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Start-up rates, Entrepreneurship Culture and the Business Cycle

Swedish patterns from national and regional data

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ABSTRACT

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JEL: L26, R11, R12, O18

Keywords: entrepreneurship, start-ups, geography, culture, business cycles, social capital, persistence

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Abstract

It is often claimed that there are locally embedded values and attitudes towards entrepreneurship, exerting a strong influence on the rate and level of entrepreneurial activity in regions. The concept of regional entrepreneurship culture aims to capture such phenomena, and refers in a general sense to the level of social acceptance and encouragement of entrepreneurs and their activities in a region. This paper discusses regional entrepreneurship culture as a source of persistent differences in regional rates of new firm formation, and presents a number of empirical regularities for Sweden to illustrate the empirical relevance of the main arguments. Using data on rates of new firm formation across Swedish regions over time, the paper further explores the association between start-up activity and the business cycle, as well as how the geographic distribution of start-up rates changes during a major economic crisis.

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1. Introduction

In her well-known book comparing California's Silicon Valley and the Route 128 corridor outside of Boston, Anna Lee Saxenian analyzes why the two regions embarked on such different development paths. While both regions had a historically strong concentration of knowledge- and technology-intensive sectors and bright prospects for a resilient economic development, the regions developed along different trajectories after the crisis period in the mid-1980s. Silicon Valley continued to flourish whereas Route 128 declined. Saxenian maintains that one important explanation for the divergent performance of the regions is rooted in differences in regional entrepreneurship culture. The following statement from an entrepreneur with experience from both regions may serve as a case in point (Saxenian 1994, p 63):

“In Boston, if I said I was starting a company, people would look at me and say: ‘Are you sure you want to take the risk? You are so well established. Why would you give up a good job as vice president at a big company?’ In California, I became a folk hero when I decided to start a company. It wasn't just my colleagues. My insurance man, my water deliverer – everyone was excited. It's a different culture out here.”

A Swedish example of such kind of locally embedded entrepreneurship culture is the so-called ‘Gnosjö-spirit’ (cf. Wigren 2003). This spirit is widely recognized in Sweden and is even listed in the Swedish National Encyclopedia. It is described as follows therein (author's translation):

“The Gnosjö spirit refers to the enterprising culture that prevails in the municipality of Gnosjö and its neighbors in the county of Småland. In this region, self-employment is a way of life that dominates the local community, which for instance implies that the local authorities, banks, and trade unions conform their way of working to the way the enterprises work.”

Examples along these lines illuminate the quite common argument that there are locally embedded values and attitudes towards entrepreneurship, exerting a strong influence on the rate and level of entrepreneurial activity in regions. The concept of regional entrepreneurship culture aims to capture

such phenomena, and refers in a general sense to the level of social acceptance and encouragement of entrepreneurs and their activities in a region (Fritsch and Wyrwich 2012).¹

In this paper I discuss regional entrepreneurship culture as a source of persistent differences in regional rates of new firm formation, and present a number of empirical regularities for Sweden to illustrate the empirical relevance of the main arguments. Using Swedish data on rates of new firm formation across regions over time, I demonstrate the association between start-up activity and the business cycle as well as how the persistence in regional start-up rates was affected by a major economic crisis for the case of Sweden.²

The paper is organized as follows: in Section 2, I provide a brief background to the interest in regional entrepreneurship culture and discuss defining characteristics of culture (in particular its persistence over time). I also assess the empirical relevance of the concept in a Swedish context using data on regional start-up rates in Sweden. Section 3 presents the main patterns as regards new firm formation rates in Sweden over time. A main focus is here on how start-up rates varied during the large recession in Sweden in the early 1990s. In the fourth section, I focus on regional variations in start-up rates in Sweden during the crisis period and link this to the discussion of an entrepreneurship culture. Section 5 concludes and discusses some general lessons for policy.

2. Regional variation in start-up rates and entrepreneurship cultures

2.1 Regional heterogeneity in start-up rates

While the idea of regional entrepreneurship culture is not new (Hoselitz 1957, Johannisson 1984, Davidsson and Wiklund 1997), the interest in this phenomenon has increased in recent years. One reason for this is a large and growing literature documenting substantial variations in rates of new firm

¹There are many different concepts in the literature that generally refer to an entrepreneurship culture (Beugelsdijk 2007). Audretsch and Keilbach (2004), for instance, introduce the concept of entrepreneurship capital. Westlund and Bolton (2003) discuss local social capital as a driver of entrepreneurship. I use the concept of entrepreneurship culture to refer to the general level of social acceptance and encouragement of entrepreneurs and their activities.

² Part of the presentation draws on previous own work, in particular by Andersson and Koster (2011).

formation across regions, despite the regions being embedded in the same national institutional environment (Audretsch and Fritsch 1994, Armington and Acs 2002, Bosma et al 2008). Within Sweden, for instance, the cross-regional variations in start-up rates amount to well over factor 5.³

This is illustrated in Figure 1 in which Swedish municipalities are ranked in descending order according to their start-up rate in 2007. The solid line shows that the number of new establishments per 10,000 inhabitants (16-64 years of age) in Swedish municipalities ranges from nearly 300 to just over 50. As indicated by the horizontal dashed line, the Swedish average amount to about 130 new establishments per inhabitant.

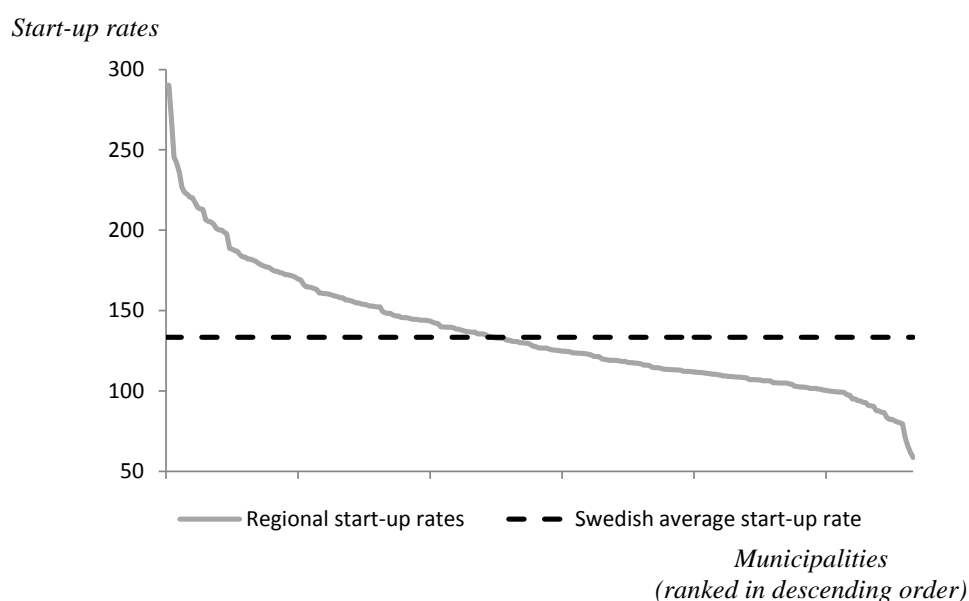


Figure 1. *The variation in start-up rates across municipalities in Sweden 2007 (per 10,000 inhabitant 16-64 years of age).*

The existence of regional entrepreneurship cultures is one theoretically plausible explanation for these spatial variations in entrepreneurship activity. But there are of course various reasons for regional variations in start-up rates – entrepreneurship culture is just one out of several possible explanations.

³ Start-up rates are here measured as the number of new establishments normalized by the regional population in the age interval 16-64.

Moreover, a general issue with concepts like conventions, informal rules, values and attitudes is that they are hard to measure.

Glaeser (2007) presents three different theoretical perspectives which, in addition to regional entrepreneurship culture, may explain why regions differ in entrepreneurial activity:

- *Supply of entrepreneurs*: Individuals may be more or less entrepreneurial due to factors such as age, education, social background or choice of industry. If more ‘entrepreneurial’ individuals sort themselves systematically towards certain regions and sectors, we will observe sharp regional differences in the supply of entrepreneurs and consequently differences in regional start-up rates.
- *Inputs for new firms*: Regions may differ in terms of availability of inputs, such as venture capital, decentralized input suppliers and supply of labor with various specializations and experiences.
- *Customers*: A large and growing local demand may stimulate new firm formation. This may in particular be important for start-ups in services sectors for which local demand is important. Another argument is that density of customers in a region may stimulate interaction between suppliers and customers, which in turn may foster ideas for new ventures.

But even after controlling for the kind of observable supply- and demand-side regional characteristics listed above, one typically find that significant regional differences remain. Such unexplained (or ‘residual’) regional variations in start-up rates across regions may in principle be attributed to entrepreneurship culture.

2.2 Persistence, time scales of change and regional entrepreneurship culture

The main empirical support for entrepreneurship culture is however not regional variations in start-up rates *per se*. It is instead that longitudinal analyses reveal a high persistency in these variations over time.

Figure 2 presents the relationship between the start-up rate 2007 and in 1987 across Swedish municipalities, i.e. a time span of two decades. It is clearly the case that there is persistence in the geography of start-up rates. The main pattern is that municipalities with high start-up rates today are typically those that had high start-up rates two decades ago. Indeed, a simple linear estimation of the relationship in Figure 2 shows that the start-up rate 20 years ago ($L20.Start_up_rate$) is capable of accounting for about 50% of the variance in start-up rates across municipalities today ($Start_up_rate$).

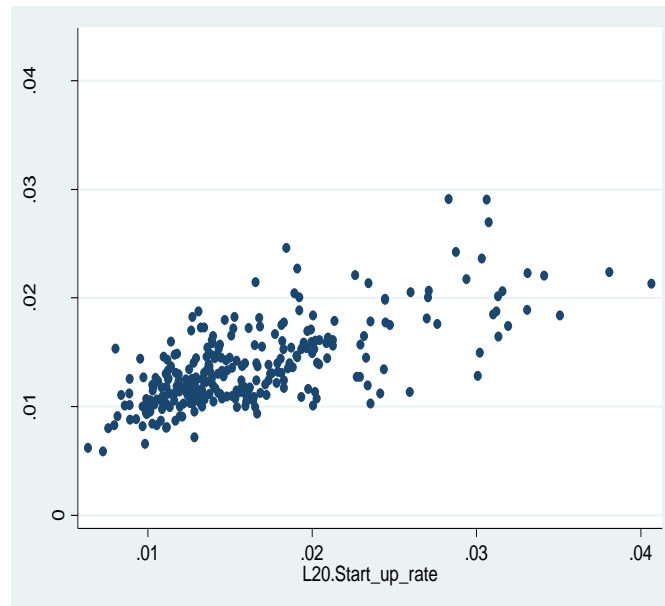


Figure 2. *The relationship between start-up rates in 2007 ($Start_up_rate$) and in 1987 ($L20.Start_up_rate$) across Swedish municipalities (new establishments per inhabitant 16-64 years of age).*

This pattern is not simply an artifact of that the three sets of determinants discussed previously do not change much over time. The influence of previous start-up rates is robust when controlling for other factors that may influence start-up rates. In Andersson and Koster (2011), we employ Swedish data and estimate a dynamic panel model including three lags of the start-up rate, while controlling for

observable regional supply- and demand-side characteristics as well as unobserved regional heterogeneity.⁴

We find that the lagged start-up rates are statistically significant, illustrating that previous start-up activities do have an effect on current start-up activity in a municipality after controlling for other determinants of start-ups. The results also confirm the role of supply- and demand-side characteristics in explaining start-ups. We find that the general education level of employees, market-size and the share of services in the local industry contribute to a municipality's start-up rate. The estimated impact of the employment rate and the regional income level is generally negative, but the statistical significance of the parameter estimates is weak. This may be explained by that higher employment rates generate fewer necessity-based start-ups, and that higher income levels increase the opportunity cost of starting a new business and become self-employed.

Why is this type of robust persistence of regional variations in new firm formation rates often interpreted as evidence of entrepreneurship culture? Culture is by definition a phenomenon that changes in slow processes. Figure 3 is adapted from Williamson (2000), and outlines different types of institutions and their time scale of change. Williamson argues that social 'embeddedness' is the highest level of institutions and that "...this is where the norms, customs, mores, traditions, etc., are located" (p. 596). This kind of informal institutions change very slowly, on the order of centuries or millennia. They also impose constraints on other (formal) institutions as well as the general workings of the economy, indicated by the solid arrows in the figure. Resource allocation and employment in the economy changes continuously, and on a much faster time scale than institutions.

⁴Observable supply- and demand-side regional characteristics include education level of employees, industry structure, market size, and income level as well as employment rate.

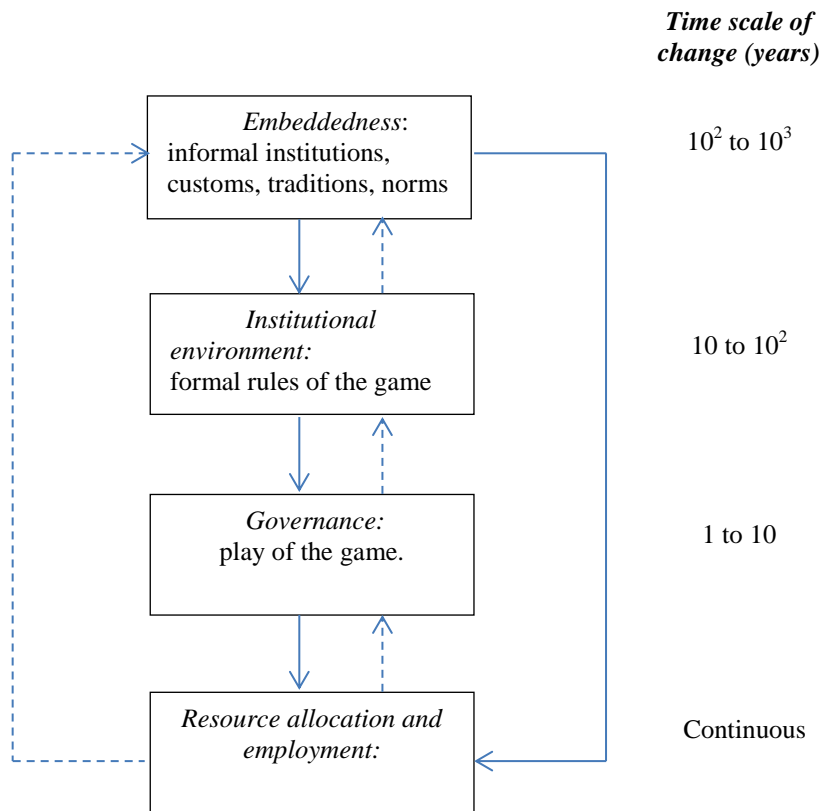


Figure 3. *Institutions and time scales of change (based on Williamson 2000).*

Williamson's scheme is a useful starting point for a discussion and characterization of regional entrepreneurship culture. Based on Figure 3, a regional entrepreneurship culture may be defined as spatially localized informal institutions that have to do with the general social acceptance and encouragement of entrepreneurs and their activities in a region. It is thus a top level (informal) institution, influencing the rate of entrepreneurship activity in a region.⁵

If informal institutions such as regional entrepreneurship cultures are historically rooted and evolve in slow processes over time, so should the phenomena dependent on it. The time scale of change is a key characteristic of entrepreneurship culture, making it distinct from other types if determinants of

⁵Entrepreneurship is indeed part of an economy's resource allocation and employment. Schumpeter (1934) proclaimed for instance that new firm formation is an important means for resource re-allocation in an economy.

regional start-up rates. In a given moment in time, the entrepreneurship culture may be thought of as a “gift from the past”, influencing current entrepreneurship activity.

Williamson (2000) suggests that the effects of informal institutions go through their effect on the institutional environment and governance structures. This is not necessarily the case for entrepreneurship culture in regions that often share the same overall institutional environment (at least if the regions under consideration belong to the same nation). A regional entrepreneurship culture can have direct impact on entrepreneurship activity, such as a ‘social’ encouragement of individuals to consider entrepreneurship as an alternative to regular employment. This is indicated by the arrows connecting the top level embeddedness with resource allocation and employment.

But even if regions in a country are exposed to the same national institutional and regulatory environment, there might be regional differences the way in which different regulations are implemented. In regions with a strong entrepreneurial culture, for example, a given set of regulations from central government may be interpreted and implemented in a more ‘business friendly’ way than other regions. Moreover, the entrepreneurship culture in a region may also have an impact on bureaucratic procedures, *inter alia* the procedures for obtaining licenses from the local government to open a new store or establish a new warehouse in the region. Such bureaucratic procedures include handling speed, attitudes of local government and the general administrative burden.⁶

A historically rooted social acceptance of entrepreneurship in a region may thus influence entrepreneurship in a direct way, but also in an indirect way through a long-term influence on the ‘formal rules of the game’ in the region as well as the ‘play of the game’.

2.3 Feedback and response mechanisms – a self-reinforcing entrepreneurship culture?

It is in general difficult to pin down the origins of informal institutions such as an entrepreneurial culture. Williamson (2000) conjectures that many informal institutions “...have mainly spontaneous

⁶Hard data on the spatial variation in this kind of local institutions are rarely available. The Confederation of Swedish Enterprise yet publishes a yearly ranking of Swedish municipalities according to a ‘business climate’ index. One of the components of this index relate to the attitudes of local authorities and the bureaucracy associated with establishment of new plants, and these components typically show quite large variations across municipalities.

origins – which is to say that deliberative choice of a calculative kind is minimally implicated. Given these evolutionary origins, they are ‘adopted’ and thereafter displays a great deal of inertia”.

Evolutionary theory would suggest that, sparked by some historical context or event, a regional entrepreneurship culture develops in a self-reinforcing way over extended periods of time. A critical ingredient in this kind of theoretical frame is the existence of a feedback (or response) mechanisms.⁷

Feedback mechanisms imply interdependence, so that a region’s entrepreneurship culture is not only a determinant but also in part a product of entrepreneurship activity over long time horizons (cf. North 1990). This kind of effect has been labeled ‘institutional hysteresis’ (Martin and Sunley 2006), and is in a general sense motivated by spatially bounded learning and externality phenomena.

How can we understand feedback mechanisms in the context of regional entrepreneurship culture? The literature typically emphasizes ‘entrepreneurial learning’, and the role of imitation and entrepreneurial role models in such processes. I elaborate on this perspective below.

Recognizing and acting upon business opportunities are inherently processes at the individual level, but the context in which these processes manifest themselves is important in shaping individual responses (Verheul et al. 2001). Guiso and Schivardi (2005) argue that entrepreneurial talent is not innate and maintain that when more entrepreneurs are active in a region, people will have greater opportunities to acquire entrepreneurial skills. According to their framework, an individual’s accumulation of entrepreneurial skills is partly a function of the regional intensity of entrepreneurs.

Entrepreneurial role models have indeed been shown to have a positive impact on the propensity of people to start new firms (Aldrich 1999, Blanchflower and Oswald 1998, Arenius and Minniti 2005). Knowing an entrepreneur and having an entrepreneur in the family are good estimators of entrepreneurship. Entrepreneur role models not only assist in developing entrepreneurial skills, they are also a sign of the social acceptability of entrepreneurship. In addition, existing entrepreneurs may serve as bellwethers of certain business opportunities that imitative entrepreneurs may follow (Baumol 1993). As such, this means that the recognition of opportunities is also influenced by role models. At

⁷The dashed arrows in Figure 3 indeed suggest feedback effects from lower to upper levels.

the regional level, a wide availability of role models may thus generate ‘demonstration effects’, such that potential entrepreneurs are stimulated to develop an idea in the form of a new firm.⁸

Entrepreneurial learning is an example of a feedback mechanism, and is strongly connected to historical rates of new firm formation. Where are role models for potential entrepreneurs abundant, if not in regions with a history of high start-up rates? A region which for some reason has had a strong new firm formation in the past will have greater opportunities for entrepreneurial learning, stimulating current start-up activity. The level entrepreneurship today then influences the regional density of role models of future entrepreneurs, as well as the general social acceptance of entrepreneurship. This kind of effects illustrates how a regional entrepreneurship culture, through feedback effects, may evolve in a self-reinforcing way over extended periods of time. Feedback effects also provide a further understanding of why the entrepreneurship culture of regions is persistent.

2.4 Swedish evidence of a self-reinforcing entrepreneurship culture

Are there any empirical regularities supporting the idea of a self-reinforcing entrepreneurship culture? In Andersson and Koster (2011), we try to empirically capture such an effect using data for Sweden. We argue that the existence of feedback effects, promoting an entrepreneurship culture that is self-reinforcing, should imply that the strength of persistence in start-up rates is particularly strong in regions with a high historical entrepreneurship activity. Feedback effects help to sustain and develop an entrepreneurship culture, providing an enduring advantage in particular for regions that have had high start-up rates in the past. These regions are most prone to a self-reinforcing development.

We tested this hypothesis on Swedish data spanning a decade of start-up rates across Swedish municipalities, using transition probability analysis and quantile regression techniques.⁹ Transition probability analysis examines whether the likelihood of switching ranks, in terms of the regional level of start-up rates in a given period, is related to the previous rank. The quantile regression technique allows us to test whether the effect of lagged start-up rates on current start-up rates depends on the levels of start-up rates across regions. The empirical counterpart to our hypothesis is that regions with

⁸ Johannisson (1983, 1984) discusses and illustrates such an effect in the Gnosjö region of Sweden.

⁹ We did not have access to longer time series in this work.

higher start-up rates are more likely to maintain their position, and the effect of past start-up rates are higher for regions with higher rates of start-ups.

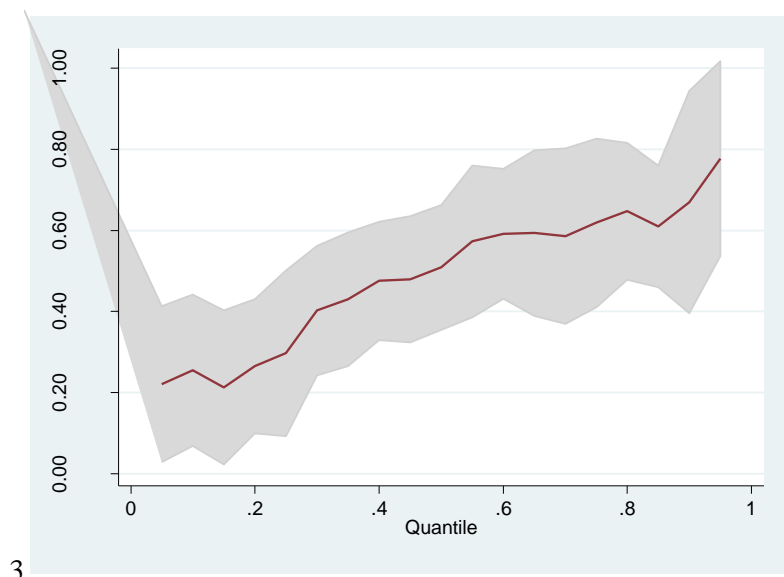


Figure 4. *Estimated marginal effect of the start-up rate in 1994 on the start-up rate in 2004 for the different quantiles of the dependent variable (start-up rate 2004). Source: Andersson and Koster (2011).*

We find support for our hypothesis. The persistence in regional start-up rates is stronger for regions with higher levels of start-up activity. Figure 4 is re-produced from Andersson and Koster (2011) and shows the estimated marginal effect of start-up rates in 1994 on current start-up rates (2004) using quantile regression technique.¹⁰

It is clear from the figure that the estimated marginal effect of the start-up rate a decade ago is larger the higher the level of start-up rate. This finding has also been confirmed in other studies (e.g. Fritsch and Wyrwich 2012). The empirical regularities with regard to the strength of persistence in regional start-up rates are thus consistent with the idea of a regional entrepreneurship culture evolving in a self-reinforcing manner.

¹⁰The underlying data is data on Swedish municipalities. The regression includes several control variables, including education intensity, market-size, share of services, income, employment share and metropolitan dummy. Standard errors are bootstrapped using 3,000 replications. Further details may be found in Andersson and Koster (2011).

3. Start-up activity over the business cycle

A localized entrepreneurship culture historically embedded in a region should also manifest itself during changes in economic conditions, such as over the business cycle. Fritsch and Wyrwich (2012) illustrate for Germany that there is persistence in start-up rates across regions over periods as long as 80 years – a period over which there has been several significant disruptions.

There is no comparable historical regional start-up data for Sweden, but available data do span a significant downturn in the Swedish economy in the beginning of the 1990s. During the period 1991-1993, for example, the average yearly growth of GDP and GDP per capita amounted to -1.5% and -2.2%, respectively. The average yearly growth in unemployment during the same period amounted to about 3%. Hagberg and Jonung (2005) maintain that the loss in employment in the 1990s crisis is the largest one ever recorded in Sweden, with an employment loss of almost 17% between 1990 and 1994.

How does the rate of start-ups change over such drastic economic swings? There are two basic perspectives on how new firm formation changes over a business cycle. On the one hand, an economic downturn may deter the rate of new firm formation because of fewer business opportunities when the general level of demand in the economy falls. On the other hand, a recession may imply that more people might be pushed into entrepreneurship. Economic downturns can also intensify change processes and creative destruction. A crisis may for instance imply that resources are reallocated, that relative prices change and that ‘equilibria’ are disturbed, which stimulate profit opportunities for new businesses (Braunerhjelm and Thulin 2010). Economic crises can in other words stimulate opportunity- as well as necessity-based entrepreneurship.

Figures 5 through 8 present the relationship between GDP growth and start-up rates in Sweden, in total as well as for broad sector categories. Start-up rates are consistently measured as the number of new establishments per inhabitant 16-64 years old, and the figures report, for each year, the percentage deviation from the mean start-up rate over the whole period, i.e. 1987-2003 for total start-up rates and

1990-2003 for start-up rates in broad sector categories.¹¹ GDP is measured in growth rates for each respective year.

I consider two different types of start-ups: (i) start-ups only involving individuals that were unemployed the year before entry and (ii) other start-ups. These two different categories broadly distinguish opportunity- from necessity-based start-ups, where start-ups by individuals that were unemployed the year before are intended to reflect the latter type of start-ups.

Figure 5 presents the relationship between GDP growth (measured on the right vertical axis in percentages) and opportunity- and necessity-based start-ups, where the respective start-up rate is measured on the left vertical axis and presented as the percentage deviation from its mean value over the whole period (1987-2003).

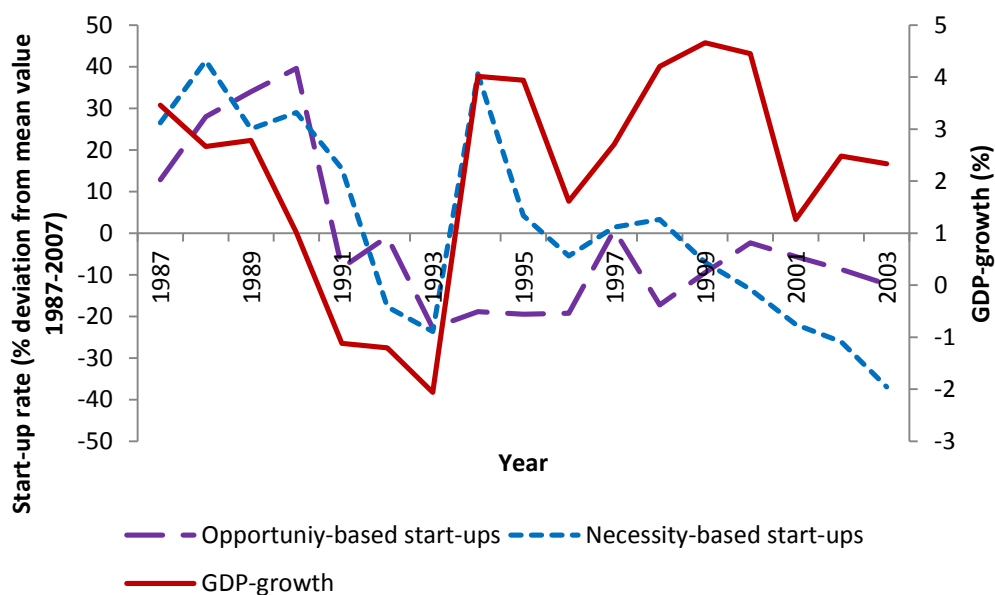


Figure 5. GDP growth and start-up rates in Sweden 1987-2003.

¹¹The reason I report a shorter time period for the start-up rates in broad sector categories is that the sector coding system changed significantly in the early 1990s.

The main patterns in the figure are as follows:

- The 1990-crisis was preceded by high rates of both opportunity- and necessity based startups. Opportunity-based start-ups are distinct in that they rose quite sharply in the immediate years before the crisis set in.
- Opportunity- as well as necessity-based start-ups responded to the economic downturn between 1991 and 1993. Both types of start-ups fell during the crisis years.
- Necessity-based start-ups increased significantly in 1994, reflecting that many individuals became unemployed during the economic downturn and tried new firm formation as an escape from unemployment. When GDP growth recovered after the crisis necessity-based start-ups fell consistently.
- There is no comparable rise in opportunity-based start-ups in association with the crisis. Opportunity-based start-ups instead show a relatively steady but slow increase after the crisis as the economy recovered.

These patterns are broadly consistent with economic downturns being associated with less opportunity-based start-ups, for instance due to a fall in general level of demand in the economy. That opportunity-based start-ups yet increase shortly after a crisis may be due to profit opportunities associated with reallocations, price changes and structural adjustments in the economy. Economic downturns and higher rates of unemployment also appear to push individuals to (necessity-based) entrepreneurship.

Figures 6 through 8 present the same relationships for start-ups in (i) agriculture, fishing and extraction sectors, (ii) manufacturing sectors and (iii) private services sectors, respectively. These figures span the 1990-2003 period. The main patterns in Figure 5 also hold for the different sector aggregates. For all sectors there is a sharp decline in start-ups between 1991 and 1993, followed by a significant increase in necessity-based start-ups in 1994. Agriculture, fishing and extraction as well as manufacturing show a declining or modest development in start-ups during the period of recovery after 1994 (Figures 6 and 7). It is instead in private services sectors that opportunity-based start-ups show a clear increase after the crisis in the beginning of the 1990s (Figure 8). This reflects that general

shift from manufacturing to services sectors that accelerated in Sweden after the crisis, such that the entrepreneurial opportunities increased particularly in private services sectors. Indeed, an increasing fraction of all start-ups started in services sectors during the period after the recession 1991-1993.

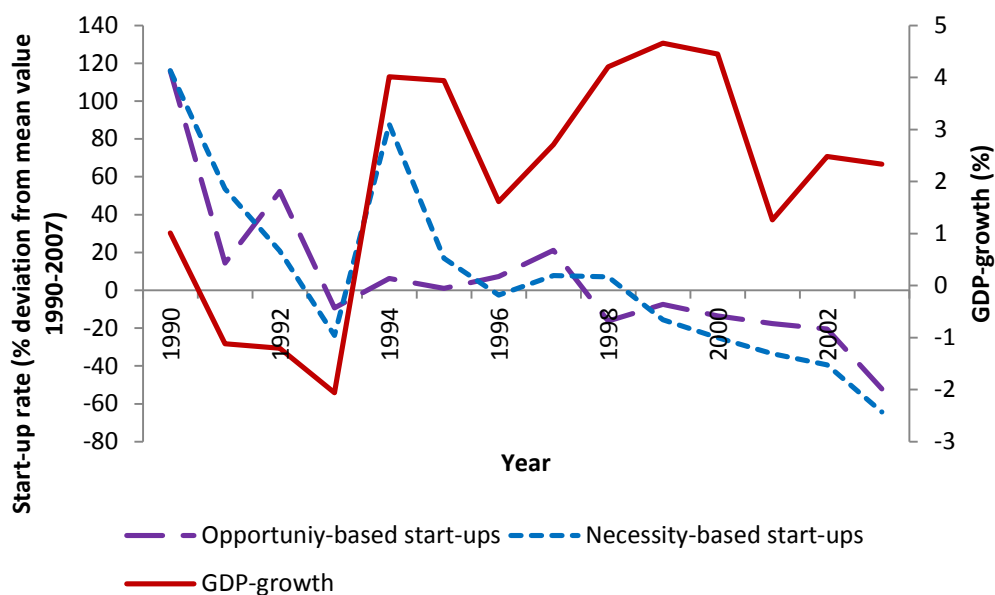


Figure 6. GDP growth and start-up rates 1987-2003 in agriculture, fishing and extraction sectors.

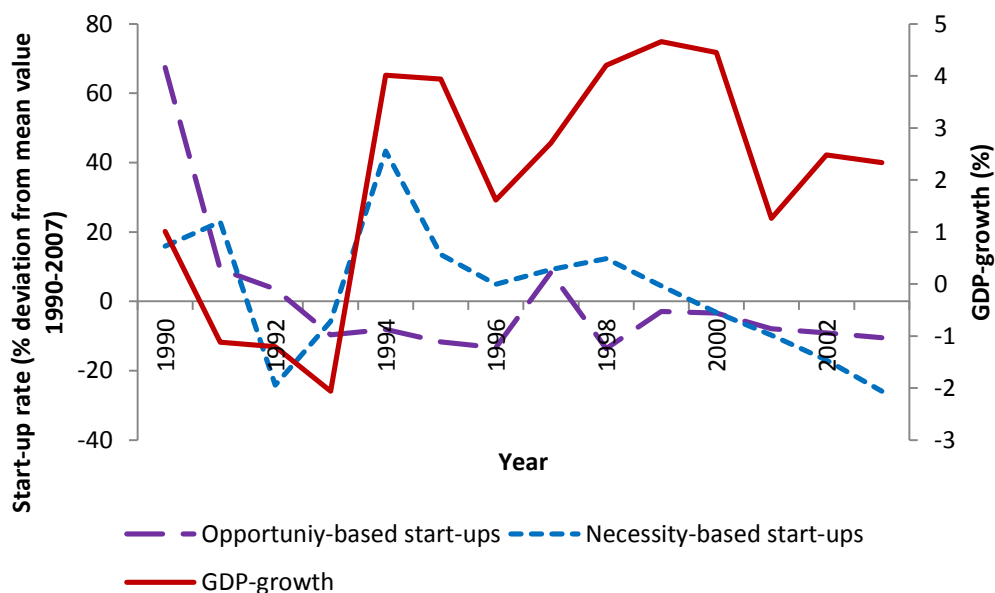


Figure 7. GDP growth and start-up rates 1987-2003 in manufacturing sectors.

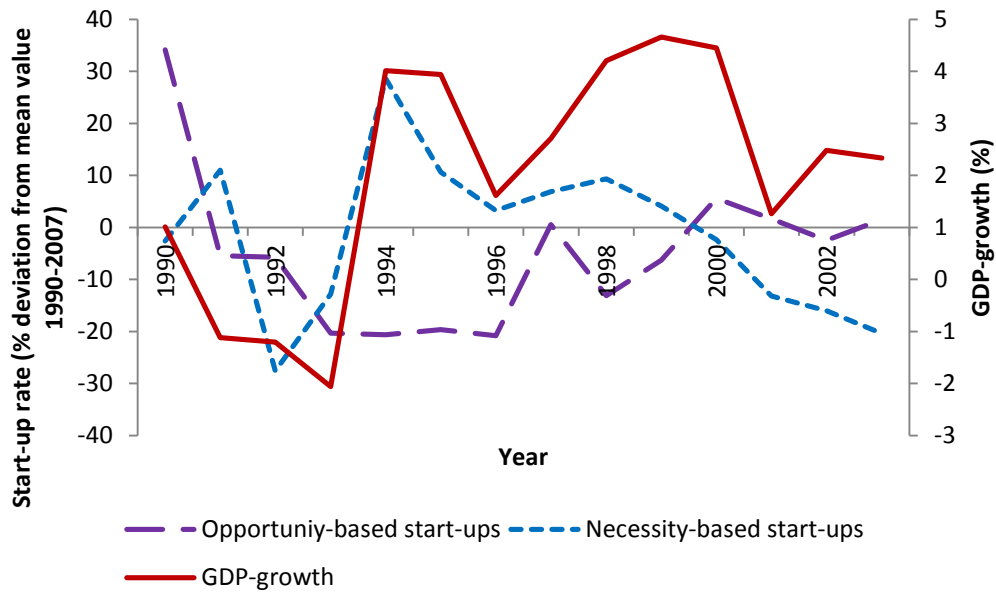


Figure 8. GDP growth and start-up rates 1987-2003 in private services sectors.

4. Does the geography of entrepreneurship change over the business cycle?

The effects of the economic crisis in Sweden were not uniform across regions. Some lost several thousands of jobs whereas others were only marginally affected.

Figure 9 illustrates the distribution of the percentage change in employees between 1990 and 1993 across Swedish municipalities. The percentage change in employees goes from marginally positive to a fall of almost 25 percent. A number of municipalities show a modest decline in employment whereas some lost about a fifth or even a quarter of their employment.

Did the spatial variation in the effects of the economic downturn have any impact on the spatial distribution of start-up activity? If different municipalities were hit differently, it is conceivable that the crisis had an impact on the spatial distribution of start-ups. On the other hand, as argued previously, an entrepreneurship culture should, because of its slow change and historical embeddedness, survive even major changes in the general economic environment.

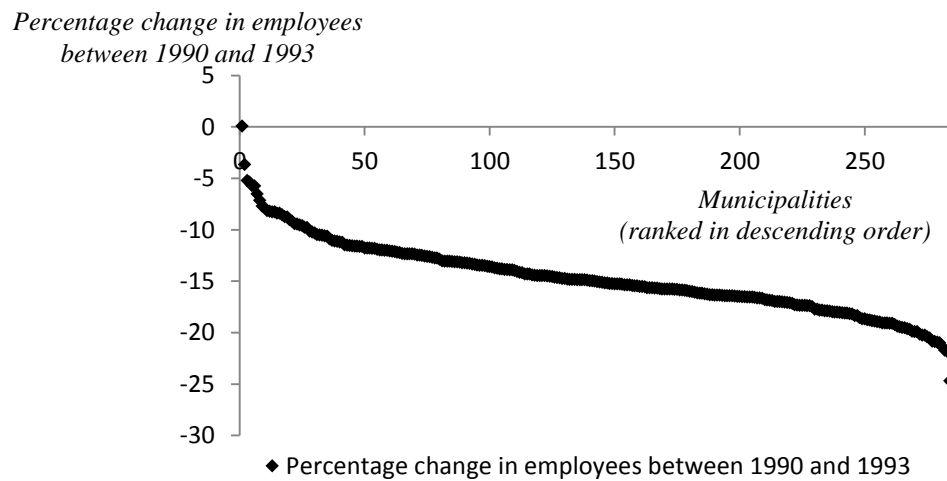


Figure 9. *Percentage employment change across Swedish municipalities (284) 1990-1993.*

To illustrate these questions for Sweden, I compare the spatial distribution of the rates of new firm formation in four different time periods:

- 2004-2007: recent times
- 1994-1997: post-crisis
- 1991-1993: crisis period
- 1987-1990: pre-crisis

The main idea is to illustrate to what extent the crisis had an impact on the spatial distribution of new firm formation.

I begin by presenting the overall distribution of the average rates of new firm formation across Swedish municipalities in the four different time periods. Figure 10 presents the estimated Kernel density of opportunity- and necessity-based start-up rates, respectively.¹²

¹² Kernel density estimation is a way to estimate the probability density function of a variable.⁹

Starting with the opportunity-based start-ups (upper figure), the pre-crisis spatial distribution (1987-1990) were less concentrated, with a higher mean start-up rate. The latter is evident by the curve being positioned to the right of the others, and is consistent with a higher level of opportunity-based start-up rates in the immediate years before the crisis, as reported in Figure 5.

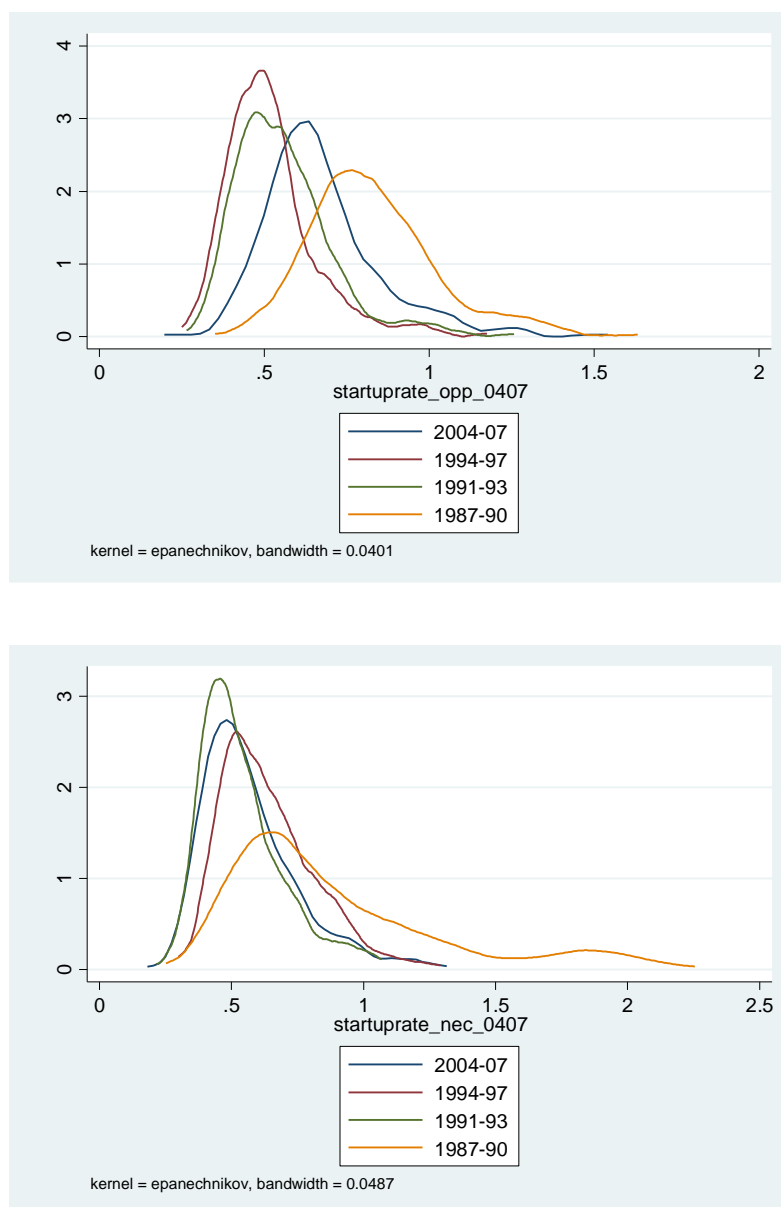


Figure 10. *The distribution of start-up rates across Swedish municipalities in four different time periods (opportunity-based start-ups in the upper figure and necessity-based start-ups in the lower).*

During the crisis period (1991-1993) and in the following years (1994-1997) the distribution becomes more concentrated and moves to the left as the average rate of start-ups fall in the economy. The distribution for 2004-2007 is positioned to the right of the distribution for the crisis years as well as the immediate post-crisis years, but its shape remains roughly invariant. A similar pattern is observed for necessity-based start-ups, though the change in the concentration and the right tail of the distribution during the crisis is much more significant.

One way to appreciate the main patterns in Figure 10 is that the pre-crisis period was a ‘bubble period’ inspiring entrepreneurial endeavors (opportunity- as well as necessity-based) in the whole economy, with a less concentrated spatial distribution of start-ups as result. When the bubble burst in the beginning of the 1990s the rate of start-ups then generally declined and became more spatially concentrated.

While illustrating the overall spatial distribution of rates of new firm formation, the estimated Kernel densities in Figure 10 do not inform about the position of different municipalities in the distributions in the different time periods. In principle, a distribution can remain invariant over time although the different municipalities change positions in the distribution.

In order to test if regional start-up rates are persistent over the business cycle in the sense that the municipalities keep their position in the (spatial) distribution of new firm formation rates over time, I do two things. First, I present Spearman rank correlation coefficients between the average start-up rate across Swedish municipalities 2004-2007 and the three other time periods, respectively. Spearman rank correlation coefficients measure how tightly ranked data cluster around a straight line and take a value between -1 and +1. Positive (negative) coefficients imply a positive (negative) association between the ranks, and a correlation close to zero means there is no linear relationship between the ranks. Second, I estimate simple linear regressions with the average start-up rate in 2004-2007 as the dependent variable and ‘explain’ this with the average start-up rate in the other respective periods. I then present the R-squares of these estimations. These R-squares inform about what fraction of the variance in the current average start-up rates across Swedish municipalities that is explained by the start-up rates in the other time periods. If the Spearman rank correlation coefficients and the R-squares are high, it means that the municipalities tend to keep their position in the spatial distribution of start-up rates even in periods of significant changes in the general economic environment.

Table 1. *Spearman rank correlation coefficients between the average start-up rate across Swedish municipalities in 2004-2007 and in three other respective time periods.*

	Opportunity-based start-up rates	Necessity-based start-up rates
1994-1997	0.79	0.81
1991-1993	0.74	0.83
1987-1990	0.72	0.81

Note: All correlation coefficients significant at the 0.01 level.

Spearman rank correlation coefficients are reported in Table 1 and the R-squares of the simple linear regressions are presented in Table 2. It is evident from Table 1 that the rank correlation coefficients are high and statistically significant, indicating that municipality's position tend to be stable even over periods of significant economic crisis. Looking at the R-squares in Table 2, over 70% of the variance in opportunity- as well as necessity-based start-up rates today is explained by the same type of start-up rates during the crisis years (1991-1993) as well as the pre- and post-crisis periods.

The main conclusion is that when the general level of start-up activity changes during a business cycle, the regional distribution of start-ups change in terms of its concentration. But the data yet suggest strong persistence in regional start-up rates over a business in the sense that the position (or rank) of municipalities is rather invariant over a business cycle. The start-up rates during an economic downturn are also able to explain a significant fraction of the variation in start-up rates in 'normal' times several years after the crisis. These patterns are in line with what one would expect in the presence of persistent differences in entrepreneurship cultures across regions.

Table 2. *Fraction of variance in the average start-up rate 2004-2007 across Swedish municipalities explained the start-up rate in three different time periods.*

	Opportunity-based start-up rates	Necessity-based start-up rates
1994-1997	0.72	0.62
1991-1993	0.63	0.73
1987-1990	0.61	0.62

Note: The table reports the R-square from three separate regressions with the average start-up rate 2004-2007 as the dependent variable and the average start-up rate in 1994-1997, 1991-1993 and 1987-1990 as respective independent variables.

5. Policy discussion

A first remark is that policy cannot change a region's history. Historically rooted and embedded phenomena, such as entrepreneurship cultures, must be perceived as 'gifts from the past'. Policy should yet be based on recognition of the role played by historical and cultural factors and be adapted to the circumstances in different regions.

Accepting entrepreneurship cultures means for example that the (local) effects of the same policy measures may be quite different depending on the region in which they are implemented. Take for instance the common discussion about the magnitude of local multipliers associated with various kinds of regional investments, such as the opening of a new plant, upgrading or construction of highways or the establishment of a local university. Local multiplier effects refer to that these investments often generate a larger number of jobs than those directly associated with the activity pertaining to the investment. The reason for this is that investments of this kind stimulate demand throughout the local economy through expenditure linkages. A new plant in a local economy, for instance, means a greater number of employees that demand local services such as hairdressers and restaurants. Part of multiplier effects of this kind are materialized in the form of individuals (or entrepreneurs) acting on new entrepreneurial opportunities provided by the investment. But the extent to which individuals in a region do so may be linked to the entrepreneurship culture prevailing in the region. In other words, in regions with a 'strong' entrepreneurship culture – where the social acceptance of entrepreneurship is high and entrepreneurial activities are (socially) encouraged – the local multiplier effects of a given type of investment may be larger because the inhabitants are more prone to recognize and materialize entrepreneurial opportunities. The message is that 'one size fits all' policy-making at a regional scale is likely to be inefficient. Discussions of policy measures and their expected effects should acknowledge and be adapted to contextual factors in the regions in which the policy measures are supposed to be implemented. Given the role played by entrepreneurship cultures, this appears particularly relevant in the context of policy aimed at stimulating regional entrepreneurship.

Another lesson for policy is that historically rooted phenomenon like entrepreneurship cultures change in slow processes, which means that policy intended to stimulate the level of entrepreneurship in a region has a difficult task. Short-term policies are likely to be of little help in altering path-dependent development trajectories of regions. The characteristics of entrepreneurship cultures provide arguments for that entrepreneurship policies should be catalytic in nature and have long term horizon.

This gives further support for the idea of that the type of ‘framework conditions’ imposed on fiscal policy in Sweden since the crisis in the beginning of the 1990s may be suitable also for policies pertaining to innovation and entrepreneurship. This idea has for example recently been launched by Braunerhjelm et al (2012). Empirical evidence of entrepreneurship being significantly influenced by durable and slowly changing cultural factors further strengthen the idea of long-term horizons and persistence of policies intended to stimulate it.

With regard to the question which regions to aim for with start-up policies, we argue in Andersson and Koster (2011) that there are in principle two basic contrasting perspectives. On the one hand it could be argued that policy efforts should be concentrated to regions with already established entrepreneurial climate, as the effects of a policy may be higher in these regions, e.g. more people willing to opt for starting new businesses. On the other hand, one could argue that policy efforts should instead be concentrated on the lagging regions as the leading regions will be fine anyway.

Policy aiming at a real influence on start-up activity and the long-term development in these regions most likely need to be *catalytic* in nature, able to alter pertinent slowly changing features of the regions (cf. Andersson and Johansson 2012). Such catalytic policy measures could, for example, comprise measures to increase the in-migration of people with entrepreneurial skills and competencies through e.g. novel housing policies or it may comprise of the establishment of new R&D centers with supporting efforts to materialize the entrepreneurial opportunities they give rise to. It could also focus on stressing entrepreneurial skills in education. Although the specific policy measures may differ from region to region, the main implication is that policy should focus on influencing the structural elements of a regional economy. This in turn can then influence the entrepreneurial activity in the long run.

As already emphasized, these processes of change are inherently slow and that policy measures should have a long time horizon. Such policy strategies appear to have higher potential than start-up policies that focus on small adjustments of the conditions for starting new firms, e.g. start-up subsidies in lagging regions.

References

Aldrich, H. (1999). *Organizations Evolving*. London: Sage

- Andersson, M and B Johansson (2012), "Regional Policy as Change Management – theoretical discussions and empirical illustrations", in Rickne, A., S Laestadius and H Etzkowitz (eds) (2012), *Innovation Governance in an Open Economy – shaping regional nodes in a globalized world*, Routledge, Berlin
- Andersson, M and S Koster (2011), "Sources of Persistence in Regional Start-Up Rates – evidence from Sweden", *Journal of Economic Geography*, 11 (1), 179-201
- Arenius, P and M Minniti (2005), "Perceptual Variables and Nascent Entrepreneurship", *Journal of Small Business Economics*, 24, 233-247
- Armington, C and Z Acs (2002), "The Determinants of Regional Variation in New Firm Formation", *Regional Studies*, 36 (1), 33–45
- Audretsch, D and M Fritsch (1994), "The Geography of Firm Births in Germany", *Regional Studies*, 28 (4), 359–365
- Audretsch, D and M Keilbach (2004), "Does Entrepreneurship Capital Matter?", *Entrepreneurship Theory and Practice*, 28 (5), 419-429
- Baumol, W.J (1993) *Entrepreneurship, Management and the Structure of Payoffs*. Cambridge: MIT Press.
- Beugelsdijk, S (2007), "Entrepreneurial Culture, Regional Innovativeness and Economic Growth", *Journal of Evolutionary Economics*, 17 (7), 187-210
- Blanchflower, D.G and A.J Oswald (1998), "What makes an Entrepreneur?", *Journal of Labour Economics*, 16, 26-60
- Bosma, N., A 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 Management Journal*, 4, 129-146
- Braunerhjelm, P and P Thulin (2010), "Nyföretagande i Kristid: tre kriser, tre förlopp", *Ekonomisk Debatt*, 38 (8), 32-46
- Braunerhjelm, P., K Eklund and M Henrekson (2012), *Ett Ramverk för Innovationspolitiken: att göra Sverige mer entreprenöriellt*, Samhällsförlaget, Stockholm
- Davidsson, P and J Wiklund (1997), "Values, Beliefs and Regional Variation in New Firm Formation Rates", *Journal of Economic Psychology*, 18, 179-199
- Fritsch, M and M Wyrwich (2012), "The Long Persistence of Regional Entrepreneurship Culture – Germany 1925-2005", Jena Economic Research Papers 2012-036
- Glaeser, E (2007), "Entrepreneurship and the City", NBER Working Paper 13551
- Guiso, L. and F. Schivardi (2005), "Learning to Be an Entrepreneur", CEPR discussion paper 5290.

- Hagberg, T and L Jonung (2005) "1990-tals krisen: hur svår var den?", *Ekonomisk Debatt*, 33 (8), 30-45
- Hoselitz, B (1957), "Noneconomic Factors in Economic Development", *American Economic Review papers and proceedings* 47, 28-41
- Johannisson, B (1983), "Swedish Evidence of the Potential of Local Entrepreneurship in Regional Development", *European Small Business Journal*, 2:, 11-24.
- Johannisson, B (1984), A "Cultural Perspective on Small Business – local business climate", *International Small Business Journal*, 2, 32-43
- Martin, R and P Sunley (2006), "Path Dependence and Regional Economic Evolution", *Journal of Economic Geography*, 6, 395-437
- North, D.C (1990) *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University P
- Saxenian, A (1994), *Regional advantage. Culture and competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press.
- Schumpeter, J (1934), *The Theory of Economic Development*. Cambridge: Harvard University Press.
- Verheul, I., S Wennekers, D Audretsch and R Thurik (2001) *An Eclectic Theory of Entrepreneurship*. Tinbergen Institution Discussion Paper, Rotterdam.
- Westlund, H and R Bolton (2003), "Local Social Capital and Entrepreneurship", *Small Business Economics*, 21, 77-113
- Wigren, C (2003), "The Gnosjö Spirit – the grand narrative and beyond", JIBS Dissertation Series
- Williamson O (2000), "The New Institutional Economics – taking stock and looking ahead", *Journal of Economic Literature*, XXXVIII, 595-613

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