Source: Michael Fritsch and Jürgen Schmude (eds.): Entrepreneurship in the Region, New York 2006, Springer.

11 THE EVOLUTION OF REGIONAL ENTREPRENEURSHIP AND GROWTH REGIMES

Michael Fritsch and Pamela Mueller

1. The Problem

It is hardly disputed that new business formation and self-employment can be important drivers of economic growth (Scarpetta, 2003; Carree and Thurik, 2003). Recent empirical studies (Fritsch and Mueller, 2004; Van Stel and Storey, 2004; Baptista, Escária and Madrugo, 2005) have clearly shown that the main positive effects of new business formation do not occur immediately when the new ventures are started but become effective only in the longer run. This paper analyzes the development of regional entrepreneurship and its effect on employment growth in West Germany in the 1983-2002 period. First, we investigate the magnitude and persistence of regional entrepreneurship (section 3 and 4). The second part is devoted to the impact of new businesses on regional employment. This analysis is based on a classification of regional growth regimes that are identified according to differences in the effect that entrepreneurship has on regional employment growth (section 5). In investigating transitions between growth regimes we are able to identify a typical life-cycle of regime types that has important implications for a policy that is aiming at stimulating regional development (section 6). We begin with some basic information on the data and on measurement issues (section 2).

2. Data and Measurement Issues

Our information on new firm formation and regional employment is from the establishment file of the German Social Insurance Statistics, as described and documented by Fritsch and Brixy (2004). This database provides information about all establishments that have at least one employee subject to obligatory social insurance. The information on West Germany is currently available on a yearly basis for a relatively long time period of twenty years ranging from 1983 to 2002.

Because the database records only businesses[1] with at least one employee, start-ups consisting of only owners are not included. In order to capture regional entrepreneurship, we exclude new businesses with more than twenty employees in the first year of their existence. As a result, a considerable number of new subsidiaries of large firms contained in the database are not counted as start-ups.[2] Although the database only includes information at the establishment level, a comparison with information on the regional distribution of headquarters of newly founded firms reveals a rather high correlation. Therefore, our information on new businesses can be regarded as indicator for regional entrepreneurship (see Fritsch and Brixy, 2004, and the analyses in Fritsch and Grotz, 2002). The share of employees in young and small firms or the share of young and small firms in the respective regions could also be utilized as a measure of regional entrepreneurship. According to Wagner (2004) work experience in young and small firms has a positive impact on the propensity to be a nascent entrepreneur. Moreover, Mueller (2005) found that a high share of small and young firms in the region can be regarded as a breeding ground for nascent entrepreneurs. Therefore, a high share of young and small firm may be a good indicator of a well-developed entrepreneurial climate or entrepreneurial spirit in a region.

We restrict our analysis to West Germany because many empirical studies indicate that the East German economy in the 1990s was a special case with very specific conditions that cannot be directly compared to those of West Germany (cf. Brixy and Grotz, 2004; Fritsch, 2004; Fritsch and Grotz, 2004).[3] The 74 West German planning regions form the spatial framework of the analysis. Planning regions are functional units that consist of at least one core city and the surrounding area (see BBR, 2003). They are somewhat larger than what is frequently defined as labor market area.

The sheer number of start-ups that occur in a region within a certain time period is only of limited significance for an interregional comparison because

1 We use the term 'new businesses' as the overall category for both new firm headquarters and new subsidiaries. Our empirical data include these two categories of new entities. For an analysis at the regional level, there are important differences between new firms and new establishments. One of these differences relates to the location of entrepreneurship. While both the set-up of new firms as well the set-up of subsidiary establishments involves some entrepreneurship, this entrepreneurship will be mainly sited at the firm's headquarters. The creation of a new branch plant in a region may, therefore, not be regarded as an indication for entrepreneurship there. Moreover, the location decision for a subsidiary could be influenced by factors that are rather different from those that determine the location of a new firm's headquarter. Restricting the empirical analysis to the firm level by including only new headquarters could make largely sure that the focus is on the effect of entrepreneurship. A potential disadvantage of such an analysis could be that it neglects the important effect that new branch plants may have for regional development.

2 The share of new establishments with more than 20 employees in the first year in the data is rather small (about 2.5 percent). Applying a definition without a size-limit does not lead to any significant changes of the results.

3 The Berlin region was excluded due to changes in the definition of that region during the time period under inspection.

it does not account for the economic potentials of these regions. In order to judge if the level of start-up activity in a certain region is relatively high or relatively low compared to other regions, or if some regions are more entrepreneurial than other regions, the number of start-ups should be related to the economic potential of the respective region. For this purpose, a start-up rate has to be determined. There are a number of alternative ways to calculate such a start-up rate.[4] We use the start-up rate according to the labor market approach. This means that the number of start-ups per period is divided by the number of persons in the regional workforce at the beginning of the respective period, including those persons that are recorded as unemployed. This kind of start-up rate is based on the notion that each member of the workforce is faced with the decision to work as a dependent employee in someone else's business or to start his or her own firm. Because start-ups are usually closely located to the founder's residence (Gudgin, 1978; Mueller and Morgan, 1962; Cooper and Dunkelberg, 1987), the regional workforce can be regarded as an appropriate measure of the number of potential entrepreneurs. The entry rate according to the labor market approach may be interpreted as the propensity of a member of the regional workforce to start an own business.

3. Regional Differences of Entrepreneurship over Time

During the 1983-2002 period there were on average about 126,000 private sector start-ups per year in West Germany. Over the years the number of start-ups increased slightly with a relatively distinct rise between the years 1990 and 1991 and between 1997 and 1999.[5] The difference between the average number of new businesses in the 1983-89 and the 1990-97 period was about 12.3 percent, and the difference between the average number of start-ups in the 1990-1997 and the 1998-2002 period was about 16.6 percent. The majority of the new businesses, about 93,400 per year (74 percent of all start-ups), were in the service sector compared to about 13,800 new establishments per year (11 percent of all start-ups) in manufacturing.[6] There was an overall trend towards an increasing share of start-ups in the service sector and a corresponding decreasing share of new businesses in manufacturing (figure 11.1). In the service sector, the largest number of new establishments was set up in wholesale and resale trade, hotels and inns, and the non-

4 See Audretsch and Fritsch (1994) for different approaches of calculating start-up rates.

5 The reasons for these two increases are largely unclear. It would not be very implausible to suspect that the rise of the number of start-ups between 1990 and 1991 was caused by the unification of East and West Germany in the year 1990. However, we could not find any further indication for this hypothesis in the data. The rise between 1997 and 1999 coincides with a change of the sector classification system of the Social Insurance Statistics, but again, it remains unclear how this change could have affected the number of start-ups that was recorded.

6 The other private sectors are agriculture and forestry, fishery, energy and water supply, mining and construction.

specified other services. In manufacturing, most start-ups were in electrical engineering, furniture, and food.

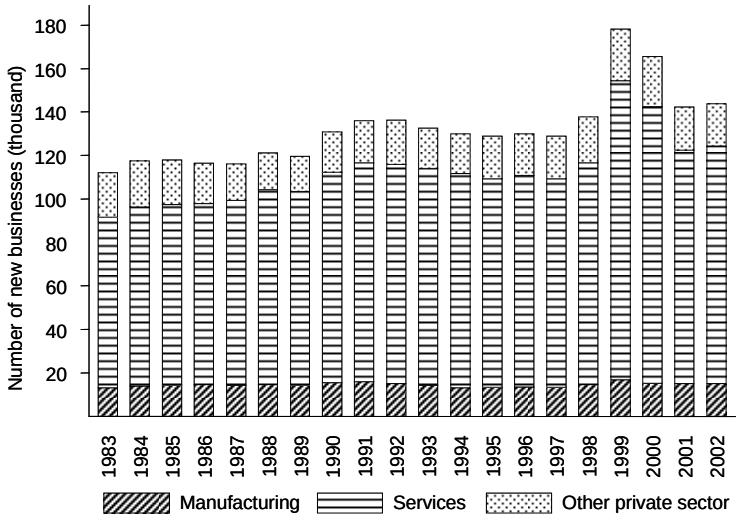

Figure 11.1: Number of start-ups per year in West Germany 1983-2002

Not surprisingly, most of the start-ups between 1983 and 2002 (on average 56.34 percent) were located in the densely populated agglomerations, while only on average 11.27 percent were in rural areas. The share of new businesses in the service sector was relatively high in agglomerations (77.02 percent) and lowest in rural regions (68.59 percent). Taking the private sector as a whole, we find the highest start-up rates in rural areas (7.78), but the start-up rate in agglomerations is not much lower having an average value of 6.88. The highest start-up rates in manufacturing can be found in the moderately congested regions and in agglomerations, the highest start-up rates for services are in rural areas as well as in agglomerations. Despite these differences however, the regional distribution of start-up rates in the two sectors is rather similar to the picture that we get for the overall private sector (figure 11.2).[7] Generally, start-up rates tended to be higher in the northern part of West Germany and in the regions south of Munich and Cologne.

The regional distribution of the share of employees in young and small firms, namely firms that are at maximum three years old, shows a very similar picture. While in and south of Munich almost eight percent of all employees were working in small and young businesses this share is only about five percent in the Stuttgart region. The regions in the northern part of Germany are also characterized by a high share of employees in young and small firms that amounts to about nine percent.

7 Start-up rates can be estimated for the time period 1984-2002. Due to missing data on regional unemployment in the year 1983, start-up rates for the year 1983 cannot be calculated.

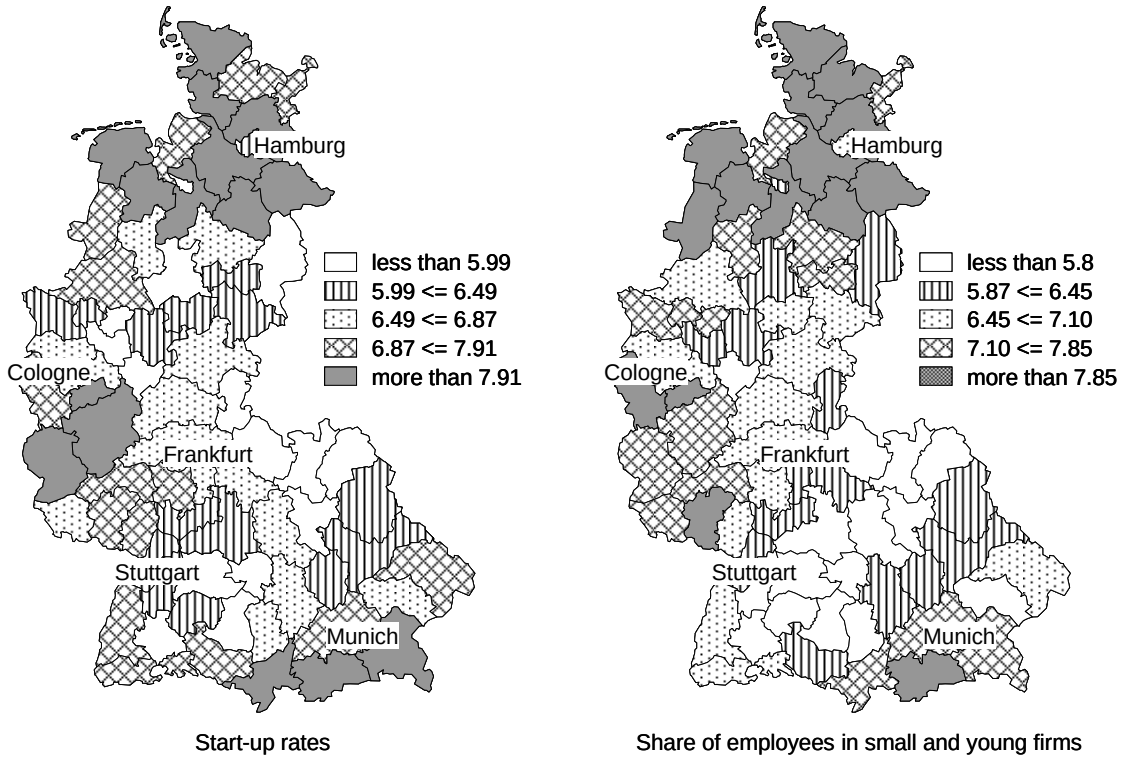

Figure 11.2: Average start-up rates (1984-2002) and average share of employees in small and young firms (1987-2002)

The development of the number of start-ups is rather steady, not only for the West German economy as a whole but also at the level of planning regions (figure 11.3). We use start-up rates for comparison of the level of new business formation activity between regions. Investigating the relationship between regional start-up rates (number of new businesses per 1,000 persons in the workforce) in different years shows rather high correlation (figure 11.3 and table 11.A1 in the Appendix). In most cases the correlation coefficient of start-up rates in subsequent years assumes a value between 0.96 and 0.98. The relationship is somewhat less close for years that are farther apart, but even over a ten, 15 and 19 year period the value of the correlation coefficient always remains above 0.76. There is some slight variation with regard to the strength of this relationship between the different years, but the basic pattern remains remarkably constant. Obviously, new business formation activity is rather persistent over time.

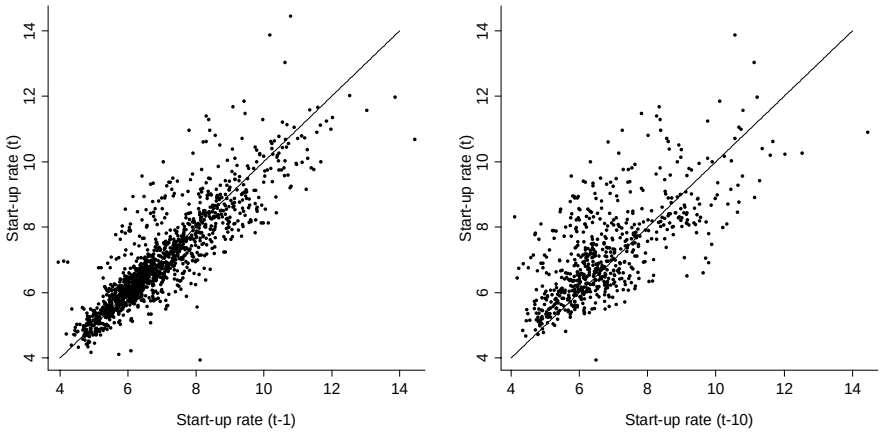

Figure 11.3: Relationship between start-up rates in subsequent years (t and t-1) and over a ten year period (t and t-10)

In comparison to the pronounced persistency of start-up rates over time, we find a high variation between start-up rates across space. The minimum regional start-up rate is about 4 start-ups per 1,000 persons in the regional work force while the maximum start-up rate amounts to a little more than 14 (figure 11.3). The variation of start-up rates over time may be caused by either changes in the number of start-ups (the numerator of the start-up rate) or by changes in the regional workforce (the denominator). Fritsch and Mueller (2005c) find that changes of start-up rates are mainly a result of the variation of the new business formation activity, while the effect of changes of the number of employees is more or less negligible.

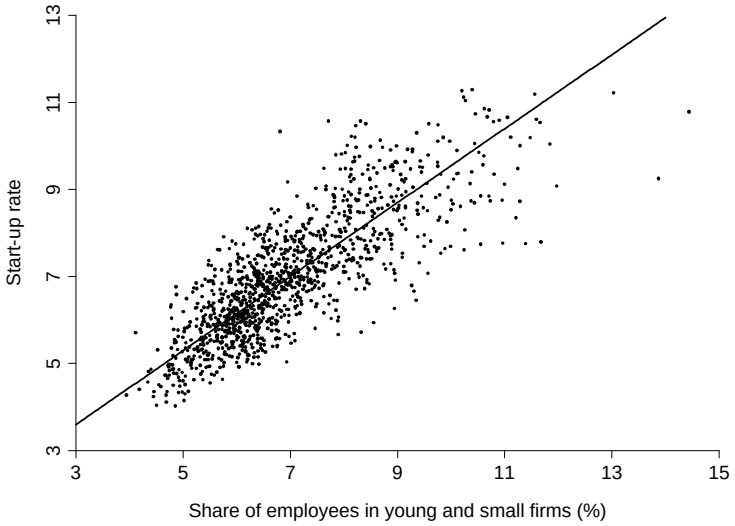

Figure 11.4: Relationship between the share of employees in young and small firms and new business formation rates West Germany 1987-2002

There seems to be an overall trend that those regions that have a high share of employees in small and young firms also experience a high level of new business formation activity (cf. figure 11.4).[8] This finding confirms the results of Wagner (2004) and Mueller (2005), who found that young and small firms are hothouses for nascent entrepreneurs (also Beesley and Hamilton, 1984). Thus, we conclude that a high share of employees in young and small firms characterizes a breeding ground for new business formation in the region.

4. Changes in Regional Entrepreneurship

Ordering regions by their start-up rate in ascending order gives their rank position with regard to the level of entrepreneurship. These rank positions of regions display their relative performance with regard to the respective indicator independent of the national trend. We assign rank 74 to the region with the highest value of the entrepreneurship indicator and rank 1 to the region with the lowest value. Because our interest is not in the short term fluctuations but rather in the development in the medium and the long run, we compare the changes of rank positions between five-year periods. Rank positions for the average start-up rates were calculated for the periods 1984-87 (period I), 1988-92 (period II), 1993-97 (period III), and 1998-2002 (period IV).

8 A comparison of regional start-up rates using the business stock approach and the share of young and small firms results in a similar picture. Regions with a high share of small and young firms also experience high start-up rates (beta coefficient of 0.80).

West German planning regions hardly experience a rank change with regard to their start-up rate of more than twenty positions between two successive five-year periods (table 11.1). The number of regions with rank changes of more than twenty positions increases with the length of the time period. Between period I and III (II and IV) five (six) regions change more than twenty rank positions. Between period I and IV such great changes can be found for nine regions, representing 12.16 percent of all regions. On average, less than half of the regions experienced a change of more than three rank positions between two successive time periods. In more than 85 percent of the regions changes between two successive time periods did not exceed ten rank positions. The greatest change between two successive periods amounted to 25 rank positions. Over three periods (period I → III or period II → IV) the maximum number of rank position change is 27 and 31, respectively. The maximum change over four periods (period I → IV) is 30 rank positions. In four out of the nine regions that experienced a change of more than twenty rank positions between period I and IV; this change was positive (Bayerischer Untermain/Aschaffenburg, Cologne, Hamburg, and Duesseldorf), in four cases it was negative (Emsland, Osnabrueck, Arnsberg, and Landshut).

Table 11.1: Change of rank positions of start-up rates between five year periods

	Number of rank positions changed between period[+]							
	0	≤ 3	≤ 5	≤ 10	≤ 15	≤ 20	> 20	Maximum[++]
I → II	4 5.41	40 54.05	47 63.51	64 86.49	68 91.89	74 100.00	0 0.00	19 (46 → 27)
II → III	8 10.81	33 44.59	47 63.51	64 86.49	70 94.59	71 95.95	3 4.05	25 (21 → 46)
III → IV	10 13.51	41 55.41	53 71.62	66 89.19	69 93.24	74 100.00	0 0.00	20 (44 → 24) (32 → 12) (45 → 25)
I → III	3 4.05	25 33.78	33 44.59	57 77.03	65 87.84	69 93.24	5 6.76	27 (19 → 46)
II → IV	7 9.46	31 41.89	39 52.70	56 75.68	64 86.49	68 91.89	6 8.11	31 (51 → 20)
I → IV	1 1.35	17 22.97	30 40.54	50 67.57	56 75.68	65 87.84	9 12.16	30 (65 → 35) (50 → 20)

Time periods: I = 1984-87, II = 1988-92, III = 1993-97, IV = 1998-2002. [+] First row: number of regions; second row: share of all regions (percent); change of ranks in absolute numbers. [++] Last column: absolute number of ranks, rank positions in parentheses,
highest rank = rank 74.

In an analysis of the factors determining changes of regional new business formation activity Fritsch and Mueller (2005b) found that regional innovativeness and the share employment in small and young businesses are rather conducive to an increase of start-up rates. Generally, a high level of new business formation rates can be regarded as a seedbed for future entrepreneurial activities; thus, entrepreneurship is to a degree self-energizing.

5. Distribution and Transition of Regional Growth Regimes

Audretsch and Fritsch (2002) suggested that there may be considerable differences between regions with regard to the role that new firms and entrepreneurship play for development. In introducing a theory of regional growth regimes, they extended the concept of the technological regime (Audretsch, 1995, 39-64; Marsili, 2002; Winter, 1984) from the unit of observation of the industry to a geographic unit of observation (see also Fritsch, 2004). By analogy to the common concepts of a technological regime, the growth regime in a region is labeled *entrepreneurial* if growth results from a high level of new-firm start-ups and a turbulent enterprise structure. In contrast, regions where above average growth goes together with a relatively stable structure of large, incumbent enterprises are regarded as having a *routinized* growth regime. In the routinized regime, new businesses do not play an important role, and their chances for survival and growth are much lower than in an entrepreneurial regime.

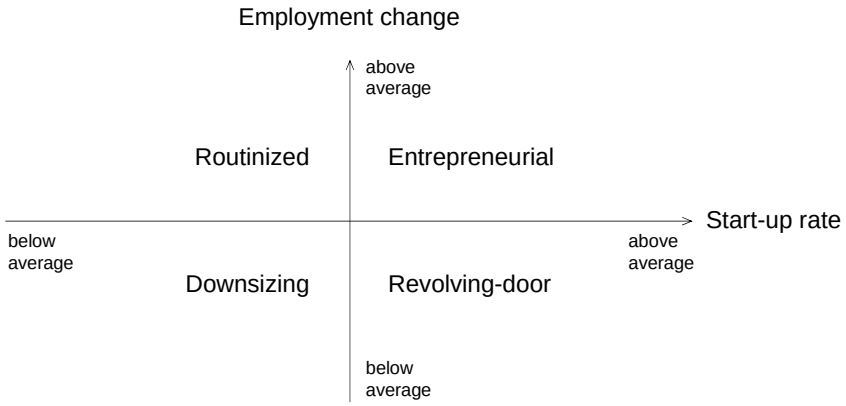

Figure 11.5: Growth regime types and their characteristics

Audretsch and Fritsch (2002) characterized regions which exhibit relatively low growth rates but above average start-up rates as *revolving-door* growth regimes (see also Fritsch and Mueller, 2005a). They suspected that under such a regime entries tend to be non-innovative, supplying basically the same products and using nearly the same technology as the incumbent firms.

Finally, relatively low-growth regions, which are characterized by a below average level of start-up activity, are classified as a *downsizing* growth regime. In such a region, the amount and the quality of start-ups is obviously not sufficient to provide enough new jobs or income to substitute for the losses in the incumbent firms.

Table 11.2: Distribution of growth regime types over time

	1984-1992	1988-1997	1993-2002
Number of planning regions classified as:			
Entrepreneurial	20	25	23
Routinized	17	12	14
Downsizing	20	25	23
Revolving-door	17	12	14
Entrepreneurial regime characteristics:			
Employment change (mean)	24.16	12.86	7.89
Start-up rate (mean)	7.96	8.16	7.39
Routinized regime characteristics:			
Employment change (mean)	21.63	9.99	4.33
Start-up rate (mean)	6.05	5.61	5.80
Downsizing regime characteristics:			
Employment change (mean)	12.33	0.75	-4.65
Start-up rate (mean)	5.67	5.58	5.53
Revolving-door regime characteristics:			
Employment change (mean)	14.51	1.02	-3.08
Start-up rate (mean)	8.42	6.93	7.45

We have assigned all 74 West German planning regions to these four growth regime types. This classification is based on the regional start-up rate and the percentage of employment change (cf. figure 11.5 and table 11.A2 in the appendix). Because the main part of the positive employment effects of new businesses occurs only in the longer run (Fritsch and Mueller, 2004; Van Stel and Storey, 2004; Baptista, Escária and Madrugo, 2005), it is important to relate the indicators for entrepreneurship to the growth performance of a sufficiently long time period. Fritsch and Mueller (2004) have found that West German regions which have the strongest positive effect of new business formation on regional employment occurred about seven to eight years after the new entities had been set up. In order to capture such long-term effects we choose three relatively long periods for the classification into regional growth regimes, namely the years 1984-1992, 1988-1997, and 1993-2002. For these three time periods the average start-up rate of the first two years is always linked to percentage of employment change of the whole

period. If both, the start-up rate and the employment growth rate, exceed their median values the regional growth regime is regarded as entrepreneurial. A routinized regime is characterized by a start-up rate below the median value and an employment growth rate exceeding the median. The downsizing regime is given when both rates are below the median values. Finally, a district is classified as a revolving-door regime if the start-up rate exceeds the median value but employment growth rate is below the median.

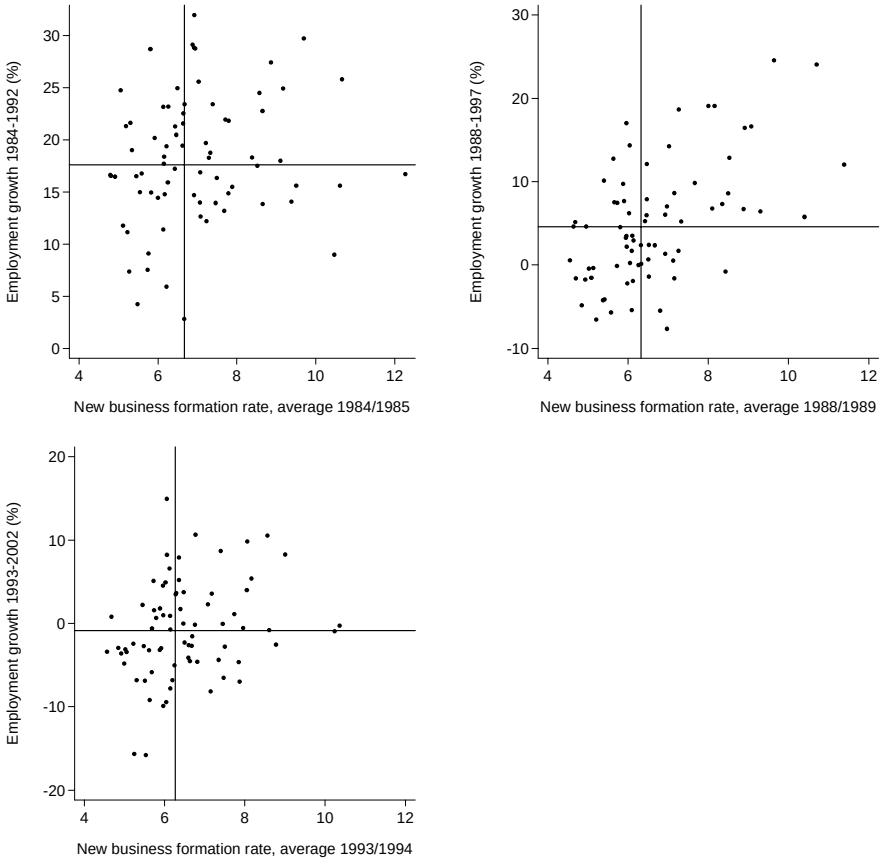

Figure 11.6: Distribution of growth regimes between 1984-1992, 1988-1997, and 1993-2002

The distribution of regions among the four categories of growth regimes shows that regions of a certain regime-type tend to be clustered in space (cf. table 11.2 and figure 11.6). This indicates the prevalence of neighborhood effects. Obviously, the spatial context is of relevance for the relationship between entrepreneurial activity and economic development (figure 11.7).

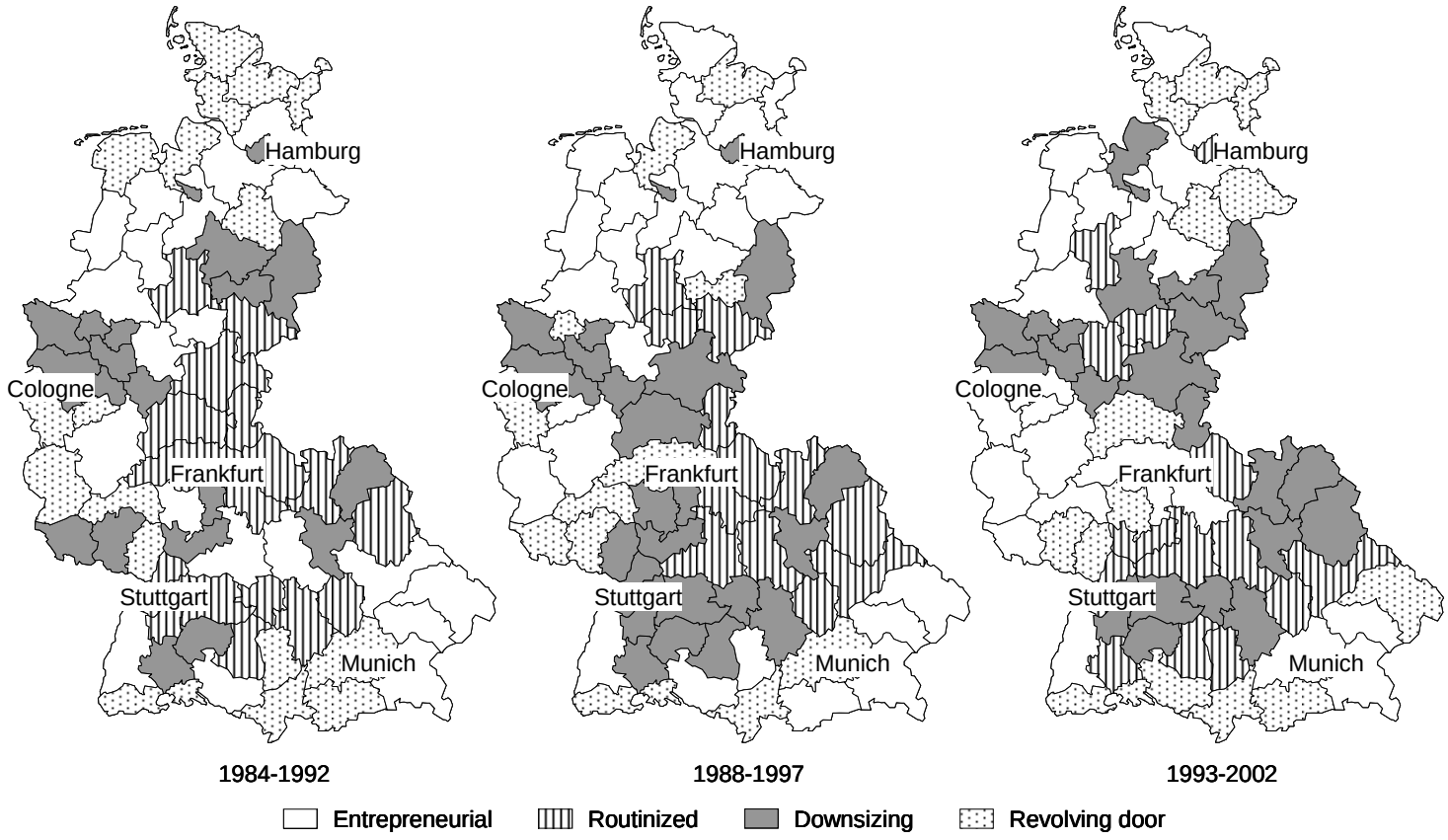

Figure 11.7: Types of regional growth regimes 1984-1992, 1988-1997, and 1993-2002

For the period of analysis, there is a remarkably prevalent transition from revolving-door regimes to entrepreneurial regimes in the northern part of Germany in the regions around Frankfurt as well as in the region of Munich. These regions have succeeded to transform new business formation into employment growth. The regions south of Cologne also became more and more entrepreneurial between 1984 and 2002. It is remarkable that particularly many of those regions that have been classified as routinized tend to become downsizing regimes in later periods, like regions around Stuttgart and northeast of Munich, or south of Hanover). Most of the regions categorized as entrepreneurial regimes over all three time periods are located in the north of Germany or in the southeast, and half of the regions that are classified as downsizing regimes for all three periods are clustered in the Rhine-Ruhr area north of Cologne.

Table11.3: Distribution of regions across regimes and transition probabilities between time periods

	Regime type in period 1988-97 and 1993-2002									
Regime type in period 1984-92, 1988-97	Entrepreneurial		Routinized		Downsizing		Revolving-door		Row Total	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Entrepreneurial regime	15	75.00	4	20.00	1	5.00	0	0.00	20	100
	15	60.00	3	12.00	0	0.00	7	28.00	25	100
		67.50		16.00		2.50		14.00		
Routinized regime	0	0.00	8	47.06	8	47.06	1	5.88	17	100
	1	8.33	7	58.33	4	33.33	0	0.00	12	100
		4.17		52.70		40.20		2.94		
Downsizing regime	1	5.00	0	0.00	15	75.00	4	20.00	20	100
	1	4.00	5	20.00	15	60.00	4	16.00	25	100
		4.50		10.00		67.50		18.00		
Revolving-door regime	9	52.94	0	0.00	1	5.88	7	41.18	17	100
	5	41.67	0	0.00	3	25.00	4	33.33	12	100
		47.31		0.00		15.44		37.26		
Column Total	25	33.78	12	16.22	25	33.78	12	16.22	74	100
	22	29.73	15	20.27	22	29.73	15	20.27	74	100

First row: change between 1984-92 and 1988-97, second row: change between 1988-97 and 1993-2002, third row: average transition probability.

Comparing all of the transitions together between the successive time periods, we found that on average 67.5 percent of the regions with an entrepreneurial regime stay in this category in the successive time period. The probability of remaining entrepreneurial is almost five-times higher than becoming a revolving-door regime and about four-times as high as becoming a routinized regime in the subsequent time period. Regions classified as a revolving-door regime have a higher probability of shifting towards an

entrepreneurial regime (47.3 percent) than remaining in the revolving-door category (37.3 percent) in the following period. Those regions that are assigned to the downsizing category show the same degree of persistence in this type of regime as the entrepreneurial regions. In the successive time period, 67.5 percent of these regions remain in the downsizing category. The probability of a region characterized by a downsizing regime to become routinized is much smaller (10 percent) than the probability of a region with a routinized regime to become a downsizing regime (40.2 percent). For both the routinized and downsizing regimes, we found the lowest probability to be a transition to an entrepreneurial regime (both about 4 percent). If regions characterized by a routinized or a downsizing regime succeed to overcome the low level of new firm formation activity, these regions are quite likely to first fall into the revolving-door category before they can, in later periods, benefit from the employment-generating effects of new firm formation and become entrepreneurial regimes (cf. table 11.3 and figure 11.8).

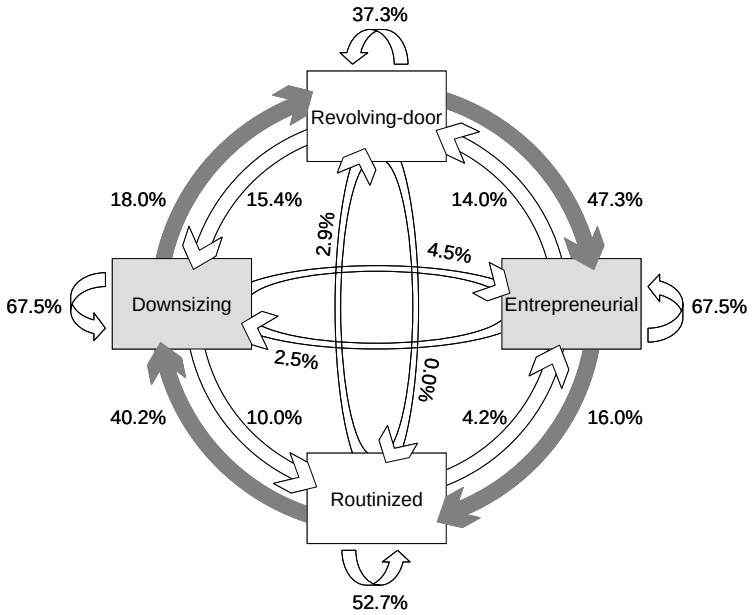

Figure 11.8: Transitions of growth regime types

Obviously, a typical development cycle for the regional growth regime can be identified. According to this typical development pattern it takes considerable time until a high level of start-up activity results in above-average growth. Therefore, the revolving-door regime leads the way of an entrepreneurial regime. Since an entrepreneurial regime which is characterized by an above-average level of new business formation and economic growth is the most likely development stage following a revolving door regime suggests that the positive effects of start-ups last somewhat

longer than the ten year period that was found in the analysis of Fritsch and Mueller (2004). If the regional level of new business formation falls below the average growth rates may still be relatively high for some time. However, soon these late benefits of earlier start-up activity will fade away and the region becomes a downsizing regime. In this situation regional growth can be revitalized by means of increasing new business formation activity, which appears to be of crucial importance for securing long term economic prosperity in a region.

6. Conclusions

We found considerable differences of regional start-up rates and it is quite likely that these differences have consequences for regional development, albeit in the long run. The level of regional new business formation activity shows a pronounced path dependency and persistence over time. Regions with relatively high rates of new business formation in the past are likely to experience a correspondingly high level of start-ups in the future. Accordingly, regions with a low level of new businesses today can be expected to have only relatively few start-ups in the near future. As far as changes in the level of regional start-up activity do occur, they emerge over quite a long period of time, and in most cases they are rather small. This high degree of persistence suggests that there are only weak prospects for rapid change with regard to regional new business formation activity. Therefore, a policy that is aiming at stimulating the regional level of entrepreneurship needs patience and a long-term orientation.

Patience and long-term orientation are also needed with regard to the growth-enhancing effects of new business formation. Our analysis of the transition of regional growth regimes suggests that these effects occur only in the long run and that the relevant time-lags may be even longer than what was found in the analyses of Fritsch and Mueller (2004), van Stel and Storey (2004) and Baptista, Escária and Madrugo (2005). We found typical transitions between the different types of growth regimes that do suggest some kind of life-cycle approach to regional development with regard to new firm formation; namely from revolving-door to entrepreneurial to routinized to downsizing.

Our analysis shows that some regions succeeded in considerably increasing the level of entrepreneurship during the period under inspection. However, in other regions start-up rates are fairly constant over a long period of time. This leads us to the question of what are the most promising ways of stimulating regional entrepreneurship? Fritsch and Mueller (2005b) found that innovation activities and the entrepreneurial climate play a crucial role in this respect. This suggests that innovation and entrepreneurial climate could serve as appropriate starting points for a policy that aims at promoting regional

entrepreneurship. Further research should try to identify suitable instruments of such a policy.

References

Audretsch, David B., 1995, *Innovation and Industry Evolution*. Cambridge: MIT Press.

Audretsch, David B. and Michael Fritsch, 1994, On the Measurement of Entry Rates. *Empirica*, 21, 105-113.

Audretsch, David B. and Michael Fritsch, 2002, Growth Regimes over Time and Space. *Regional Studies*, 36, 113-124.

Baptista, Rui, Victor Escária and Paulo Madrugo, 2005, *Entrepreneurship, Regional Development and Job Creation: the Case of Portugal*. Papers on Entrepreneurship, Growth and Public Policy 06-2005, Max-Planck Institute for Economics, Jena, Germany.

Bundesamt für Bauwesen und Raumordnung (BBR), 2003, *Aktuelle Daten zur Entwicklung der Städte, Kreise und Gemeinden*, Band 17. Bonn.

Beesley, Michael Edwin and Robert T. Hamilton, 1984, Small firms' seedbed role and the concept of turbulence. *Journal of Industrial Economics*, 33, 217-231.

Brixy, Udo and Reinhold Grotz, 2004, Differences of the economic performance of newly founded firms in West- and East Germany. In: Michael Dowling, Jürgen Schmude and Dodo zu Knyphausen-Aufsess (Eds.), *Advances in Interdisciplinary European Entrepreneurship Research*. Muenster: Lit, 143-152.

Carree, Martin A. and A. Roy Thurik, 2003, The Impact of Entrepreneurship on Economic Growth. In: Zoltan A. Acs and David B. Audretsch (Eds.), *Handbook of Entrepreneurship Research*. Boston: Kluwer, 437-471.

Cooper, Arnold and William C. Dunkelberg, 1987,, Entrepreneurial Research: Old Questions, New Answers and Methodological Issues. *American Journal of Small Business*, 11, 11-23.

Fritsch, Michael, 2004, Entrepreneurship, Entry and Performance of New Businesses Compared in two Growth Regimes: East and West Germany. *Journal of Evolutionary Economics*, 14, 525-542.

Fritsch, Michael and Reinhold Grotz, 2002, *Das Gründungsgeschehen in Deutschland - Darstellung und Vergleich der Datenquellen (New Firm Formation in Germany – Exposition and Comparison of Data Sources)*. Heidelberg: Physica.

Fritsch, Michael and Udo Brixy, 2004, The Establishment File of the German Social Insurance Statistics. *Schmollers Jahrbuch / Journal of Applied Social Science Studies*, 124, 183-190.

Fritsch. Michael and Reinhold Grotz, 2004, *Empirische Analysen des Gründungsgeschehens in Deutschland (Empirical Analyses of New Firm Formation Processes in Germany)*. Heidelberg: Physica.

Fritsch, Michael and Pamela Mueller, 2004, The Effects of New Business Formation on Regional Development over Time. *Regional Studies*, 38, 961-975.

Fritsch, Michael and Pamela Mueller, 2005a, Regional Growth Regimes Revisited, – The Case of West Germany. In: Michael Dowling, Jürgen Schmude and Dodo von Knyphausen-Aufsess (Eds.), *Advances in Interdisciplinary European Entrepreneurship Research,* Vol. II, Muenster: Lit, 251-273.

Fritsch, Michael and Pamela Mueller, 2005b, How Persistent are Regional Start-up Rates? An Empirical Analysis. In: Vining, G.T. and R.C.W. van der Voort (Eds.), *The Emergence of Entrepreneurial Economics.* Amsterdam: Elsevier Science (forthcoming).

Fritsch, Michael and Pamela Mueller, 2005c, *The Persistence of Regional New Business Formation-Activity over Time – Assessing the Potential of Policy Promotion Programs*, Paper on Entrepreneurship, Growth and Public Policy, 02/2005, Max Planck Institute of Economics, Jena.

Gudgin, Graham, 1978, *Industrial Location Processes and Regional Employment Growth*. Westmead: Saxon House.

Marsili, Orietta (2002): Technological Regimes and Sources of Entrepreneurship. *Small Business Economics*, 19, 217-215.

Mueller, Eva and James N. Morgan, 1962, Location Decisions of Manufacturers. *American Economic Review*, 52, 204-217.

Mueller, Pamela, 2005, *Entrepreneurship in the Region: Breeding Ground for Nascent Entrepreneurs?* Working Paper 05/2005, Faculty of Economics and Business Administration, Technical Universiy Freiberg.

Scarpetta, Stefano, 2003, *The Sources of Economic Growth in OECD Countries*. Paris: OECD.

Van Stel, Andre and David Storey, 2004, The Link Between Firm Births and Job Creation: Is there a Upas Tree Effect? *Regional Studies*, 38, 893-909.

Wagner, Joachim, 2004, Are Young and Small Firms Hothouses for Nascent Entrepreneurs? *Applied Economics Quarterly*, 55.

Winter, Sidney G., 1984, Schumpeterian Competition in Alternative Technological Regimes. *Journal of Economic Behavior and Organization*, 5, 287-320.

Appendix

Table 11.A1: Correlation matrix of yearly start-up rates 1984-2002

	Start-up rate of year																	
	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985
2001	0.92																	
2000	0.96	0.92																
1999	0.93	0.90	0.97															
1998	0.94	0.89	0.94	0.94														
1997	0.95	0.92	0.95	0.93	0.95													
1996	0.95	0.91	0.96	0.95	0.96	0.96												
1995	0.92	0.88	0.92	0.93	0.95	0.95	0.97											
1994	0.91	0.88	0.92	0.93	0.95	0.95	0.96	0.98										
1993	0.92	0.89	0.93	0.94	0.94	0.96	0.96	0.97	0.97									
1992	0.82	0.88	0.92	0.92	0.95	0.95	0.95	0.96	0.95	0.96								
1991	0.90	0.86	0.89	0.89	0.93	0.92	0.93	0.94	0.93	0.94	0.95							
1990	0.86	0.82	0.88	0.86	0.89	0.90	0.90	0.92	0.91	0.93	0.96	0.91						
1989	0.90	0.86	0.90	0.90	0.93	0.92	0.93	0.93	0.93	0.94	0.97	0.95	0.95					
1988	0.88	0.82	0.86	0.85	0.90	0.88	0.89	0.88	0.88	0.89	0.95	0.93	0.91	0.96				
1987	0.87	0.84	0.88	0.87	0.92	0.90	0.91	0.92	0.91	0.92	0.96	0.94	0.93	0.97	0.95			
1986	0.81	0.76	0.81	0.81	0.88	0.84	0.86	0.88	0.86	0.86	0.92	0.88	0.92	0.94	0.92	0.95		
1985	0.82	0.79	0.84	0.84	0.89	0.87	0.88	0.91	0.90	0.89	0.95	0.91	0.93	0.95	0.92	0.96	0.96	
1984	0.84	0.80	0.86	0.87	0.91	0.88	0.90	0.93	0.91	0.91	0.94	0.92	0.90	0.94	0.89	0.95	0.93	0.97

All coefficients significant at 1%-level.

Table 11.A2: Growth regime types

name of planning region	number of region	1984-1992	1988-1997	1993-2002
Schleswig-Holstein Nord	1	RD	E	E
Schleswig-Holstein Sued-West	2	RD	E	RD
Schleswig-Holstein Mitte	3	RD	RD	RD
Sshleswig-Holstein Ost	4	RD	E	RD
Schleswig-Holstein Sued	5	E	E	E
Hamburg	6	D	D	R
Bremen	11	D	D	D
Ost-Friesland	12	RD	E	E
Bremerhaven	13	RD	RD	D
Hamburg-Umland-Sued	14	E	E	E
Bremen-Umland	15	E	E	E
Oldenburg	16	E	E	E
Emsland	17	E	E	E
Osnabrueck	18	E	E	R
Hannover	19	D	E	E
Suedheide	20	RD	E	RD
Lueneburg	21	E	E	RD
Braunschweig	22	D	D	D
Hildesheim	23	D	RD	D
Goettingen	24	R	R	D
Muenster	35	E	E	E
Bielefeld	36	R	R	D
Paderborn	37	E	R	R
Arnsberg	38	E	E	R
Dortmund	39	D	D	D
Emscher-Lippe	40	D	RD	D
Duisburg/Essen	41	D	D	D
Duesseldorf	42	D	D	D
Bochum/Hagen	43	D	D	D
Koeln	44	D	D	E
Aachen	45	RD	RD	E
Bonn	46	RD	E	E
Siegen	47	D	D	D
Nordhessen	48	R	D	D
Mittelhessen	49	R	D	RD
Osthessen	50	R	R	D
Rhein-Main	51	R	RD	E
Starkenburg	52	E	D	RD
Mittelrhein-Westerwald	62	E	E	E
Trier	63	RD	E	E

Continuation *table 11.A2*:

name of planning region	number of region	1984-1992	1988-1997	1993-2002
Rheinhessen-Nahe	64	RD	RD	E
Westpfalz	65	D	RD	RD
Rheinpfalz	66	RD	D	RD
Saar	67	D	RD	E
Unterer Neckar	68	D	D	R
Franken	69	E	R	R
Mittlerer Oberrhein	70	R	D	R
Nordschwarzwald	71	R	D	D
Stuttgart	72	R	D	D
Ostwuerttemberg	73	R	D	D
Donau-Iller (Ba-Wü)	74	R	D	R
Neckar-Alb	75	D	D	D
Schwarzwald-Baar-Heuberg	76	D	D	R
Südlicher Oberrhein	77	E	E	E
Hochrhein-Bodensee	78	RD	RD	RD
Bodensee-Oberschwaben	79	E	E	RD
Bayerischer Untermain	80	D	D	E
Wuerzburg	81	R	R	E
Main-Rhoen	82	R	R	R
Oberfranken-West	83	R	R	D
Oberfranken-Ost	84	D	D	D
Oberpfalz-Nord	85	R	R	D
Industrieregion Mittelfranken	86	D	D	D
Westmittelfranken	87	E	R	R
Augsburg	88	R	D	D
Ingolstadt	89	R	R	R
Regensburg	90	E	R	R
Donau-Wald	91	E	E	RD
Landshut	92	E	E	E
Muenchen	93	RD	RD	E
Donau-Iller (BY)	94	RD	E	R
Allgaeu	95	RD	RD	RD
Oberland	96	RD	E	RD
Suedostoberbayern	97	E	E	E

E = Entrepreneurial, R = Routinized, D = Downsizing, RD = Revolving door.