Chapter 4
Entrepreneurship in European Regions: Implications for Public Policy

Niels Bosma, Veronique Schutjens, and Erik Stam

4.1 Introduction

Policy makers' interest in stimulating entrepreneurship suggests a general consensus about their beneficiary economic effects that exist. For example, the goal of the EU 2000 Lisbon Agenda to become the world's most innovative area by 2010 relies on the entrepreneurial power of regions. The European Commission, in its Green paper on Entrepreneurship in Europe (European Commission 2003, p. 9), makes it more explicit:

> The challenge for the European Union is to identify the key factors for building a climate in which entrepreneurial initiative and business activities can thrive. Policy measures should seek to boost the Union's levels of entrepreneurship, adopting the most appropriate approach for producing more entrepreneurs and for getting more firms to grow.

At national levels, entrepreneurship plays a prominent position in formal policy documents and instruments as it is regarded a cure for backward economic structures.[1] Also in cities, entrepreneurial initiatives face high expectations while battling economic problems (Trettin and Welter 2007). The implicit or explicit link between entrepreneurship and economic growth, albeit at the European, national, regional, or urban level, exists everywhere both in academic studies and policy documents (Minniti 2008).

However, how exactly might entrepreneurship affect economic growth? According to Wennekers and Thurik (1999, p. 50), the mechanisms at play are variety, competition, selection, and imitation. These mechanisms entail direct and

N. Bosma (✉), V. Schutjens, and E. Stam
Urban and Regional Research Centre Utrecht (URU), Utrecht University,
P.O. Box 80115, NL-3508 TC, Utrecht, The Netherlands
e-mail: n.bosma@geo.uu.nl

[1] See for instance the most recent Dutch government treaty (Dutch Coalition Agreement 2007) and the German "Ich-AG" (BMWi 2005).

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indirect components, as increasing firm entry also affects economic performance and the behavior of incumbent firms. Thus far, a full understanding of the economic effects of entrepreneurship and its underlying mechanisms is lacking, which hinders exploitation of potential policy instruments designed to increase the economic benefits of new firms. In our view, it is necessary to acknowledge the differential economic impact of new firms that do not go beyond self-employment on the one hand, and new firms with growth ambitions and innovative potential on the other. Our contribution is to search for determinants for these types of entrepreneurship, and to unravel the mechanisms behind their respective economic effects. In our view, future policy efforts should focus on these mechanisms.

We embrace several streams of literature stressing the importance of regions when it comes to investigating both causes and consequences of entrepreneurship. This chapter's main objective is to study the "determinants side," i.e., investigating regional conditions on entrepreneurial activity. The focal difference with respect to most other studies in this area is that we adopt a multilevel approach. We are interested in regional conditions impacting individual entrepreneurial behavior. This also makes sense in light of entrepreneurship policy. After all, regional and national entrepreneurship policies are designed to impact *individuals'* entrepreneurial behavior. Therefore, we work with a dataset encompassing individual behavior of over 350,000 individuals in 131 regions across 16 countries in Europe. This allows us to study the impact of regional as well as national characteristics on the engagement of individuals in several types of entrepreneurial activity.

After defining our concept of entrepreneurship in Sect. 4.2, we conceptualize and discuss the mechanisms behind the economic effects of entrepreneurship according to the literature. Next, we provide an overview of empirical studies testing the effect of different types of entrepreneurship on different types of economic growth. After presenting our conceptual model in the empirical part, we focus at the explanation of new entrepreneurship in various forms, using data from the Global Entrepreneurship Monitor. We conclude with policy recommendations to influence the level and – indirectly – the economic effects of entrepreneurship.

4.2 Entrepreneurship, Economic Growth, and the Role of Government Policy

4.2.1 Entrepreneurship and Economic Growth: Definitions, Mechanisms, and Causality

4.2.1.1 Definitions: Types of Entrepreneurship

The fact that there is no generally accepted definition of entrepreneurship is a major challenge for entrepreneurship research. Often applied definitions of entrepreneurship mirror the mechanism by which the effect on economic growth supposedly takes place.

According to Schumpeter for example, real entrepreneurs commercialize inventions and are, one way or the other, *innovative*. In the Schumpeterian world, the innovative nature of entrants leads to creative destruction, which in terms leads to economic growth. The influential paper by Birch (1979) demonstrates that a large share of economic growth was accounted for by fast-growing young businesses ("gazelles"). This implies that economic growth at least partly stems from the continuing gestation of *growth-oriented* new firms. Thus, in the literature, the alleged positive economic effects of entrepreneurship on economic growth are attributed to specific causal mechanisms, based on different *types* of entrepreneurship.

4.2.1.2 Mechanisms: Competition and Selection

New firms introduce products and methods of production that threaten incumbent firms. Through a process of competition, firms with new products make firms with old products redundant; firms with more efficient modes of production push less efficient producers out of the market.

By introducing new products and methods of production and distribution new firms directly enhance economic growth. In addition, they play an important indirect role in triggering old firms to improve or restructure their activities (with liquidation as sanction). The easy formation of new firms acts as a disciplinary device for existing firms (cf. Aghion et al. 2006). New innovative firms circumvent bureaucratic rigidity and supply older firms with an incentive – self-preservation – for taking internal measures to avoid habits and practices leading eventually to rigidity. This is for example reflected in the rise of corporate venturing, as a means for corporate renewal.

4.2.1.3 Mechanisms: Variety and Imitation

Experimentation is usually conducted on the smallest scale necessary to prove or disprove a point. Since experimentation is important for innovation, a large part of the activity in progressive economies is conducted on a small scale. Economic growth implies change and adaptation, and much of this adaptation takes place through the formation of firms that are, at least initially, small. New firms are useful for innovation, because they are established at a small, experimental scale with relatively low costs and its effort can be focused on a single innovation. The experimental and innovative aspect of new firms is reflected in the fact that they usually start small, their number is large, and as with other kinds of experimentation, most of them fail. High rates of firm entry and exit (so-called churning or turbulence) are regarded as a necessary price to pay in order to allow "exploration" of new technological and market possibilities: failures at the micro level are consistent with social benefit at the aggregate level (see March 1991; Saxenian 1994; Dosi and Lovallo 1997). A high level of new variety is needed to produce a few very successful new innovative industry leaders, like Microsoft, Google, and eBay. The experimental

approach to organizing economic activity is a key mechanism for economic progress. New firms often provide the seedbed for the emergence of new industries.[2] They have been instrumental in the introduction of electricity, the internal-combustion engine, automobiles, aircraft, electronics, aluminum, petroleum, plastic materials, and many other advances (Rosenberg and Birdzell 1986; Audretsch 1995; Baumol 2002).

In short, although a large portion of economic change is fuelled by the expansion and conversion of old firms, innovative change is brought about by new firms (see Rosenberg and Birdzell 1986; Acs and Audretsch 2003). That small firms have played a large part in economic growth is not accidental; it can be explained, at least in part, by the lower agency costs, in addition to the special suitability of smallness to the experimental stage of innovation. Innovation is more likely to occur in societies open to the formation of new enterprises than in societies that relies on existing organizations for innovation (Rosenberg and Birdzell 1986, p. 258). New, usually small, firms have an important role in bringing about change – a role depending on the degree of inertia accumulated in older bureaucracies.

Imitation entails the diffusion of existing products and practices to new contexts. The contexts may be explicitly geographic, such as introducing existing products in a different country or region. New contexts may also include a different consumer audience. For example an existing product, thus far only consumed by a small group of trend-watchers, may be disposed to a wider audience for a lower price. However, new producers entering the market by imitating successful innovations challenge the monopolistic position of the innovator and decrease the "first mover advantages." This limits his/her rewards which may even discourage innovative behavior. It should be noted, however, that for innovation to fuel economic growth, dissemination of innovative products and processes and its adoption by imitators is crucial (Baumol 2004). In this respect, innovation and imitation go hand in hand.

4.2.1.4 Combining the Innovation and Competition Mechanisms

At the start of the twentieth century, Schumpeter argued that the entrepreneur was the person bringing new ideas to the market in ways that causes economic renewal and progress. A necessary condition is that these innovations have to offer more (or the same for a lower price) than the pre-existing good. If this condition is fulfilled there might even be creative destruction: innovations that make the "old economy" redundant. A recent example is the success of the digital route planner that has partly substituted the production of roadmaps (Stam, 2008). An important indirect effect of the introduction of these innovations by new firms is that incumbents are forced to upgrade their product offerings in order to remain competitive.

[2] According to Pasinetti (1993), an economy that does not increase the variety of industries over time will suffer from structural unemployment and will ultimately stagnate. In this view, the development of new industries in an economy is required to absorb labor that has become redundant in pre-existing industries. This labor has become redundant due to a combination of productivity increases and demand saturation in pre-existing industries, characterizing the product lifecycle dynamics in each sector.

The combination of large investments in new knowledge (exploration) and high levels of entrepreneurship exploiting this knowledge is a key driver of growth in advanced capitalist economies (Acs et al. 2005; Audretsch et al. 2006). As such, diversity of enterprises is necessary for economic growth and prosperity. History shows that long-term economic growth and prosperity depends on a mix of large and especially small enterprises (Rosenberg and Birdzell 1986; Landes 1969). Many types and sizes of enterprise are useful under the right conditions and circumstances, but what matters is the diversity of economic organization in economic systems – the variety of the system's organizational repertoire rather than the size of particular enterprises (Rosenberg and Birdzell 1986, p. 270).

A recent review of empirical studies by Van Praag and Versloot (2007) shows mixed evidence on the assumption of the relatively high innovativeness of small and new firms. They conclude that "entrepreneurs and their counterparts [large incumbent firms] contribute equally importantly to the innovativeness of societies. However, they serve different goals in terms of quality, quantity and efficiency, as well as in terms of producing (and adopting) more radical (and higher cost) innovations" (Van Praag and Versloot 2007, p. 18). They show that while new and small firms have relatively high levels of innovative sales, they are relatively less likely to adopt high-cost innovations.

Many new firms come into existence because the entrepreneur merely seizes existing market opportunities. Due to high uncertainty and risks involved in setting up a new firm, many entrepreneurs choose safe, familiar economic activities already proven successful.

4.2.1.5 Causality and Measurement Issues

The link between entrepreneurship and economic growth has a recursive aspect, as in time economic growth itself changes the conditions of entrepreneurship. Prior economic growth has both positive and negative relationships with entrepreneurship rates: positive because of growth opportunities ("prosperity-pull"), and negative because unemployed workers are encouraged to become self-employed because the opportunity costs of self-employment have decreased ("recession-push") (see Thurik et al. 2008). The measurement of these recursive effects between entrepreneurship and economic growth is complex as it requires both data that cover long time spans and analytical models that control for other determinants of both entrepreneurship and economic growth.

4.2.2 Entrepreneurship and Economic Growth: Empirical Evidence

A key question is whether entrepreneurship actually causes economic growth. Before we can answer this question with empirical research, we must choose empirical indicators for entrepreneurship and economic growth. Traditionally,

economic growth is defined in terms of employment or national income growth. Recently, productivity growth is seen as the more relevant indicator. The two dominant empirical definitions of entrepreneurship are the creation of new organizations (a new legal entity; including both independent start-ups and spin-offs) and self-employment (performing work for personal profit rather than for wages paid by others). Some studies also take into account people with a preference for entrepreneurship ("latent entrepreneurship"), or people who take steps to start a new business ("nascent entrepreneurship"). The latter two indicators can be seen as potential entrepreneurship. Corporate entrepreneurship is not easily identified, and is unfortunately largely an invisible aspect of entrepreneurship in empirical research. In addition to these operational definitions of entrepreneurship, there are several measures of firm performance, such as survival, growth, profitability, and realizing an initial public offering (IPO) of the business. These performance measures may reflect high impact entrepreneurship to a lesser or greater degree. Take for example survival: new firms that survive in the long term but remain relatively small often become more conservative (i.e., less innovative) while new firms that grow into substantial corporations revolutionize the economic structure (cf. Schumpeter 1942, p. 83). In addition, there are habitual entrepreneurs that "specialize" in setting up new firms, then leaving (either successfully, for example via an IPO, or less successfully with a liquidation) to set up other ones (see Stam et al. 2008).

4.2.2.1 Differential Effects of Entrepreneurship on Economic Growth Indicators

Empirical research finds an ambiguous relationship between entrepreneurship and employment growth: the relationship is often positive (Audretsch and Thurik 2001; Audretsch and Fritsch 2002; Bosma et al. 2006; Acs and Mueller 2008; Acs and Armington 2004; Carree and Thurik 2008; Van Stel and Suddle 2008; Thurik et al. 2008)[3]; sometimes nonexistent (Audretsch and Fritsch 2002; Acs and Mueller 2008)[4]; or even negative (Van Stel and Storey 2004; Mueller et al. 2008). Growth in national income is unambiguously related to high levels of new firm formation and high-growth start-ups (Stam et al. 2007; Wong et al. 2005). Research on the effects of entrepreneurship on productivity growth is less abundant, and only shows an ambiguous positive effect of new firm formation (Callejón and Segarra 1999; Audretsch and Keilbach 2004, 2005[5]; Bosma et al. 2009) or no effect of changes in self-employment (Carree and Thurik 2008).

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[3]Even when controlled for recent macroeconomic growth and time lags of the effect on economic growth (see Thurik et al. 2008).

[4]In what Audretsch and Fritsch (2002) call "revolving door" regimes: inefficient entrants, which exit soon after entry will not make a valuable contribution to the economy.

[5]The studies of Audretsch and Keilbach find no (2005), or only very weak (Audretsch and Keilbach, 2004) associations of new firm formation in general- and labor-productivity growth. Only specific forms of entrepreneurship, like new firm formation in high-tech or ICT industries (i.e., technology start-ups) have strong positive associations with labor productivity growth.

A review of recent research on high impact entrepreneurship and economic growth reveals that high levels of new growing firms are more positively related to economic growth than high general entrepreneurship rates (Acs 2008). There is no consistently positive relationship between new firms in general and economic growth. This is not that remarkable: as explained above many new firms are a continuation of the activities that were previously done as by employees before – so these involve no new economic activities (for example the construction worker who becomes an independent handyman, and the graphic designer who is laid off during organizational restructurings, but still supplies the same services to her previous employer). The decision to enter into self-employment is more often driven by lifestyle reasons, like a strong wish for independence or self-realization (Cassar 2007) or the possibility to combine labor and care tasks more easily (Dirks et al. 2003),[6] than driven by innovation. The category "new firm formation" therefore includes both entrepreneurs aiming at self-employment and entrepreneurs with high expectations.

A critical interpretation of the overview of empirical research in Table 4.1 could be that innovation aspects are missing at the entrepreneurship side. Entrepreneurship as measured by current empirical studies does not have much to do with innovation at all. Similarly, productivity growth is probably the best output indicator of innovation, and the studies reviewed showed that entrepreneurship has hardly any effect on this. The positive effects on income and employment are not necessarily caused by innovation: consider the situation in which increased labor market participation via self-employment is registered both as an increase in new firm formation and in self-employment, this is likely to lead to an increase in employment and income, as members of society that were not involved in paid labor, now contribute both to total employment and to total income. In this situation, both employment and income are growing, without innovation as a necessary ingredient.

Table 4.1 Entrepreneurship and economic growth (in OECD countries)

	Employment	Income	Productivity
New firm formation	+/0/−	+	+/0
High-growth start-ups	+/0	+	x
Innovation-oriented start-ups	x	x	x

[+] Statistically significant positive relation; 0 no statistically significant relation;
[−] statistically significant negative relation; and x no empirical research

[6]The Global Entrepreneurship Monitor makes a distinction between "necessity entrepreneurship," which is having to become an entrepreneur (often "self-employed") because you have no better option, and "opportunity entrepreneurship," which is an active choice to start a new enterprise based on the perception that an unexploited or underexploited business opportunity exists. Analyzing data in 11 countries, Acs and Varga (2005) found that effects on economic growth and development of necessity and opportunity entrepreneurship vary greatly: necessity entrepreneurship has no effect on economic development while opportunity entrepreneurship has a positive and significant effect. They also found that the ratio of opportunity to necessity entrepreneurship in a country is positively related to GDP per capita.

4.2.3 Spheres of Public Policy Influence on Entrepreneurship and Growth

Having stressed the relevance of identifying different stages in the entrepreneurial process, different types of entrepreneurship, and different mechanisms linking entrepreneurship and growth, one must determine how entrepreneurship policy can benefit this process. Entrepreneurship policy influences not just the entrepreneurial process, but also economic growth at multiple spatial levels. Figure 4.1 gives an overview identifying three major stages where policy may impact entrepreneurship levels and growth. This framework closely relates to the eclectic framework proposed by Verheul et al. (2002). Considering the aforementioned mechanisms linking entrepreneurship and economic growth levels, it is important to identify direct and indirect effects (spheres B and C, respectively, in Fig. 4.1).

The indirect effects may outweigh the direct effects: while at the firm level, as indicated above, mixed results are found with respect to the productivity of new entrants (compared to incumbents); the impact on regional growth is more convincingly documented (see Fritsch, 2008). Recent studies show that the magnitude of the impact is conditional on characteristics of the region, specifically population density and related variety (Fritsch and Schroeter 2009; Bosma et al 2009). Therefore, it is important for regional policymakers to appreciate the local conditions. Densely populated areas tend to have younger and better educated inhabitants with stronger networks. This is the relevant context in which the entrepreneurial process of discovery, exploration, and exploitation takes place, and these may be crucial elements for the occurrence of different types of entrepreneurship as

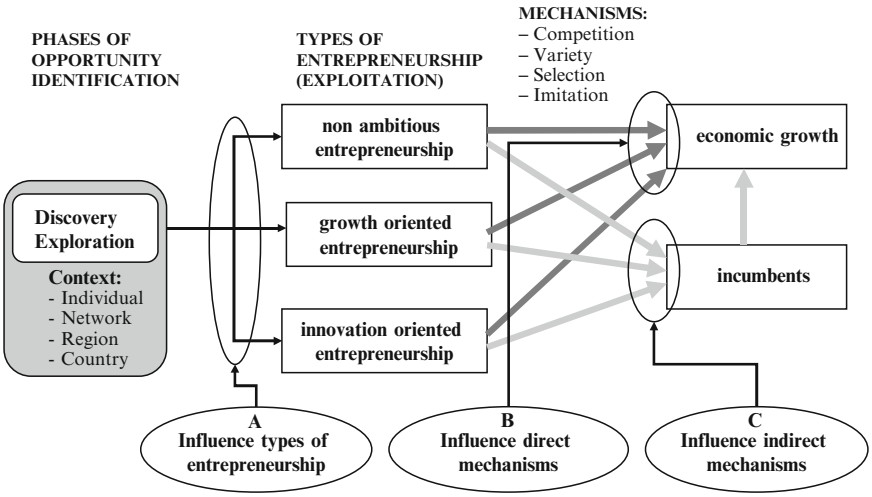

Fig. 4.1 Conceptual model of public policy influence on economic growth via entrepreneurship. Note: Growth oriented entrepreneurship and innovation oriented entrepreneurship are not mutually exclusive

displayed in Fig. 4.1. In the present contribution, we focus at the first sphere of public policy influence: stimulating different types of entrepreneurship (type A in Fig. 4.1). Below we discuss some aspects that are in potential subject to public policy efforts.

Two major views can be distinguished when it comes to investigating determinants of entrepreneurship (Koster 2006; see also Audretsch and Fritsch 1992). While the labor market perspective emphasizes the human population "at risk" to become an entrepreneur, the industrial organization literature stresses the role of existing firms in creating new economic activity, for instance through spin off mechanisms. As a result, public policy influence, instruments, and target groups differ widely between both views.

According to the industrial organization view, large existing organizations play a role in creating new firms. This can take the form of push-effects, while restructuring, their downsizing, decentralization, or strategic reorientation will render positions and employees obsolete, thus driving former firm employees to initiate innovative new firms, with or without consensus of the former employer (Koster 2006). Positively speaking, many major inventions have been reshaped, speeded, and expanded by (individuals and their) new firms with different objectives, interests, and ideas from those of the original inventing (cf. Shane 2000) or originating organization. These innovative new firms are started because the innovations were turned down by, or severely delayed by, the originating organization. These research-based organizations are often repositories of unused ideas: big firms have natural diseconomies of scope that a cluster of small start-ups does not have (Moore and Davis 2004; cf. Nooteboom 2000), and public R&D organizations often lack the incentives to commercialize ideas. One of the arguments behind the so-called open innovation strategies of large firms like Philips Electronics is exactly this: the intellectual property developed in these firms is best exploited by firms outside its boundaries than by divisions within. Technology transfer and "valorization" has also become an important function of public research organizations. University-based spin-offs commercializing knowledge have become more common worldwide (Shahid and Kaora 2007).

As large firms create new entrepreneurial opportunities, regions without larger research organizations (at the scientific or technological frontier) will probably have fewer spin-offs because of a lack of technically trained people and a shortage of ideas (Moore and Davis 2004). A mix of large and small knowledge-based organizations is a better starting point for the exploration and exploitation of new ideas than a concentration of small entrepreneurial firms only (Baumol 2002; Moore and Davis 2004; Nooteboom 1994).

From the labor market perspective, individual decisions are paramount. This is not to say that the literature covers only personality and personal characteristics of the population, the interaction between individual and contextual circumstances is widely acknowledged (OECD 2000; Verheul et al. 2002; Parker and Robson 2004). Individual entrepreneurial preferences and ambitions not only depend on the personal assessment of own capabilities and resources available, but also are strongly colored by actual and perceived market opportunities, local or regional demand and

competition, and future prospects (Davidsson 1991). Consequently, the explanations of entrepreneurship can be found at both the individual level, regional level, and national level (Tamásy 2006; Bosma et al. 2008).

The characteristics affecting individual entrepreneurial behavior are often related to the human, social, and financial capital of individuals. Age, gender, education level, professional experience, specific sector knowledge, and entrepreneurial experience are also associated with entrepreneurial involvement. In terms of social capital at the regional level, the visibility of entrepreneurs, in the sense that her/his endeavors set an example, affects entrepreneurial behavior (Bosma et al. 2008). Focusing on ambitious types of entrepreneurship, Liao and Welsch (2003) find that social capital (both network size and trust) positively influences growth aspirations, while the effect of human capital variables (experience and education) is absent. A significant positive effect of financial capital on growth aspirations, however, existed, together with the positive influence of strong shared norms and values, or cognitive capital.

The regional context affects entrepreneurship in two ways: first, through its more objective "regional economic attributes" and second, in offering a specific regional entrepreneurial attitude or culture. Regional economic attributes affecting entrepreneurship cover market size, structure and growth, economic structure in terms of competition, specialization and market concentration, accessibility, and the availability of cheap business locations. The growth of product demand, for instance, opens up new niches for entrepreneurs – and this effect might even be larger for the more specific group of ambitious entrepreneurs (Davidsson 1991). When regional income and welfare is high or growing, people expect market growth that can benefit a new ambitious firm.

Regional attitudes and values toward entrepreneurship, combined with a regional entrepreneurial culture in terms of abundant start-up activities, may also affect individual entrepreneurial behavior (see Wiklund et al. 2003; Vaillant and Lafuente 2007). In a regional atmosphere of entrepreneurial efforts, risk takers, entrepreneurial role models, and positive attitudes toward self-employment, especially ambitious individuals are likely to actually try to realize their growth or innovation plans. High regional levels of visibility of new entrepreneurs also stimulate ambitious entrepreneurship at the individual level (Bosma et al. 2008).

The national context also matters for entrepreneurship. Regulations for setting up a firm as well as hiring or firing employees are typically determined by national governments (Henrekson 2005; Stevenson and Lundström 2001). National regulations for new firm registration, taxes, and administration will influence individual entrepreneurial endeavors. This is especially relevant for more ambitious entrepreneurs: entrepreneurs, who face or perceive high administrative or institutional burdens to hiring and firing employees, have relatively low ambitions in terms of firm size (cf. Henrekson 2005). Employment protection decreases incentives to increase employment, thus limiting employment growth.

In this paper we adopt the labor market approach, making an extension to an "adult population approach" because we are interested in the entire entrepreneurial landscape; for our research question anyone in the adult population may be a

potential entrepreneur, regardless of current occupation and sector experience. For investigating causes and consequences of entrepreneurial dynamics in *specific sectors* the industrial organization view may be more relevant.

4.3 Data and Research Method

We use data from the Global Entrepreneurship Monitor (GEM) to create individual-level indicators on regional entrepreneurial activity (dependent variables) and regional-level indicators on perceptions to entrepreneurship (independent variables) (see also Bosma and Schutjens 2009; Bosma et al. 2008).[7] Additional independent variables at the regional level are obtained from Cambridge Econometrics' European Regional Dataset, appended with Eurostat's regional database. At the national level we include OECD indicators. The selection of countries and regions included in our empirical study is based on data availability.

First, we require GEM participation for at least 3 years between 2001 and 2006. This results in indices on entrepreneurial activity and entrepreneurial perceptions over 125 larger regions (NUTS 1 and NUTS 2) in 18 countries.[8] By mapping these indicators we identify spatial patterns relating to our four measures of entrepreneurial activity. In a second step, we identify some dense regions situated in the previously identified larger regions. When the sample size permits, we extract these dense regions and treat them separately from the larger region they are part of. An example is the Munich metropolitan area ("Raumordnungsregion"), situated in the Nuts1 region of Bavaria. Based on the literature we can expect different patterns of entrepreneurial activity in the Munich area as compared to the rest of Bavaria (Tamásy 2006). Therefore, we include Munich and the Bavarian region excluding Munich as two separate and distinct regions in our empirical analysis. In sum, this exercise leads to an augmented sample of 147 regions.[9] Due to data availability for the independent variables and a minimum sample size of at least 500 valid cases, we end up with 359,469 observations over 131 regions and 16 countries in the final regression analyses. Because the GEM 2001 lacks information about innovation, this is further narrowed to 334,799 observations.

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

[8] NUTS stands for Nomenclature of Territorial Units for Statistics. The Eurostat introduced the standard European NUTS classification. In this selection we have indices for 125 regions corresponding to the classification used by ESRI. This classification comprises of NUTS1 levels for Belgium, France, Germany, Greece, Ireland, the Netherlands and the United Kingdom. NUTS 2 levels are applied for Croatia, Denmark, Finland, Hungary, Norway, Portugal, Slovenia and Sweden an2d a combination of NUTS1 and NUTS 2 for Italy, Spain and Switzerland.

[9] 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).

4.3.1 Dependent Variables

In accordance with the left-hand side of the framework in Fig. 4.1, our dependent variables are binary, indicating several types of early-stage entrepreneurial activity (ESEA). An individual is involved in ESEA if s/he is either setting up a business that s/he will (partly) own and manage, or if s/he is currently the owner–manager of a business that is not older than 42 months. The four types of entrepreneurial activity are as follows:

1. ESEA with low growth ambitions (ESEAGR_LO): individuals in ESEA who expect to have none or one employee in the next 5 years
2. ESEA with modest growth ambitions (ESEAGR_MD): Individuals in ESEA who expect to have between two and nine employees in the next 5 years
3. ESEA with high growth ambitions (ESEAGR_HI): Individuals in ESEA who expect to have ten or more employees in the next 5 years
4. ESEA with innovative ambitions (ESEAINNOV): Individuals in ESEA who expect (1) at least some customers to consider the product or service new and unfamiliar and (2) not many businesses to be offering the same products or services

We acknowledge that the last indicator may not be the perfect measure for innovative entrepreneurship. However, it gives some indication of the innovative ambitions of individuals in the region, in terms of new product–market combinations. 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 overoptimistic. An important advantage of our measure is that innovation in services is not underrepresented unlike those measures constructed from patent data.

While our analyses for the four types of entrepreneurial activity are at the individual level, we initially examine the spatial variation in European entrepreneurship rates. This regional pattern of entrepreneurship types, as pictured in Figs. 4.2–4.5, shows large differences, pointing to the importance and relevance of distinguishing regions instead of merely countries. The average nongrowth regional entrepreneurship rate (ESEAGR_LO) pictured in Fig. 4.2 is 2.8% and ranges from 1.2% in western France to 6.0% in Western Transdanubia region of Hungary. The rate of high-growth oriented ESEA in Fig. 4.4 ranges from 0.6% in the French Parisien Bassin to 2.6% in the Hamburg area. We should note that, since the indicators are *estimates* rather than count data, there are confidence intervals attached to these estimates. Therefore, when examining the maps one should especially focus on general patterns and not so much on the outcome for one particular region.[10]

Although national borders are still identifiable in the European maps, regional variations within countries are significant. Focusing on the differences between

[10]This issue is not relevant for our empirical analysis since it is based on the individual-level observations constituting the regional aggregates shown in Figs. 4.2–4.5.

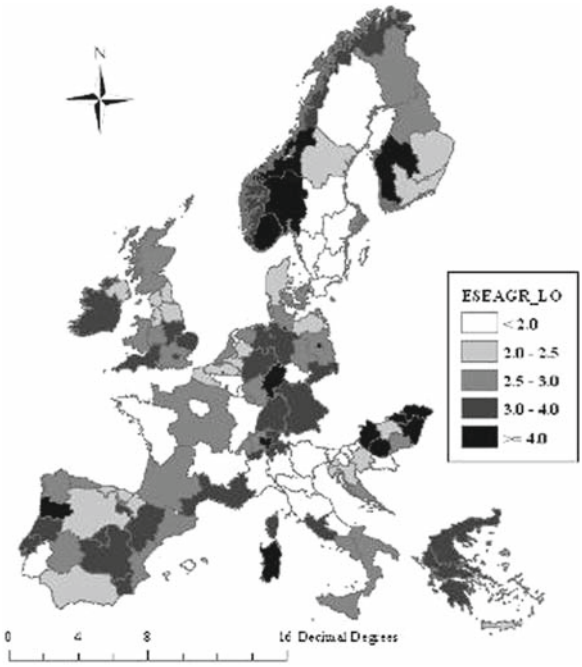

Fig. 4.2 Early-stage entrepreneurial activity with low growth ambitions (0–1 employees in the next 5 years)

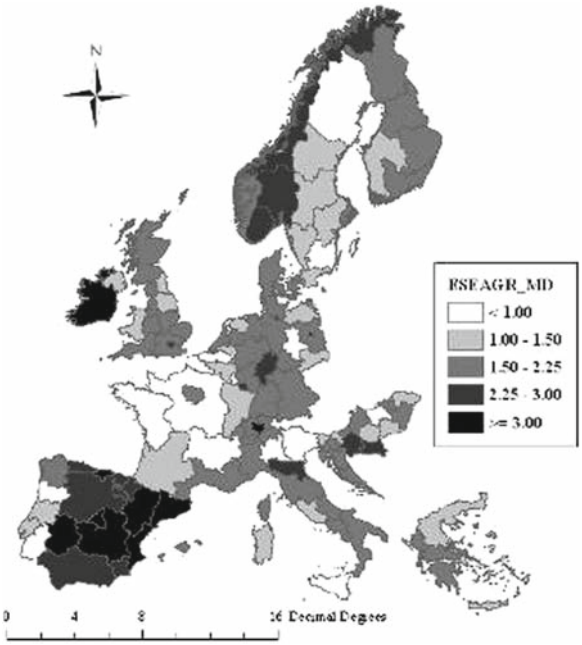

Fig. 4.3 Early-stage entrepreneurial activity with modest growth ambitions (2–9 employees in the next 5 years)

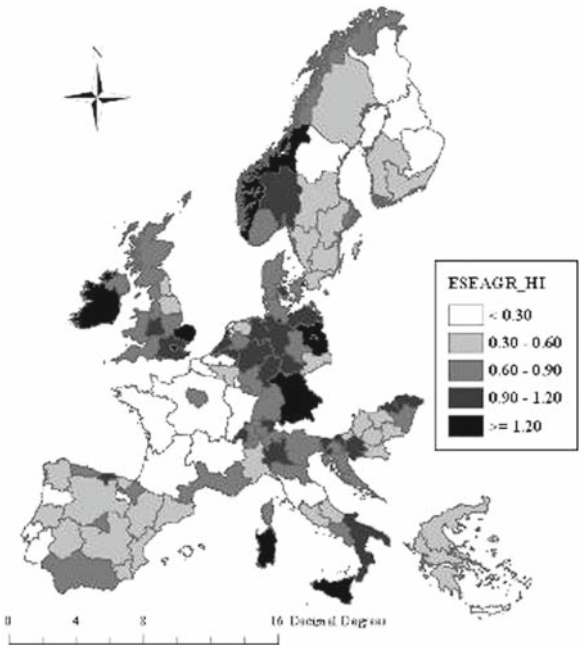

Fig. 4.4 Early-stage entrepreneurial activity with high growth ambitions (ten or more employees in the next 5 years)

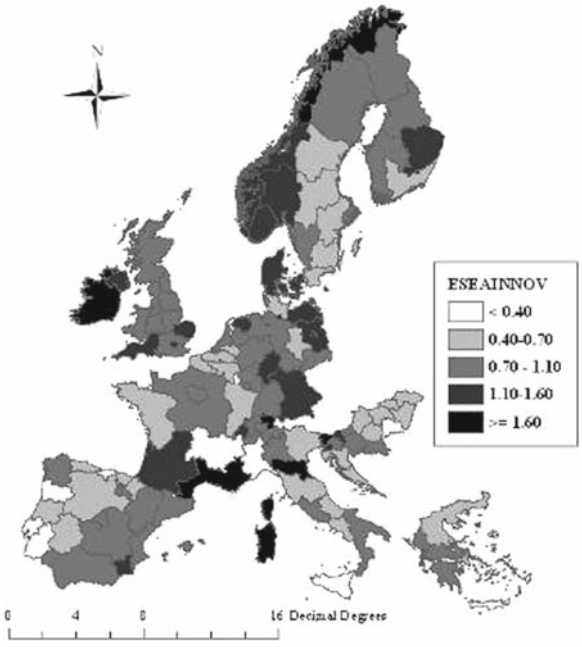

Fig. 4.5 Early-stage entrepreneurial activity with innovative orientation

low-ambition types of entrepreneurship (Figs. 4.2 and 4.3) vs. high-ambition entrepreneurship (Fig. 4.4), there are some notable differences. In general, the higher growth-oriented entrepreneurship rates are in or around populated regions. Compared to other European regions, in many Spanish areas there are fairly many early-stage entrepreneurs with low or modest growth ambitions, but the rate of ambitious ones with respect to hiring employees is relatively low. The same is true 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. This is even stronger for the northern part of Italy, where there is relatively little participation in ESEA with low growth orientation, but the scores on growth ambitious entrepreneurship are clearly higher. In this respect, the Western part of Slovenia connects to Northern Italy. Within France only the Paris and Mediterranean areas have relatively many growth ambitious early-stage entrepreneurs, while other regions have significantly lower rates. Regions performing relatively bad 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, of all indicators, the innovation-oriented early-stage entrepreneurship rates (Fig. 4.5) show the greatest regional variation. We find interesting differences between high-growth-oriented ESEA and innovation-oriented ESEA. In France, for example, the Paris and Mediterranean regions stand out concerning growth orientation, while the regional pattern is more mixed if we look at orientation toward innovation. Here the Mediterranean area seems to be outstanding compared to the rest of France.[11] In UK, the London area and the Eastern region (including Cambridge) outperform other regions with respect to both growth-oriented and innovation-oriented early-stage entrepreneurship rates. Sweden and Finland show higher levels of innovation-oriented entrepreneurial activity in comparison to high growth-oriented entrepreneurship.

4.3.2 Independent Variables

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

Entrepreneurial perceptions enter as *regional* level determinants. One crucial finding of the GEM studies is that cross-country variation in early-stage entrepreneurial perceptions as well as entrepreneurial activity is persistent across time. As it is shown empirically that regional variation in entrepreneurial perceptions are also persistent and reflect path-dependent developments (Beugelsdijk 2007), we merge the GEM data of 6 subsequent years (2001–2006). This merging exercise results in regional indicators on entrepreneurial perceptions that pertain to the

[11]This region includes the Sophia-Antipolis cluster.

2001–2006 period.[12] Here we excluded regions with less than 500 observations – a requirement for acceptable standard errors to the regional estimates. The regional entrepreneurial perceptions refer to:

1. *Network effects*. The percentage of individuals personally knowing an entrepreneur who started a business in the past 2 years
2. *Start-up skills*. The percentage of individuals who personally know a start-up entrepreneur and believe that they have the required skills and knowledge to start a business themselves
3. *Regional opportunities*. The percentage of entrepreneurs indicating that there are good opportunities in the region
4. *No fear of failure*. The percentage of those individuals who perceive good opportunities (as above) indicating that fear of failure would not prevent them from setting up a business

Other regional determinants involve regional composition and regional economic attributes (see Bosma and Schutjens 2009). Included economic attributes are gross regional product (GRP) per capita in purchasing power parities, GRP growth, unemployment rates, and a variable designed to measure opportunity costs. We defined this measure as the ratio between GRP per capita and compensation per employee, which at the regional level indicates the difference between production and wages and conceptually captures a region's relative advantage of entrepreneurship (as compared to wages). Data on economic attributes at the regional level are mainly drawn from the Cambridge Econometrics database on European Regions. In case of missing values (for example, unemployment rates) we use the Eurostat regional database. We also combine both data sources to derive regional composition attributes (population growth and share of people aged 18–34).

With respect to measuring determinants at the *national* level, indicators on employment protection and immigration were obtained from the OECD. In accordance with Hessels et al. (2008), we planned to include social security rates.

However, tests for multicollinearity found high correlation between social security rates and employment protection, so we include the employment protection index instead of the social security rates because it is more specific and because we are particularly interested in its effect on growth- and innovation-oriented types of ESEA. Individuals who have potential to be a growth- or innovation-oriented entrepreneur may prefer to remain employed if there are strong employment benefits. Table 4.2 shows descriptions and sources of the independent variables

[12]In line with Davidsson (1991) one could 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 to entrepreneurship and their involvement in nascent entrepreneurship. However, we feel that the data poses methodological restrictions to do so, 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 do not have the skills to start a business or that they do not see opportunities to start a business. Let alone that people already making actual preparation to start a firm will answer that fear of failure would prevent them from starting a business.

Table 4.2 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, three 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 effects		
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 2 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
Share 18–34 years	Share of people aged between 18 and 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
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, between year t-2 and t-1	Cambridge econometrics database
Unemployment rate	Number of unemployed as percentage of labor force, 2001	Cambridge econometrics database and Eurostat regional database
National effects		
Employment protection	OECD Employment protection index (version 2), 2003	OECD
Immigration	Share of in-migrants (OECD + non-OECD countries) in total population	OECD Factbook

entering the regressions. Table 4.3 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.

4.3.3 Methodology

We use multilevel analysis to investigate individuals' entrepreneurial behavior.[13] Therefore, we explicitly model that individuals are "hierarchically" nested in their regional environment and that regional environments are in turn nested in a national context.

Multilevel models – contrary to standard multivariate models – control the assumption of independence of observations in grouped data. In terms of our specific analysis, we acknowledge that some regional and national characteristics may shape individuals' entrepreneurial behavior, and that this context is not independent for individuals due to influences such as peer effects, regional role models, and knowledge spillovers. The covariation between individuals' behavior sharing the same regional externalities can be expressed by the *intraclass* correlation (Hox 2002). With intraclass correlation, the between-regions variance contributes to individual behavior in addition to the variance between individuals. When standard significance tests would be used treating the individual as the single unit of analysis and regional level variables are included for each individual, the important assumption of independence of residual error terms may be violated, potentially leading to large errors and too liberal significance levels (see e.g., Rabe-Hesketh and Skrondal 2005). Analyzing processes that play a role at different (individual or spatial) levels, at one single level, is causing conclusions to be harmed by ecological fallacies (aggregated correlations and individual correlations are not the same, either in magnitude or in sign). Multilevel analysis is developed for this cause and solves these kinds of problems (Hox 2002).

In our empirical exercise we use multilevel regression modeling as described by Hox (2002) and Goldstein (2003). We incorporate three levels that are fully nested: the model assumes that we have data from K countries, with a different number of regions r_j for each country. In term, 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. Assume there is one explanatory variable X_{ijk} on the individual (respondent) level, a region-level explanatory variable Z_{ijk} and a country-level explanatory variable C_k. To model these data, a separate regression model in each group is formulated:

[13]The general idea of multilevel analysis is that individuals in the same social context show similar progressive behavior. The most researched cases are within educational studies on school performances: students learn by individual and class influences (Raudenbusch and Bruyk 2002).

Table 4.3 Descriptive statistics for regional and national level variables[a]

				Correlation matrix															
		Mean	Std. dev	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	ESEA low growth orientation[b]	2.8	0.9	1.00															
2	ESEA modest growth orientation[b]	1.9	0.8	0.26	1.00														
3	ESEA high growth orientation[b]	0.7	0.4	0.38	0.26	1.00													
4	ESEA innovative growth orientation[b]	0.9	0.5	0.27	0.36	0.59	1.00												
5	Know start-up entrepreneurs	0.37	0.07	0.24	0.13	0.29	0.31	1.00											
6	Perceived skills	0.58	0.07	0.20	0.18	0.01	−0.15	−0.39	1.00										
7	Perceived opportunities	0.32	0.13	0.02	0.38	0.25	0.35	0.33	0.01	1.00									
8	No fear of failure	0.66	0.08	0.11	−0.17	0.18	0.10	0.09	0.18	0.05	1.00								
9	Share 18–34 years	0.37	0.04	0.02	0.35	0.04	−0.05	−0.11	0.27	0.04	−0.07	1.00							
10	Population growth	0.02	0.04	−0.06	0.45	0.01	0.20	−0.13	0.27	0.40	−0.15	0.48	1.00						
11	Population density	0.42	0.85	0.11	0.05	0.33	0.21	−0.07	0.06	0.01	0.12	0.21	0.02	1.00					
12	Opportunity costs	1.74	0.35	0.16	0.06	0.35	0.26	0.17	0.14	0.28	−0.01	−0.09	0.16	0.29	1.00				
13	GRP per capita	108	52	−0.09	0.06	0.14	0.20	0.15	−0.15	0.21	0.05	−0.05	0.12	0.24	0.39	1.00			
14	GRP growth	0.12	0.07	0.09	0.27	−0.08	−0.02	−0.16	0.22	0.09	−0.21	0.43	0.36	−0.04	0.03	−0.07	1.00		
15	Unemployment rate	7.37	4.60	−0.10	−0.01	−0.16	−0.21	0.02	−0.14	−0.31	−0.26	0.16	−0.22	−0.01	−0.40	−0.18	0.11	1.00	
16	Employment protection	2.37	0.61	−0.16	0.11	−0.35	−0.35	0.11	−0.11	−0.13	−0.34	0.32	0.21	−0.12	−0.18	−0.10	−0.05	0.32	1.00
17	Immigration	10.95	4.89	0.04	−0.15	0.15	0.19	−0.03	0.19	−0.13	0.05	−0.21	−0.04	0.02	0.39	0.09	−0.18	−0.24	−0.39

[a] All descriptive statistics are based on 131 observations (regions) over 16 countries entering the regressions

[b] *Note*. Early-stage entrepreneurial activity (ESEA) variables are described here at the regional level (in %) but enter the regression as binary independent variables at the individual level

$$Y_{ijk} = \beta^0{}_{jk} + \beta^1{}_{jk} X_{ijk} + e_{ijk}. \quad (1)$$

The variation of the regression coefficients β^0 is modeled by a region-level regression model:

$$\beta^0{}_{jk} = \gamma^{00}_k + \gamma^{01}_k Z_{jk} + \zeta^0{}_{jk}. \quad (2)$$

Finally, the variation of the regression coefficient γ^{00}_k is modeled by a country-level regression model:

$$\gamma^{00}_k = \alpha + \delta_k C_k + \eta_k. \quad (3)$$

This model is known as a three-level model with random intercepts. The difference with a usual regression model is that we assume that each region *j* has a different intercept coefficient β_{0j}, which is stochastically modeled – and in turn related to the country level. We do not model random slopes, meaning that the β^1coefficients in (1) for the individual independent variables entering the regression are assumed equal across regions and countries. We incorporate a binomial logit-link in order to investigate the probabilities of being involved in different types of early-stage entrepreneurship.[14] This chapter's main objective is to study the effect of regional conditions on individual entrepreneurial activity. In explaining our results in Sect. 10.4, we stress the results we find in this particular area.

4.4 Results

Our results are shown in Table 4.4 for each of the four types of entrepreneurial activity.

4.4.1 Individual Effects

Focusing on the first three columns, representing early-stage entrepreneurship rates with increasing growth ambitions, as expected the control variables at the individual level correlate with growth ambitions. Growth ambitious early-stage entrepreneurs are typically male, younger, and better-educated individuals. High household income and being employed also positively relates to high growth orientation of early-stage entrepreneurs. The parameters also clearly increase in size according to higher growth ambitions (ranging from low growth to high growth) especially when looking at gender, education level, and household income.

With respect to the innovative orientation entrepreneurship category, the education effect is more pronounced in explaining growth ambitions, again revealing relatively

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

Table 4.4 Estimation results: explaining different types of early-stage entrepreneurial activity (ESEA) at regional level[a]

Individual effects												
Gender (female)	–0.42	(0.02)	***	–0.81	(0.03)	***	–1.15	(0.05)	***	–0.64	(0.04)	***
Age: 18–24												
Age: 25–34	0.55	(0.04)	***	0.43	(0.05)	***	0.20	(0.08)	*	0.29	(0.07)	***
Age: 35–44	0.52	(0.04)	***	0.32	(0.05)	***	0.15	(0.08)	*	0.25	(0.07)	***
Age: 45–54	0.24	(0.05)	***	–0.05	(0.05)		–0.13	(0.08)	+	–0.06	(0.07)	
Age: 55–64	–0.10	(0.05)	*	–0.50	(0.06)	***	–0.47	(0.09)	***	–0.41	(0.08)	***
Education: no secondary												
Education: secondary degr.	0.12	(0.03)	***	0.15	(0.04)	***	0.29	(0.06)	***	0.32	(0.06)	***
Education: post-secondary	0.23	(0.03)	***	0.28	(0.04)	***	0.57	(0.06)	***	0.64	(0.06)	***
Education: graduate	0.30	(0.03)	***	0.35	(0.04)	***	0.76	(0.07)	***	0.95	(0.06)	***
Household income: low												
Household income: middle	–0.03	(0.03)		0.02	(0.04)		0.16	(0.06)	**	0.00	(0.05)	
Household income: high	0.00	(0.04)		0.32	(0.04)	***	0.67	(0.07)	***	0.11	(0.06)	+
Work status: employed												
Work status: unemployed	–0.63	(0.06)	***	–0.75	(0.08)	***	–0.69	(0.13)	***	–0.05	(0.09)	
Work status: student	–1.38	(0.11)	***	–1.56	(0.14)	***	–1.37	(0.21)	***	–0.88	(0.15)	***
Work status: retired	–1.50	(0.11)	***	–1.65	(0.16)	***	–1.58	(0.24)	***	–1.33	(0.19)	***
Work status: other	–1.20	(0.09)	***	–1.78	(0.15)	***	–1.26	(0.24)	***	–0.94	(0.16)	***
Regional effects												
Know start-up entrepr.	0.03	(0.03)		–0.30	(0.03)	***	0.05	(0.05)		0.13	(0.04)	**
Perceived skills	0.11	(0.03)	***	0.26	(0.03)	***	0.11	(0.05)	*	–0.05	(0.04)	
Perceived opportunities	–0.10	(0.03)	**	0.24	(0.04)	***	0.13	(0.06)	*	0.04	(0.05)	
No fear of failure	0.05	(0.03)	+	–0.16	(0.04)	***	–0.09	(0.06)		0.03	(0.05)	
Share 18–34 years	–0.03	(0.02)		–0.03	(0.02)		0.06	(0.03)	+	0.01	(0.03)	
Population growth	0.02	(0.02)		0.00	(0.02)		–0.02	(0.03)		0.08	(0.03)	**
Opportunity costs	0.04	(0.02)	*	–0.05	(0.02)	*	0.06	(0.03)	+	0.00	(0.03)	

(continued)

Table 4.4 (continued)

Population density	0.00	(0.02)		0.06	(0.02)	**	0.03	(0.02)		0.03	(0.02)	
GRP per capita	–0.01	(0.03)		0.06	(0.03)	*	0.00	(0.04)		–0.06	(0.04)	
GRP squared	0.02	(0.01)	+	–0.02	(0.01)	+	0.01	(0.02)		0.03	(0.01)	+
GRP growth	0.01	(0.01)		0.02	(0.02)		–0.02	(0.03)		0.00	(0.02)	
Unemployment rate	0.07	(0.02)	**	0.03	(0.03)		0.09	(0.04)	*	0.03	(0.03)	
National effects												
Employment protection	–0.03	(0.03)		0.02	(0.04)		–0.37	(0.05)	***	–0.09	(0.04)	*
Immigration	0.00	(0.02)		–0.08	(0.03)	*	–0.08	(0.04)	*	0.10	(0.03)	**
Constant	–3.54	(0.06)	***	–3.99	(0.08)	***	–5.05	(0.13)	***	–4.05	(22.97)	

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$. +$p < 0.10$. Standard errors between parentheses. Observations over 131 regions nested in16 countries

[a]All regressions performed using Stata (gllamm procedure with logit-link from binomial distribution) with random intercept for region and country levels

high rates among younger and high-educated individuals. Again, male and high-income individuals are relatively more innovation oriented, but the difference with their female and low income counterparts, respectively, is lower than with respect to growth ambitions (column 3). Finally, we find that in general students are not involved in early-stage entrepreneurship, although they are more prevalent in innovation-oriented entrepreneurship.

4.4.2 Regional Effects

Several regional entrepreneurial perceptions are significantly related to both growth and innovative orientation of individuals. We find that in regions where many inhabitants believe they have the necessary start-up skills (and being able to judge that as they know a start-up entrepreneur), many people engage in ESEAs, especially aiming at modest growth. The results reveal the importance of a special combination of the network and skills effect: if an individual is located in a region where perceived abilities to start a firm (among those who know a start-up entrepreneur) are high, this also tends to increase the probability of being involved in growth ambitious entrepreneurship. It should be noted that the coefficient for high growth orientation is not highly significant. For innovative orientation, however, the network effect itself is highly positive and significant. Here, perceived skills are less important.

High regional levels of perceived opportunities increase the probability of being involved in modest or high growth orientation entrepreneurship. In contrast to our expectations, a high level of people without fear of failure (while perceiving start-up possibilities), negatively correlates with growth orientation. With respect to innovation orientation, regional levels of perceived opportunities are not significant at all. This may be due to the fact that the regional entrepreneurial perception indicators all related to the start of the firm.

Next to an age effect at the individual level, also at the regional level we find a positive relation between young population composition and the probability of being involved in high growth-oriented early-stage entrepreneurship. In sum, being young or being among young people increases high growth ambitions.

Regional population growth seems to trigger innovation-oriented entrepreneurship, but not the ambitions to hire (many) employees. Population density, however, has the opposite effect: we find that densely populated regions have relatively more modest growth-oriented entrepreneurs. This urbanization effect is absent in innovative orientation.

Surprisingly we find no association between regional GRP growth and participation in any type of entrepreneurship. Instead, the squared-GRP level effects point at a nonlinear association with innovation or growth orientation. For example, innovative orientation entrepreneurship is high at both low and high levels of regional GRP. Finally, the regional employment rate is most strongly and positively associated with entrepreneurship in the low growth orientation category, which may be linked to necessity entrepreneurship.

Summarizing, we find little evidence for an effect of the regional economy on ambitious entrepreneurship with respect to growth or innovation. After controlling for individual effects regional economic characteristics do not seem to be of much importance.

4.4.3 National Effects

We find a negative relation between employment protection and growth-oriented early-stage entrepreneurship which confirms our proposition that high levels of employment protection form a barrier for new entrepreneurs to hire people. Our finding that employment protection is also related to innovative orientation is quite unexpected. Finally, we find a positive and significant effect of high immigration rates on involvement in early-stage entrepreneurship oriented at innovation. This may point at regional newcomers seeking new market niches. However, high national immigration decreases individual propensity of involvement in new entrepreneurship in the modest and high growth-oriented categories. In these immigration countries, entrepreneurship aiming at hiring people is less common.

4.5 Discussion and Public Policy Recommendations

This chapter reviews potential policy impacts on the prevalence of low and high ambition entrepreneurship, and the conceptual link with economic growth. In an empirical application, we analyze the probability of being involved in four types of early-stage entrepreneurship (identifying low, modest, and high growth-oriented entrepreneurship and innovation-oriented entrepreneurship) by applying a multilevel modeling technique. We included determinants at the individual, regional, and national level. Besides confirming the importance of individual characteristics to the explanation of involvement in entrepreneurial behavior, our results point at determinants of ambitious entrepreneurship that are regional or national in nature. In other words, identifying regions and nations, when in a study on the prevalence of promising types of entrepreneurship, is relevant and necessary. This means that we now can identify effective public policy instruments to encourage entrepreneurship and, indirectly, economic growth (see Fig. 4.1).

First, network effects in the region are important. Regions where many individuals personally know someone who recently started a business exhibit more innovation-oriented entrepreneurs. Second, at the national level we found a profound negative effect of the degree of employment protection on involvement in both growth- and innovation-oriented entrepreneurship. The underlying reasons may be twofold. First, potential growth- or innovation-oriented entrepreneurs who are currently employed may feel that the benefits of being employed are too high compared to the risks of becoming an entrepreneur. Second, early-stage entrepreneurs may perceive the employment protection as a burden and limit their growth or innovation

ambitions. Further research into the effects of employment protection on specific types of entrepreneurship is required. A third main finding is the positive effect of immigration on early-stage entrepreneurship with innovation ambitions, while its effect on employment growth ambitions is tentatively negative. This may be linked to the argument of Lee et al. (2004) that an immigrant community creates specialized market niches and brings about new business opportunities for both natives and immigrants. However, we should stress that in the empirical analysis we have only investigated the impact of immigration at the national level. Including details on immigration on the individual and regional level is preferable. At the individual level, the positive effect on innovation-oriented entrepreneurship could be explained by relatively high education levels and skills of migrants as compared to the local workforce (Spencer 1994).

We found no evidence for a positive impact of regional levels and growth of GRP on the probability of being involved in growth-oriented entrepreneurship. We find evidence for some demography effects, both from an economic geography perspective (regions with high dominance of the service sector have somewhat higher propensities of being involved in growth-oriented entrepreneurship) and from an urban geography perspective (people in dense regions have higher propensities of being involved in growth-oriented entrepreneurship).

The total supply of entrepreneurs varies across societies due to different prevailing values and beliefs related to entrepreneurship, that is its entrepreneurial culture. Economists generally share the opinion that it is not the role of government to change the attitude of its people, perhaps even leading to "social engineering" (Storey 2002), or that public policy cannot change the culture of a country in order to stimulate the supply of entrepreneurship, on the short term (Baumol 1990). Some economists argue that entrepreneurship is an omnipresent aspect of human action, and that for economic development to take place, certain institutions must be present for the entrepreneurial aspect of humans to flourish (Boettke and Coyne 2003). This omnipresence also means entrepreneurship cannot be the "cause" of economic development: it is caused by proper institutions that channel entrepreneurship in a direction that spurs economic growth (cf. Baumol 1990). Entrepreneurship policy might also include integrating entrepreneurship in the education system in order to develop entrepreneurial skills and promote an entrepreneurship culture in the long run. The other more direct role for public policy involves changing the formal institutions in order to stimulate productive entrepreneurship. Examples of these formal institutions relevant for entrepreneurship are taxation rules, bankruptcy regulations, social security rules, and immigration laws.

Taking the above into account, what are the lessons of our study for policy aiming at stimulating entrepreneurship in European regions? We focus on four special types of entrepreneurship, namely growth-oriented (in three levels) and innovative early-stage entrepreneurship. We expect that especially growth-oriented and innovative entrepreneurship would be supported by different regional or national conditions. However, this is only partly true. The largest difference exists between the conditions for low growth-ambitious entrepreneurship on the one hand and growth-ambitious and innovative entrepreneurship on the other hand. At the level of individuals, general policy

instruments that increase the share of young people (e.g., by attracting them to the region; cf. Faggian et al. 2007) and improve education levels, employment, and household incomes should lead to a regional composition that favors high levels of high growth and innovative entrepreneurship. Indirectly, creating or improving educational institutes in a region could have a positive effect, by attracting young people that will improve their educational levels. This gives a rationale to the emphasis in the EU Green Paper on the development of skilled labor in the order to "…gear enterprises to growth…" (European Commission 2003, p.15).

High growth start-ups are the economic entities that are successful in commercializing new ideas on a large scale in a short term. These firms are serious candidates for the industrial leadership of tomorrow. However, the contradiction for public policy is that policymakers grant themselves an important role in stimulating these (potentially) successful firms (Smallbone et al. 2002), but that these same firms regard government intervention as only marginally influencing success (see Fischer and Reuber 2003; Perren and Jennings 2005). Research has shown that probably the best that entrepreneurship policy could do for young high-growth firms is to stimulate (regional) communities of practice for entrepreneurs leading (potentially) high-growth firms (Smallbone et al. 2002; Fischer and Reuber 2003; Rocha and Sternberg 2005). In their Third Policy Option for Entrepreneurship, called "Towards an entrepreneurial society", the EU Green Paper stresses the need for providing both local and regional role models as well as entrepreneurial success stories. The potential power of this policy option is confirmed by our empirical results. With respect to the regional context, measures that increase the presence and visibility of regional start-up entrepreneurs are likely to stimulate levels of innovative entrepreneurship.

Furthermore, decreasing employment protection – often determined by national labor laws – would probably lead to higher levels of growth-oriented and innovative entrepreneurship. Again, this underpins one of the main obstacles the EU Green paper already signaled: the regulatory environment and especially labor market flexibility constrains entrepreneurial performance (European Commission 2003). In his recent overview of entrepreneurship policy options, Acs (2008) mentioned deregulation and regulatory flexibility as important ingredients of the entrepreneurial economy.

Finally, stimulating immigration flows might evoke innovative new entrepreneurship. The immigration policy option with respect to entrepreneurship is still absent in policy documents (see European Commission 2003; OECD 2003), while more recently academic scholars do point at the importance of an "Entrepreneurship-Friendly Immigration Policy." (Acs 2008, p. 58; Houston et al. 2008). The latter two significant national effects means that supraregional institutions should be taken into account when explaining and influencing regional economic growth.

In contrast to expectations, increasing regional wealth levels and population density do not affect entrepreneurship levels. Also the alleged positive effects on innovative and especially high growth entrepreneurial ambitions were absent in our findings. When individual characteristics are accounted for regional entrepreneurial culture effects as measured by attitudes and perceptions, they hardly affect growth- and innovation-oriented entrepreneurial behavior.

Some disclaimers apply. One limitation is that data availability restricts our definition of regions: we can only distinguish relatively large regions. In our analysis, we have exploited the available data as much as possible; still ideally for some of the countries included in our analysis one would probably use the more disaggregated NUTS 3 level as the most relevant regional level. For most European countries, NUTS 3 level regions are regarded as labor market areas.

A second limitation concerns our indicators of entrepreneurial culture, emphasizing perceived opportunities, perceived skills, and fear of failure. In general, these three indicators are only marginally significant for high growth- or innovation-oriented entrepreneurship. A possible explanation is that the regional indicators relate to "just" starting a business, while the dependent variable concerns people starting a business with a considerable expectations of employment growth. Only perceived skills were indeed linked to low and modest growth-oriented entrepreneurship.

Third, even though many studies have confirmed the positive effect of entrepreneurship on regional economic growth, this does not mean that stimulating entrepreneurship will always improve regional economic performance. A few recent studies (Bosma et al. 2009; Fritsch and Schroeter 2009) show that after reaching a certain level, more entrepreneurship is likely to be harmful for economic performance.

In this chapter, we aim to identify factors that are positively related to regional entrepreneurship levels by analyzing a sample containing all European regions. This enabled us to make some general claims about regional entrepreneurship policy. However, entrepreneurship policy in specific regions should take into account the specific history, location, and industrial structure of the region. These unique contextual factors might explain how the behavior of entrepreneurs, in how they actively interact with their environments, adapt to new situations, crises (see Feldman 2005), or opportunities using place-specific assets (see Storper 1997) and, finally, build and augment local institutions (see Keeble et al. 1999).

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