0.02	0.00	0.01	0.00	0.00	-0.01
Entry (t-2)	0.09	0.02	0.09	0.09	0.09	0.10	0.11
Turbulence	0.13	0.03	0.11	0.12	0.13	0.15	0.16
Regional demography							
Population density	0.32	0.22					
Related Variety	0.93	0.09					

Table 7.2 Correlation Matrices

	Manufacturing				Services			
	1.	2.	3.	4.	1.	2.	3.	4.
1. TFP								
2. Entry (t-2)	0.06				-0.01			
3. Turbulence	0.06	0.71			-0.06	0.95		
4. Related variety	0.15	0.27	0.24		-0.03	0.23	0.16	
5. Population density	0.05	0.29	0.36	0.45	0.02	0.16	0.12	0.45

Although it is hard to establish the effect of this package of policy initiatives conducive to entrepreneurship on observed entrepreneurial behaviour empirically, the circumstantial evidence at least points in this direction. Controlling for a range of determinants, Bosma et al. (2008b) have found entry rates to be significantly higher for the years after, 1993 and attribute this rise to Dutch policy, in particular the relaxation of the Establishment Act. [63] Carree and Nijkamp (2001) have found evidence for the Dutch retail sector after the relaxation, they found that the number of entries increased significantly, especially in the non-food retail sector. A joint characteristic of the policy package is that, throughout, it is directed in particular at the entry and exit of small firms. The policy measures will have limited success if the minimum efficient scale (MES) in the market is high and entry barriers remain. This argument is reflected in our distinction drawn between manufacturing and services. The minimum efficient scale in manufacturing is much higher than in services (see Audretsch et al., 2004), where new firm formation rates have grown less (if at all).

63 The most important change in the Establishment Act has been the abolishment of mandatory self-employment exams in most industries.

Empirical Model

Following Geroski (1989) and Calléjon and Segarra (1999), we model firm dynamics as a component of the total productivity in region *i* and year *t*, controlling for the effects of labour and capital. For region *i* and year *t*, the quantity of output (value added) Y_{it} is the result of the combination of capital and labour:

$$Y_{it} = F\,(A_{it}, K_{it}, L_{it}) \tag{7.1}$$

where output depends on the number of employees (*L*), the stock of physical capital (*K*), and a productivity index (*A*) that captures the variations in production that are not attributable to changes in the use of labour or capital. More specifically, we specify equation (7.1) in growth rates, and assume constant returns to scale in terms of output in labour and capital:

$$dy_{it} = da_{it} + \alpha dl_{it} + (1 - \alpha)_{it}\, dk_{it} + \eta_{it}\,, \tag{7.2}$$

where the operator d reflects the growth rates and is expressed as first differences in logarithms. Suppose that the growth of the corrected productivity index (d*a*) can be modelled by several components for region *i* and year *t*: percentage changes in industry productivity that are constant over time and region (θ); improvements in productivity resulting from firm dynamics (*FD*); the degree of related variety in the region (*RV*); and population density (*PD*). We minimize the danger of reversed causality by incorporating the lagged effects of firm dynamics on TFP growth. After subtracting $da_{it} + \alpha dl_{it} + (1 - \alpha)_{it}\, dk_{it}$ from both sides, this extension of equation (7.2) leads to an expression in which the dependent variable is Solow's residual θ_{it}^{s}:

$$\theta_{it}^{s} = \theta + \beta_1 FD_{i,t-p} + \beta 2 RV_i + \beta_3\, PD_i + \varepsilon it \tag{7.3}$$

with $i \in (1,\ldots,n)$, $t \in (T_o,\ldots,T)$, $0 \le p \le T - T_o$,

In our empirical analysis, the values of α are based on cost components (for the argumentation, see e.g. Griliches and Lichtenberg (1984, p. 486-488)). An advantage of this method is that weightings depend on region and sector. We have controlled for general business-cycle effects (affecting all regions) by including dummy variables representing each year of observation. Summarizing, equation (7.3) measures total factor productivity (TFP) growth or Solow's residual for region *i* in year *t* as the sum of: (i) technical industrial progress in the strict sense (θ), (ii) additional efficiency caused by firm dynamics (coefficient β_1), the degree of related variety (coefficient β_2), and population density effects (coefficient β_3). We also tested for spatial autocorrelation, that is, the possibility that benefits in one region spill over to neighbouring regions. To this end, we examined the residuals by region (for separate years and averaged over the years) and examined the Moran's-I values, using a spatial weight matrix identifying each neighbouring region. The Moran-I values indicated that spatial errors were not a problem in our models[64]. This finding is different from those reported in studies investigating the impact of entry rates on employment growth (e.g. Van Stel and Storey, 2004; Fritsch and Mueller, 2004; Van Stel and Suddle, 2008). In our

64 Using spatial weight matrices on distances rather than neighbouring regions produced very similar results.

case with TFP as the dependent variable, the size and significance of the Moran-I increase dramatically if we exclude year dummies in the regression.[65] To prevent multicollinearity problems, we do not model entry and turbulence together in one single model, but use separate models for entry rates and the combined measure of turbulence.

We estimated equation (7.3) using ordinary least squares while including the lagged dependent variable. In addition, and as a test for robustness, we discuss a dynamic panel data regression in the Appendix. The panel nature of our data combined with the temporal correlation of some of our variables (hinting at the probability of spurious correlations) calls for the dynamic panel-data estimation technique known as the GMM-sys estimator. GMM-sys is appropriate to our model, because it takes care of endogeneity issues exploiting the panel data structure. However, the advantage comes at the cost of losing observations (degrees of freedom) and therefore we consider it as a check for the robustness of our results using ordinary least squares.

7.4 Results

Estimation results of equation (7. 3) are depicted in tables 7.3 and 7.4 for manufacturing and services respectively. The first two columns in both tables (model A) present the results of a basic model, excluding moderating effects, for entry rates and turbulence rates respectively. Our analyses thus suggest that, for the Netherlands, entry and turbulence rates are important drivers of productivity growth in services, but not in manufacturing.

We find some evidence of the moderating effects of urbanization economies and Jacobs externalities, in particular for the effect of firm dynamics on productivity growth in services. Firm dynamics have an additional positive effect on productivity growth in regions with relatively high population density or relatively high related-variety (see Table 7.2, models B and C). The moderating effect with related variety seems to dominate the effect with population density as the outcomes in model D show.

We also tested for the presence of a curvilinear effect in the sense that, at a certain point, increases in entry or turbulence rates might *deter* rather than increase competitiveness. In this case, optimal levels of entry and turbulence can be derived, as Fritsch and Schroeter (2009) found for German regions, but which other studies have been unable to identify (see Robinson et al., 2006). The likelihood ratio test supports the relevance of the inclusion of a quadratic term ($p<0.05$) for services, but not for manufacturing. Figure 7.6 describes the curvilinear effects for model C2 in services. The top of the curve (indicating maximum effect) occurs at turbulence rates around 15 percent, whereas observed regional turbulence rates range from 7 percent to 22 percent. The maximum effect for entry rates occurs between 10 percent and 11 percent[66]. Figure 7.6 also displays the curve that would

65 This suggests that the (designed) spatial autocorrelation effect may unintentionally pick up some temporal autocorrelation as a result of business cycles. It is therefore important to account for business cycle effects.

66 The estimated maximum effect by Fritsch and Schroeter (2009), who also find an inverse U-shaped impact, occurs at a start-up rate of about 8 percent. However, the percentages are not directly

Table 7.3 Regression results for TFP growth in manufacturing.

	A1		A2		B1		B2		C1		C2		D1		D2	
Lagged dependent																
TFP (t-1)	-0.07		-0.07		-0.07		-0.07		-0.07		-0.07		-0.07		-0.07	
	(0.07)		(0.07)		(0.07)		(0.07)		(0.07)		(0.07)		(0.07)		(0.07)	
Firm dynamics																
Entry (t-2)	0.15				0.11				0.21				0.29			
	(0.16)				(0.17)				(0.16)				(0.17)			
Turbulence:			0.03				0.03				0.08				0.07	
Entry (t-2) + Exit (t)			(0.07)				(0.07)				(0.07)				(0.07)	
Regional demography																
Related variety	0.17	**	0.18	**	0.18	**	0.19	**	0.24	**	0.24	**	0.24	**	0.23	**
	(0.04)		(0.04)		(0.04)		(0.04)		(0.06)		(0.06)		(0.06)		(0.06)	
Population density	-0.01		-0.01		0.01		0.01		-0.01		-0.01		0.00		0.00	
	(0.01)		(0.01)		(0.01)		(0.02)		(0.01)		(0.01)		(0.02)		(0.02)	
Firm dynamics in regions with high levels of...																
Population density					-0.17	*	-0.20	**					-0.14		-0.14	
					(0.10)		(0.10)						(0.11)		(0.11)	
Related variety									-0.22	*	-0.21	*	-0.20		-0.16	
									(0.12)		(0.12)		(0.14)		(0.13)	
Constant	-0.14	**	-0.14	**	-0.15	**	-0.15	**	-0.20	**	-0.20	**	-0.21	**	-0.19	**
	(0.04)		(0.04)		(0.04)		(0.04)		(0.06)		(0.06)		(0.04)		(0.06)	
Number of obs.	511		511		511		511		511		511		511		511	
F statistic	5.15		4.95		4.90		4.69		5.00		4.78		4.75		4.52	
R^2	0.178		0.177		0.182		0.183		0.186		0.184		0.189		0.186	

Year dummies included but not reported. Robust standard errors in parentheses. Outliers (absolute value of standardized residuals > 2.5) are removed from the analysis
* p<.10, ** p<.05

Table 7.4 Regression results for TFP growth in services.

	A1		A2		B1		B2		C1		C2		D1		D2	
Lagged dependent																
TFP (t-1)	0.32	**	0.31	**	0.31	**	0.30	**	0.31	**	0.29	**	0.31	**	0.29	**
	(0.06)		(0.06)		(0.07)		(0.06)		(0.07)		(0.07)		(0.07)		(0.07)	
Firm dynamics																
Entry (t-2)	1.01	**			0.92	**			1.05	**			1.02	**		
	(0.42)				(0.42)				(0.42)				(0.42)			
Turbulence:			1.20	**			1.13	**			1.24	**			1.22	**
Entry (t-2) + Exit (t)			(0.32)				(0.32)				(0.32)				(0.33)	
Squared term	-4.54	**	-3.86	**	-4.12	**	-3.67	**	-4.93	**	-4.19	**	-4.90	**	-4.12	**
	(1.98)		(1.02)		(1.98)		(1.03)		(2.03)		(1.04)		(2.00)		(1.07)	
Regional demography																
Related variety	-0.00		-0.00		-0.01		-0.00		-0.04	**	-0.04	**	-0.04	**	-0.04	**
	(0.01)		(0.01)		(0.01)		(0.01)		(0.02)		(0.02)		(0.02)		(0.02)	
Population density	0.00		-0.00		-0.00		-0.01		0.00		-0.01		-0.00		-0.00	
	(0.00)		(0.00)		(0.00)		(0.01)		(0.00)		(0.00)		(0.01)		(0.01)	
Firm dynamics in regions with high levels of...																
Population density					0.04	*	0.03						0.02		0.01	
					(0.02)		(0.02)						(0.03)		(0.03)	
Related variety									0.06	**	0.08	**	0.07	**	0.08	**
									(0.03)		(0.03)		(0.03)		(0.03)	
Constant	-0.04	*	-0.08	**	-0.03		-0.07	**	-0.04		-0.07	**	-0.03		-0.07	**
	(0.02)		(0.03)		(0.02)		(0.03)		(0.03)		(0.03)		(0.03)		(0.03)	
Number of obs.	513		513		513		513		514		514		513		514	
F statistic	16.86		17.54		16.29		16.80		16.49		17.37		15.74		17.37	
R^2	0.379		0.381		0.382		0.391		0.379		0.392		0.381		0.392	

Year dummies included but not reported. Robust standard errors in parentheses. Outliers (absolute value of standardized residuals > 2.5) are removed from the analysis
* p<.10, ** p<.05

result from related variety of relatively high and low degrees (plus and minus one standard deviation from the mean), taking into account the estimated negative effect of related variety (single effect) on regional productivity growth in services. Thus, Figure 7.6 gives the total picture of the combined effect of turbulence and related variety resulting from model C2, *ceteris paribus*.

The results of the GMM-sys approach are shown in appendix II and confirm the main findings. Productivity growth in manufacturing seems to be driven mainly by the restructuring of the incumbents. In manufacturing, the most spectacular improvements in TFP are shown to go hand in hand with a severe decline in employment, indicating labour-shedding processes. We tested some further models. For instance, in accordance with the arguments on creative destruction in the theoretical section, we allowed exit rates to have a moderating effect on the impact of entry rates on TFP growth. We did not find any evidence of this relationship, but this may be the result of the high sectoral aggregation in our study. We also specified models with longer time lags in manufacturing (3-9 years). These did not improve the model fit and the effects of entry and turbulence were still insignificant.[67]. Allowing a one-year lag and a three-year lag for entry and turbulence to impact TFP growth in services yielded results very similar to those presented in Table 7.2.[68]

7.5 Discussion

Despite a long tradition of productivity studies and endogenous growth theory, it is still hard to explain productivity growth. In this study, we have attempted to analyse the effects of firm entry and turbulence on competitiveness at the most relevant level of analysis, namely the region. We have used total factor productivity growth as a measure of competitiveness and regressed this onto firm entry and exit and TFP growth in manufacturing and services in regions in the Netherlands over a 14 year period. Our results suggest that firm entry and exit are important for regional competitiveness in services, but not in manufacturing.

Why do not firm entry and exit in manufacturing have a positive effect on TFP growth? One reason might be that productivity growth in manufacturing in the Netherlands is driven by a few large players, and that new entrants and firm exits have only marginal effects on aggregate productivity growth. This intuition seems to be confirmed by the relatively low explained variance of the statistical models of TFP growth in manufacturing in comparison with the services models. In addition, most studies on the effect of entry on TFP growth in manufacturing are based on data from the, 1970s and, 1980s, while our study is based on data from a much more recent period. In recent decades, productivity growth in manufacturing has increasingly been driven by the incumbents (through industry restructuring, de-industrialization), while the contribution made by new entrants (and exits) has declined over time (see Baldwin and Gu, 2006). This might partly explain the

67 Also, we did not find a polynomial lag impact structure that resembles the one discussed in Fritsch (2008) This lag structure is characterized by positive short-term employment effects (typically between 0-2 years) diminishing effects because of replacement effects that may even become negative (3-7 years) and positive long term (carrying capacity) effects surfacing only after that.

68 The results of these additional analyses are not reported, but are available on request.

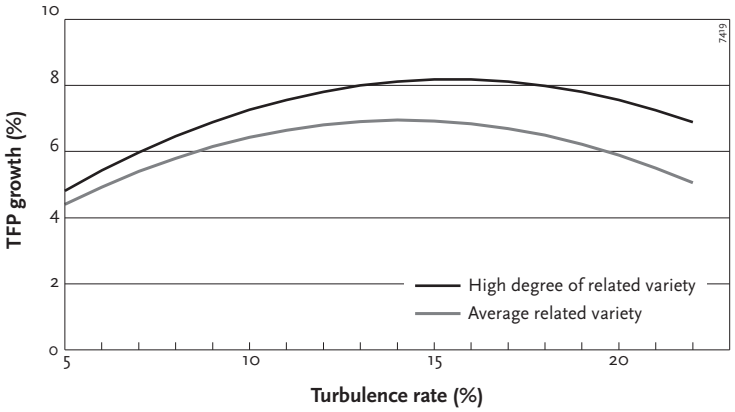


Figure 7.6 Graphical representation of the curvilinear impact of firm dynamics on TFP and the moderating role of related variety in the region – based on coefficients Table 4, model C2.

different outcomes of our study in comparison with previous research on the role of entry in productivity growth in manufacturing.

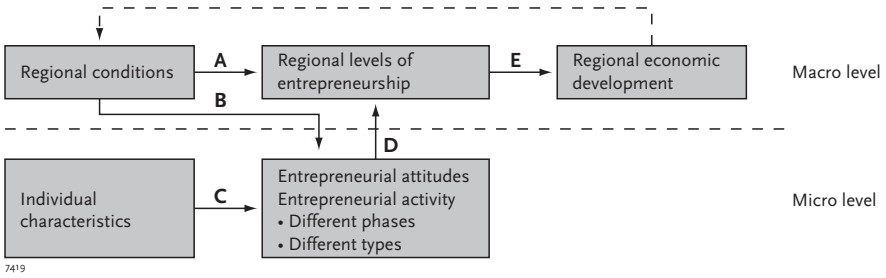
One reason why entry and exit *do* have a positive effect on productivity growth in services may be the relatively low minimum efficient scale of service activities (see Audretsch et al., 2004), which means that (often small) entrants in services contribute more easily to productivity improvements in the sector than entrants in manufacturing do. However, another study in the Netherlands found that young services firms are relatively inefficient and so do not contribute directly to productivity improvements in the sector (Bangma et al., 2004). This finding is consistent with other studies focusing on the firm level (Bartelsman and Doms, 2000). This paradox can be explained by the difference in the level of analysis. While, relative to incumbent firms, entrants may not be more efficient in the initial phase, their potential pressure may provoke incumbents in the same region to stay alert and improve their efficiency; in an extreme case, established companies could even be induced to acquire new and promising firms or else to appropriate the new knowledge provided by the new firms, a process of creative construction. Such a spillover process, although well-documented in the literature, is not verified by directly comparing productivity rates at the firm level. The research design of our study enables the inclusion of potential spillover processes by analysing the effects of firm entry and exit at the regional level and allowing for time lags for the changes in firm dynamics to affect productivity growth. In comparison with the manufacturing sector, where knowledge is generally more capable of being appropriated and is patented more frequently, knowledge spillovers may take place more often in the service sector. Of course, sectors are linked and it is conceivable that an entry in services has an impact on regional productivity growth manufacturing. We did not account for this in our model and future research might take a closer look at these interlinkages.

We should note that we did not control for the innovativeness of entrants, which is an important part of the creative destruction story; entrants should potentially be innovative in order to destruct less innovative (or construct better) incumbents. Our approach basically assumes that an increase in entry rates goes together with an increase in innovative potential stemming from new firms. For innovative potential, the creative *use* of technology

that has recently become available is just as relevant as the *production* of innovation. Inklaar et al. (2003), for instance, show that productivity growth is particularly high in ICT-using sectors. This also links to the policy conclusion for the Netherlands by Bartelsman (2004) where, commenting on Baumol (2004), he stresses that policy should not aim at entry or small businesses in general, but at "..the number of firms (...) that experiment with new methods to serve the market..." (Bartelsman, 2004, p. 361). Future research might take a closer look at this and make an attempt to separate new firm activity with innovative potential from new firm activity that has no innovative potential – regardless of sector classification. Similarly, it will also be fruitful to explore different types of exit; in our study we were not able to distinguish between exits that recently entered the market and exits of firms that had been operational for several years. A distinction between voluntary and involuntary exit would also be highly relevant.

Policymakers increasingly aim to foster entrepreneurship to stimulate the competitiveness of regions. Previous studies have shown that entrepreneurship is an important vehicle for achieving employment growth in many settings. Our study for the Netherlands shows that entrepreneurship can be important for regional competitiveness. In order to increase the effectiveness of public policy in economies like the Netherlands, perhaps one should not stimulate entry and possibly exit in general, but focus on lowering the entry and exit barriers in the service sector. Policymakers should also be aware that firm dynamics will have a greater impact on regional competitiveness in some regions, especially those with higher degrees of relatedness and, to a lesser extent, higher population density. Finally, one should know where to stop when stimulating entrepreneurship; our results also indicate that too much entry can lead to decreases in competitiveness.

8 Entrepreneurship, Urbanization Economies and Productivity of Regions; A Multilevel Approach Applied to European Regions



8.1 Introduction

The literature of regional economic growth has established that differences in regional productivity can to a large extent be explained by the density of economic activity. This effect of *urbanization economies* has been documented for regions in the United States (Ciccone and Hall, 1996) and Europe (Ciccone, 2002). Micro-level foundations of urbanization economies have been investigated since the, 1980s and a satisfactory overview of today's knowledge is provided in reviews by Duranton and Puga (2004) and Rosenthal and Strange (2003;, 2004). Other authors have related urbanization economies to specific characteristics of the labour force in cities such as human capital (Glaeser et al. (1992) and creative class (Florida, 2004)[69]. In addition, in the tradition of Romer (1986;1990) and Lucas (1988), urbanization economies have been connected to knowledge, innovation, and technology (Audretsch and Feldman, 1996). An important regional-level mechanism that feeds urbanization effects is knowledge spillovers taking place via Jacobs' externalities (Jacobs, 1969). Duranton and Puga (2004) conclude that the different microeconomic mechanisms that may be used to justify the existence of cities generally lead to very similar outcomes. They argue that, while this equivalence means that the concept of *urban agglomeration economies* is robust for many different specifications and microeconomic mechanisms, the problem remains that identifying and separating these mechanisms empirically becomes very difficult.

69 Regional variations in human capital and creative class overlap, but are not the same. Boschma and Fritsch (2007) find that the measure of creative class dominates the human capital measure in explaining growth over European regions.

An emerging contribution to regional growth theory comes from the entrepreneurship literature. The reasoning of the importance of entrepreneurship and the surprisingly low attention paid to entrepreneurship in economic literature had already been signalled in the, 1960s by William Baumol using the often-cited words (Baumol, 1968, p.68): "The theoretical firm is entrepreneurless – the Prince of Denmark has been expunged from the discussion of Hamlet." In the very same issue of the *American Economic Review*, Leibenstein (1968, p. 72) argued that "... the standard competitive model hides the vital function of the entrepreneur." It was, however, only after the rediscovery of Joseph Schumpeter's works in the, 1980s and the publication of David Birch's findings about the importance of the small-business sector for job growth (Birch, 1987) that data collection on entrepreneurship really took off. This data collection has enabled empirical testing so that now entrepreneurship is included more explicitly in economic modelling. Audretsch and Keilbach (2004a;, 2005) see entrepreneurial processes as an additional factor that enables the productive use and combinations of labour, capital, and knowledge. Acs et al. (2004) see entrepreneurs as agents who filter the available stock of knowledge in the region and turn this into promising new ventures. They argue that it is the combination of R&D and entrepreneurship in particular that leads to economic growth.

This expanding body of literature takes as its point of departure that most new firms are embodied by the entrepreneurs. However, it is clear that there are many types of entrepreneurs and it can be argued that different types of entrepreneurship may impact on the regional economy differently. Indeed, Leibenstein (1968, p. 72-73) made a plea forty years ago for the identification of different types of entrepreneurship, separating *routine entrepreneurship* as a type of management from Schumpetarian or *new* type of entrepreneurship. Sternberg and Wennekers (2005) argue that different types of entrepreneurship will impact on economic growth differently. Since the empirical literature clearly documents spatial unevenness in entrepreneurship rates (Reynolds et al., 1994; Audretsch and Fritsch, 2004a; Bergmann and Sternberg, 2007; Glaeser, 2007; Bosma and Schutjens, 2009b) it becomes clear that, conceptually, the individual level and the regional level should be explicitly modelled when linking entrepreneurship to economic growth.

In addition, the *stage* of entrepreneurship is important. Entrepreneurship is not an event, but a process. In line with Schumpeter, the early-stage of entrepreneurship, including the phase from before to after the birth event of the firm, is widely recognized as the most relevant entrepreneurial stage for economic growth. Davidsson (2006) makes a plea for investigating the pre-birth processes of entrepreneurship, also known as *nascent entrepreneurship*. Whether a potential high-impact firm succeeds in reaching the market depends on numerous factors. However, even if nascent entrepreneurs do not succeed in getting their business started, their efforts will not be lost. Good ideas will be picked up by others, or returned to by the same entrepreneur who experienced what went wrong in the first attempt. The chances that the knowledge spillovers will remain lingering in the region are high (Michelacci and Silva, 2007). We therefore hypothesise that early-stage entrepreneurial activity, and in particular the ambitious types of early-stage entrepreneurial activity, contribute to regional economic performance.

In this chapter, we contribute to the literature by describing a multilevel model of entrepreneurship impacting on regional levels of growth in addition to the traditional

inputs of labour, capital, and knowledge. The model presumes that different types of entrepreneurship are identified at the individual level. The model also recognizes that the odds of being engaged in (types, stages of) entrepreneurship are not exogenous. Individual characteristics are believed to exert a significant influence on the odds of being entrepreneurially active. Regional characteristics are believed to provide an additional effect. Thus, the best way to comprehend the effects of regional characteristics and potential policy instruments is to observe how individuals respond to regional conditions – while controlling for individual characteristics – and how the set of responses relates to observed differences in entrepreneurship dynamics at the regional level. Moreover, our combined individual and regional level focus allows us to investigate which types of entrepreneurship complement urbanization economies in explaining regional variation in labour productivity and which types of entrepreneurship unravel effects equivalent to other micro-level explanations of agglomeration effects (Duranton and Puga, 2004).

In our empirical analysis, we draw on an extensive database extracted from the Global Entrepreneurship Monitor (GEM). It allows us to explore the entrepreneurial perceptions and behaviour of more than 370,000 individuals over 136 regions in 17 European countries. In our methodology, as our point of departure we have taken Ciccone's (2002) model – applied for establishing the effect of urbanization economies in European regions – and provided two additions. First, at the regional level we introduce different types of early-stage entrepreneurship as additional explanations of regional variation in labour productivity. Our results indicate that regional levels of low, modest, and high-growth -oriented early-stage entrepreneurship are indicators of higher levels of regional labour productivity. This finding is in line with, for example, those of Audretsch and Keilbach (2004b), Wong et al. (2005) and Acs et al. (2005b). For entrepreneurial activity with innovation-oriented entrepreneurship, we do not find any significant impact. Importantly, when including high-growth-oriented entrepreneurship in our equation, the estimated effect of urbanization economies decreases by 20 percent, suggesting that high-growth-oriented entrepreneurship is a type that can be linked to urbanization economies. The impact of low and modest growth-oriented entrepreneurship, however, complements urbanization economies rather than afford an explanation.

The second part of our analysis isolates the triangular relationship between entrepreneurship, high-growth-oriented entrepreneurship, and regional productivity by explicitly introducing the entrepreneurial process at the individual level. We propose a multilevel model where the entrepreneur features: as an individual. Here the results show that the positive impact of growth-oriented entrepreneurship vanishes if we model entrepreneurial activity at the individual level and account for basic individual characteristics in the multilevel analysis. By modelling entrepreneurship at the individual level, it turns out that the size and significance of regional levels of educational attainment in explaining regional productivity increases further. We argue that entrepreneurship is indeed a relevant factor for growth, albeit not an input factor or a form of capital. In fact, it is the entrepreneurship *mechanism* that allows human capital to impact on regional performance.

8.2 Entrepreneurship, urbanization economies, and the productivity of regions

Evidence from regional level models

In specifying the link between entrepreneurship, urbanization economies, and regional productivity levels, we can conveniently take the model proposed by Ciccone (2002), also applied to European regions, as a point of departure. Ciccone examines a production function relating the output of an acre of land to the amount of human capital (the number of workers employed on the acre multiplied by the average level of the human capital of the workers on the acre), the amount of physical capital used on the acre, and an index of total factor productivity in the region. A regional perspective is added by conditioning the production function on a basic regional feature: the total production of the region divided by the total acreage of the region. In this model, spatial externalities are driven by the density of production in the region; the elasticity of output per acre is assumed to be constant. The approach concentrates exclusively on explaining regional variation in production; dynamic effects are not considered[70].

What is the role of entrepreneurship in such a model? Audretsch and Keilbach (2004c) argue that entrepreneurship is an additional relevant factor in models of economic growth. Knowledge is not enough in itself for economic growth; new ideas have to be turned into economic outputs in order to affect the economic performance of regions and countries. Entrepreneurship involves the capacity for economic agents to generate new firms or new activities in existing firms, an essential condition for turning new ideas into economic outputs. Empirical studies have confirmed to some extent the importance of entrepreneurship in economic growth (Audretsch et al., 2006; Carree and Thurik, 2003). Analyses of German data show that entrepreneurship is an even more important factor for (regional) economic growth than the regional knowledge base (Audretsch and Keilbach, 2004a).

From an evolutionary economics perspective, the long-term competitiveness of a region depends on its ability to upgrade its economic base (i) by creating new economic variety (that is, new combinations of resources introduced into a market) and (ii) by selection (that is, the destruction of the weaker economic entities in the existing supply) (Boschma, 2004)[71]. New economic variety emanates from investments in R&D by incumbent firms, but also through the start-up of new firms; economic variety can accordingly be expressed in terms of differences in the regional levels of entrepreneurship (Audretsch and Keilbach, 2004c).

The above lines of thought have resulted in formal economic models that take entrepreneurship into account. One of the most comprehensive models was proposed by Acs et al. (2003). They formally model the interplay between knowledge workers (researchers) and entrepreneurs and arrive at a macro-level growth equation where

70 Estimating dynamic effects calls for spatial econometrics applications, see for example Bosker (2007) who investigated space-time structures for growth in European regions using spatial panel data estimation techniques.

71 These two parts of the creative destruction process generally tend to go together. In a review, Caves (1998) concludes that entry and exit are highly correlated.

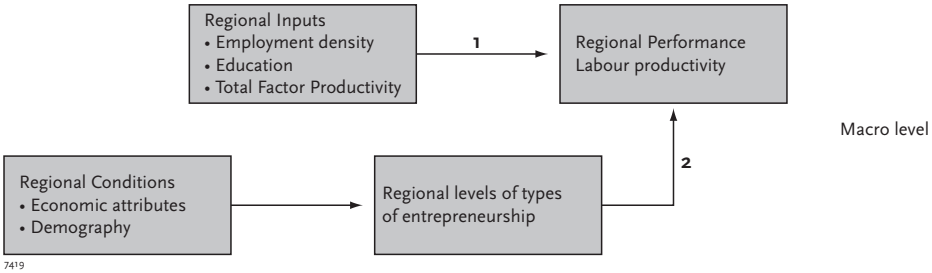


Figure 8.1 Representation of the macro-macro model

entrepreneurship is an explanatory variable additional to labour, capital, and knowledge. In an empirical exercise, the same authors found evidence for the importance of entrepreneurship in explaining national economic growth (see Acs et al., 2005b)[72].

Integrating the entrepreneurship module proposed by Acs et al. (2004) into Ciccone's model, we arrive at the purely macro-level model described by figure 8.1. In this figure, the upper part represented by relationship 1 represents Ciccone's analysis. The effect of employment density on regional levels of labour productivity captures urbanization economies. The additional impact of entrepreneurship is described in the lower part of the figure. This model incorporates the notion that regional levels of entrepreneurship are not exogenous and depend on regional characteristics relating to economic and demographic characteristics. Although the model describes the macro level, the individual level is acknowledged by identifying different types of entrepreneurship. The existing body of literature on entrepreneurship suggests that identifying the *type* of entrepreneurship is essential for making the link between entrepreneurial activity and economic growth: different types of entrepreneurship may have a different impact on a region's economic development (Sternberg and Wennekers, 2005; Acs, 2008). Drawing a distinction between the different types of entrepreneurship makes it possible to disentangle the different micro-level behavioural mechanisms that drive the growth processes at the macro level.

In this chapter, we concentrate on two major types of entrepreneurship: growth oriented and innovation oriented. Both types are well documented in the literature. Growth-oriented entrepreneurship is particularly important, because it has been found that fast growing firms (also known as gazelles) form a minority of the business stock, but account for a large share of employment growth. Henrekson and Johansson (2008) provide a thorough review of studies investigating the significance of gazelles for national and regional economies. The importance of innovative entrepreneurship can be traced back to Schumpeter's work on creative destruction: he saw entrepreneurs as agents challenging the existing markets, creating disequilibria, and thus moving the production frontier forward (Schumpeter, 1942). Aghion and Howitt (1992) formally introduced the creative-destruction mechanism in economic modelling by explicitly focusing on the degree of innovation with which entrepreneurship is associated in the theory of creative destruction.

72 Interestingly, even though the empirical analysis takes place at the national level, the authors acknowledge the importance of spatial unevenness to some extent by instrumenting entrepreneurship on the degree of urbanisation. However, this is only applied in one of their equations.

For both of the types distinguished, the *early stage* of the entrepreneurial process is of the utmost importance. Gazelles are most often found among start-ups and the increasing importance of new firms is reflected in the increasing share of young firms in listings such as *Fortune 500*. Autio (2007) charts the job-growth expectation for early-stage entrepreneurs and finds that 12 percent of the individuals involved in early-stage entrepreneurial activity account for 78 percent of the total expected job-growth created by early-stage entrepreneurs. The early-stage is also the most relevant phase for innovation-oriented entrepreneurial activity; as Schumpeter (1942) argues, most creative destruction can be expected from entrepreneurs entering existing markets or exploring new markets. Here the expected returns for the regional economy are not as direct as with growth orientation. Regions in particular will benefit from new, innovative ventures by virtue of the spillover processes. The nascent or pre-start-up phase is also very important; while a new idea may invoke innovation, that is no guarantee for success. The new business may even fail; however, economically-viable ideas will be picked up by others who may be better equipped to exploit them, attract investors, and target the right markets.

Summarizing, in this chapter we have considered the role of entrepreneurship for regional performance in what we feel are crucial elements. We have concentrated on the occurrences of specific types of entrepreneurship in the early-stage phase. The types of early-stage entrepreneurship are determined at the individual level, but their regional prevalence rates exhibit significant regional variation. Our first two basic hypotheses at the regional level are accordingly:

H1: The regional propensity of *high-growth* oriented early-stage entrepreneurial activity explains the variation in regional productivity
H2: The regional propensity of *innovation* oriented early-stage entrepreneurial activity explains the variation in regional productivity

A relatively new insight into modelling entrepreneurship as a driver of regional economic performance is the idea tjat some regional features may have an impact on the magnitude of the measured effect. The urban features of a region may be particularly important. Thus, not only may levels of entrepreneurship in cities exceed those at the country level (see Acs et al., 2008 for initial evidence on world cities), but also the consequences for economic growth may be higher in cities (see Becker and Henderson, 2000). In particular, Fritsch and Schroeter (2009) find that, for densely-populated areas in Germany, the long-term impact of regional firm-formation rates on employment growth exceeds the impact found for rural areas. In chapter 7, we reported a similar conclusion for the Dutch services sector and declared that the effect was more pronounced if related variety is examined rather than population density (see Bosma et al., 2009b) [73]. We showed that related variety is positively correlated with population density. However, in comparison with related variety, population density better reflects Jacobs' externalities and can therefore be associated with economic density (see Frenken et al., 2007). These findings suggest that part of urbanization

73 Frenken et al. (2007) define *related variety* as a combination of sector diversity and the degree to which the sectors are related. Entropy statistics have been used to calculate this measure. Related variety is measured for each region as the weighted sum of industrial variety (over 5-digit classes) within each of two digit classes (for a detailed description and formal computation see Frenken et al., 2007)

economies, captured in Ciccone and Hall (1996) by estimating the impact of employment density on labour productivity, may be accounted for by entrepreneurial activity. In other words, inserting entrepreneurship in the regression would result in a lower estimated impact of employment density on regional productivity. In our framework, the remaining question is whether specific types of entrepreneurship would cause such an effect. Since Acs et al. (2008) present evidence for the *entrepreneurial advantage of cities*, especially where high degrees of growth orientation are concerned, we expected the effect for this type of early-stage entrepreneurship in particular.

H3: including high-growth -oriented entrepreneurial activity in the regional growth equations reduces the estimated effect of employment density on labour productivity.

Acknowledging the multilevel mechanism

The emerging set of studies that focuses on the impact of regional levels of entrepreneurship on regional economic performance assumes that knowledge spillovers, competition, and variety within a region are enhanced by entrepreneurship, especially in high-tech sectors (Audretsch and Keilbach, 2004b; Carree and Thurik, 2003; Fritsch and Mueller, 2004). However, the underlying causal mechanisms are still not disentangled; in Baumol's vocabulary: Hamlet has still not resurfaced. The multilevel process we propose is described in figure 8.2. *Regional* conditions are believed to affect *individual* entrepreneurial behaviour (type 2 relationships), for example, in the decision to set up a new firm or to create a new subsidiary firm. The aggregate characteristics of individual-firm behaviour will thus vary across regions, resulting in a variety of regional levels of entrepreneurship dynamics. The effect on regional development is captured by relationship 3 in figure 8.2. The macro-micro-macro path (type 2 and 3 relationships) is at most only partially explained in the current literature. Establishing the magnitude of these effects is only possible if one considers the complete model.

How would this multilevel framework alter our expectations with respect to the macro-level framework from Figure 8.2? The extended model makes it possible to control for the interrelationships between entrepreneurship, employment density (as an indicator of urbanization economies), and other determinants of labour productivity. A possible criticism of the empirical applications of Audretsch et al. (2006) and Acs et al. (2005b) is that insufficient account is taken of the interrelationship between entrepreneurship and, for instance, human capital. If regional variation in entrepreneurship is caused by regional variation in human capital so that entrepreneurship and human capital are positively correlated, the effect of entrepreneurship could be overestimated. Similar arguments can be made for financial and social capital.

Taking the argument further, if growth-oriented entrepreneurship overrides part of the estimated effect of employment density on labour productivity, as postulated in the third hypothesis, this could in fact be caused by individual factors. Regional levels of urbanization economies and growth-oriented entrepreneurship may, as argued above, be driven by similar characteristics of the region's inhabitants, embodied in human and financial capital. The importance of these is well documented for post-start-up performance (see for example Bosma et al., 2004, Kim et al., 2006) and for urbanization economies (Duranton and Puga, 2004). Support for this explanation would mean that, by controlling for human

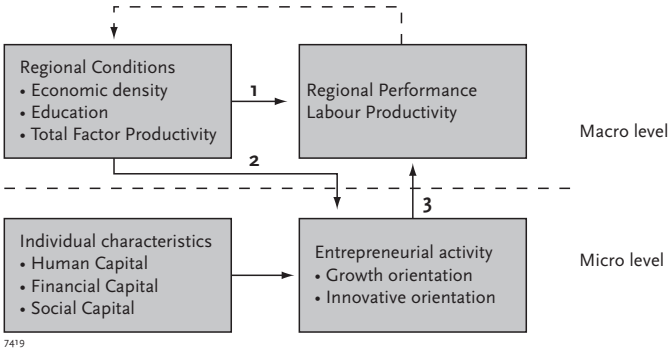


Figure 8.2. Micro-macro relations between entrepreneurship and (regional) economic development

and financial capital, the impact of growth-oriented entrepreneurship on regional levels of labour productivity decreases.

8.3 Modelling entrepreneurship, urbanization economies, and regional productivity

The regional level model

Following Ciccone (2002), we model a regional productivity function where Q denotes value added at the Nuts3 level, N captures employment, and A the acreage of the region in square kilometres. The derived equation to be estimated at the regional level (see Ciccone, 2002, p. 218) is as follows:

$$\log Q_{ci} - \log N_{ci} = \text{Country/Regional Dummies}$$

$$+ \vartheta (\log N_{ci} - \log A_{ci}) + \sum_k \delta_k F_{kci} + \gamma_p E_{pci} + \mu_{ci}; \qquad (8.1)$$

where c denotes the country and i the region. F_k represents the share of educational attainment of type k. The dummy variables entering the regression – at either the country, Nuts1 or Nuts2 level – control for potential regional differences in total factor productivity at that particular country or regional level. In Ciccone's computations, the inclusion of different regional dummies did not affect the estimated effect of urbanization economies. Ciccone (2002, p. 217) shows that the estimated coefficient ϑ does not measure the strength of spatial externalities; rather, it measures the effect of the regional density of employment and human capital on regional productivity. While Ciccone uses the term *agglomeration effects* for this measure, we denote it the *urbanization effect*[74]. Urbanization effects are consistently estimated at a rate ranging between 4.0 and 4.5 percent[75]. In this chapter, we provide two additions to equation (8.1). First, we introduce regional levels of

74 Agglomeration economies consist of urbanization and localization economies. Localization economies, that is, the strength of particular industries in agglomerations, are not considered here.

75 Here employment density has not been considered as an exogenous variable; it has been instrumented by the size of the region in square kilometres.

early-stage entrepreneurship as additional explanatory variables. Three of the measures reflect entrepreneurship along a growth-expectation classification (low growth, moderate growth, high growth). The fourth measure captures the innovative ambitions of early-stage entrepreneurship. Second, we explicitly model the entrepreneurial process at the individual level. Thus, in model (i) regional characteristics (together with individual characteristics) affect the odds that an individual is engaged in a certain type of early-stage entrepreneurship and (ii) the early-stage entrepreneurs contribute to regional performance.

Adding entrepreneurship to equation (8.1) in a similar fashion to education, we have:

$$\log Q_{ci} - \log N_{ci} = \text{Country/Regional Dummies}$$

$$+ \vartheta (\log N_{ci} - \log A_{ci}) + \sum_k \delta_k F_{kci} + \gamma_p E_{pci} + \mu_{ci}; \qquad (8.2)$$

where p denotes the type of entrepreneurship. In principle, multiple types of entrepreneurship may also be modelled in equation 8.2. In this chapter, we consider only one type of entrepreneurship in each regression.

Extension: the multilevel model

Modelling a multilevel framework as in figure 8.2 involves some statistical challenges. We adopted a multilevel model with a random intercept for the regional level. That is to say, we model individuals as hierarchically nested in their regional environment. In contrast with standard multivariate models, multilevel models control for the assumption of independence of observations in grouped data. In our specific analysis this means that we acknowledge that some regional and national characteristics may shape individuals' entrepreneurial behaviour, and that this context may not be independent for individuals owing to such influences as peer effects, regional role models, and knowledge spillovers. The co-variation between the behaviour of individuals sharing the same regional externalities can be expressed by the *intra-class* correlation (Hox, 2002). With this, the between-regions variance contributes to individual behaviour in addition to the variance between individuals. If standard significance tests were used treating the individual as the single unit of analysis and regional level variables are included for each individual, the important assumption of the independence of residual error terms would be violated, potentially leading to large errors and too liberal significance levels (Rabe-Hesketh and Skrondal, 2005). Analysing processes that play a role on different (individual or spatial) levels at one single level causes conclusions to be harmed by ecological fallacies (aggregated correlations and individual correlations are not the same, either in magnitude or in sign). Multilevel analysis has been developed for this reason as it resolves problems of this kind (Hox, 2002).

Following Hox (2002) and Goldstein (2003), we incorporate two levels that are fully nested: assuming that each region consists of n_i respondents, the respondent level variable Y_{ij} denotes the regional economic performance measure that is attributed to respondent j in region i. Assume for simplicity that there is one regional-level explanatory variable X_{ij}, and a purely individual-level explanatory variable E_{ij}. A separate regression model in each group is then formulated:

$$Y_{ij} = \beta_j^{\circ} + \beta_{ij}^{1} X_{ij} + \mu_{ij} \tag{8.3}$$

Note that X_{ij} and Y_{ij} have identical values for all the individuals in region *i*. The variation of the regression coefficient β°is not exogenous, but is modelled by an individual-level regression model:

$$\beta_{cij}^{\circ} = \gamma^{\circ} + \gamma^{\circ 1} E_{cij} + \zeta_{cij}^{\circ}, \tag{8.4}$$

This model is known as a two-level model with random intercepts. The difference from a usual regression model is that we assume that each individual *j* in region *i* and country *c* has a different intercept coefficient β_{cij}, which is stochastically modelled. We have not modelled random slopes, so that the β^{1} coefficients in (8.3) for the individual independent variables entering the regression have been assumed to be equal across regions[76]. Equations (8.3) and (8.4) account for the relationships 1 and 3 described in figure 8.2. The remaining relationships described in the figure are obtained from explaining entrepreneurship by some individual characteristics captured by Z_{ij} and the previously-defined regional characteristics captured by X_{ij}. The complete model then reads

$$\log Q_{ci} - \log N_{ci} = \beta_{ci}^{\circ} + \vartheta (\log N_{ci} - \log A_{ci}) + \sum_k \delta_k F_{kci} + \mu_{ci} \tag{8.5a}$$

$$\text{where } \beta_{ci}^{\circ} = \gamma^{\circ\circ} + \gamma^{\circ 1} E_{cij} + \zeta_{cij}^{\circ}, \text{ and} \tag{8.5b}$$

$$\log it \{\Pr (E_{cij} = 1 \mid N_{ci}, A_{ci}, HC_{cij}, FC_{cij}\} =$$

$$\rho^{\circ\circ} + \mu_1 (\log N_{ci} - \log A_{ci}) + \mu_2 HC_{cij} + \mu_3 HC_{cij} + \nu_{cij}^{\circ} \tag{8.5c}$$

This model consists of a set of equations that we refer to as the production equation (8.5a), the multilevel effect (8.5b), and the entrepreneurship equation (8.5c). In equation (8.5c), human capital variables are denoted by *HC* and the variables reflecting financial capital are captured by *FC*. The treatment effect for entrepreneurship (equation 8.5c) is incorporated through a binomial logit-link since the data on entrepreneurial activity has a binomial nature; consequently, we have investigated the odds of being involved in different types of early-stage entrepreneurship[77].

8.4 Empirical Application

Data

For analysing equation (8.2), we require data on value added, employment, education, the acreage of each region, and several types of entrepreneurship. Data on value added and employment are available at the Nuts3 level and are drawn from the Cambridge Econometrics database on European Regions. Data on education are obtained from Eurostat's regional database, which distinguishes three major categories of education. We

76 We acknowledge that random slopes may be relevant and future research could investigate this.

77 We apply Stata's gllamm procedure (see Rabe-Hesketh and Skrondal, 2005), using the logit link from the binomial family in the treatment effect.

included the shares of the numbers of people who have tertiary education (the denominator is the population aged between 25 and 64).[78]. These indicators are only available for the Nuts2 region; we have therefore assumed that the shares at the Nuts2 level are equal to those at the Nuts3 level. This assumption is less restrictive in our applications using the Nuts1/3 classification, since the regions defined by Nuts3 only form a minor share of the total number of regions (see Appendix for the regions included in our analysis). The square kilometres for the acreage of the Nuts3 regions are also drawn from Eurostat.

Our entrepreneurship indicators are derived from the Global Entrepreneurship Monitor (see Reynolds et al., 2005; Bosma et al., 2008a). The indicators are based on telephone surveys among the adult population. A key GEM indicator is the early-stage entrepreneurial activity (ESEA) rate[79]. This measure is defined as the prevalence rate (in the 18-64 population) of individuals who are involved in either nascent entrepreneurship or as an owner-manager in a new firm in existence for up to 42 months. *Nascent entrepreneurs* are identified as individuals who are, at the moment of the GEM survey, setting up a business. Moreover they have indicated (i) that they have 'done something to help start a new business, such as looking for equipment or a location, organizing a start-up team, working on a business plan, beginning to save money, or any other activity that would help launch a business'; and (ii) that they will be the single owner or a co-owner of the firm in gestation. Also, they have not paid any salaries, wages or payments in kind (including to themselves) for more than three months; if they have, they are considered to be an owner-manager of a (new) firm.

While the ESEA rate is an overall measure of early-stage entrepreneurial activity, identifying different types of ESEA is also possible. We draw the same distinctions as in chapter 3: that is, between growth orientation (three categories) and innovation orientation[80]. The four types of early-stage entrepreneurial activity are thus:

1. Early-stage entrepreneurial activity with low-growth ambitions (ESEAGR_LO): Individuals in early-stage entrepreneurial activity who expect to have no or one employee in the next five years
2. Early-stage entrepreneurial activity with modest-growth ambitions (ESEAGR_MD): Individuals in early-stage entrepreneurial activity who expect to have between two and nine employees in the next five years
3. Early-stage entrepreneurial activity with high-growth ambitions (ESEAGR_HI): Individuals in early-stage entrepreneurial activity who expect to have 10 or more employees in the next five years
4. Early-stage entrepreneurial activity with innovative ambitions ESEAINNOV: Individuals in early-stage entrepreneurial activity who expect (i) at least some customers to consider

78 In terms of the ISCED (1997) classification, the third category includes levels 5 and 6. In other specifications we additionally included an indicator expressing the share with upper and post-secondary education. These did not improve the overall fit of the model.

79 This is the same measure as that known as 'TEA' in most GEM reports. We have chosen to use the abbreviation ESEA because it better reflects the early-stage nature of the measure.

80 All entrepreneurs have been asked to indicate if all, many or none of their (potential) customers would consider their product or service new and unfamiliar. Also, they have indicated if many, few or no other businesses are offering the same products or services to their (potential) customers.

the product or service new and unfamiliar *and* (ii) not many businesses offering the same products or services.

Each individual involved in innovation-oriented early-stage entrepreneurship is also classified in one of the three growth-orientation categories. As could be expected, early-stage entrepreneurs were relatively often in the category of high-growth orientation: of all the high-growth-oriented individuals involved in ESEA, 25 percent was also characterized as innovative, whereas the percentages for the medium and low levels of growth orientation were, 19 and 16 respectively.

Table 8.1 shows the correlations of all the variables concerned in the estimation of equation (8.2). High regional education levels, high-growth-oriented entrepreneurship and innovation-oriented entrepreneurship are all positively correlated with regional levels of labour productivity. Also, high-growth-oriented entrepreneurship correlates with employment density, which gives some initial support for hypothesis 2. The correlation between high-growth-oriented entrepreneurship and innovation-oriented entrepreneurship equals 0.62, which could potentially lead to multicollinearity problems. We have therefore not included both measures in the same regression. Employment density is strongly correlated with its instrumental variable, the acreage of the region. The instrument is not correlated with employment density and therefore this assumption for proper instruments is not violated. We also included the overall regional ESEA rates in the correlation table. Interestingly, these rates do not correlate with any of the four different types of ESEA. This finding confirms the relevance of identifying different types; the regional patterns turn out to differ from each other.

For analysing model (8.5), we additionally required individual-level data on human capital and financial capital. Here we are restricted by the information available from the GEM dataset. Human capital is captured by the age of the entrepreneur in five categories and the educational attainment in four categories. Furthermore, we have information on each individual's household income, broken down in third-tiles based on the national income distributions. That is, while educational attainment is harmonized over countries, household income is related to the national context. Finally, we controlled for gender effects. This is relevant, since the literature indicates that – particularly in developed countries – women are less likely to start a business than men are (see for example Verheul, 2005).

Results

In our empirical application we replicate Ciccone's analysis as a starting point (Ciccone, 2002, pp. 215-219) with two empirical adjustments. First, we estimated equation (8.2) for the year, 2003 instead of, 1989. Second, where Ciccone's model controls for educational systems varying over countries, we used one single classification for educational attainment that is harmonized over EU countries and only recently made available by Eurostat. This procedure allows us to interpret the results concerning educational attainment better and seriously limits the loss of degrees of freedom when augmenting the number of countries from five to sixteen in our analysis. We estimate equation (8.2) in several applications. First, we developed a model acknowledging the role of entrepreneurial activity and compatible with data availability. Second, we entered different types of regional levels of entrepreneurial activity.

Table 8.1 Descriptive statistics, regional level

	Mean	Std.Dev	correlations							
			1	2	3	4	5	6	7	8
1. Labor productiviy (ln)	3.81	0.42								
2. Employment density (ln)	-2.65	1.48	0.24*							
3. Acreage of the region	25,359	30,422	0.10	-0.69*						
4. Entrepreneurship: low growth	2.84	0.98	-0.13	0.01	-0.08					
5. Entrepreneurship: moderate growth	1.84	0.84	0.09	-0.01	-0.07	0.24*				
6. Entrepreneurship: high growth	0.73	0.43	0.31*	0.40*	-0.30*	0.36*	0.23*			
7. Entrepreneurship: innovation	0.92	0.48	0.37*	0.15	0.01	0.26*	0.33*	0.61*		
8. Entrepreneurship: overall	5.42	1.57	0.02	0.07	-0.10	0.11	0.13	0.09	0.00	
9. Education: high level	0.20	0.07	0.51*	0.19*	-0.07	-0.06	0.30*	0.19*	0.29*	0.07

* p <0.05

Our results are shown in Table 8.2. The first model replicates Ciccone (2002) with fixed effects at the country level and employment density instrumented with the acreage of the region. For, 1989, Ciccone reported a coefficient for employment density equal to 0.046 with a robust standard error of 0.005. Whether he used nuts0 (country), nuts1 or nuts2 regions as fixed effects did not make any difference in the estimated size of the coefficient. Our computation in model 1 produces very similar results: we arrived at a coefficient equal to 0.050. Augmenting the number of countries and adopting the regional level for which we have entrepreneurship leads to a decrease in the number of observations. We had 142 regions at our disposal, but we excluded ten regions for which the sample size of adults from which entrepreneurship rates are derived is lower than 500. For the remaining 132 regions over 17 countries, the estimated effect in model 2 remains quite stable at 4.8 percent and is significant at the 5 percent level. The standard errors are somewhat larger owing to the lower number of observations. This model has the features that allow us to include different types of early-stage entrepreneurial activity.

From the results in models 3a-3d, entrepreneurial activity appears to be positive and significant at $p<0.10$ for low-growth, medium-growth, and high-growth entrepreneurship, while we particularly expected the impact to be positive for high-growth and for innovation-oriented entrepreneurial activity[81]. A possible explanation of the unexpected findings for low-growth-oriented entrepreneurial activity may be that we pick up some of the effects not captured by employment and education. Self-employment is not very often captured in employment statistics used to estimate growth models. More specifically, the effect found for low-ambition self-employment may be very similar to the traditional effect of employment.

Interestingly, however, we do find a distinctive result for high-growth-oriented entrepreneurship: this exhibits the strongest interplay with employment density – controlling for national effects. Here we find support for the second hypothesis, since the urbanization economies effect drops from 4.8 to 3.7 percent. This is equivalent to a reduction of 20 percent. Thus, employment density alone does not give the complete picture; regions also need entrepreneurs who can create job *opportunities*. Adding entrepreneurship to model 2 leads to a significant improvement for most of the models: the likelihood ratio test supports the relevance of the inclusion of early-stage entrepreneurial activity at $p<0.05$ for models 3a-3c. Although the estimated impact for innovative entrepreneurship (model 3d) is positive, the coefficient is not significant at the 10 percent level. Also, the likelihood ratio test statistic is only weakly significant.

Although the results of models 3a-3d in table 8.2 are derived from information at the individual level by distinguishing between *types* of entrepreneurship, we have yet to address the multilevel model as depicted in Figure 8.2. More specifically, rather than just account for individual differences, the individual process has not been explicitly modelled. We present our results exploiting the individual-level data in table 8.3. The first model describes the results of a simple logit regression with a treatment effect for high-growth-

81 In specifications including the ten regions with sample size below 500, the coefficient for innovation turned out to be positive at $p<0.05$.

Table 8.2 Estimation results. Dependent variable: regional levels of labour productivity, in logarithm

	1	2	3a	3b	3c	3d
Employment density	0.050***	0.048***	0.048***	0.048***	0.037**	0.049***
	(0.008)	(0.014)	(0.016)	(0.015)	(0.018)	(0.015)
Share tertiary education	-0.02	0.14*	0.14	0.12	0.15*	0.13
	(0.03)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Entrepreneurship						
- Low growth ESEA			0.077*			
			(0.041)			
- Medium growth ESEA				0.053*		
				(0.031)		
- High growth ESEA					0.041*	
					(0.023)	
- Innovation ESEA						0.024
						(0.020)
Constant	3.88***	3.73***	4.29***	4.22***	4.25***	4.15***
	(0.05)	(0.18)	(0.20)	(0.17)	(0.17)	(0.19)
Nr. of countries	5	17	17	17	17	17
Nr. of regions	766	132	132	132	132	132
Regional Classsifcation	Nuts3	Nuts1/3	Nuts1/3	Nuts1/3	Nuts1/3	Nuts1/3
Fixed effects	Nuts0	Nuts0	Nuts0	Nuts0	Nuts0	Nuts0
Adj. R-squared	0.378	0.945	0.948	0.947	0.947	0.947
LR test model 2			7.43***	4.04**	3.99**	2.74*

* p <0.10, ** p<0.05, *** p<0.01

Notes: robust standard errors reported between parentheses. Regions with a sample size lower than 500 have been excluded (this concerns ten regions). Education and entrepreneurship variables enter the regression in logarithms. Employment density instrumented with acreage of the region.

oriented entrepreneurship where multilevel effects are not modelled[82]. By linking the values of the regional productivity equation variables to all individuals in those regions, we have, however, potentially violated the assumption of independent variables being uncorrelated with the error terms. The second model fixes the estimates of the first model, but calculates the corresponding standard errors when taking the multilevel character into account. Test statistics support the relevance of identifying the regional and national level by including random intercepts. It is seen that the size and significance of the impact of entrepreneurship on growth disappears completely. The impact of regional levels of educational attainment has, however, considerably increased in comparison with the results in table 8.2.

82 This treatment effect is similar to introducing instrumental variables. However, it recognizes the binary nature of the dependent variable in the entrepreneurship equation.

Table 8.3 Estimation results multilevel model

	Ordinary selection regression (no multilevel specification)	Multilevel specification
Productivity equation: regional level (dependent variable: labour productivity)		
Employment density	0.020***	0.023***
	(0.0003)	(0.0001)
Share tertiary education	0.599***	0.202***
	(0.001)	(0.0005)
High growth oriented ESEA (individual level)	0.080***	0.000
	(0.013)	(0.0016)
Constant	4.85***	4.182***
	(0.002)	(0.0010)
Entrepreneurship equation: individual level (dependent variable: high growth oriented ESEA)		
Employment density (regional level)	0.048***	0.060 ***
	(0.006)	(0.0033)
Gender: male	- reference category -	- reference category -
Gender: female	-0.42***	-0.21***
	(0.015)	(0.0088)
Age: 18-24	- reference category -	- reference category -
Age: 25-34	0.122***	0.325***
	(0.027)	(0.017)
Age: 35-44	0.117***	0.313***
	(0.026)	(0.017)
Age: 45-54	0.016	0.182***
	(0.027)	(0.017)
Age: 55-64	-0.173***	-0.039**
	(0.031)	(0.019)
Education: low	- reference category -	- reference category -
Education: middle	0196***	0.066***
	(0.018)	(0.011)
Education: high	0.229***	0.10***
	(0.019)	(0.012)
Household income: low	- reference category -	- reference category -
Household income: average	0.037**	-0.08***
	(0.017)	(0.010)
Household income: high	0.239***	0.010
	(0.021)	(0.014)
Constant	-2.34***	-2.82***
	(0.029)	(0.030)
Nr. of countries	17	17
Nr. of regions	136	136

Table 8.3 continued

	Ordinary selection regression (no multilevel specification)	**Multilevel specification**
Nr. of individuals	371,896	371,896
Fixed effects productivity equation	Country	
Random intercepts	–	Country, region
Variance regional level		0.024***
(identifies relevance of this spatial level)		(0.0000)
Variance national level		0.168***
(identifies relevance of this spatial level)		(0.0001)
LR test statistic of independent equations	16.46***	

* p <0.10, ** p<0.05, *** p<0.01

What can we conclude from these computations? If we include growth-oriented entrepreneurship in our equation on the regional level, the explained regional variation in labour productivity is improved, suggesting that entrepreneurship makes for an additional factor in explaining regional productivity. So far, these results confirm the findings of Audretsch and Keilbach (2004b), Wong et al. (2005), and Acs et al. (2005b). The positive impact of growth-oriented entrepreneurship vanishes if we model entrepreneurial activity at the individual level and account for basic individual characteristics. Although the sceptic might conclude that entrepreneurship might not matter after all, we hold a different view. We believe that the results should be interpreted as follows. Entrepreneurship is indeed a relevant factor for growth, although it is not an input factor or a form of capital. By adding the entrepreneurial mechanism at the individual level, the significance of the knowledge variable increases further. In other words, it is the entrepreneurship *mechanism* that allows human capital to impact regional performance. When combining human capital and entrepreneurship in an appropriate model, they are stronger in explaining (i) regional productivity in general and (ii) urbanization economies.

The estimates of the entrepreneurship equation demonstrate that more high-growth entrepreneurships in agglomerations are accounted for by individual characteristics such as age, education, and household income. The controls confirm that high-growth-oriented entrepreneurial activity is most prevalent in middle-aged, male, and highly-educated segments of the population. These results correspond with our findings in chapters 4 and 7[83].

83 In chapter 4 we allowed more macro level determinants, such as regional perceptions of entrepreneurship and national levels of employment security to impact individual involvement in growth-oriented early-stage entrepreneurial activity. However, in this chapter we only focus on the most important determinants, that is, the individual level characteristics.

8.5 Concluding remarks

In this chapter, we considered the role of entrepreneurship for regional performance in a specific spatial and economic context. We concentrated on the occurrences of specific types of entrepreneurship in the early-stage phase, when the venture is in the exploration phase (nascent entrepreneurship) or in the early years after the start-up. The types of early-stage entrepreneurship are determined at the individual level, but their regional prevalence rates exhibit significant regional variation. We expected to find a positive link between high-growth-oriented and innovation-oriented entrepreneurship and regional levels of labour productivity, controlling for regional differences in labour, capital, and national levels of total factor productivity.

In our empirical investigation we found confirmation for the importance of high-growth-oriented entrepreneurship in explaining regional variation in labour productivity, but not for innovation-oriented entrepreneurship. Moreover, we found in our analysis of European regions that the impact of growth-oriented entrepreneurship overrides 20 percent of the urbanization economies found by Ciccone (2002), who also examined European regions. Thus, urbanization economies can partly be explained by the effect of differentials in regional levels of growth-oriented entrepreneurship. We did not find this particular effect for the other three identified types of entrepreneurship. An interesting finding was that regions with high levels of low-growth-oriented entrepreneurship (that is, early-stage entrepreneurs expecting to generate at most one job apart from their own over the next five years) were also associated with higher levels of labour productivity. Regions with a large number of such early-stage entrepreneurs, overall constituting over 50 percent of all early-stage entrepreneurs, may be more productive because there are more people who are responsible for their own income and therefore willing to work hard. Another explanation may be that the effect of low-growth entrepreneurship compensates the effect of labour, since in most statistics the number of employed exclude the self-employed. In this perspective, the positive effect found with low-growth-oriented entrepreneurship may be interpreted similarly to the contribution of the traditional factor of labour.

In a multilevel analysis, we further investigated the relationship between entrepreneurship, urbanization economies, and regional levels of productivity by modelling the impact of high-growth-oriented entrepreneurship on regional performance at the individual level and controlling for individuals' characteristics. Here we found that the impact of growth-oriented entrepreneurship did not have a direct impact on productivity levels. We found instead that, by accounting for entrepreneurship in this particular way (that is, at the individual level) the effect of human capital becomes more pronounced. In other words, human capital affects economic performance to an important extent through entrepreneurship – and the impact of human capital may be underestimated if one does not account for entrepreneurship. These preliminary conclusions certainly call for further research in the domain of entrepreneurship, human capital, and (regional) economic performance.

Some limitations to our study should be pointed out. First, it may be the case that we do not have an ideal measure of innovative entrepreneurship and that better measures would link innovative entrepreneurship to regional productivity more convincingly. Also, the

literature seems to suggest that the impact would particularly be found in interaction with R&D investments; R&D investments paired with the presence of innovative entrepreneurs who know how to commercialize new ideas should lead to higher regional economic performance. Other limitations in our study are that we have not considered dynamics in space and time. It is conceivable that exceptional productivity in one region spills over to neighbouring regions – even though in our analysis we considered rather large regions.

In addition, the time dimension is absent in our approach; it may take a while for innovative entrepreneurship to impact on regional productivity. In this chapter, we were primarily interested in explaining differences in regional productivity. Regional variation in economic performance is often persistent (Martin and Sunley, 2007), as are entry rates (Fritsch and Mueller, 2007; Brenner and Fornahl, 2008). Independent and dependent variables thus seem to reveal path-dependent processes and our results indicate that entrepreneurship may be an important vehicle driving these processes at the regional level. Nevertheless, there are also signs that some economic convergence is taking place in the EU; using a sophisticated spatial panel data analysis, Bosker (2007) finds a negative coefficient for *change* in economic growth in highly urbanized areas, whereas for the regions surrounding highly-urbanized areas he finds a positive coefficient. It is clear that further systematic collection of entrepreneurship data – preferably identifying types and phases – remains crucial for deriving the impact of (types of) entrepreneurship on growth and *vice versa*.

To conclude, our multilevel model opens other avenues for further research. To some extent, we accounted for the interaction between human capital and growth-oriented entrepreneurship when we investigated the impact on urbanization economies, but this could be modelled more explicitly. For instance, the data also allow us to look at the impact of highly-educated entrepreneurs on regional performance *viz. a viz.* the impact by less-well-educated entrepreneurs. Similarly, one might contribute to the creativity debate by identifying entrepreneurial activity in sectors associated with the creative class, as proposed by Florida (2004). Preliminary results for world cities indeed suggest relatively high prevalence rates of this particular type of entrepreneur (Acs et al., 2008).

9 Conclusions and implications

Our main objective throughout this thesis was to link regional conditions to types of entrepreneurial activity on the one hand, and types of entrepreneurial activity to regional performance on the other. We identified the need for integrating the individual level with the regional level. The regional level is a relevant context for entrepreneurship: the existing literature clearly documents spatial unevenness in entrepreneurship rates within countries. At the same time, certainly within the European Union with increasing numbers of agreements on economic policy and the ongoing harmonization of legislation, regions gain in importance over nations as relevant economic units. The individual is the most relevant level for studying the entrepreneurial process from opportunity recognition to resource mobilization and exploitation. But integrating the individual and regional levels also yields new insights into urbanization economies: in exploring the microfoundations of urbanization economies, entrepreneurs have thus far only implicitly been accounted for (cf. Duranton and Puga, 2004). We stated our research questions in the introduction (chapter 1), where we also explained how they fit together in a multilevel framework and showed how they have been assessed in chapters 2-8.

We feel that exploitation of Global Entrepreneurship Monitor (GEM) data – extensively used in this thesis – paves the way for new insights in the field of entrepreneurship studies. GEM started its data collection in 1999 and, since 2001, the resulting indices have been comparable over time and over countries. This thesis has added a regional dimension for 18 European countries involved in GEM. Consequently, we have analysed the GEM data collected between 2001 and 2006, consisting of more than 370,000 individuals in the population between 18 and 64 years, over 142 regions and 18 countries.

In the next section we summarize our answers to each of the research questions, recognizing the scope and limitations of our studies. Section 9.2 highlights the main conclusions, evaluates the relevance of our approach, and provides suggestions for future research. We believe that adopting our framework is worthwhile, but improvements could be made. We provide some suggestions in this direction. This chapter concludes by discussing potential policy implications based on our findings.

9.1 Answers to the research questions

Research question 1. How do levels of entrepreneurial perceptions and entrepreneurial activity differ across Dutch and European regions?

By mapping patterns in entrepreneurial activity and entrepreneurial perceptions for European regions, countries, and supra-national areas we initially explored the (possible)

influences of urbanization, institutions, and culture in chapter 2. An important message from our descriptive analysis of these data is that high degrees of entrepreneurial activity in a region do not necessarily relate to well-developed or developing regional economies. Our regional indices suggest that entrepreneurial activity may be high in both highly-competitive regions (in many cases characterized by urbanization economies) and in less-competitive environments. For the less-competitive regions with high levels of entrepreneurial activity we often found entrepreneurial perceptions to be positive. These may be positive from an economic perspective, but also because of the habitual, life-style function entrepreneurship may have in the region; in some regions starting a business may be regarded less as a special event than in other regions, because the perception of a business may differ. This attitude difference seems to divide the northern part of Europe from the southern part. In Southern European regions, business dynamics and perceptions of starting a business are highly positive, while Gross Regional Product (GRP) levels are lower than elsewhere in Europe.

Within countries, it is clearly the dynamic high-density areas that exhibit higher levels of early-stage entrepreneurial activity paired with higher levels of GDP. For the more mature phase of entrepreneurship, regional patterns were less apparent. Our results may thus suggest that, as new businesses progress and mature, they will be increasingly affected by the national institutions. In other words, the first step of setting up a business depends primarily on regional conditions and is affected relatively little by national institutions. However, in the following phases of entrepreneurship, such as survival and growth, national conditions gain in importance.

By mapping entrepreneurship indicators over regions in Europe and by conducting some descriptive analyses, we found entrepreneurial perceptions and entrepreneurial activity were linked, but the link was not clear-cut. For further insights we constructed a new variable, *Untapped Entrepreneurial Potential*, by deriving the regional prevalence rates of individuals who exhibit positive perceptions, but were not involved in entrepreneurial activity. We also found support for separating the early phase of entrepreneurship from the mature phase when studying regional patterns of entrepreneurial activity. Early-stage entrepreneurial activity exhibits more regional variation than the established phase of entrepreneurial activity does. In the remainder of the thesis we concentrated on early-stage entrepreneurship.

For the Netherlands, we observed notable differences in regional firm-formation rates at the Nuts3 level in chapter 5. Also, the pattern for independent start-ups was shown to be different from the pattern for new subsidiaries. Both spatial scopes applied indicated observable differences in regional variation for different types and phases of entrepreneurship. These findings call for the recognition of these types and phases when (i) explaining regional differences in entrepreneurship and (ii) linking entrepreneurship to regional performance.

Research question 2. What factors determine regional differences in different types of entrepreneurship levels?

In chapters 3 and 5 we investigated the determinants of regional variation in several types of entrepreneurship. In chapter 3, we focused on low-ambition versus high-ambition entrepreneurship levels for European regions, whereas in chapter 5 we examined firm-formation rates for independent firms and new subsidiaries in the Netherlands. In these studies we explored relationship type A in figure 1.1.

Our empirical analysis on entrepreneurship rates for European regions showed that the coefficients for explaining highly ambitious entrepreneurial activity were found to be significant more often than for explanations of less ambitious entrepreneurial activity. For instance, population density does not affect the explanation of less-ambitious entrepreneurship rates, but it is related to ambitious entrepreneurship. Furthermore, a subdivision of ambitious entrepreneurship in growth-oriented and innovation-oriented entrepreneurship shows that, here too, the impact of regional and national factors varies to some extent. While growth-oriented entrepreneurship is positively associated with the share of younger adults in the region and exhibits a U-shaped relationship with regional wealth levels, regional population growth is positively linked to innovation-oriented entrepreneurship. Common determinants are regional levels of *entrepreneurship-specific social capital* effects (measured by the degree to which people – excluding entrepreneurs – personally know someone who started a business in the past two years), population density, and a negative effect from the national degree of employment protection.

In contrast with our expectations, we found no impact of regional entrepreneurial perceptions on ambitious entrepreneurship rates. Whereas regional levels of (self-perceptions of) start-up skills are of significant importance in explaining less ambitious entrepreneurial activity, none of the three regional attitude indices were significant in explaining ambitious entrepreneurship. The positive influence of perceived skills on non-ambitious entrepreneurship warrants more detailed inspection. Observing the regional variation in the maps (see also Bosma and Schutjens, 2009b for maps displaying perceptions to entrepreneurship), we have reason to believe that starting a business is considered less of a special event (in other words, it is an event embedded in society) in Southern Europe and therefore people may perceive that fewer skills and less knowledge are required for starting a business. It may even be the case that the 'average' business in some countries is perceived differently than in others, so that the perceptions of opportunities and required capabilities relating to start-ups may differ substantially. We should also note that the perception variables included in our study relate to starting a business rather than *growing* a business or starting an *innovative* business. Consequently, the independent variables covering perceptions of entrepreneurship do not match very well with the dependent variables relating to high-growth orientation and innovation.

With regard to formal institutions at the national level, these appear to affect total early-stage entrepreneurial activity to some extent, even in our case with 16 countries across Europe. We find evidence of negative impacts, that is, of employment protection on growth- and innovation-oriented entrepreneurial activity. This finding certainly invites further research. Our results indicate that this effect, as an example of a *formal institutional* effect, may to some extent also be captured in regional level variables measuring individual perceptions of entrepreneurship. More research is called for on how formal institutions affect informal institutions and vice versa (see for example Henreksson and Johansson, 2009).

In chapter 5, we found support for a positive role of entrepreneurship policy conducted in the Netherlands. In particular, the effect of the new Establishment Act, loosening the restrictions of mandatory self-employment exams, seems to have had a positive impact on independent entry. In every year since 1993, the year in which this Act became effective, there have been significantly higher numbers of entries in comparison with, 1990, controlled for all other determinants – including those that relate to the business cycle, such as growth in value added and unemployment rates. As hypothesised, the effect of this policy variable is stronger for independent start-ups in comparison with new subsidiaries.

In chapter 5, we reported our finding that growth in regional value added was positively linked to independent firm-formation rates – which supports the findings of, for example, Reynolds et al. (1994) and Siegfried and Evans (1994) – while the regional rate of newly-unemployed people affects the number of independent start-ups negatively. This finding is consistent with those of, for example, Reynolds et al. (1994) and Carree (2002) and suggests that, for the Netherlands, the hypothesised negative influence caused by the business cycle outweighs the alternative hypothesised (positive) effect of the 'unemployment push' found by Evans and Leighton (1990) and Storey (1991). For both determinants, we find no effect on the number of new subsidiaries. This suggests that the business cycle – proxied by growth in value added and entry in unemployment – affects the level of firm formation through independent firms rather than through new subsidiaries. Population growth is an important regional determinant for the number of new subsidiaries, reflecting an increase in demand for additional firms. A high degree of urbanization involves relatively more new subsidiaries.

Research question 3. How and to what extent do regional and national conditions influence individuals' engagement in early-stage entrepreneurial activity and are these conditions different for low-growth-oriented entrepreneurs in comparison with high-growth-oriented entrepreneurs?

In chapter 4, we adopted a multilevel approach in order to investigate individual, regional, and national determinants of involvement in three categories of growth-oriented early-stage entrepreneurial activity. In comparison with chapter 3, also dealing with regions in Europe but focusing on the type A relationships in figure 1.1, this chapter differed by defining the dependent variables at the individual level and by controlling for individual characteristics (types B and C relationships in figure 1.1). The individual characteristics relate to gender, age, education, and household income and capture general human capital and financial capital. The outcomes for these individual characteristics were similar to the well-documented results in the literature on the determinants of firm formation and firm growth (see for example Blanchflower and Oswald, 1998; Bosma et al., 2004; Kim et al., 2006). However, our focus is on the regional and national determinants impacting on entrepreneurial activity *in addition to* individual characteristics.

We found no evidence for a positive impact of GRP growth on the odds of being involved in growth-oriented entrepreneurship. The state and development of regional income, as measured by 'objective' indicators, is not associated with growth-oriented entrepreneurship when other (individual) characteristics and regional entrepreneurial-culture features are controlled for. In chapter 3 we reported a link observed between GRP levels and growth-oriented early-stage entrepreneurship.

Our results confirmed that subjective regional factors affect the odds of being involved in growth-oriented entrepreneurship. High regional levels of individuals knowing other start-up entrepreneurs, and high regional levels of individuals perceiving mastery of start-up skills (among those who actually know other start-up entrepreneurs), positively influence involvement in growth-oriented entrepreneurship. It seems that 'objective' regional features of income (growth) do not affect growth orientation. At the national level, we found a profound negative effect of the degree of employment protection on growth-oriented entrepreneurship. This is consistent with our findings in chapter 3.

With regard to the drivers of low-growth versus high-growth-oriented entrepreneurial activity, the most important differences can be found with the regional-level variables population density, share of young people in the population, and the national level of employment protection. All these indicators have a strong effect on the odds of being involved in growth-oriented entrepreneurship, but have no effect at all on low-growth entrepreneurship.

Research question 4. What is the impact of entrepreneurship dynamics on regional productivity growth and is this impact contingent on regional characteristics?

In chapter 7 we reported our analysis of the impact of regional levels of firm dynamics, that is, entry and exit rates, on regional performance measured by the growth of total factor productivity (TFP). We conducted our analysis for the forty Dutch Nuts3 level regions over the period 1990-2004. Our analyses suggest that, for the Netherlands, entry and turbulence rates are important drivers of productivity growth in services, but not in manufacturing. Furthermore, we found some evidence of the moderating effects of urbanization economies and Jacobs' externalities, in particular for the effect of firm dynamics on productivity growth in services. Firm dynamics have an additional positive effect on productivity growth in regions with relatively high population density, but even more so in regions with relatively high related variety. Thus the economic benefits of entrepreneurship, as documented by Van Praag and Versloot (2007), seem to be contingent on regional characteristics and, in particular, on the degree of related variety.

We also tested for the presence of a curvilinear effect in the sense that, at a certain point, increases in entry or turbulence rates might *deter* rather than increase competitiveness. In this way *optimal levels* of entry and turbulence can be derived, as Fritsch and Schroeter (2009) found for German regions, but other authors have not been able to identify (see Robinson et al., 2006). For our empirical application to Dutch regions, the test supported the existence of such an inverse U-shaped pattern for services, but not for manufacturing. A possible explanation for the differences we found with respect to manufacturing and services is the difference in a minimum efficient scale level. This scale is generally higher in manufacturing, which makes the barriers to entry higher and the selection process tougher. For services, entry is easier, especially for less talented entrepreneurs. It is their entry entrepreneurs that can be particularly detrimental to regional-level competitiveness. The top of the curve indicating maximum effect occurs at turbulence rates of around 15 percent, whereas the observed regional turbulence rates range from 7 percent to 22 percent.

Summarizing, we may conclude that, for studying the impact of entrepreneurship on regional growth, appreciating the regional context is important and that creative destruction captured by entry and exit rates is particularly applicable to the services sectors where barriers to entry (and exit) are low, leading to lower levels of minimum efficient scale. Schumpeter's creative destruction story might be more fitting here than in manufacturing.

Research question 5. Do different types of entrepreneurship affect regional productivity levels differently and can certain types of entrepeneurship explain urbanization economies?

In chapter 8 we incorporated regional levels of different types of entrepreneurship in a regional productivity equation. More specifically, we added types of entrepreneurship to the model investigated by Ciccone (2002). To this end we first adapted Ciccone's empirical application to reflect the same time and spatial dimensions as our regional entrepreneurship indices presented throughout chapters 2-4. The estimated size of urbanization economies was practically unaffected by these changes in spatial scale and year of reference. Introducing entrepreneurship in the productivity equation resulted in positive and significant effects of *both* low-growth and high-growth entrepreneurship on productivity, although on the basis of the existing literature we expected the impact to be positive for high-growth and innovation-oriented entrepreneurial activity.

Low-growth-oriented entrepreneurial activity may pick up some of the effects not captured by employment and education. In other words, low-ambition early-stage entrepreneurial activity may be a relevant type of economic activity not recognized by employment (since the self-employed are generally not included in employment statistics) nor by regional levels of human capital in terms of educational attainment. An alternative explanation for the positive effect may be that, even though individuals involved in low-growth entrepreneurial activity do not add much in terms of employment, they may be more *productive* than when they were employees.

High-growth-oriented entrepreneurship exhibits the strongest interplay with employment density – controlling for national effects. By including high-growth-oriented entrepreneurship, the estimated effect of urbanization economies drops from 4.5 to 3.7 percent. This reduction equals 20 per cent. Thus, employment density alone does not give the complete picture of urbanization economies; regions also need entrepreneurs who can create and exploit employment *opportunities*.

9.2 Key conclusions, limitations and implications for future research

Point of departure in this thesis was that the regional and individual levels should ideally be considered *in tandem* in the entrepreneurial process. The empirical results reported in chapters 2-8 predominantly support this view and we can therefore assert that the multilevel framework presented in the introduction is rational. We also found that urbanization effects have a crucial role in (i) explaining regional levels of specific types of entrepreneurship and (ii) determining the linkages between specific types of entrepreneurship and regional economic performance. Taking our findings into account, the principal question may be *What characterizes the inhabitants of the region?* rather than *What characterizes the region?*

In a region that is highly urbanized and characterized by a young, growing, and highly-educated population, entrepreneurship in general will be enhanced, but particularly the more ambitious types of entrepreneurial activity, as we found in chapters 3, 4, 7, and 8. Thus, once we control for these individual characteristics, the explained variation of regional entrepreneurship levels appears to be accounted for mainly by the characteristics of the regions' inhabitants. The effects of the regional context seem to exist, but they play a secondary role. This finding implies that, if the determinants of the regional rates of entrepreneurship are analysed at the regional level, the composition effects of the population in terms of education, age distribution, and income levels should be accounted for.

It is important to note, however, that we did not investigate whether regional characteristics *attract* individuals who might be more willing to become an entrepreneur. To some extent this is certainly plausible. Consider for instance the educational opportunities in the larger cities. These will attract students and provide a dynamic urban region with relatively young highly-educated people. In addition, these characteristics can also be passed on through the generations. These processes suggest that reinforcing mechanisms operate: some regions are attractive to certain subpopulations and these tend to have higher odds of becoming engaged in (ambitious) entrepreneurial activity. More entrepreneurial activity – particularly if it is accompanied by regional growth – again attracts these subpopulations, and the process repeats itself. It would be difficult to prove to what extent regional performance causes entrepreneurial activity and to what extent entrepreneurial activity leads to regional performance. Nevertheless, the idea that they tend to go hand in hand in a reinforcing mechanism, possibly leading to path-dependent processes at the regional level, should alert policymakers to the idea that these processes are hardly malleable. Apart from unexpected shocks, only consistent long-term policy can make a difference by slowly moving the region in a new, more entrepreneurial direction. Again, considerable attention should be paid to the characteristics of the inhabitants (that is, the potential pool of people who could become entrepreneurs; see the rates of Untapped Entrepreneurial Potential discussed in chapter 2) *paired with* the economic opportunities the region supplies, such as specific forms of tourism.

The caveat above calls for more research into the *dynamic* scope of entrepreneurship and regional development[84]. Endogeneity is a well-known and relevant issue: not only may entrepreneurship lead to economic development; well-developed regions may also *attract* entrepreneurial activity, as discussed above. Even though we discussed endogeneity problems in chapter 7 and met some of the potential concerns by modelling lagged effects and applying appropriate GMM panel data techniques, we did not take these fully into account. In chapter 8, our main focus was devoted to explaining the spatial variation of economic performance (rather than its variation over time). Unravelling the true impact of entrepreneurship on economic growth is a tremendous challenge. If one not only considers endogeneity issues, but also adopts the view that specific *types* and *phases* of entrepreneurship should be acknowledged, and on top of this also recognizes

84 Cf. Rosenthal and Strange (2004), who identify three scopes of agglomeration economies: the industrial scope (localization economies), the geographical scope (urbanization economies) and the dynamic scope.

the probability of *spatial errors* and *spatial lags*, that is, economic effects spilling over to neighbouring regions, it is clear that trying to measure the impact of entrepreneurship on growth empirically using endogenous growth models is close to mission impossible. In chapter 8, we demonstrated that, by using information at the individual and regional level, some specific *elements* of what entrepreneurship does for economic performance – in this case the role of entrepreneurship in urbanization economies – can be investigated.

Regions with high population density and a relatively young population will also stimulate networking (cf. Thornton and Flynn, 2003). In this thesis, the role of networking for entrepreneurship has not been featured centrally, but it seems worthwhile to include this concept as a separate context level in the multilevel framework (cf. Malecki, 1997). Networks are technically not subject to a spatial scale and will therefore overlap with the hierarchical individual-region-country spatial structure used in this thesis. Networks are, however, strongly associated with the regional level. Some of our results in chapter 6 seem to support this idea: more than half the early-stage entrepreneurs indicated that, in their decision to become an entrepreneur, they had been influenced by other entrepreneurs and/or enterprises. In other words, other entrepreneurs and enterprises have served as role models for a large share of the early-stage entrepreneurs. On further inspection, these role models appeared to be predominantly active in the same regions as the firm founders themselves. At the individual level, networks closely relate to social capital (Sorenson, 2003). This has been shown to be important in explaining involvement in entrepreneurship and in being successful as an entrepreneur. Davidsson and Honig (2003) showed that *bonding* social capital such as family, friends, and other peers are particularly important in the pre-start-up phase, while *bridging* social capital that relates to networking is more important in the post-start-up phase.

Our multilevel framework opens other avenues for further research. To some extent we accounted for the interaction between human capital and growth-oriented entrepreneurship when investigating the impact on urbanization economies (chapter 8), but this could be modelled more explicitly. For instance, with a minor expansion of the model and using the same data, one could look at the impact of highly-educated entrepreneurs on regional performance *viz*. *a viz*. the impact by less-well-educated entrepreneurs. Similarly, one might contribute to the creativity debate by identifying entrepreneurial activity in sectors associated with the creative class as proposed by Florida (2004). Preliminary results for world cities indeed indicate relatively high prevalence rates of this particular type of entrepreneur (Acs et al., 2008). Multilevel modelling may thus be a key instrument in unravelling complex relationships between institutions, human capital, creativity, entrepreneurship, and (regional) economic development. Based on our arguments and main findings, we call for further understanding of the impact of entrepreneurship in specific contexts, possibly within the setting of a multilevel framework, rather than frantic efforts to measure *the* impact of entrepreneurship on growth.

Of course, investigating multilevel relationships requires a substantial amount of data. In this thesis we were fortunate to be able to use data from the Global Entrepreneurship Monitor (GEM). In our view, the GEM data, even though we are fully aware of the restrictions, are highly suitable for exploring the abovementioned relationships. Owing to the costs of collecting GEM data, so far only the basic characteristics of individuals have

been included. The full establishment of the role of entrepreneurship will require more information, particularly in the domain of individuals' personal networks. Sorenson (2003) documents the relevance of studying the networks of entrepreneurs in economic geography and asserts that networks lie at the root of spinoff processes (people from established companies starting a new firm). Stam (2009) is exploring the research avenues of entrepreneurship in evolutionary economic geography and argues that, by means of the spinoff processes, entrepreneurship can lead to the creation of new industries, often related to existing economic activity. This notion has already been confirmed in empirical studies by, for example, Klepper (2002) and Boschma and Wenting (2007). Further investigation into how networking, peer effects, and role models affect entrepreneurship, while acknowledging the regional perspective and including the spinoff processes, could greatly benefit the literature on entrepreneurship and economic geography (Boschma and Frenken, 2006; Stam, 2009).

In chapter 2 we touched on *intrapreneurship* (see De Jong and Wennekers, 2008 for a comprehensive overview of the literature). In this thesis, mainly because of data restrictions, we have not considered the intrapreneur as a type of entrepreneur.[85] However, as the thesis developed we found ourselves increasingly convinced that intrapreneurs should be taken into account to obtain a richer picture of entrepreneurship, particularly where national and regional differences are concerned. A sizable share of individuals engaged in entrepreneurial behaviour may, contingent on the sets of rules related to entrepreneurship, including administrative burdens, taxation, and the degree of employment protection, opt for employment or self-employment. In both forms they can behave entrepreneurially. It would be interesting to see if developed countries with low prevalence rates of entrepreneurship compensate this with relatively high rates of intrapreneurship. Also, whether individuals who find themselves close to the line drawn between entrepreneurship and intrapreneurship would contribute more to the regional or national economy as employees or as self-employed is at present not convincingly documented. It is clear that increased knowledge in this area may have serious implications for the research field of entrepreneurship and for policymakers.

9.3 Policy implications

Even though we did not bring to the fore the impact regional or national governments may have, little effort is required to expand the model and add *spheres* in which policymakers could try to influence the entrepreneurial process. Here we support the views of Verheul et al. (2002) and Grilo and Thurik (2006) in that entrepreneurship policy – with the aim of achieving regional or national growth – can be conducted directly (that is, with target-specific subpopulations) and indirectly towards (potential) entrepreneurs. For an idea of how this may appear in the multilevel framework, we refer to Bosma et al. (2009a). The multilevel framework is also intuitively appealing for policymakers, since policy at the macro level is, after all, designed to impact on individuals.

85 One might argue that new subsidiaries, as described in Chapter 5 for the Netherlands, are an outcome of intrapreneurial behaviour. However, this still does not recognize the notion that, just as with entrepreneurs, the individuals themselves are the relevant economic actors.

Our main finding that the characteristics of individuals are key in explaining and consequently predicting specific types of entrepreneurial activity and that the regional context plays a secondary role does not mean that conducting entrepreneurship policy is fruitless. Our findings suggest that entrepreneurship policy should be consistent over time and integrated with other high-profile policies affecting people's individual behaviour. Entrepreneurship should, therefore, be recognized not only in policy issues relating to economics, but should also be represented in a coherent view on entrepreneurship in, for example, policies on social development and spatial planning. Our analyses of different types of entrepreneurship make it clear that regional characteristics may impact on ambitious types of entrepreneurship differently than on non-ambitious types of entrepreneurship.

An intriguing finding from our research is that lower degrees of employment protection are associated with higher levels of ambitious entrepreneurship (see chapters 3 and 4). At this point we hesitate to derive policy implications from these findings. Relaxing (or enforcing) employment protection is a politically sensitive issue and generating more ambitious entrepreneurship can be seen as a side effect of lowering the degree of employment protection. Of course, the effect on employees should be taken into account as well. Estevez-Abe et al. (2001) argue that employment protection can be seen as an effort to increase workers' dependence on employers and stimulates their willingness to develop their skills. The sets of rules around employment protection are about finding a good balance of the constraints over two types of individuals: employers and employees. The optimal balance may differ for countries given the shared beliefs and values. Moreover, the distinction between employer and employee is not always clear-cut. A sizable share of employees can behave in a far more entrepreneurial fashion than the average self-employed. The regulation around employment protection might actually be an important determinant for high-potential individuals in their decision to either engage in (ambitious) entrepreneurship or to engage in employment as an intrapreneur, that is, with some freedom to pursue entrepreneurial activities. The challenge for policymakers is therefore to issue a set of rules that stimulates employees to keep developing their skills while not discouraging workers with the entrepreneurial talent and ambition to start new ventures.

In the thesis, we have described the holistic entrepreneurship policy that has characterized the Netherlands since the late, 1980s (see Chapter 7). We found that there was a substantial additional entry of firms shortly after implementation of the main policy changes (in particular the abolishment of mandatory self-employment exams). The set of policy measures implemented seems to have opened many doors to entrepreneurship (see also Kloosterman, 2003). Audretsch and Fritsch (2002) have classified German regions in four regimes, two of which were characterized by high entry rates. One of these two regimes is the entrepreneurial regime in which high levels of entry were followed by high levels of employment growth. They labelled the other regime, where high levels of entry were paired with low levels of employment growth, the *revolving door* regime. Revolving doors work well for large department stores, but do not add much value to smaller shops. The same might hold true for regions fostering entrepreneurship: urban areas will benefit more from taking away barriers to entrepreneurship than rural areas. In chapter 7, we found for the Dutch services industries that entry rates have a positive impact on productivity growth, but that the impact decreases with increasing entry rates; after some point the impact

even becomes negative. Returning to the quotation at the start of this thesis, our findings suggest that nuances in entrepreneurship could make a difference. For fostering the types of entrepreneurship that improve regional economic development, some doors may need to be further opened; others that were previously opened may have to be set ajar.

References

Acs, Z.J. (2008). Foundations of High Impact Entrepreneurship, *Jena Economic Research Papers, #*, 2008 – 060. Max Planck Institute of Economics, Jena.

Acs, Z.J., Arenius, P., Hay, M. and Minnitti, M. (2005a). *Global Entrepreneurship Monitor, 2004 Executive Report*, Babson College/London Business School. Babson Park, MA/ London.

Acs, Z. J. and Armington, C. (2004). Employment growth and entrepreneurial activity in cities. *Regional Studies*, 38 (8), 911-927.

Acs, Z.J., Audretsch, D.B., Braunerhjelm, P. and Carlsson, B. (2003). *The Missing Link: The Knowledge Filter and Endogenous Growth*. Center for Business and Policy Studies, Stockholm, Sweden.

Acs, Z.J., Audretsch, D.B., Braunerhjelm, P. and Carlsson, B. (2005b). The Knowledge Spillover Theory of Entrepreneurship, *CEPR Discussion Paper No. 5326*. CEPR: London.

Acs, Z.J., Bosma, N.S. and Sternberg, R. (2008). The Entrepreneurial Advantage of World Cities, *EIM Scales Paper H200810*. EIM, Zoetermeer.

Acs, Z.J. and Mueller, P. (2008). Employment effects of business dynamics: Mice, Gazelles and Elephants. *Small Business Economics,* 30 (1), 85-100.

Agarwal, R., Audretsch, D.B. and Sarkar, M.B. (2007). The process of creative construction: knowledge spillovers, entrepreneurship and economic growth. *Strategic Entrepreneurship Journal*, 1, 263-286.

Aghion, P. and Bessonova, E. (2006). On entry and growth: Theory and evidence. *Revue de l'OFCE,* June, 2006, 259-278.

Aghion, P. and Howitt, P. (1992). A model of growth through creative destruction. *Econometrica,* 60 (2), 323-351.

Ajzen, I. (1985). From intentions to actions: a theory of planned behaviour, in: Kuhl, J. and Bechmann, J. (eds.), *Action-control: from cognition to behaviour*. Springer, Heidelberg, 11-39.

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behavior and Human Processes,* 50, 179-221.

Alexander, E.R. (2002). Metropolitan regional planning in Amsterdam: a case study. *Town Planning Review*, 73 (1), 17-40.

Allen, D.N. and Hayward, D.J. (1990). The role of new venture formation/entrepreneurship in regional economic development: a review. *Economic Development Quarterly*, 4, 55-64.

Arauzo-Carod, J.M. and Teruel-Carrizosa, M. (2005). An urban approach of firm entry: The effect of urban size. *Growth and Change*, 36 (4), 508-528.

Arellano, M. and Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58, 277-297.

Arenius, P. and Minniti, M. (2005). Perceptual variables and nascent entrepreneurship. *Small Business Economics,* 24, 233-247.

Armington, C. and Acs, Z. (2002). The determinants of regional variation in new firm variation. *Regional Studies,* 36 (1), 33-45.
Arrighetti, A. and Vivarelli, M. (1999). The role of innovation in the postentry performance of new small firms: evidence from Italy. *Southern Economic Journal,* 65, 927-939.
Ashcroft, B., Love, J.H. and Malloy, E. (1991). New firm formation in the British counties with special reference to Scotland. *Regional Studies,* 25, 395-409.
Audretsch, D.B., Carree, M.A., Van Stel, A.J. and Thurik, A.R. (2008). Does self-employment reduce unemployment? *Journal of Business Venturing,* 23 (6), 673-686.
Audretsch, D.B. and Feldman, M.P. (1996). R&D spillovers and the geography of innovation and production. *American Economic Review,* 86 (3), 630-640.
Audretsch, D.B. and Feldman, M.P. (2004). Knowledge spillovers and the geography of innovation, in: Henderson, J.V. and Thisse, J.-F. (eds.), *Handbook of Regional and Urban Economics*, 7. Elsevier, Amsterdam, 2713-2740.
Audretsch, D.B. and Fritsch, M. (1994a). The geography of firm births in Germany. *Regional Studies,* 28 (4), 359-365.
Audretsch, D.B. and Fritsch, M. (1994b). On the measurement of entry rates. *Empirica*, 21, 105-113.
Audretsch, D.B. and Fritsch, M. (2002). Growth regimes over time and space. *Regional Studies,* 36, 113-124.
Audretsch, D.B. and Keilbach, M.P. (2004a). Does entrepreneurship capital matter? *Entrepreneurship Theory and Practice*, 28 (5), 419-430.
Audretsch, D.B. and Keilbach, M.P. (2004b). Entrepreneurship capital and economic performance. *Regional Studies,* 38 (8), 949-959.
Audretsch, D.B. and Keilbach, M.P. (2004c). Entrepreneurship and regional growth: an evolutionary interpretation. *Journal of Evolutionary Economics*, 14, 605-616.
Audretsch, D.B. and Keilbach, M.P. (2005). Entrepreneurship capital and regional growth. *Annals of Regional Science*, 39, 457-469.
Audretsch, D.B., Klomp, L., Santarelli, E. and Thurik, A.R. (2004). Gibrat's Law: Are the services different? *Review of Industrial Organization*, 24 (3), 301-324.
Audretsch, D.B., Keilbach, M.P. and Lehmann, E.E. (2006). *Entrepreneurship and Economic Growth*. Oxford Press, Oxford.
Audretsch, D.B. and Thurik, A.R. (2000). Capitalism and democracy in the 21st century: from the managed to the entrepreneurial economy, *Journal of Evolutionary Economics*, 10 (1-2), 17-34.
Autio, E. (2007). *Global Entrepreneurship Monitor: 2007 Global Report on High-Growth Entrepreneurship*. Babson College, London Business School, and Global Entrepreneurship Research Association (GERA).
Autio, E., Kronlund, M. and Kovalainen, A. (2007). *High-Growth SME support Initiatives in Nine Countries: Analysis, Categorization, and Recommendations*. Report prepared for the Finnish Ministry of Trade and Industry.
Baily, M.N. and Chakrabarti, A.K. (1985). Innovation and productivity in U.S. industry. *Brookings Papers on Economic Activity*, 2, 609-639.
Baily, M.N., Hulten, C. and Campbell, D. (1992). Productivity dynamics in manufacturing plants. *Brookings Papers on Economic Activity: Microeconomics*, 187-267.
Baldwin, J.R. and Gu, W. (2006). Plant turnover and productivity growth in Canadian manufacturing. *Industrial and Corporate Change,* 15 (3), 417-465.

Bangma, K., Gibcus, P., Kuijpers, J. and De Wit, G. (2004). *Arbeidsproductiviteit in de Nederlandse dienstensector*. EIM Business and Policy Research, Zoetermeer.
Baptista, R., Escária, V. and Madruga, P. (2005). Entrepreneurship, regional development and job creation: the case of Portugal. *Discussion Papers on Entrepreneurship, Growth and Public Policy #0605-2005*. Max Planck Institute for Research into Economic Systems, Jena.
Barreto, H. (1989). *The Entrepreneur in Microeconomic Theory*. Routledge, London and New York.
Bartelsman, E.J. (2004). Firm dynamics and innovation in the Netherlands; A comment on Baumol. *De Economist*, 152 (3), 353-363.
Bartelsman, E.J. and Doms, M. (2000). Understanding productivity: Lessons from longitudinal microdata. *Journal of Economic Literature*, 38, 569-594.
Bartelsman, E.J., Scarpatta, S. and Schivardi, F. (2005). Comparative analysis of firm demographics and survival: evidence from micro-level sources in OECD countries. *Industrial and Corporate Change,* 14, 365-391.
Baskerville, R.F. (2003). Hofstede never studied culture. *Accounting, Organizations and Society,* 28, 1-14.
Baumol, W.J. (1968). Entrepreneurship in economic theory. *American Economic Review*, 58 *(2)*, 64-71.
Baumol. W.J. (1990). Entrepreneurship: Productive, unproductive, and destructive. *Journal of Political Economy*, 98 (5), 893-921.
Baumol, W.J. (2004). Four sources of innovation and stimulation of growth in the Dutch economy. *De Economist*, 152 (3), 321-351.
Becker, G.S. (1964). *Human capital: a theoretical and empirical analysis*. Columbia University Press: New York.
Becker, R. and Henderson, J.V. (2000). Intraindustry specialization and urban development, in: Huriot, J.M. and Thisse, J.-F. (eds.) *Economics of Cities: Theoretical Perspectives*. Cambridge University Press, Cambridge, 138-166.
Bergmann, H. (2008). Entrepreneurship differences within Switzerland: Do taxes and culture play a role? Paper presented at *AAG Annual Meeting*, Boston, MA, USA.
Bergmann, H. and Sternberg, R. (2007). The changing face of entrepreneurship in Germany. *Small Business Economics*, 28 (2), 205-221.
Beugelsdijk, S. (2007). Entrepreneurial culture, regional innovativeness and economic growth. *Journal of Evolutionary Economics*, 17 (2), 187-210.
Beugelsdijk, S. and Noorderhaven, N. (2004). Entrepreneurial attitude and economic growth: A cross-section of 54 regions. *Annals of Regional Science*, 41 (4), 346-365.
Beugelsdijk, S. and Noorderhaven, N. (2005). Personality characteristics of self-employed; an empirical study. *Small Business Economics*, 24, 159-167.
Beugelsdijk, S., Van Schaik, T. and Arts, W. (2006). Towards a unified Europe? Explaining regional differences in value patterns by economic development, cultural heritage and historical shocks. *Regional Studies*, 40 (3), 317-327.
Birch, D. (1979). *The Job Generation Process*. MIT Program on Neighbourhood and Regional Change, Cambridge, MA.
Blachflower, D. and Oswald, A. (1998). What makes an entrepreneur? *Journal of Labor Economics,* 16, 26-60.
Blanchflower, D.G., Oswald, A. and Stutzer, A. (2001). Latent entrepreneurship across nations. *European Economic Review,* 45 (4), 680-691.

Blundell, R. and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87, 115-143.
Boschma, R. (2004). Competitiveness of regions from an evolutionary perspective. *Regional Studies,* 38 (9), 1001-1014.
Boschma, R.A. and Frenken, K. (2006). Why is economic geography not an evolutionary science? Towards an evolutionary economic geography. *Journal of Economic Geography* 6 (3), 273-302.
Boschma, R.A., Wenting, R. (2007). The spatial evolution of the British automobile industry: does location matter?, *Industrial and Corporate Change*,16, 213-238.
Bosker, M. (2007). Growth, Agglomeration and Convergence: a Space-time Analysis for European Regions, *Spatial Economic Analysis*, 2, 91-108.
Bosma, N.S., De Wit, G. and Carree, M.A. (2005). Modelling entrepreneurship: Unifying the equilibrium and entry/exit approach. *Small Business Economics*, *25*, 35-48.
Bosma, N.S., Jones, K., Autio, E. and Levie, J. (2008a). *Global Entrepreneurship Monitor, 2007, Executive Report*. Babson College/London Business School/Global Entrepreneurship Research Association, Boston MA/London.
Bosma, N.S. and Schutjens, V.A.J.M. (2007). Outlook on Europe: Patterns of promising entrepreneurial activity in European regions. *Tijdschrift voor Economische en Sociale Geografie,* 98 (5), 675-686.
Bosma, N.S. and Schutjens, V.A.J.M. (2009). Mapping entrepreneurial activity and entrepreneurial attitudes in European regions. *International Journal of Entrepreneurship and Small Business,* 7 (2), forthcoming.
Bosma, N.S., Schutjens, V.A.J.M. and Suddle, K. (2008b). Whither a flat landscape? Regional differences in entrepreneurship in the Netherlands, *EIM Scales paper H200805*. EIM: Zoetermeer.
Bosma, N.S., Stam, E. and Schutjens, V.A.J.M. (2006). Creative destruction and regional competitiveness. *EIM Research Report H200624*. Zoetermeer: EIM.
Bosma. N.S. and Wennekers, A.R.M. (2004). Entrepreneurial attitudes versus entrepreneurial activities. *Global Entrepreneurship Monitor, 2003 The Netherlands*. EIM: Zoetermeer.
Bosma, N.S, Van Praag, C.M., Thurik, A.R. and De Wit, G. (2004). The value of human and social capital investments for the business performance of startups. *Small Business Economics,* 23 (3), 227-236.
Bosma, N.S., Van Stel, A.J. and Suddle, K. (2008c). The geography of new firm formation: Evidence from independent start-ups and new subsidiaries in the Netherlands. *International Entrepreneurship and Management Journal*, 4 (2), 129-146.
Bosma, N.S., Schutjens, V.A.J.M. and Stam, E. (2009a). Entrepreneurship in European regions: implications for public policy. In: Leitao, J. and Baptista, R. (eds.), *Public Policies for Fostering Entrepreneurship*. Springer, New York.
Bosma, N.S., Stam, E. and Schutjens, V.A.J.M. (2009b). Creative destruction and regional productivity growth: Evidence from Dutch manufacturing and services. *Small Business Economics,* forthcoming.
Braunerhjelm, P. and Borgman, B. (2004). Geographical concentration, entrepreneurship and regional growth: Evidence from regional data in Sweden, 1975-99. *Regional Studies,* 38 (8), 929-947.
Brenner, N. (2000). The urban question: Reflections on Henri Lefebvre, urban theory and the politics of scale. *International Journal of Urban and Regional Research*, 24 (2), 361-378.

Brenner, T. and Fornahl, D. (2008). Regional path-dependence in start-up activity. *Papers in Evolutionary Economic Geography nr. 08.12*. Utrecht University, Utrecht.
Breschi, S. and Lissoni, F. (2003). Mobility and social networks: Localised knowledge spillovers revisited. *CESPRI Working Papers 142*. Centre for Research on Innovation and Internationalisation, Universita' Bocconi, Milan.
Brunet, R. (1989). Les villes 'européennes'. *Rapport pour la DATAR*. La Documentation Francaise/Groupement d'Intérêt, Université Montpellier, Montpellier.
Brush, C., Carter, N., Greene, P., Gatewood, E. and Hart, M. (2001). *An investigation of women-led firms and venture capital investment*. Report prepared for the U.S. Small Business Administration Office of Advocacy and the National Women's Business Council.
Callejón, M. and Segarra, A. (1999). Business dynamics and efficiency in industries and regions: The Case of Spain. *Small Business Economics*, 13, 253-271.
Camagni, R. (2002). On the concept of territorial competitiveness: sound or misleading? *Urban Studies*, 39 (13), 2395-2411.
Cantillon, R. (1755). *Essai sur la Nature du Commerce en Général* (On the Nature of Trade in General).
Carlin, W., Haskel, J. and Seabright, P. (2001). Understanding 'the essential fact about capitalism': Markets, competition and creative destruction. *National Institute Economic Review*, 175, 67-84.
Carree, M.A. (2002). Does unemployment affect the number of establishments? A regional analysis for US states. *Regional Studies,* 36 (2), 389-398.
Carree, M.A. and Nijkamp, J. (2001). Deregulation in retailing: the Dutch experience. *Journal of Economics and Business*, 53, 225-235.
Carree, M.A. and Thurik, A.R. (1996). Entry and exit in retailing: Incentives, barriers, displacement and replacement. *Review of Industrial Organization*, 11 (2), 155-172.
Carree, M.A. and Thurik, A.R. (2003). The impact of entrepreneurship on economic growth, in: Acs, Z. and Audretsch, D.B. (eds.), *Handbook of Entrepreneurship Research*. Kluwer, Dordrecht, 437-472.
Carree, M.A., Van Stel, A., Thurik, R. and Wennekers, S. (2002). Economic development and business ownership: an analysis using data of 23 OECD countries in the period, 1976-1996. *Small Business Economics*, 19 (3), 271-290.
Cassar, G. (2006). Entrepreneur opportunity costs and intended venture growth. *Journal of Business Venturing*, 21, 610-632.
Castells, M. and Hall, P. (1994). *Technopoles of the World: The making of 21st Century Industrial Complexes*. Routledge, London.
Caves, R. (1998). Industrial organization and new findings on the turnover and mobility of firms. *Journal of Economic Literature,* 36, 1947-1982.
Ciccone, A. (2002). Agglomeration effects in Europe. *European Economic Review,* 46 (2), 213-227.
Ciccone, A. and Hall, R.E. (1996). Productivity and the density of economic activity. *American Economic Review*, 86 (1), 54-70.
Clark, K. and Drinkwater, S. (1998). Ethnicity and self-employment in Britain. *Oxford Bulletin of Economics and Statistics*, 60, 383-407.
Coughlin, C.C., and Segev, E. (2000). Location determinants of new foreign-owned manufacturing plants. *Journal of Regional Science,* 40 (2), 323-351.

Davidsson, P. (1991). Continued entrepreneurship: Ability, need, and opportunity as determinants of small firm growth. *Journal of Business Venturing,* 6 (6), 405-429.
Davidsson, P. (1995). Culture, structure and regional levels of entrepreneurship. *Entrepreneurship and Regional Development,* 7, 41-62.
Davidsson, P. and Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. *Journal of Business Venturing,* 18 (3), 301-331.
Davidsson, P. and Wiklund, J. (1997). Values, beliefs and regional variations in new firm formation rates. *Journal of Economic Psychology,* 18, 179-199.
Davidsson, P. (2006). Nascent entrepreneurship: empirical studies and developments. *Foundations and Trends in Entrepreneurship,* 2 (1), 1-76.
Davidsson, P., Delmar, F. and Wiklund, J. (2006). Entrepreneurship as growth; growth as entrepreneurship, in: Davidsson, P., Delmar, F. and Wiklund, J. (eds.), *Entrepreneurship and the Growth of Firms.* Edward Elgar, Cheltenham, UK and Northampton, MA, US, 21-38.
De Jong, J.P.J. and Wennekers, A.R.M. (2008). Intrapreneurship; Conceptualizing entrepreneurial employee behaviour. *EIM Scales Paper* H200802. EIM, Zoetermeer.
De La Vega Pastor, I., Coduras, A., Cruz, C., Justo, R. and Pia Nogueira, M. (2005). *GEM Spain National Report, 2005,* available at www.gemconsortium.org (last accessed on 24 December, 2008).
De Leeuw, J., and Meijer, E., (eds.) (2008). *Handbook of Multilevel Analysis.* Springer, New York.
Dejardin, M. (2009). Linking net entry to regional economic growth. *Small Business Economics,* forthcoming.
Delmar, F., and Davidsson, P. (2000). Where do they come from? Prevalence and characteristics of nascent entrepreneurs. *Entrepreneurship & Regional Development,* 12, 1-23.
Dimov, D. (2007). Beyond the single-person, single-insight attribution in understanding entrepreneurial opportunities. *Entrepreneurship, Theory and Practice,* 31 (5), 713-731.
Djankov, S., La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (2002). The regulation of entry. *Quarterly Journal of Economics,* 117 (1), 1-37.
Dowd, T.J. and Dobbin, F. (1997). The embedded actor and the invention of natural economic law. Policy change and railroader response in early America. *American Behavioral Scientist,* 40, 478-489.
Dunford, M. and Perrons, D. (1994). Regional ineqality, regimes of accumulation and economic development in contemporary Europe. *Transactions of the Institute of British Geographers,* 19 (2), 163-182.
Duranton, G. and Puga, D. (2004). Micro-foundations of urban agglomeration economies, in: Henderson, J.V. and Thisse, J.-F. (eds.), *Handbook of Urban and Regional Economics, 4.* North Holland, New York, 2063-2118.
Dutta, D.K. and Thornhill, S. (2008). The evolution of growth intentions: Toward a cognition-based model. *Journal of Business Venturing,* 23, 307-332.
EIM (2002). Een warmer vestigingsklimaat voor het MKB?, *EIM Strategic Study, B200104.* EIM, Zoetermeer.
EIM (2004). *Monitor Etnisch Ondernemerschap, 2004.* EIM, Zoetermeer.
EIM/Dutch Ministry of Economic Affairs (2003). *Entrepreneurship in the Netherlands; Knowledge Transfer: Developing High-tech Ventures,* EIM/Dutch Ministry of Economic Affairs, Zoetermeer/The Hague.

Eliasson, G. (1996). *Firm Objectives, Controls and Organization*. Kluwer Academic Publishers, Dordrecht.
Estevez-Abe, M. and Iversen, T. (2001). Social protection and the formation of skills: a reinterpretation of the welfare state, in: Hall, P. and Soskice, D. (eds.), *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford University Press, Oxford, 145-183.
Etzioni, A. (1987). Entrepreneurship, adaptation and legitimation. *Journal of Economic Behavior and Organization,* 8, 175-189.
European Commission (2003). *Green Paper: Entrepreneurship in Europe*. Enterprise Directorate General, Brussels.
Evans, D.S. and Leighton, L.S. (1989). The determinants of changes in US self-employment, 1968-1987. *Small Business Economics,* 1, 111-119.
Evans, D.S. and Leighton, L.S. (1990). Small business formation by unemployed and employed workers. *Small Business Economics*, 2, 319-330.
Feldman, M.P. (2001). The entrepreneurial event revisited: Firm formation in a regional context. *Industrial and Corporate Change,* 10 (4), 861-891.
Figueirado, O. and Guimaraes, P. (1999). *Start-ups Domestic Location and the Entrepreneur's Geographical Origin*. 39th European Regional Science Association Congress, Dublin.
Figueiredo, O., Guimaraes, P. and Woodward, D. (2002). Home-field advantage: Location decisions of Portuguese entrepreneurs. *Journal of Urban Economics*, 52, 341-361.
Fischer, E. and Reuber, A.R. (2003). Support for rapid-growth firms: A comparison of the views of founders, government policymakers, and private sector resource providers. *Journal of Small Business Management*, 41, 346-365.
Florida, R. (2002). *The Rise of the Creative Class. And How it's Transforming Work, Leisure Community and Everyday Life*. Basic Books: New York.
Fotopoulos, G. and Louri, H. (2000). Location and survival of new entry. *Small Business Economics*, 14, 311-321.
Fotopoulos, G. and Spence, N. (1999). Spatial variations in new manufacturing plant openings: Some empirical evidence from Greece. *Regional Studies*, 33, 219-229.
Frank, H., Lueger, M. and Korunka, C. (2007). The significance of personality in business start-up intentions, start-up realization and business success. *Entrepreneurship & Regional Development,* 19, 227-251.
Frenken, K., Van Oort, F. and Verburg, T. (2007). Related variety, unrelated variety and regional economic growth. *Regional Studies*, 41 (5), 685-697.
Freytag, A. and Thurik, A.R. (2007). Entrepreneurship and its determinants in a cross-country setting. *Journal of Evolutionary Economics*, 17 (2), 117-131.
Fritsch, M. (1992). Regional differences in new firm formation: Evidence from West Germany. *Regional Studies*, 26 (3), 233-241.
Fritsch, M. (1997). New firms and regional employment change. *Small Business Economics*, 9, 437-448.
Fritsch, M. (2008). How does new business formation affect regional development? Introduction to the special issue. *Small Business Economics*, 30, 1-14.
Fritsch, M., Brixy, U. and Falck, O. (2006). The effect of industry, region, and time on new business survival – a multi-dimensional analysis. *Review of Industrial Organization*, 28, 285-306.
Fritsch, M. and Mueller, P. (2004). The effects of new business formation on regional development over time. *Regional Studies*, 38, 961-975.

Fritsch, M. and Mueller, P. (2006). *The evolution of regional entrepreneurship and growth regimes,* in: Fritsch, M. and Schmude, J. (eds.), *Entrepreneurship in the Region*. International Studies in Entrepreneurship, 14. Springer Science, New York.
Fritsch, M. and Mueller, P. (2007). The persistence of regional new business formation-activity over time – assessing the potential of policy promotion programs. *Journal of Evolutionary Economics*, 17, 299-315.
Fritsch, M. and Schmude, J. (2006). *Entrepreneurship in the Region*. International Studies in Entrepreneurship, 14. New York: Springer Science.
Fritsch, M. and Schroeter, A. (2009). Why does the effect of new business formation differ across regions? *Small Business Economics,* forthcoming.
Gabe T., (2003). Local industry agglomeration and new business activity. *Growth and Change* 34 (1), 17-39.
Garnsey, E., Stam, E. and Heffernan, P. (2006). New firm growth: Exploring processes and paths. *Industry and Innovation*, 13 (1), 1-20.
Gartner, W.B. (1985). A framework for describing and classifying the phenomenon of new venture creation. *Academy of Management Review*, 10 (4), 696-706.
Geroski, P.A. (1989). Entry, innovation and productivity growth. *Review of Economics and Statistics,* 71, 572-578.
Giddens, A. (1984). *The Constitution of Society. Outline of the Theory of Structuration*. Polity, Cambridge.
Gieling, S. (2006). Amsterdam's urban form, in *PlanAmsterdam,* 12 (1). Dienst Ruimtelijke Ordening, Amsterdam.
Gimeno, J., Folta, T., Cooper, A. and Woo, C. (1997). Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Administrative Science Quarterly*, 42, 750-783.
Glaeser, E.L. (2007). Entrepreneurship and the City, *NBER Working Papers w13551,* October, 2007.
Glaeser, E.L., Kallal, H.D., Scheinkman, J.A. and Shleifer, A. (1992). Growth in Cities. *Journal of Political Economy*, 100, 6, 1126-1152.
Goldstein, H. (2003). *Multilevel Statistical Models (3rd ed.)*. Arnold, London.
Goldstein, H. (2007). Becoming familiar with multilevel modeling. *Significance*, September, 2007, 133-135.
Griliches, Z. and Lichtenberg, F. (1984). Productivity and R&D at the Firm Level. in: Griliches, Z. (ed.), *R&D, Patents and Productivity*. University of Chicago Press, Chicago, 330-374.
Grilo, I. and Irigoyen, J-M. (2006). Entrepreneurship in the EU: To wish and not to be. *Small Business Economics*, 27, 305-318.
Grilo, I. and Thurik, A.R. (2005). Entrepreneurial engagement levels in the European Union. *International Journal of Entrepreneurship Education,* 3 (2), 143-168.
Grilo, I and Thurik, R. (2006). *Latent and actual entrepreneurship in Europe and the US: some recent developments.* EIM Scales-paper, Zoetermeer.
Gundry, L. and Welsch, H. (2001). The ambitious entrepreneur: high growth strategies of women-owned enterprises. *Journal of Business Venturing,* 16, 453-470.
Hall, B.H. and Mairesse, J. (1995). Exploring the relationship between R&D and productivity in French manufacturing firms. *Journal of Econometrics*, 65, 263-293.
Hall, P.A. and Soskice, D. (2001). *Varieties of Capitalism. The Institutional Foundations of Comparative Advantage*. Oxford University Press, Oxford.

Hanlon, D. and Sounders, C. (2007). Marshaling resources to form small new ventures: Toward a more holistic understanding of entrepreneurial support. *Entrepreneurship, Theory and Practice,* 31 (4), 619-641.
Hébert, R.F. and A.N. Link (1988), *The Entrepreneur, Mainstream Views and Radical Critiques*. Praeger, New York.
Henderson, J.V. (1985). The Tiebout model: Bring back the entrepreneurs. *Journal of Political Economy,* 93 (2), 248-264.
Henrekson, M. (2005). Entrepreneurship: a weak link in the welfare state? *Industrial and Corporate Change*, 14, 437-467.
Henrekson, M., (2006). Entrepreneurship and the welfare state: a reply. *Industrial and Corporate Change*, 15 (3), 579-593.
Henrekson, M. and Johansson, D. (2008). Gazelles as Job Creators, *IFN Working Paper No. 733*. Research Institute of Industrial Economics, Stockholm.
Henrekson, M. and Johansson, D. (2009). Competencies and institutions fostering high-growth firms. *Foundations and Trends in Entrepreneurship*, 5 (1), 1-80.
Hessels, S.J.A. (2008). International Entrepreneurship: Value Creation Across National Borders, *ERIM PhD Series in Management,* 144. Erasmus University Rotterdam, Rotterdam.
Hessels, S.J.A., Van Gelderen, M. and Thurik, R. (2008). Entrepreneurial aspirations, motivations, and their drivers. *Small Business Economics,* 31 (3), 323-339.
Hessels, S.J.A., Van Stel, A.J., Brouwer, P. and Wennekers, A.R.M. (2007). Social security arrangements and early-stage entrepreneurial activity. *Comparative Labor Law & Policy Journal*, 28 (4), 743-774.
Hofstede, G. (2001). *Culture's Consequences; Comparing Values, Behaviors, Institutions and Organizations Across Nations. 2nd Edition*. Sage, Beverly Hills, CA.
Holl, A. (2004). Transport infrastructure, agglomeration economies, and firm birth: Empirical evidence from Portugal. *Journal of Regional Science*, 44, 693-712.
Hoover, E.M. and Vernon, R. (1962). *Anatomy of a Metropolis*. Anchor Books: New York.
Hox, J.J. (2002). *Multilevel Analysis: Techniques and Applications*. Erlbaum, Mahwah, New Jersey.
Illeris, S. and Jakobsen, L. (1991). Computer services and the urban system: A case study in Denmark, in: Pumain, D., Saint-Julien, T. and Van der Haegen, H. (eds.), *Cities in Movement: Urban Systems on the Eve of the 21st Century*. Katholieke Universiteit Leuven, Leuven, 39-45.
Inglehart, R. and Baker, W.E. (2000). Modernization, cultural change, and the persistence of traditional values. *American Sociological Review*, 65 (1), 19-51.
Inklaar, R., O'Mahony, M., Robinson, C. and Timmer, M.P. (2003). Productivity and competitiveness in the EU and the US, in O'Mahony, M. and Van der Ark, B. (eds.), *EU Productivity and Competitiveness: An Industry Perspective*. Office for Official Publication of the European Communities, Luxemburg, 73-147.
Jacobs, J. (1969). *The Economy of Cities*. Random House: New York.
Jaffe, A.B, Trajtenberg, M. and Henderson, R. (1993). Geographic localization of knowledge spillovers as evidenced by patent citations. *Quarterly Journal of Economics*, 108 (3), 577-598.
Johnson, P. and Parker, S.C. (1996). Spatial variations in the determinants and effects of firm births and deaths. *Regional Studies*, 30 (7), 679-688.
Jovanovic, B. (1982). Selection and the evolution of industry. *Econometrica*, 50, 649-670.

Kan, K. and Tsai, W.D. (2006). Entrepreneurship and risk aversion. *Small Business Economics,* 26, 465-474.
Keeble, D. and Walker, S. (1994). New firms, small firms and dead firms: spatial patterns and determinants in the United Kingdom. *Regional Studies*, 28 (4), 411-427.
Keeble D. and Wever E. (1986). *New Firms and Regional Development in Europe*. Croom Helm, London.
Kihlstrom, R.E. and Laffont, J.J. (1979). A general equilibrium entrepreneurial theory of firm formation based on risk aversion. *Journal of Political Economy,* 87, 719-749.
Kihlstrom, R.E. and Laffont, J.J. (1983). Taxation and risk taking in general equilibrium models with free entry. *Journal of Public Economics,* 21, 159-181.
Kim, P.H., Aldrich, H.E. and Keister, L.A. (2006). Access (not) denied: The impact of financial, human, and cultural capital on entrepreneurial entry in the United States. *Small Business Economics,* 27 (1), 5-22.
Kirzner, I. (1973). *Competition and Entrepreneurship*. University of Chicago Press, Chicago.
Kirzner, I. (1979). *Perception, Opportunity, and Profit*. University of Chicago Press, Chicago.
Kitson, M., Martin, R. and Tyler, P. (2004). Regional competitiveness: An elusive yet key concept? *Regional Studies*, 38 (9), 991-999.
Kleinknecht, A. (1998). Is labor market flexibility harmful to innovation? *Cambridge Journal of Economics*, 22, 387-396.
Kleinknecht, A. and Poot, T.P. (1992). Do regions matter for R&D? *Regional Studies*, 26 (3), 221-232.
Klepper, S. (2002). Agglomeration through spinoffs: How Detroit became the capital of the U.S. automobile industry. Paper presented at the 9th *Congress of International Joseph A. Schumpeter Society*, Gainesville, Florida.
Kloosterman, R.C. (2003). Creating opportunities. Policies aimed at increasing openings for immigrant entrepreneurs in the Netherlands. *Entrepreneurship and Regional Development*, 15(2), 167-181.
Koellinger, Ph. (2008). Why are some entrepreneurs more innovative than others? *Small Business Economics*, 31, 21-37.
Koellinger, Ph., Minniti, M. and Schade, C. (2007). I think I can, I think I can....: a study of entrepreneurial behaviour. *Journal of Economic Psychology,* 28 (3), 502-527.
Kolvereid, L. (1992). Growth aspirations among Norwegian entrepreneurs. *Journal of Business Venturing*, 7, 209-222.
Koster, S. (2007). The entrepreneurial and replication function of new firm formation. *Tijdschrift voor Economische en Sociale Geografie,* 98 (5), 667-674.
Krueger, N.F. (2000). The cognitive infrastructure on opportunity emergence. *Entrepreneurship, Theory and Practice*, 24, 5-23.
Krugman, P. (1990). *The Age of Diminished Expectations*. MIT Press, Cambridge, MA.
Krugman, P. (2005). Second winds for industrial regions? In: Coyle, D., Alexander, W. and Ashcroft, B. (eds), *New Wealth for Old Nations: Scotland's Economic Prospects*. Princeton University Press, Princeton, 35-47.
Lasch, F., Le Roy, F. and Yami, S. (2007). Critical growth factors of ICT start-ups. *Management Decision*, 45 (1), 62-75.
Lee, S.Y., Florida, R. and Acs, Z. (2004). Creativity and entrepreneurship: A regional analysis of new firm formation. *Regional Studies*, 38 (8), 879-891.
Leibenstein, H. (1968). Entrepreneurship and development. *The American Economic Review,* 58 (2), 72-83

Lenz, B. and Kulinat, K. (1997). Contact networks and regional milieux in rural areas. Contribution to the concept of the regional milieu and empirical experiences from Baden-Wurttemberg/Germany. *Erdkunde*, 51, 33-42.
Levie, J. (2007). Immigration, in-migration, ethnicity and entrepreneurship in the United Kingdom. *Small Business Economics,* 28 (2), 143-169.
Levie, J. and Autio, E. (2008). A theoretical grounding and test of the GEM model. *Small Business Economics,* 31 (3), 235-263.
Liao, J. and Welsch, H. (2003). Social capital and entrepreneurial growth aspiration: a comparison of technology- and non-technology-based nascent entrepreneurs. *Journal of High Technology Management Research*, 14 (1), 149-170.
Liu, L. (1993). Entry-exit, learning, and productivity change: Evidence from Chile. *Journal of Development Economics*, 42 (2), 217-242
Lucas, R.E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22 (1), 3-42.
Madsen, J.B. and Damania, R. (2001). Labor demand and wage-induced innovations: evidence from the OECD countries. *International Review of Applied Economics*, 15 (3), 323-334.
Malecki, E.J. (1997). Entrepreneurs, networks, and economic development: A review of recent research, in Katz, J.A. (ed.), *Advances in Entrepreneurship, Firm Emergence, and Growth*, 3, 57-118.
Malecki, E.J. (2007). Cities and regions competing in the global economy: networks, knowledge and local development policies. *Environment & Planning C: Government & Policy*, 25 (5), 638-654.
Mansfield, E. (1962). Entry, Gibrat's Law, innovation, and the growth of firms. *American Economic Review,* 52 (5), 1023-1051.
Martin, R. and Sunley, P. (2006). Path dependence and regional economic evolution. *Journal of Economic Geography*, 6, 395-437.
Maskell, P. (2000). Social capital, innovation and competitiveness, in: Baron, S., Field, J. and Schuller, T. (eds.), *Social Capital. Critical Perspectives*. Oxford University Press, Oxford, 111-123.
Metcalfe, J.S. (2002). Knowledge of growth and growth of knowledge. *Journal of Evolutionary Economics*, 12, 3-15.
Michelacci, C. and Silva, O. (2007). Why so many local entrepreneurs? *The Review of Economics and Statistics,* 89 (4), 615-633.
Nanda, R. and Sorenson, J.B. (2007). Peer effects and Entrepreneurship. *Harvard Business School working paper* 08-051, Boston MA.
North, D.C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press, Cambridge.
Nyström, K. (2005). Determinants of regional entry and exit in industrial sectors. *CESIS Electronic Working Paper Series, 33*.
OECD (1998). *Fostering Entrepreneurship*. OECD: Paris
OECD (2004a). *Employment Outlook, Employment Protection Regulation and Labour Market Performance*. OECD: Paris.
OECD (2004b). *Promoting Entrepreneurship and Innovative SMEs in a Global Economy: Towards a More Responsible and Inclusive Globalisation*. OECD: Paris
Orr, D. (1974). The determinants of entry: A study of the Canadian manufacturing industries. *The Review of Economics and Statistics*, 56 (1), 58-66.

OTA (1984). *Technology, Innovation, and Regional Economic Development*. US Congress, Office of Technology Assessment (OTA), Washington, D.C.
Oviatt, B.M. and McDougall, P.P. (1994). Toward a theory of international new ventures. *Journal of International Business Studies*, 25 (1), 45-64.
Parker, S.C. (2004). *The Economics of Self-employment and Entrepreneurship*. Cambridge University Press: Cambridge.
Parker, S.C. (2005). Explaining regional variations in entrepreneurship as multiple equilibria. *Journal of Regional Science*, 45, 829-850.
Porter, M.E. (1990). *The Competitive Advantage of Nations*. Free Press, New York.
Porter, M.E. (1998). *On Competition*. Harvard Business School Press, Boston.
Porter, M.E. (2000). Location, competition and economic development: local clusters in the global economy. *Economic Development Quarterly*, 14 (1), 15-31.
Rabe-Hesketh, S. and Skrondal, A. (2005). *Multilevel and Longitudinal Modeling Using Stata*. Stata Press, College Sattion, Texas.
Raudenbusch, S.W. and Bruyk, A.S. (2002). *Hierarchical Linear Models*. Sage, Newbury Park, CA.
Regio Twente (2006). *Netwerkanalyse regio Twente*. Stuurgroep Netwerkanalyse regio Twente, Enschede.
Regional Studies Special Issue (1994), Crossnational comparisons of the variation in new firm formation rates (eds. P.D. Reynolds, D.J. Storey and P. Westhead), *Regional Studies* 28(4), 343-456.
Reynolds, P.D. (1994). Autonomous firm dynamics and economic growth in the United States, 1986-1990. *Regional Studies*, 28 (4), 229-442.
Reynolds, P.D., Bosma, N.S., Autio, E., Hunt, S., De Bono, N., Servais, I., Lopez-Garcia, P. and Chin, N. (2005). Global Entrepreneurship Monitor: Data collection design and implementation, 1998-2003. *Small Business Economics*, 24 (3), 205-231.
Reynolds, P.D., Bygrave, W.D., Autio, E., Cox, L.W. and Hay, M. (2002). *Global Entrepreneurship Monitor, 2002 Executive Report*. Babson College, London Business School and Kauffman Foundation. Boston, MA and London, UK.
Reynolds, P.D, Carter, N.M., Gartner, W.B. and Greene, W.B. (2004). The prevalence of nascent entrepreneurs in the United States: evidence from the Panel Study of Entrepreneurial Dynamics. *Small Business Economics*, 23, 263-284.
Reynolds, P.D., Miller, B. and Maki, W.R. (1995). Explaining regional variation in business births and deaths: U.S., 1976-88. *Small Business Economics*, 7, 389-407.
Reynolds, P., Storey, D.J. and Westhead, P. (1994). Cross-national comparisons of the variation in new firm formation rates. *Regional Studies*, 28 (4), 443-456.
Robinson, C., O'Leary, B. and Rincon, A. (2006). *Business Start-ups, Closures and Economic Churn. A Review of the Literature*. National Institute of Economic and Social Research, London.
Rocha, H. and Sternberg, R. (2005). Entrepreneurship: The role of clusters. Theoretical perspectives and empirical evidence from Germany. *Small Business Economics*, 24 (3), 267-292.
Romer, P.M. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, 94 (5), 1002.
Romer, P.M. (1990). Endogenous technological change. *Journal of Political Economy*, 98 (5), S71-S102.

Roodman, D. (2006). How to do xtabond2: An introduction to "Difference" and "System" GMM in Stata. *Working Paper 103*. Center for Global Development, Washington DC.
Rosenthal, S.S. and Strange, W.C. (2003). Geography, industrial organization, and agglomeration. *Review of Economics and Statistics*, 85 (2), 377-393.
Rosenthal, S.S. and Strange, W.C. (2004). Evidence on the nature and sources of agglomeration economies, in: Henderson, J.V. and Thisse, J.-F. (eds.), *Handbook of Urban and Regional Economics*, 4. Elsevier, Amsterdam, 2119-2172.
Safran Foer, J. (2005). *Extremely Loud & Incredibly Close*. Houghton Mifflin (paperback), Boston.
Santarelli, E. and Vivarelli, M. (2007). Entrepreneurship and the process of firms' entry, survival and growth. *Industrial and Corporate Change*, 16 (3), 455-488.
Schumpeter, J.A. (1934). *The Theory of Economic Development*. Harvard University Press, Cambridge MA, US.
Schumpeter, J.A. (1942). *Capitalism, Socialism and Democracy*. Harper and Row, New York, NY, US.
Schutjens, V.A.J.M. and Stam, E. (2003). The evolution and nature of young firm networks: A longitudinal perspective. *Small Business Economics*, 21, 115-134.
Schutjens, V.A.J.M. and Stam, E. (2006). Starting anew: Entrepreneurial intentions and realizations subsequent to business closure, *Papers in Evolutionary Economic Geography, 06.04*. Utrecht University, Utrecht.
Schutjens, V.A.J.M. and Wever, E. (2000). Determinants of new firm success. *Papers in Regional Science*, 79 (2), 135-153.
Scott, A.J. (2004). *Entrepreneurship, Innovation and Industrial Development: Geography and the Creative Field Revisited*. Centre for Globalization and Policy Research, UCLA, Los Angeles.
Shane, S. and Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review,* 25, 217-226.
Shane, S. (2003). *A General Theory of Entrepreneurship: The Individual-Opportunity Nexus*. Edward Elgar, Aldershot, UK.
Siegfried, J.J. and Evans, L.B. (1994). Empirical studies of entry and exit: a survey of the evidence. *Review of Industrial Organisation,* 9, 121-155.
Smallbone, D., Baldock, R. and Burgess, S. (2002). Targeted support for high-growth start-ups: some policy issues. *Environment and Planning C,* 20 (2), 195-209.
Sorenson, O. (2003). Social networks and industrial geography. *Journal of Evolutionary Economics,* 13(5), 513-527.
Stam, E. (2005). The geography of gazelles in the Netherlands. *Journal for Economic and Social Geography,* 96 (1), 121-127.
Stam, E. (2007). Why butterflies don't leave: Locational behavior of new firms. *Economic Geography,* 83 (1), 27-50.
Stam, E. (2008a). Entrepreneurship and innovation policy, in: Nooteboom, B. and Stam, E. (eds.), *Micro-Foundations for Innovation Policy*. Amsterdam University Press/Chicago University Press, Amsterdam/Chicago.
Stam, E. (2008b). Entrepreneurship, in: Kitchin, R. and Thrift, N. (eds.), *The International Encyclopedia of Human Geography*. Elsevier Science, Oxford. In press.
Stam, E. (2009): Entrepreneurship, Evolution and Geography. in: Boschma, R. and Martin, R. (eds) *The Handbook of Evolutionary Economic Geography*. Edward Elgar, Cheltenham, forthcoming.

Stam, E., Gibcus, P., Telussa, J. and Garnsey, E. (2007). Employment growth of new firms, *Jena Economic Research Papers, 2008-005*. Max-Planck-Institute of Economics, Friedrich-Schiller-University Jena, Jena.
Sternberg, R. (2000). Gründungsforschung – Relevanz des Raumes und Aufgaben der Wirtschaftsgeographie. *Geografische Zeitschrift*, 88, 199-219.
Sternberg, R. (2005). Entrepreneurship in German regions and the policy dimension, in: Audretsch, D.B., Grimm, H. and Wessner, C.W. (eds.), *Local Heroes in the Global Village, Globalization and New Entrepreneurship Policies*. Springer, New York, 113-144.
Sternberg, R. (2009). Regional implications of entrepreneurship. *Foundations and Trends in Entrepreneurship*, forthcoming.
Sternberg, R. and Wennekers, S. (2005). Determinants and effects of new business creation using Global Entrepreneurship Monitor data. *Small Business Economics*, 24, 193-203.
Stevenson, L. and Lundström, A. (2001). Patterns and trends in entrepreneurship/SME policy and practice in ten economies. *Entrepreneurship Policy for the Future Series* 3, Swedish Foundation for Small Business Research.
Storey, D.J. (1991). The birth of new firms – does unemployment matter? A review of the evidence. *Small Business Economics*, 3 (3), 167-178.
Storper, M. (1997). *The Regional World: Territorial Development in a Global Economy*. Guilford Press, New York.
Stuart, T. and Sorenson, O. (2003). The geography of opportunity: spatial heterogeneity in founding rates and the performance of biotechnology firms. *Research Policy*, 32, 229-253.
Sutaria, V. and Hicks, D. (2002). The determinants of new firm formation dynamics. Paper presented at *European Regional Science Association (ERSA) Conference*, 2002, Dortmund.
Sutaria, V. and Hicks, D. (2004). New firm formation: Dynamics and determinants. *The Annals of Regional Science*, 38, 241-262.
Swedberg, R. (2000). *Entrepreneurship: The Social Science View*. Oxford University Press, Oxford.
Tamásy, C. (2006). Determinants of regional entrepreneurship dynamics in contemporary Germany: A conceptual and empirical analysis. *Regional Studies*, 40 (4), 365-384.
Taylor, P. and Hoyler, M. (2000). The spatial order of European cities under conditions of contemporary globalisation, *Tijdschrift voor Economische en Sociale Geografie*, 91(2), 176-189.
Thornton, P.H. and Flynn, K.H. (2003). Entrepreneurship, networks and geographies, in: Acs, Z. and Audretsch, D.B. (eds.), *Handbook of Entrepreneurship Research*. Kluwer, Dordrecht, 401-433.
Tödtling, F. and Wanzenböck, H. (2003). Regional differences in structural characteristics of start-ups. *Entrepreneurship & Regional Development*, 15, 351-370.
Vaillant, Y. and Lafuente, E. (2007). Do different institutional frameworks condition the influence of local fear of failure and entrepreneurial examples over entrepreneurial activity? *Entrepreneurship and Regional Development*, 19, 313-337.
Van Ark, B., Monnikhof, E. and Mulder, N. (1999). Productivity in services: An international comparative perspective. *Canadian Journal of Economics*, 33 (2), 471-499.
Van Duijn, M.A.J., Van Busschbach, J.T. and Snijders, T.A.B. (1999). Multilevel analysis of personal networks as dependent variables. *Social Networks*, 21 (2), 187-209.
Van Oort, F. (2002). *Agglomeration, economic growth and innovation; Spatial analysis of growth- and R&D externalities in the Netherlands*. Dissertation Tinbergen Institute, Erasmus University Rotterdam, Rotterdam.

Van Oort, F.G. and Stam, E. (2005). Entrepreneurship and agglomeration economies in the Dutch ICT industry, in: Johansson, I. (ed.), *Regions in Competition and Co-operation*. University of Trollhättan/Uddevalla, Uddevalla, 689-718.
Van Praag, C.M. (1996). *Determinants of Successful Entrepreneurship*. Thesis Publishers, Amsterdam.
Van Praag, C.M. (1999). Some classic views on entrepreneurship. *De Economist*, 147 (3), 311-335.
Van Praag, C.M. and Versloot, P.H. (2007). What is the value of entrepreneurship? A review of recent research. *Small Business Economics*, 29 (4), 521-382.
Van Stel, A.J. and Nieuwenhuijsen, H.R. (2004). Knowledge spillovers and economic growth: An analysis using data of Dutch regions in the period 1987-1995. *Regional Studies*, 38, 393-407.
Van Stel, A.J. and Storey, D.J. (2004). The link between firm births and job creation: Is there a Upas Tree Effect? *Regional Studies*, 38, 893-909.
Van Stel, A.J., Storey, D.J. and Thurik, A.R. (2006). The effect of business regulations on nascent and young business entrepreneurship. *EIM Research Report H200609*. EIM: Zoetermeer.
Van Stel, A.J. and Suddle, K. (2008). The impact of new firm formation on regional development in the Netherlands. *Small Business Economics,* 30 (1), 31-47.
Verheul, I. (2005). Is there a (fe)male approach? Understanding gender differences in entrepreneurship. *ERIM Ph.D. Series Research in Management*. Erasmus University Rotterdam, Rotterdam.
Verheul, I., Wennekers, A.R.M., Audretsch, D.B. and Thurik, A.R. (2002). An eclectic theory of entrepreneurship, in: Audretsch, D.B., Thurik, A.R., Verheul, I. and Wennekers, A.R.M. (eds.), *Entrepreneurship: Determinants and Policy in a European-US Comparison*. Kluwer Academic Publishers, Boston/Dordrecht, 11-81.
Vernon, R. (1966). International investment and international trade in the product life cycle. *Quarterly Journal of Economics*, 80, 190-207.
Vivarelli, M. and Audretsch, D.B. (1998). The link between the entry decision and post-entry performance: evidence from Italy. *Industrial and Corporate Change,* 7, 485-500.
Wagner, J. and Sternberg, R. (2004). Start-up activities, individual characteristics, and the regional milieu: Lessons for entrepreneurship support policies from German micro data. *The Annals of Regional Science*, 38 (2), 219-240.
Wennekers, A.R.M. (2006). Entrepreneurship at country level; Economic and non-economic determinants. *ERIM Ph.D. Series Research in Management*. Erasmus University Rotterdam, Rotterdam.
Wennekers, A.R.M. and Thurik, A.R. (1999). Linking entrepreneurship and economic growth. *Small Business Economics,* 13, 27-55.
Wennekers, A.R.M., Thurik, A.R., Van Stel, A.J. and Noorderhaven, N. (2006). Uncertainty Avoidance and the Rate of Business Ownership Across 21 OECD Countries. *ERIM Report Series ERS-2006-065-ORG*. Erasmus University Rotterdam, Rotterdam.
Werker, C. and Athreye, S. (2004). Marshall's disciples: knowledge and innovation driving regional economic development and growth. *Journal of Evolutionary Economics,* 14, 505-523.
Wever, E. (1984). *Nieuwe Bedrijven in Nederland*. Van Gorcum, Assen.

Wiklund, J. (2006). The sustainability of the entrepreneurial orientation-performance relationship, in: Davidsson, P., Delmar, F. and Wiklund, J. (eds.), *Entrepreneurship and the Growth of Firms*. Edward Elgar, Cheltenham, UK and Northampton, MA, US, 141-155.
Wiklund, J., Davidsson, P. and Delmar, F. (2003). What do they think and feel about growth? An expectancy-value approach to small business managers´ attitudes toward growth. *Entrepreneurship Theory and Practice*, 27 (3), 247-270.
Wilks-Heeg, S., Perry, B. and Harding, A. (2003). Metropolitan regions in the face of the European dimension: regimes, re-scaling or repositioning? In: Salet, W.G.M., Thornley, A. and Kreukels, A. (eds.), *Metropolitan Governance and Spatial Planning: Comparative Case Studies of European City-Regions*. Spon Press/Taylor & Francis Group, London/New York, 20-38.
Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, 126, 25-51.
Wong, P.K., Ho, Y.P. and Autio, E. (2005). Entrepreneurship, innovation, and economic growth: Evidence from GEM Data, *Small Business Economics*, 24 (3), 335-350.
World Bank (2005). *Doing Business in, 2005; Removing Obstacles to Growth*. World Bank, Washington DC.
World Bank (2007). *Review of the Dutch Administrative Burden Reduction Programme*. Worldbank Group, Washington.
Zander, I. (2004). The microfoundations of cluster stickiness – Walking in the shoes of the entrepreneur. *Journal of International Management*, 10, 51-75.
Zellner, A. (1962). An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. *Journal of Statistical Association*, 57, 348-368.
Zellner, A. (1963). Estimators for seemingly unrelated regression equations: Some exact finite sample results. *Journal of Statistical Association*, 58, 977-992.

Appendix I: Classification of GEM European Regions

Throughout this thesis we apply a database extracted from the Global Entrepreneurship Monitor (GEM). Table I.1 shows for each country involved the regions that have been identified, as well as the number of individuals in the sample per region.

Table I.1 Regional classification for European countries included in the thesis and sample size per region (adults between 18-64 years) [a]

Belgium		**Greece**		**Spain**	
Brussel	1552	Athens	1381	Galicia	4476
Vlaams Gewest	4728	Macedonia & Thrace	1537	Asturias	2257
Region Wallone	5911	Thessaly & Epiros'	769	Pais Vasco	6256
+ Antwerp (Nuts2)	2606	Central + Ionian Islands	1381	Navarra	3941
+ Ghent (Nuts2)	1953	Peleponese Agean Crete	1276	Aragon	783
				Madrid	6408
Denmark		**Hungary**		Castilla y León	6349
Copenhagen area	4559	Central Transdanubia	1089	Castilla La Mancha	2395
Sealand and Bornholm	4207	Western Transdanubia	1025	Extremadura	3131
Funen	1648	Southern Transdanubia	1020	Catalunya	4564
Jutland	6620	Northern Hungary	1222	Comm Valenciana	4323
+ Aarhus area (Nuts3)	2309	Northern Great Plain	1376	Baleares	770
		Southern Great Plain	1393	Andalucia	6453
Finland		+ Budapest area (Nuts3)	1749	Murcia	2261
Ita-Suomi	1362			Canarias	6256
Etela-Suomi	2725	**Ireland**		+ Barcelona (Nuts3)	2429
Lansi-Suomi	2101	Dublin	2203	+ Valencia (Nuts3)	2337
Pohjois-Suomi	1219	Border, Midlands, Western	3356	+ Sevilla (Nuts3)	1204
+ Helsinki Area (Nuts3)	2709	Southern and Eastern	2537	+ Malaga (Nuts3)	1408
France		**Italy**		**Sweden**	
Ile de France	1768	Nord-Ovest	1020	Stockholm area	2073
Parisien Bassin	1582	Lombardia	1467	Östra Mellansverige	6752
East	884	Nord-Est	1110	Sydsverige	3066
West	1161	Centro	1025	Norra Mellansverige	3946
South-West	1027	Campania	906	Mellersta Norrland	2594
Center-East	1209	Sud	1139	Övre Norrland	2675
Meditéranee	1079			Småland med öarna	5195
		Netherlands		Västsverige	3415
Germany		Noord-Nederland	1569		
Baden-Württemberg	3663	Oost-Nederland	3126	**Switzerland**	
Bayern	4516	West-Nederland	2429	North-East	2065
Berlin	1620	Zuid-Nederland	3650	North-West	2112
Brandenburg	1245	+ Utrecht (Nuts3)	1014	South	1906
Hamburg	757	+ Amsterdam (Nuts3)	1272	West (French speaking)	2232
Hessen	1587	+ The Hague (Nuts3)	764		
Mecklenburg-Vorpommern	839	+ Rotterdam (Nuts3)	1242		
Niedersachsen	3724				

Nordrhein-Westfalen	5032
Rheinland – Pfalz	1868
Sachsen	2248
Sachsen-Anhalt	1331
Schleswig-Holstein	1227
Thüringen	1279
+ Duisburg-Essen (ROR)	962
+ Düsseldorf (ROR)	1330
+ Köln (ROR)	1051
+ Rhein-Main (ROR)	1235
+ Stuttgart (ROR)	1203
+ München (ROR)	1104

Norway	
North Norway	1499
Middle Norway	1154
West Norway	2455
South Norway	2457
Oslo and surroundings	3397

Portugal	
Norte (incl Porto)	962
Lisboa e Vale de Tejo	997

United Kingdom	
Scotland	8403
North East	6294
North West	12074
Yorkshire Humberside	8826
East Midlands	7639
West Midlands	6428
East Anglia	4966
Greater London	6050
South East	7287
South West	6815
Wales	11358
Northern Ireland	12674

---

[a] This table only lists regions with a sample size larger than 750 adults between 18-64 years

\+ Not considered in Chapter 2.

ROR: 'Raumordnungsregionen'. This classification for German regions indicate labour market areas, and lie between Nuts2 and Nuts3 level

Appendix II: Alternative Specifications Using Dynamic Panel Data Estimation Techniques

Since we have a panel of regional observations, and temporal correlation of some of our variables is likely, it is appealing to employ the dynamic panel data estimation technique developed by Arellano and Bond (1991), and Blundell and Bond (1998) also known as the GMM-sys estimator. GMM-sys is appropriate to our model, not only because of potential endogeneity issues, but also because it includes a level and a difference equation. This implies that (i) potential multicollinearity issues arising from including multiple lags of independent variables are sufficiently dealt with, (ii) estimated effects are truly dynamic and (iii) it is still possible to control for regional effects – in our case related variety and population density.

The GMM-sys technique is particularly appropriate for panel data with a limited number of time observations. When the number of years increases, the number of instruments involved will increase exponentially and the GMM-sys technique becomes less applicable (Roodman, 2006). In this respect the length of our observed time period (14 years) is not particularly low relative to the number of regions. As a check for robustness, however, we do present our results based on GMM-sys estimation techniques. To this end we use the averages of non-overlapping periods; this implies we loose (time) observations but it renders the data more suitable for this kind of GMM panel data analysis. We use the two-step procedure and the finite-sample correction by Windmeijer (2005) in order to obtain robust estimation results. We compare our results with the outcomes using OLS techniques. The results for TFP growth are presented in tables II.1 and II.2. Firm dynamics seem to induce TFP growth in services but not in manufacturing. This is consistent with the OLS results in tables 7.2 and 7.3.

Table II.1. Regression results for TFP growth in Manufacturing, non-overlapping periods:

Firm dynamics:	**Turbulence**		**Entry**	
	OLS	**GMM-sys**	**OLS**	**GMM-sys**
TFP (lagged)	-0.09	-0.06	-0.09	-0.08
	(0.08)	(0.10)	(0.08)	(0.08)
Firm Dynamics		-0.34		-0.66
		(0.54)		(1.26)
Firm Dynamics (lagged)	0.01	0.07	0.30	0.05
	(0.25)	(0.54)	(0.48)	(0.45)
Related variety	0.28**	0.40	0.27**	0.63
	(0.07)	(0.40)	(0.07)	(0.45)
Population density	-0.02	-0.11	-0.02	-0.08
	(0.03)	(0.16)	(0.03)	(0.21)
Spatial autocorrelation	0.01	-0.37	0.01	-0.47**
	(0.12)	(0.22)	(0.12)	(0.19)
Constant	-0.12*	-0.18	-0.13**	-0.45
	(0.07)	(0.57)	(0.07)	(0.56)
Number of observations	200	200	200	200
Number of instruments		40		40
F statistic	8.2	10.5**	8.3	17.8**
Adj. R^2	0.27		0.27	
AR(1) in first differences		-2.47**		-2.26**
AR(2) in first differences		-0.07		-0.45
Hansen test of overid. restrictions		25.2		24.5
Prob. > chi2		0.52		0.66

* p<.10, ** p<.05
Period dummies included (estimates not reported): 1990-1991, 1992-1994, 1995-1997, 1998-2000, and 2001- 2002
Note: all difference-in-Sargan tests of exogeneity of instrument subsets did not reject the Null hypothesis of exogenous instruments in the GMM-sys models. GMM-sys regressions were performed using Stata, xtabond2 procedure..

Table II.2. Regression results for TFP growth in Services, non-overlapping periods

Firm dynamics:	**Turbulence**		**Entry**	
	OLS	**GMM-sys**	**OLS**	**GMM-sys**
TFP (lagged)	0.65**	0.31**	0.65**	0.45**
	(0.07)	(0.15)	(0.07)	(0.16)
Firm Dynamics		1.74**		1.71**
		(0.64)		(0.84)
Firm Dynamics (lagged)	0.05	-0.21	0.01	-0.36
	(0.13)	(0.56)	(0.18)	(0.73)
Related variety	-0.02	-0.15	-0.02	-0.13
	(0.03)	(0.18)	(0.03)	(0.15)
Population density	0.01	-0.00	0.01	-0.04
	(0.01)	(0.05)	(0.01)	(0.05)
Spatial autocorrelation	-0.25	-0.05	-0.25	-0.23
	(0.17)	(0.47)	(0.17)	(0.43)
Constant	0.03	-0.10	0.04	-0.04
	(0.03)	(0.28)	(0.03)	(0.21)
Number of observations	200	200	200	200
Number of instruments		40		40
F statistic	22.3**	20.0**	22.3**	25.3**
Adj. R^2	0.52		0.52	
AR(1) in first differences		-2.75**		-2.62**
AR(2) in first differences		-1.05		-0.88
Hansen test of overid. restrictions		27.9		32.8
Prob. > chi2		0.47		0.24

* p<.10, ** p<.05
Period dummies included (estimates not reported): 1990-1991, 1992-1994, 1995-1997, 1998-2000, and 2001- 2002
Note: all difference-in-Sargan tests of exogeneity of instrument subsets did not reject the Null hypothesis of exogenous instruments in the GMM-sys models. GMM-sys regressions were performed using Stata, xtabond2 procedure.

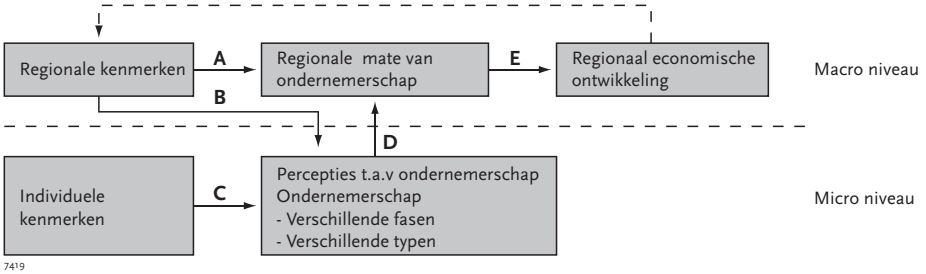
Summary in Dutch –
Samenvatting in het Nederlands

Bijdrage
Ondernemerschap staat volop in de belangstelling en wordt gezien als een belangrijke katalysator voor economische groei. Toch is, ondanks een sterk groeiend aantal empirische studies en de bestaande consensus onder wetenschappers en beleidsmakers over het belang van ondernemerschap, nog niet duidelijk *hoe* ondernemerschap economische ontwikkeling beïnvloedt. In deze dissertatie dragen wij bij aan bovengenoemd vraagstuk door twee relevante kenmerken van ondernemerschap uit de literatuur expliciet te erkennen en te modelleren.

Ten eerste is ondernemerschap eerder een regionaal fenomeen dan een nationaal fenomeen (Feldman, 2001).Uit empirische studies blijkt dat de regionale variatie in ondernemerschap veelal groter is dan de nationale variatie in ondernemerschap. De oorzaken van deze regionale verschillen zijn inmiddels veelvuldig onderzocht – echter bijna altijd voor regio's binnen één land. De mate van urbanisatie blijkt hierbij een belangrijke verklaring voor de mate van ondernemerschap (Reynolds et al., 1994). In dichtbevolkte gebieden is de vraag naar diverse producten en diensten hoog, zijn sociale netwerken en kennisoverdracht efficiënter en kan ondernemerschap lokaal besmettelijk werken, bijvoorbeeld via regionale rolmodellen. Daarom is voor het verkennen van de rol van ondernemerschap voor economische ontwikkeling het erkennen van regionale invloeden van belang. Dientengevolge vormt de regionale insteek, en met name de mate van urbanisatie, een belangrijke kenmerkpijler van dit proefschrift.

Ten tweede is ondernemerschap moeilijk onder één noemer te vangen. De heterogeniteit in ondernemerschap wordt duidelijk wanneer we verschillende *typen* ondernemers en *fasen* in het ondernemersproces kijken (Bosma en Schutjens, 2007; 2009). Belangrijke verschillende typen ondernemers zijn bijvoorbeeld ondernemers met groeiambities, ondernemers met innovatieve producten en/of processen. Maar ook de grote groep ondernemers zonder groeiambities (zoals bijvoorbeeld zelfstandigen zonder personeel, ook wel aangeduid als *zzp'ers*) die niet van plan zijn te groeien, kunnen tezamen een wezenlijke bijdrage aan de economie leveren. Het maken van onderscheid in fasen van ondernemerschap is noodzakelijk om bijvoorbeeld de vroege, dynamische fase van ondernemerschap (*nieuw ondernemerschap)* te onderscheiden van de meer statische, volwassen fase. Bij nieuw ondernemerschap hoort zowel de periode vóór de start van het bedrijf als de periode direct na de start van het bedrijf. Om deze typen en fasen van ondernemerschap, en hun verschillende rollen in de economie (en de maatschappij) goed te kunnen duiden dient informatie verzameld te worden op het individuele niveau.

In deze dissertatie wordt een conceptueel model gehanteerd dat (i) regionale patronen van verschillende typen en fasen in ondernemerschap blootlegt én verklaart; en (ii) de rol van deze typen en fasen ondernemerschap voor regionaal economische ontwikkeling beschrijft (zie figuur S1). We onderzoeken de bijdrage van ondernemerschap aan economische ontwikkeling door in verscheidene hoofdstukken onderdelen van het model



Figuur S1 Conceptueel model dissertatie

te beschouwen. De hoofdstukken zijn empirisch van aard en richten zich op specifieke *elementen* van ondernemerschap en onderzoeken op welke manier deze zich in ruimtelijke zin manifesteren. Een voorbeeld hiervan is de terugkerende focus op het 'groeigerichte' type ondernemerschap, waarbij de (nieuwe) ondernemer minimaal tien arbeidsplaatsen denkt te creëren in de komende vijf jaar; de relatie van dit type ondernemerschap met urbanisatievoordelen en regionale arbeidsproductiviteit wordt bijvoorbeeld onderzocht in hoofdstuk 8. Daarnaast laat het conceptuele model zien dat voor het onderzoeken van het verband tussen ondernemerschap en regionaal economische ontwikkeling rekening gehouden dient te worden met de invloed van regionale kenmerken en individuele kenmerken op ondernemerschap.

Het conceptuele model benadrukt het belang van *multilevel* relaties: *regionale* en *nationale* kenmerken beïnvloeden *individuele* betrokkenheid in ondernemerschap. Maar uiteraard spelen individuele kenmerken ook een belangrijke rol. Op zijn beurt veronderstelt het model dat het regionale patroon dat voortvloeit uit individuele ondernemersactiviteiten – in verschillende typen en fasen – mede bepalend is voor regionale economische ontwikkeling (Sternberg en Wennekers, 2005). Het model laat door middel van de onderbroken lijn ook zien dat er een *dynamische* wisselwerking bestaat tussen ondernemerschap en economische groei. In deze dissertatie concentreren we ons echter op de *ruimtelijke* aspecten van het conceptuele model. Om de relaties in figuur S1 empirisch te toetsen is een zeer omvangrijke dataset nodig, die voldoende regionale variatie biedt en voor iedere regio een omvangrijke en representatieve steekproef bevat. Het onderscheiden van nationale, regionale én individuele niveaus in één dataset is in deze dissertatie mogelijk gemaakt door bestaande data van de Global Entrepreneurship Monitor (GEM) samen te voegen over de periode 2001-2006 voor 18 Europese landen. Het GEM onderzoek bestaat sinds 1999; het is een grootschalige studie naar ondernemerschap waarbij jaarlijks in ruim 40 landen tenminste 2.000 volwassenen worden bevraagd over hun percepties ten aanzien van en hun betrokkenheid in ondernemerschap. Op deze manier wordt gewerkt aan een zeer grote en constant groeiende database met internationaal vergelijkbare gegevens over ondernemerschap in diverse landen.[86] In deze dissertatie is aan deze bestaande dataset een regionale dimensie toegevoegd. We beschikken hiermee over een unieke dataset bestaande

86 Internationale vergelijkbaarheid is vaak een probleem omdat landen veelal verschillend omgaan met de voorwaarden voor het inschrijven van (nieuwe) bedrijven in bedrijfsregisters (zoals in Nederland uitgevoerd door de Vereniging voor Kamers van Koophandel).

uit gegevens over meer dan 370.000 volwassenen in de leeftijd tussen 18 en 64 jaar, verdeeld over 142 regio's in 18 Europese landen.[87]

Bevindingen
Wanneer we diverse percepties ten aanzien van ondernemerschap en verschillende fasen van ondernemerschap voor de Europese regio's in kaart brengen (hoofdstuk 2), dan wordt duidelijk dat zowel nationale als regionale verschillen groot zijn. Met name *nieuw ondernemerschap* laat sterke regionale verschillen zien. Deze fase wordt in de literatuur veelal als kenmerkend voor ondernemerschap gezien (Gartner, 1985) en op deze fase ligt ook de focus in de volgende hoofdstukken.

Bij het verklaren van de *regionale* variatie in verschillende typen nieuw ondernemerschap (hoofdstuk 3) wordt bevestigd dat hoge bevolkingsdichtheid, als maat voor urbanisatie, samen gaat met meer ondernemerschap. Het belang van urbanisatie blijft overeind wanneer in hoofdstuk 4 de kans op *individuele* participatie in (typen) nieuw ondernemerschap wordt verklaard uit regionale kenmerken en rekening wordt gehouden met de invloed van individuele kenmerken (relaties B en C in figuur S1).[88] De individuele kenmerken hebben betrekking op leeftijd, geslacht, opleiding en huishoudeninkomen. Deze individuele kenmerken zijn, zoals ook in de ondernemerschapliteratuur wordt bevestigd, sterk bepalend voor participatie in nieuw ondernemerschap. Echter, regionale kenmerken blijken er ook toe te doen. Naast de mate van urbanisatie blijkt dat ook meer subjectieve regionale factoren een verklarende kracht uitoefenen op groeigericht ondernemerschap. Zo kennen regio's met relatief meer volwassenen die zelf denken over voldoende kennis en vaardigheden te beschikken om zelf een bedrijf te starten in het algemeen meer groeigerichte ondernemers van andere regio's. Ook het persoonlijk kennen van andere ondernemers (op regionaal niveau) wordt in verband gebracht met relatief meer ondernemerschap. In tegenstellig tot subjectieve regionale factoren blijken regionale welvaartsniveaus en regionaal economische groei van gering belang voor het verklaren van participatie in nieuw ondernemerschap, wanneer rekening wordt gehouden wordt met de invloed van individuele kenmerken.

Op nationaal niveau wordt de mate van werknemersbescherming in negatieve zin geassocieerd met groeigericht nieuw ondernemerschap. Deze bevinding kan op twee manieren worden verklaard. Ten eerste kunnen werknemers die de potentie en de wil hebben om te ondernemen (met een groeiend bedrijf) worden tegengehouden bij het maken van de overstap naar ondernemerschap vanwege de hoge mate van werknemersbescherming. Ten tweede kan een hoge werknemersbescherming nieuwe ondernemers doen besluiten om klein te blijven. Uiteraard is het politieke debat over het al dan niet inperken van de werknemersbescherming veel breder en dienen de mogelijke

87 De landen zijn België, Kroatië, Denemarken, Duitsland, Finland, Frankrijk, Griekenland, Groot-Brittannië, Hongarije, Ierland, Italië, Nederland, Noorwegen, Portugal, Slovenië, Spanje, Zweden en Zwitserland. De regio's lopen uiteen van sterk ruraal tot sterk urbaan. Ook de verschillen in regionale welvaartsniveaus zijn groot. In de analyses (met uitzondering van hoofdstuk 2) zijn de regio's in Kroatië en Slovenië achterwege gelaten. Dit geldt ook voor enkele regio's waarvoor de grootte van de steekproef niet toereikend werd geacht.

88 De regressies zijn uitgevoerd met behulp van *multilevel* regressie technieken (zie bijvoorbeeld Goldstein, 2003)

voordelen voor ondernemerschap te worden afgewogen tegen de mogelijke nadelen voor werknemers. Niettemin is het inzicht dat een toename van groeigerichte ondernemers door de (verwachte) creatie van banen uiteindelijk ook positief kan uitwerken voor werknemers waardevol.

De analyse op Europese regio's met behulp van GEM data is uniek in de zin dat het mogelijk is om de grote variatie in typen en fasen van ondernemerschap te bestuderen en te verklaren in regio's én landen tegelijkertijd. Een mogelijk nadeel is dat de beschikbare data ons dwingen om tamelijke grote regio's te analyseren. Idealiter zou gewerkt dienen te worden met een indeling die (kleinere) arbeidsmarktregio's afbakent. Voor Nederland is dit de Corop indeling, die op Europees niveau overeenkomt met de Nuts3 classificatie (zie Kleinknecht en Poot, 1992). In hoofdstukken 5-7 bestuderen we onderdelen van het model in figuur S1 voor Nederlandse regio's op Corop-niveau.

In hoofdstuk 5 worden voor de 40 Nederlandse Corop regio's de geboortecijfers van bedrijven verklaard (relatie A in figuur S1). Twee relevante typen ondernemerschap worden hier onderscheiden: onafhankelijke oprichtingen versus nieuwe dochterbedrijven. Waar voor onafhankelijke oprichtingen de locatie veelal samenvalt met de woonregio van de ondernemer, kan voor dochterbedrijven de locatiekeuze meer op rationeel economische gronden gemaakt worden. De regionale patronen van deze twee soorten ondernemerschap blijken wezenlijk van elkaar te verschillen. De resultaten van de econometrische analyse laten zien dat de regionale geboortecijfers van onafhankelijke oprichtingen in Nederland met name verklaard worden door regionaal economische groei (positief) en het werkloosheidspercentage (negatief). Tezamen duidt dit op een sterk verband tussen (verschillen in) regionale conjunctuur en ondernemerschap. De regionale variatie in nieuwe dochterondernemingen blijkt daarentegen voornamelijk bepaald door regionaal demografische kenmerken zoals bevolkingsgroei en bevolkingsdichtheid. Dit zijn factoren die in verband gebracht kunnen worden met een grotere afzetmarkt en daarmee uitermate relevant voor dochterbedrijven. Hiernaast is ook enige ondersteuning gevonden voor de invloed van de Nederlandse overheid, die sinds eind jaren '80 ondernemerschap expliciet heeft gestimuleerd. Met name de versoepeling van de Vestigingswet, die vanaf 1993 in verschillende stappen werd doorgevoerd, lijkt een positief effect te hebben gehad op de ontwikkeling van het aantal onafhankelijke bedrijfsoprichtingen. Carree en Nijkamp (2001) en Kloosterman (2003) kwamen al eerder tot eenzelfde conclusie voor respectievelijk de detailhandel en allochtoon ondernemerschap.

Om tot een beter inzicht in regionale verschillen te komen voor wat betreft de verschillende *typen* en *fasen* in ondernemerschap op Corop niveau, focussen we in hoofdstuk 6 op drie van de Nederlandse Corop regio's: Oost-Groningen, Twente en Groot-Amsterdam. Deze regio's verschillen substantieel van elkaar in economische, demografische en institutionele kenmerken, geboortecijfers van nieuwe bedrijven en economische ontwikkeling. Voor deze drie regio's is in 2007 dezelfde methodologie gehanteerd als bij het reguliere GEM onderzoek op landsniveau. Zoals verwacht blijkt Amsterdam de hoogste graad van *nieuwe ondernemers* ten opzichte van de volwassen bevolking tussen 18 en 64 jaar te hebben en Oost-Groningen de laagste. Echter, het aandeel groei- en innovatief georiënteerde nieuwe

ondernemers verschilt niet noemenswaardig tussen de drie regio's.[89] Ook voor de mate van betrokkenheid in de volwassen fase van ondernemerschap zijn de verschillen niet significant. Net als in hoofdstuk 4 zijn de individuele kenmerken als leeftijd, geslacht, opleiding en huishoudeninkomen belangrijke verklaringen voor de gevonden verschillen in regionale ondernemersdynamiek.

Een afgeleide doelstelling van dit hoofdstuk was om meer te weten te komen over de regionale inbedding van ondernemerschap (Sternberg, 2009). Hiertoe zijn enkele extra vragen toegevoegd aan de reguliere vragenlijst. In alle drie regio's blijkt dat voor een groot aandeel van de nieuwe ondernemers (meer dan de helft) een àndere ondernemer of een ander bedrijf invloed heeft gehad op de beslissing om zelf ondernemer te worden. Van de ondernemers die op deze manier als rolmodel fungeerden woonde 80% in dezelfde (Corop) regio als de nieuwe ondernemer. Bij de 'bedrijfsrolmodellen' was 70% van de bedrijven in dezelfde regio gevestigd als de nieuwe ondernemer.

In hoofdstuk 7 wordt voor de 40 Nederlandse Corop regio's de mate van bedrijfsdynamiek in verband gebracht met economische concurrentiekracht (relatie E in figuur S1). Er is al veel bekend over het effect van regionale geboortecijfers van bedrijven op de groei in werkgelegenheid (zie bijvoorbeeld Fritsch, 2008). Dit hoofdstuk wijkt af van de meeste bestaande studies door (i) een gecombineerde maat voor *entry* en *exit* (die we *turbulentie* noemen) te beschouwen conform Schumpeter's *creative destruction* theorie (Schumpeter, 1942); (ii) voor het meten van economische concurrentiekracht een productiviteitsmaat te hanteren, te weten *Total Factor Productivity* (TFP); en (iii) verschillende invloeden van bedrijfsdynamiek toe te laten voor regio's met bovengemiddelde bevolkingsdichtheid of dichtheid van economische activiteiten (gemeten als *related variety,* zie Frenken et al., 2007). Bovendien analyseren we de relaties apart voor industrie en diensten. Beargumenteerd wordt dat de *creative destruction* theorie van Schumpeter met name relevant is voor de dienstensector, aangezien deze sector gekenmerkt wordt door een relatief kleine benodigde schaalgrootte en relatief veel starters kent. Bovendien vindt kennisoverdracht gemakkelijker plaats in sectoren waar bedrijven minder marktmacht uitoefenen en daarmee hun verworven kennis minder goed binnenshuis kunnen houden. De resultaten van econometrische analyses bevestigen een positief effect van zowel toetreding als turbulentie op regionale productiviteitsgroei; het geschatte effect is het hoogst wanneer rekening wordt gehouden met een vertraging van twee tot drie jaar. Voor de industrie wordt geen significant verband gevonden, ook niet wanneer rekening wordt gehouden met een langere vertraging, tot 10 jaar. Voor de dienstensector vinden we bovendien twee interessante nevenuitkomsten. Ten eerste blijkt het effect van bedrijfsdynamiek op productiviteitsgroei groter voor regio's met een bovengemiddelde *related variety*, en in mindere mate voor regio's met een bovengemiddelde bevolkingsdichtheid. Ten tweede vinden we dat het effect tussen bedrijfsdynamiek en productiviteit niet lineair is, maar verloopt volgens een omgekeerd U-vormig verband. Onze resultaten suggereren dus dat een toenemende mate van regionale bedrijfsdynamiek in eerste instantie weliswaar positief uitwerkt voor productiviteitsgroei, maar dat het effect wel afneemt en na een bepaald punt zelfs negatief zal worden.

89 Vermeld moet worden dat de steekproef van 1.000 volwassenen per regio enigszins laag is voor het vergelijken van deze typen ondernemers, aangezien het om kleine percentages gaat. De onzekerheidsmarges zijn hierdoor relatief groot.

Tenslotte wordt in hoofdstuk 8 teruggekeerd naar het Europese niveau. Ook in dit hoofdstuk wordt een verband gelegd tussen ondernemerschap en regionaal economische ontwikkeling. Echter, het verschil met hoofdstuk 7 is dat het hier ook individuele niveau betrokken wordt in de analyse. Dit hoofdstuk concentreert zich in eerste instantie op relaties A, D en E in figuur S1 door een verband te leggen tussen verschillende *typen* ondernemerschap, urbanisatievoordelen en het niveau van regionaal economische arbeidsproductiviteit. Bovendien ligt de focus op het ruimtelijke aspect en wordt het dynamische aspect niet in beschouwing genomen. Uitgangspunt is een model van Ciccone (2002), die de omvang van urbanisatievoordelen schatte voor Europese Nuts3 regio's. Ciccone vond hierbij vergelijkbare resultaten als Ciccone en Hall (1996) voor Amerikaanse regio's. Gebaseerd op de regioclassificatie van hoofdstukken 3 en 4 repliceren we Ciccone's analyse en vinden een vergelijkbaar effect van urbanisatievoordelen. Hierbij wordt gecontroleerd voor regionale verschillen in opleidingsniveau, urbanisatievoordelen en alle overige verschillen op nationaal niveau.

Wanneer we zowel nieuw ondernemerschap zonder groeiambities als groeigericht nieuw ondernemerschap opnemen als mogelijke extra verklaring van regionale verschillen in arbeidsproductiviteit, dan blijkt dat voor beide uitersten een significant positief verband wordt gevonden. Echter, waar het toevoegen van ondernemerschap zonder groeiambitie geen effect heeft op de overige verklaringen van regionale verschillen in arbeidsproductiviteit, is dit wél het geval voor groeigericht ondernemerschap: het effect van groeigericht ondernemerschap neemt ruim 20 procent van de eerder geschatte urbanisatievoordelen over. Wanneer we in een experimentele uitbreiding van het model ook nog expliciet het individuele niveau (relaties B en C) modelleren in een multilevel analyse blijkt het eerder geschatte positieve directe verband tussen groeigericht ondernemerschap en arbeidsproductiviteit in zijn geheel weg te vallen. Het effect van het regionale opleidingsniveau op arbeidsproductiviteit valt nu echter hoger uit. Dit resultaat suggereert dat groeigericht ondernemerschap niet direct bijdraagt aan arbeidsproductiviteit, maar vooral werkt als een *mechanisme* voor hoogopgeleide individuen in de regio om hun kennis om te zetten in economische prestaties. Echter, voor een dergelijke conclusie is meer ondersteuning en dus meer onderzoek vereist.

Hoofdconclusies, kanttekeningen en suggesties voor verder onderzoek
Een belangrijke uitkomst van deze dissertatie is dat bij het vinden van verklaringen voor regionale verschillen in ondernemerschap met name de kenmerken van de *inwoners* van de regio relevant zijn en dat additionele regionale kenmerken weliswaar een rol spelen, maar van ondergeschikt belang zijn. Dit impliceert dat bij het zoeken naar determinanten van regionale (en nationale) verschillen in ondernemerschap, het van belang is om te controleren voor (individuele) kenmerken van de regionale bevolking. De mate van urbanisatie wordt, ook als we rekening houden met individuele kenmerken, die immers ook kunnen samenhangen met de mate van urbanisatie, wél duidelijk in verband gebracht met een hogere participatie in nieuw ondernemerschap en met name groeigericht ondernemerschap. Bovendien bleek dat urbanisatie, vooral als deze zich ook in economisch opzicht manifesteert (*related variety*) ook positief bijdraagt aan het effect van nieuw ondernemerschap op regionaal economische ontwikkeling. Hierbij dient wel aangetekend te worden dat we niet hebben geanalyseerd in welke mate regionale kenmerken een *aantrekkingskracht* uitoefenen op individuen die later een grotere kans

hebben om ondernemer te worden. Hierbij kan bijvoorbeeld gedacht worden aan het opleidingsaanbod in steden. Steden met de beste opleidingen trekken in het algemeen de beste studenten aan en veroorzaken een dynamische omgeving met een relatief jonge en hoog opgeleide populatie. Deze processen zorgen voor een zelfversterkend mechanisme: sommige regio's zijn juist aantrekkelijker voor de subpopulaties die een ondernemende houding hebben. Uit de resultaten in hoofstukken 7 en 8 blijkt dat ondernemerschap in steden kan leiden tot hogere economische prestaties van de regio en dit maakt de regio nóg aantrekkelijker. Vanuit econometrisch oogpunt is het nog steeds een enorme uitdaging om deze wederkerige relatie met enige precisie te ontrafelen. Maar het idee dat beide relaties elkaar versterken en leiden tot padafhankelijke processen maakt in ieder geval duidelijk dat dergelijke processen zeer moeilijk te beïnvloeden zijn. Beleidsmakers doen er beter aan om in te spelen op de bestaande sterktes en mogelijkheden in de regio dan te proberen te excelleren in een bepaald 'type' ondernemerschap door het vanaf de grond te proberen op te bouwen. Wel vinden we in hoofstuk 5 aanwijzingen dat consistent generiek beleid gericht op het stimuleren van ondernemerschap, zoals dat in Nederland sinds het eind van de jaren '80 gevoerd is, positief kan uitwerken op de groei van het aantal startende bedrijven.

Ook hebben we het belang laten zien van het maken van onderscheid in *typen* en *fasen* van ondernemerschap bij het bepalen van de rol van ondernemerschap voor regionaal economische ontwikkeling. Uit de analyses voor Nederlandse en Europese regio's kwam naar voren dat de ruimtelijk patronen van verschillende typen en fasen wezenlijk van elkaar verschillen. Voor de Europese regio's vonden we in hoofdstuk 2 ook duidelijke verschillen in de patronen van verschillende percepties ten aanzien van ondernemerschap. Het is dan ook niet verwonderlijk dat er aan de verschillende typen nieuw ondernemerschap, zoals geanalyseerd in hoofdstukken 3-6, ook verschillende verklaringen ten grondslag liggen. In hoofdstukken 7 en 8 worden voor verschillende typen ondernemerschap ook verschillen gevonden in verband met regionaal economische ontwikkeling. In hoofdstuk 7 werd dit voor Nederlandse regio's aangetoond door verschillende sectoren te beschouwen, terwijl in hoofdstuk 8 nieuw ondernemerschap werd uitgesplitst naar de mate van groeioriëntatie en innovatieve oriëntatie.

Deze dissertatie laat zien dat meer inzicht verkregen kan worden in specifieke elementen van 'wat ondernemerschap doet voor regionaal economische ontwikkeling' door informatie op individueel niveau en regionaal niveau met elkaar te combineren. In deze dissertatie concentreren we ons op de ruimtelijke aspecten van verklaringen van ondernemerschap en de samenhang tussen ondernemerschap en economische ontwikkeling. De eerder genoemde dynamische aspecten verdienen zeker meer aandacht. Vanuit econometrisch oogpunt en door beperkte beschikbaarheid van data is het een enorme opgave om vat te krijgen op de dynamische wisselwerking tussen ondernemerschap en economische groei wanneer ook erkend wordt dat regionale verschillen en heterogeniteit in ondernemerschap van belang zijn.

De gehanteerde multilevel benadering opent nieuwe mogelijkheden voor verder onderzoek. Met een kleine aanpassing van het model in hoofdstuk 8 kan bijvoorbeeld onderzocht worden wat de economische bijdrage is van hoog opgeleide ondernemers ten opzichte van die van laag opgeleide ondernemers. Ook kan een bijdrage worden geleverd aan het debat over de 'creatieve klasse' (Florida, 2004) door nieuw ondernemerschap te analyseren in de

sectoren die geassocieerd worden met deze 'creatieve klasse. Acs et al. (2008) laten in een eerste analyse zien dat het relatieve aandeel van deze typen ondernemers is duidelijk hoger in (wereld)steden.

Dichtbevolkte regio's stimuleren ook netwerkvorming (Thornton & Flynn 3003; Malecki, 2007). De rol van netwerken staat niet centraal in deze dissertatie maar is indirect wel onderzocht. In hoofdstuk 6 bijvoorbeeld blijkt dat regionale rolmodellen belangrijk zijn voor nieuwe ondernemers bij hun beslissing om een bedrijf op te starten. Het lijkt daarom nuttig om het gehanteerde multilevel model uit te breiden door netwerken als een apart niveau te beschouwen. Een dergelijk netwerkniveau kan niet in ruimtelijke zin gedefinieerd worden en zal overlappen met de hiërarchische individu-regio-land structuur zoals gehanteerd in deze dissertatie. Wel is bekend dat netwerken met name geassocieerd kan worden met het regionale niveau en ook sterk gerelateerd zijn aan *social capital*. Davidsson en Honig (2003) laten zien dat sterke sociale banden (familie, vrienden en andere 'peers') met name van belang zijn in de fase voorafgaand aan de daadwerkelijke start van het bedrijf, terwijl de zwakkere banden (meer bedrijfsgerichte netwerken) belangrijker zijn voor succes van het bedrijf ná de start. Ons onderzoek voegt hier een ruimtelijke dimensie aan toe; onze resultaten duiden er op dat lokale en regionale netwerken met name in de vroege fase van ondernemerschap van belang zijn. Meer geavanceerde netwerk analyses kunnen hierin meer duidelijkheid verschaffen en daarnaast aantonen welke rol internet en globalisatie hierin spelen.

Een laatste opmerking is gewijd aan ondernemend gedrag door werknemers, ofwel *intrapreneurship* (zie De Jong en Wennekers, 2008). Gedurende het onderzoek werd duidelijk dat dit een relevante groep is voor het verkrijgen van een optimaal beeld van ondernemerschap, met name wanneer niet alleen regio's maar ook landen vergeleken worden. Een belangrijk aandeel van de volwassenen die geanalyseerd zijn heeft wellicht gekozen voor een ondernemende vorm van werknemerschap, afhankelijk van de regels en wetten die relevant zijn voor ondernemerschap *ten opzichte van* werknemerschap. Hierbij valt te denken aan regels en wetten als administratieve lasten voor ondernemers, belastingtarieven en de mate van werknemersbescherming (ten opzichte van de bescherming van ondernemers). Gegevens over intrapreneurship zijn vooralsog zeer beperkt voorhanden. Het zou zeer waardevol zijn om te analyseren in welke mate ontwikkelde landen van elkaar verschillen in de mate van intrapreneurship en in hoeverre deze verschillen terug te voeren zijn op verschillen in regels en wetten. Het in deze dissertatie gevonden negatieve verband tussen werknemersbescherming en groeigericht ondernemerschap zou bijvoorbeeld gecompenseerd kunnen worden door een positief verband tussen werknemersbescherming en intrapreneurship. Ook over het effect van intrapreneurship op (regionaal) economische ontwikkeling *ten opzichte van* het effect van ondernemerschap is nog weinig bekend. Meer kennis op dit gebied kan zeer belangrijke implicaties tot gevolg hebben voor zowel het onderzoeksveld als beleidsmakers.

Curriculum Vitae

Niels Bosma was born on 14 Aril, 1974 in Borger, the Netherlands. After obtaining his MSc degree in econometrics in 1998 at the University of Groningen, he completed a research trainee program at Erasmus University Rotterdam in a joint program with EIM Business & Policy Research and Tinbergen Institute. He worked as an entrepreneurship researcher at EIM Business & Policy Research in the Netherlands (2000-2004) and London Business School (2004-2005). Since September, 2005 Niels is a member of the Urban and Regional research centre Utrecht, Utrecht University at the department of Economic Geography. He is also Research Director for GERA, the umbrella organization that hosts the Global Entrepreneurship Monitor (GEM) project. He has published several articles in academic and professional journals in the fields of entrepreneurship, entry & exit and regional economic development.